

# **Social influences as risk factors for internet gaming disorder**

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*This thesis is submitted in partial fulfilment of the Honours Degree of the Bachelor of  
Psychological Science*

School of Psychology

University of Adelaide

March 2019

Word Count: 8987 words

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## **Abstract**

The rise of the internet and online video gaming has led to some individuals becoming over invested in gaming. In some cases this may lead to the development of Internet Gaming Disorder (IGD). Current addiction models have focused on examining individual risk factors related to problematic gaming. However an area that has received less attention is social influences on problematic gaming. Video gaming has become a highly social activity and preliminary research suggests the social features of games may change problem gaming behaviours. This study aimed to examine social influences related to the risk of IGD for young adults. It also explored whether social influences could be contributing to increased game-related spending. An online questionnaire was completed by 374 young adults through internet gaming forums. Participants were required to answer questions about their own and their friends' video game playing, spending habits and engagement with other social influences, such as internet streamers. Three psychological measures measuring impulsivity, psychological distress and IGD were included in the survey. The results demonstrated there were modest relationships between social influences, spending, and IGD symptoms. Problem gamers were found to report significantly more social engagement, such as watching streamer content. Significant links were found between certain types of video game spending, for example monthly purchasing of loot boxes and meeting the criteria for IGD. The findings are discussed in terms of their implications for different sub-types of problem gamers and highlight future directions for addiction research.

### **Declaration**

This thesis contains no material which has been accepted for the award of any other degree or diploma in any University, and, to the best of my knowledge, this thesis contains no materials previously published except where due reference is made. I give consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

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March, 2019



## **Acknowledgments**

First and foremost, I would like to thank my supervisor Daniel King for his patient and thoughtful guidance throughout the process of writing this thesis. Your expertise and encouragement was extremely helpful, for which I extend my deepest gratitude.

My thanks also go to my family and friends for their support throughout the year. To Emma, for cheering me along every step of the way and a special thanks to my brother Tom, for your reassurance and crash course in SPS

## **Chapter 1: Introduction**

### **1.1 Video Gaming**

The rise of technology and the internet has led to an increased ownership and accessibility of electronic devices. The introduction of online connectivity, social media platform integration, monetisation of virtual goods, introduction of gambling-like elements in game design, hardware portability and greater uptake of smartphones as a gaming platform has seen us immerse ourselves with online gaming (King, 2018). This engagement has transformed the video gaming market significantly. Video game use has also greatly increased, particularly among adolescents and young adults that typically fall within the age range of 13-25 years (Griffiths et al., 2014). Data collected in 2018 by Digital Australia found 97% of Australian homes with children have video games, 60% of households have five or more screens and 80% of gaming households have more than one gaming device platform (Brand et al., 2017).

The term 'video game' broadly refers to an interactive playable form of digital entertainment (Esposito, 2005). Modern gaming is designed to provide a range of psychological experiences for the player and gaming technologies are highly varied to support different types of gaming experiences (Hamari & Keronen, 2017). The majority of video gaming activities have some kind of substantial skill-based or tactical element to them that can largely determine the outcomes of the game (King, 2018). The styles and types of video games being developed are essentially endless, now appealing to a larger market of individuals.

## 1.2 Problem Gaming

Since gaming has become easier to access and more immersive than ever before, there are some serious concerns over the amount of time people are spending playing video games. There has been little doubt that particularly for a number of children and adolescents, video games take up a large amount of their time and some individuals appear to be addicted to them (Griffiths & Wood., 2000; Saunders et al., 2017). It is also considered that students may be at a particularly high risk for internet gaming problems due to their accessibility, knowledge on technology and flexible timetables (Moore, 1995). Since the fifth edition of the Diagnostic and Statistical Manual of mental disorders (DSM-5) was released, Internet Gaming Disorder (IGD) is now listed under the section of disorders that requires additional scientific research (APA, 2013). IGD is defined in the DSM-5 as a ‘persistent and recurrent use of the Internet to engage in games, often with other players, leading to impairment or clinically significant distress’ (APA, 2013, pp. 795). There are a number of symptoms listed, for example withdrawal symptoms when online gaming is withheld and excessive use of online games despite being aware of psychosocial problems. (APA, 2013). A gamer must fulfil at least five of the IGD symptoms listed in the criteria over the last 12 months to be considered a problem gamer.

If problem gaming can be seen as an unhealthy investment in video-gaming, it is important to try understand what the risk factors are that are causing individuals to become overly invested in video games. Risk factors are considered to be influences that can predict who is more likely to become ‘addicted’ and develop IGD (Liau et al., 2015). Vulnerable characteristic traits such as mental health issues and high impulsivity have been looked at in the literature as individual risk factors, as current addiction models suggest that problematic gamers tend to have difficulties with impulsivity due to the short-term benefits in-game

purchases provide (Brand et al, 2016; Dong & Potenza, 2014). However it could be the case that it is not just individual characteristics that are related to problematic gaming.

Over time it has been well documented gaming is no longer played in isolation and that many individuals play video games socially (Amialchuk & Kotalik, 2016; Phillips et al., 1995; Kubey & Larson, 1990). An area that has received less attention is the effect of social influences on problematic gaming. Therefore, this study will address the gap in the literature by examining social influences related to the risk of IGD for young adults. The study will also explore whether social influences could be contributing to increased gaming-related spending, as it has been suggested that it is driving individuals to become more invested in their video gaming (Balakrishnam & Griffiths, 2018; Wang et al., 2014).

### **1.3 Social Integration into Gaming**

One of the new ways gaming has become highly social is the integration of social media and video gaming. The explosion of online gaming has enabled many types of online video games to integrate or link their game with social media platforms such as on the social media site *Facebook*. This genre of online gaming has been labelled ‘social networking games’ (SNGs) (Groves et al., 2014). Having the connection through social media platforms opens the door to a large social aspect of gaming that was not possible before integration. Playing these games on a social media platform allows for players to share their game activities and invite more friends to join and play with them (King, 2018).

Research indicates compared to the general population, teenagers and tertiary students make the most of social networking sites and therefore dominate the playing of SNGs (Griffiths et al., 2014). As of 2015, Nielsen Online data reported 1.49 million Australian youths (up to 17 years old) were online in 2015 and 70% accessed social media and/or online games on social media platforms. The integration of online gaming and social media could be

concerning as studies have found the combination of reward and social aspects that encourage game play could lead to it becoming extreme and possibly problematic (Groves et al., 2014). It was also found there were numerous psychologically motivating situations that encouraged players to come back and play at times that could be considered unsuitable within the context of their everyday life and obligations. (Groves et al., 2014). This could be an indication that the social integration of gaming is contributing to the risk of problematic video gaming.

#### **1.4 Developments in Microtransaction Spending**

With the rise of ways to game and their general accessibility, there have also been major developments in online gaming tactics by game developers to make players feel more invested, play for longer and to spend more money.

A recent development in the gaming industry is the introduction of monetisation features (Hamari & Keronen, 2017). These come in the form of small in-game purchases, known as microtransactions (Evers et al., 2015). Microtransactions were first introduced in games that are referred to as ‘free-to-play’ games (Tomic, 2017). These are games where the players do not have to spend any money on the game initially, but optional small purchases within the game help game progress or add to visual aesthetics (Hamari et al., 2017).

The eSafety Commissioner reported in 2018 about a third of young Australians have made in-game purchases playing online games within the last 12 months (eSafety Commissioner, 2018). This kind of spending has allowed for the gaming industry to boom off these typically small in-game purchases. It was reported that that free-to-play games made more than \$82 billion dollars in revenue in 2017 (SuperData Research, 2017).

Microtransactions within free-to-play games can be broken down into three major categories: virtual currency, pay-to-win ‘unlocks’ and visual customisation ‘cosmetics’.

Virtual currency can be described as ‘unregulated digital money’ which is supplied and controlled by the game developers as a payment method within that given game (Tomic, 2017). Pay-to-win, or unlocks are when an individual makes a microtransaction to progress further in the game, such as paying to bypass a level or to unlock a video character that would usually take playing time to unlock (Dreier et al., 2017). Cosmetic microtransactions comprise virtual goods such as clothing, hairstyles for virtual characters as well as items such as home decoration for virtual homes (Wohn, 2014). Unlike most other microtransactions, cosmetic items usually serve no advantage to progressing in the game and are bought purely based on aesthetics.

The nature of microtransactions is controversial, as developing research and evidence from clinical case reports are starting to demonstrate financial dangers of microtransaction purchasing (Gainsbury et al., 2017; Wohl et al., 2017; Teichert et al., 2017). Purchasing is made difficult to resist for gamers, as gaming companies have been known to manipulate the nature and presentation of microtransaction offers depending on the player and their gaming/spending habits (Ernst, 2013; Kalhour & Ng, 2016; King & Delfabbro, 2018). Although not a causal relationship, Dreier’s 2017 study found the prevalence of problem gaming symptoms in young people were higher among those who had spent money on free-to-play-games than those who had not. This is concerning, as it suggests spending on microtransactions could be linked to problem gaming.

### **1.5 Motivations for Spending**

The literature has determined several motivations for gaming related spending, such as a desire to relieve stress, increase game enjoyment and to avoid waiting for or earning game credits (Gainsbury et al., 2016; Hamari, 2015). Social motivations are also considered

to be a key category for buying in-game items and other virtual goods (Lehdonvirta, 2009; Hamari et al., 2016).

It is also argued the way microtransactions are presented in games could be causing an over-investment in gaming to motivate this spending. It has been observed many of the free-to-play games mask or withhold the true-term price of the activities within the game until the players are already invested, both financially and psychologically (King & Delfabbro, 2018). It has been considered exploitative this model encourages players to invest in the game and then uses this investment to encourage the purchases of in-game features (Hayes, 2008; Groves et al., 2014).

The desire to spend money on microtransactions after becoming psychologically committed to the game can be potentially traced back to a process known as the *sunk cost effect*. The sunk cost effect is one's justification to maintain one's investment based on previous investment in the activity (Garland, 1990). If a player has already invested time and energy into playing a video game, they may then use this to then justify why they should spend money on microtransactions for a game they initially paid nothing for. The more engagement in the game, the more this will increase the possibility of making purchases related to the game (Drell, 2013).

## **1.6 Similarities between Gaming and Gambling**

Another issue that has been raised with the rise of online social gaming and microtransactions is the similarities between some structures of video games and gambling. The similarity between the two activities is concerning, as it is a proposed risk that gambling features in video games may make video gaming more addictive for some users. (King, 2018). This could increase the rate of problematic involvement in video gaming irrespective of gambling participation. In recent years, many video games have simulated gambling in a

number of ways and among SNGs there are many games that have gambling like elements to them, accessible to players of all ages (Griffiths, Derevensky & Parke, 2011; Griffiths, Derevensky & Parke, 2012; King Delfabbro & Griffiths, 2010; Griffiths, 2015).

Another major convergence between gambling and gaming has been the introduction of loot boxes. A loot box is a recent form of microtransaction which refers to an in-game prize system that can be bought with real currency to acquire a random virtual item from a larger assortment of virtual items (Drummond & Sauer, 2018). As there is a low probability of winning certain items, it usually means an individual would need to make numerous loot box purchases to get a particular item they want (Baglin, 2017). This concept has been considered psychologically similar to gambling slot machines or scratch-cards, as it is an activity that requires no skill and delivers a randomly determined outcome (King, 2018).

The introduction of skins and skin gambling is also being considered problematic. Skins are in-game cosmetic items usually obtained through opening loot boxes (Macey & Hamari, 2018a). As skins often have a real-world monetary value, people have begun to gamble with them in ways such as replacing real world currency with skins as stakes or using them to bet on eSports matches (Macey & Hamari, 2018a). Skin lotteries have also become a popular way to gamble, skins are again used as stakes where the higher a player's skin stake is, the higher their chance of winning the total pot (Grove, 2016).

A major point of concern is that there is no age restriction for buying skins and they are often very easy to purchase through payment means available to young people such as gift cards and vouchers (King, 2018). This has raised legal concerns over these kinds of activities in the context of underage betting and gambling (Hardenstein, 2017; Holden et al., 2017; Schneider, 2015). It is also proposed, just like real-life gambling, the introduction of these kinds of gambling features in video games could allow the activity of video gaming to



become even more immersive and addictive for some users, regardless of their gambling participation.

### **1.7 Streamers and Youtube Personalities Influence**

A key social influence that could be affecting spending and problem gaming is online 'streamers'. Popular online broadcasting services such as *Twitch* and *Youtube* have seen a new market of content creators emerge. These streamers have begun to make money through providing personalised online content centred around their own gaming experiences. (King, 2018). They are often in their early 20s for example Felix Kjellberg or PewDiePie and therefore reach out to a youthful audience through these platforms (King, 2018). They also have extremely regular posting schedules to satisfy their audience and some streamers have been known to stream for periods of 24 hours or longer at a time (Holden et al., 2018).

There is currently limited research on the effect of the streamer/gamer relationship and how it relates to problem gaming. However, it could be considered problematic if they encourage excessive game play, microtransaction spending and participation in gambling-like video game related activities. This could be contributing to individuals becoming overly invested in video gaming, increasing the risk of problem gaming.

### **1.8 Esports Events and Betting Influence**

A further social influence which could be contributing to an over investment in video games comes in the form of eSport events. eSports can be defined as competitive gaming on an extremely large, international scale (Macey & Hamari, 2018). The rapid rise of eSports globally has also facilitated the growth and popularity of betting on eSports events (Hardenstein, 2017; Holden & Ehrlich, 2017; Schneider, 2015). Again the youth have been the major target for these events and it is indicated there is a large underage viewership.

(Statista.com). As eSports is a new addition to the gaming world, research on its' relationship with spending and problem gaming is relatively unknown. This study proposes the constant exposure to streamers and participating in either viewing or betting on eSport events could be a risk factor to developing problem gaming due to the continuous immersion in video gaming.

## **1.9 Peer Influence**

There is limited research that has examined the influence of peer relationships on an individual's own gaming participation and spending. However more broadly it has been determined that relationships and a sense of belonging to peer groups are considered to be centrally important to young people, as the peer group can serve as a model influencing behaviours and attitudes (Glaser et al, 2010). It has also been found that peers can strongly determine personal preferences of their friends and influence the way they choose to dress and speak, the use of illicit substances, anti-social behaviours and other areas of an individual's life (Padila et al, 2009). Evidence has also supported that peers have a direct influence on adolescents' risk behaviours (Tome, 2012). This raises the possibility that peers who exhibit risky video game and spending behaviour may also encourage their friends' own playing and spending behaviour.

Many video games such as MMORPGs (massively multiplayer online role-playing game) are found to be high socially interactive environments (Cole & Griffiths, 2007). The eSafety Commissioner (2018) report stated that 81% of Australian young people have played an online game and 64% played with others (i.e. friends and strangers) over the last 12 months. This social side to gaming may confer some benefits to players, but could also be contributing to the over investment in video games that is present among some problem gamers. Online gaming with friends can cause players to feel socially obligated to play regularly in teams online or to commit to playing video games for large periods of time

before there is a group consensus among the friends to stop playing (King, 2018). There is evidence supporting the notion that adolescents who leave social activities early or before others may even feel guilt due to the social pressure, repercussions and/or fear of missing out on the experience (Przybylski et al., 2013). A recent study on peer influence among adolescents found that the amount of time school peers spent playing video games significantly affected the participant's own time playing video games (Amialchuk & Kotalik, 2016).

It has been found that not only do peers influence the frequency of an individual's gaming, but also influence their gaming related spending. A 2014 study on purchasing patterns of virtual goods in a particular social game online found social influences were strongly linked to whether a gamer spent on the game or not. The study showed having more friends playing the game increased the chances of making purchases (Wohn, 2014). This suggests there is something about the social experience of playing video games that is encouraging players to spend.

### **1.10 Mental Health and Gaming**

There is a consensus in the literature that supports the notion of poor mental health being a potential risk factor for internet gaming disorder (Lemmens et al., 2015; Kim et al., 2016; Laconi et al., 2017). Past research has established that gaming experiences influence cognition and emotion in a multitude of ways (West & Bailey, 2013). A growing number of clinical research studies have found correlations between gaming abuse/overuse and disorders like addiction, anxiety, depression and psychosis (Kardaras, 2016). It has also been found that those with IGD have more depressive symptoms compared to non-problematic gamers and that depressive symptoms were significant predictors of IGD (Gentile et al., 2011; Mentzoni et al., 2011). Similarly, the 2015 Australian Child and Adolescent survey of

Mental Health and Wellbeing found IGD was more prevalent among youth with mental disorders (Lawrence et al., 2015).

Although it is hard to say whether mental illness is contributing to problem gaming or if individuals with mental illness may be more likely to game or develop IGD, it is safe to assume there is a relationship between them and that mental illness can be considered a potential risk factor for IGD.

### **1.11 Impulsivity and Gaming**

A growing body of literature is supporting the notion that impulsivity could be a potential risk factor for excessive spending and problem gaming. Strong links in the literature have been made between impulsivity and gambling (Kim et al., 2018; Bailey et al., 2013; Derevensky & Vitaro, 2014). Due to the similarities between some forms of gaming and gambling, it is argued impulsivity may also be a risk factor for gaming. In addition it has also been found that a psychological protective factor identified in relation to youth problem gaming is low impulsivity, further supporting the notion high impulsivity could be related to problem gaming (Muller et al., 2014; Walther et al., 2012). Impulsivity does not just affect gaming frequency, but also spending as from a psychological perspective, studies have also been carried out looking into online purchasing behaviour in terms of impulsive and compulsive actions too (Dittmar et al., 2007; Greenfield, 1999; Maraz et al., 2016). In a recent study social casino gamers who make microtransaction purchases reported significantly higher levels of impulsivity (Kim et al., 2017). Impulsivity is therefore being considered a potential risk factor for IGD.

## **1.12 Study Aims**

This study aims to address the gap in the literature by examining social influences related to the risk of IGD for young adults. It will also explore whether social influences could be contributing to increased microtransaction spending. As there is evidence behind the risk factors of impulsivity and mental health, two psychological measures will be included in the study to assess how the participants score for two predetermined risk factors for problem gaming.

The hypotheses for the current study are:

Hypothesis 1: In game spending and time spent playing will be positively related to meeting the criteria for IGD.

Hypothesis 2: Peer spending on microtransactions will have a positive correlation with participant self-spending on microtransactions

Hypothesis 3: Greater engagement with streamers and eSports will be positively related to meeting the criteria for IGD.

Hypothesis 4: Psychological distress and impulsivity will be significant predictors for meeting the criteria for IGD.

## Chapter 2: Method

### 2.1 Participants.

The present study was comprised of two major data collection efforts. Initially this project was conceived as a survey for adolescent aged participants. Seven different private schools, both co-education and single sex education were contacted and frequent communication over several weeks was made. (Correspondence letter found under appendix A). However, all but one of the schools declined to participate in the study due to the timing of the school year finishing. The one school that did participate administered the online survey to students from year 7 through to year 12. (Appendix D). An information sheet on the survey also went home to parents (Appendix B) The questionnaire yielded 81 responses. It was determined this was not a large enough sample to produce meaningful results for the study, which led to the presented methodology of recruiting for young adults instead.

The second recruitment strategy was to survey young adults from an online gaming forum. There were 623 responses to version 2 of the questionnaire administered to young adults online. There was a total of 374 completed responses after removing responses that were incomplete, outliers or did not meet the eligibility criteria. The eligibility criteria required to participate in the study were that participants must have an internet connection and be between (the young adult age range) of 18-25 years old. The demographic characteristics of the sample are provided in Table 1.

### 2.2. Sampling Procedure

The sample was recruited through social media posts on the online website *Reddit*. These announcement posts were made across gaming related sub-reddits and displayed on the

following sub-reddits webpages: r/gaming, r/playstation, r/Steam, r/FORTnITE, r/WOW, r/Games, r/pcgaming, r/pcmasterrace, r/XboxOne r/leagueoflegends, r/MMORPG and r/PUBATTLEGROUNDS. The post, (Appendix E) contained a hyperlink to the information sheet and survey, a brief overview of the study and the eligibility criteria. Participants were also made aware of the option to leave an email address to enter a draw to win a \$50 Steam voucher as reimbursement for their time and effort. The study was available online to the *Reddit* community from December 5<sup>th</sup> 2018 to January 8th, 2019.

### **2.3. Study Design**

The survey was completed online on the internet survey website, *SurveyMonkey*. The survey required participants to answer questions that measured basic demographic information, video game playing habits and microtransaction spending. The next section required participants to answer questions that measured their closest friends' video game playing habits and microtransaction spending. The final section of the survey was made up of three psychological scales to measure impulsivity, psychological distress and IGD.

### **2.4. Survey Measures**

#### **2.4.1 Demographics and Video Game Experience/Spending**

Participants were asked questions that requested demographic information such as their age, sex, employment status and household environment. General questions about video game playing tendencies such as frequency of play, number of devices played on etc were also assessed. Questions covering viewership of eSports, online streamers, loot boxes, skin gambling participation, spending method and money spent on microtransactions were also included. Participants were then asked a very similar set of questions in relation to their 7 closest friends' video gaming and spending habits. (See Appendix G for full item list).

#### 2.4.2. Barratt Impulsiveness Scale-Brief (BIS-Brief)

This inventory developed by Steinberg, Sharp, Stanford & Tharp (2013) is a shortened 8-item self-report measure to quantify impulsivity. Questions include ‘I act on the spur of the moment’, and ‘I plan tasks carefully’. All items are measured on a 4-point scale: of 1 = (*rarely/never*), 2 = (*occasionally*), 3 = (*often*), and 4 (*almost always*). Four of the questions are reverse ranked. The scores are summed to a total ranging between 8 and 32. Participants scoring low numbers were likely to be less impulsive.

#### 2.4.3. Kessler Psychological Distress Scale (K10)

This inventory developed by Kessler (2001) is a 10-item self-report measure of psychological distress based on questions about anxiety and depressive symptoms. The scale requires the person to reflect what they have experienced in the recent 4-week period. Questions include *about how often do you feel-* ‘...so restless you could not sit still?’ and ‘..that everything was an effort?’ All items are measured on a scale of 1 = (*none of the time*), 2 = (*a little of the time*), 3 = (*some of the time*), 4 = (*most of the time*), to 5 = (*all of the time*). The scores are summed to a total ranging between 10 and 50. Scores under 20 are unlikely to be experiencing psychological distress. Scores between 20-24 are likely to be experiencing a mild level of psychological distress. Scores between 25-29 are likely to be experiencing a moderate level of psychological distress. Scores 30 and over are likely to be experiencing a severe level of psychological distress.

#### 2.4.4 Internet Gaming Disorder Scale-Short-Form (IGDS9-SF)

This inventory developed by Pontes & Griffiths (2015) is a shortened 9-item self-report measure of gaming activity during the past 12 months which attempts to measure Internet Gaming Disorder. Questions include ‘were you unable to reduce your time playing



games, after others had repeatedly told you to play less?’ and ‘have you hidden the time you spend on games from others?’ According to the *DSM-5*, IGD is present when a person meets five (or more) of the nine criteria during a period of 12 months (APA, 2013). Every item on the IGD scale was preceded by this statement: “During the last 12 months . . .” The participants received a dichotomous scale, so they were therefore required to rate all items with either *no* = (0) or *yes* = (1). For analyses of the dichotomous scale, all individual *yes* answers range: 0–27.

## **2.5 Procedure**

### **2.5.1 Information, Consent and Questionnaire**

The information sheet (Appendix F) detailed the inclusion and exclusion criteria, information on the study and contact details of the researcher, supervisor and ethics committee. Participants were required to tick a box that indicated they had read the information sheet and give their consent before being able to participate in the study.

Once providing informed consent, participants were able to begin the 33 question online survey. Every question required an answer. Once the participants had finished the study they had the option of leaving their email address to enter the draw for the voucher.

## Chapter 3. Results

### 3.1 Analytical Procedures

Statistical analysis for this study was conducted using SPSS Statistics 25. The first stage of the data analysis was to screen the young adult data sample. All outliers and responses under 50% completed were removed. This took the data sample size from 623 responses to 374 responses. Several worded questions were coded to numerical responses. Total scores for the psychological measures were also summed.

Descriptive statistics were then generated to examine the central tendencies and present an overall summary of the data. Normality testing of variable distributions was checked prior to running inferential statistics. The principal hypotheses were investigated using independent samples t-test to compare mean differences of problem gamers and non problem gamers and Pearson's  $r$  was used to examine the relationship between variables. For hypothesis 4, multiple regression was run to determine the predictive power of the sample's impulsivity and mental health for problem gaming.

### 3.2 Descriptive Statistics

#### 3.2.1 Descriptive Statistics from Survey Version 1

Although the main focus of this study moved from adolescents to young adults, version 1 of the survey produced some interesting preliminary findings worth noting. The sample was made up of adolescents from year 7 through to year 12 (13-18 years old). From the 81 responses, it was found among the (45.2%) male and (54.8%) female, that 61.9% of the students owned 3 or more video games and almost half (42.8%) had spent money on microtransactions over the last 6 months. This demonstrates microtransaction spending is

occurring among young people and future studies should look to investigate this further with a larger sample.

Table 1: *Demographic Characteristics of the Current Study Sample*

Characteristic	Participants	
	<i>N</i>	%
<b>Gender</b>		
Male	344	92
Female	24	6.4
Other	6	1.6
<b>Age</b>		
18	25	6.7
19	22	5.9
20	22	5.9
21	39	10.4
22	48	12.8
23	52	13.9
24	67	17.9
25	99	26.5
<b>Household environment</b>		
Live at home with parents/guardian	210	56.1
Live out of home with roommates	55	14.7
Live out of home alone	65	17.4
Other	44	11.8
<b>Employment status</b>		
Employed (Full time)	134	35.8
Employed (Casual)	64	17.1
Student	161	43
Unemployed	53	14.2
Other	17	4.5

### 3.2.2 Video Game Self-Reported Measures

The majority of participants (N = 199, 52.9%) reported owning or having access to over 3 different gaming devices. The PC computer was the most popular device to play video games on. The sample reported they play for an average of 31.48 hours per week with an average of 4.51 hours per day. The smartphone followed, as the sample reported they play an average of 12.23 hours per week for an average of 1.75 hours a day. Gaming consoles (i.e. PlayStation) were third, as the sample reported they play an average of 10.84 hours per week with an average of 1.5 hours per day. The tablet device was the least popular out of the four devices for gaming, as the sample reported they play for an average of 7.59 hours per week with an average of 1.08 hours per day. The most popular day of the week reported for playing video games was Saturday. More than half of the participants (N= 214, 57.2%) reported they play on their PC computer for 5+ hours on a Saturday.

### 3.2.3 Microtransaction Self-Reported Measures

Table 2 presents descriptive statistics for microtransaction spending. Just under two thirds of the sample reported spending money on microtransactions in the last 6 months. (N = 237, 63.4%). Budget range for participants was typically between \$10-150, however several participants indicated their budget was between \$100-500 (N= 4).

Table 2: *Spending Characteristics of the Study Sample*

Characteristic	Participants	
	N	%
<b>Payment Method</b>		
Own Credit/Debit Card	296	79.1
Parent’s Credit/Debit Card	26	7
Gift Vouchers	47	12.6
Other	50	13.4
<b>Budget</b>		
No	340	90.9
Yes	34	9.1
<b>Used money or skins to bet on eSports match?</b>		
No	312	83.4
Yes, to skins	41	11
Yes, to money	6	1.6
Yes, to both skins and money	15	4

### 3.2.4 Peer Gaming and Spending Habit Measures

Participants were asked to indicate how many of their closest friends also play video games. The mode was all 7 friends, making up just over a third over the responses. (N= 138, 36.9%). The findings followed that 49.7% of the sample reported they had 6+ online gaming friends, 27.2% had 3-5 online gaming friends, 14.9% had 1-2 online gaming friends and 8.2% of the sample had no online gaming friends. A Pearson’s correlation matrix presented in table 4 displays the relationships between participant and peer spending.

### 3.2.5 Impulsivity Measure

The scale used to measure impulsivity strength had a range of 8 to 32. The mode was a total impulsivity score of 21, suggesting that overall the sample reported a medium level of impulsivity (N= 53, 16.6%). 2.2% of the sample scored a total score between 8-15, which indicated a lower level of impulsivity. The majority of the sample (73.7%) scored a total score between 16-22, which indicated a medium level of impulsivity. Just under a quarter of the sample reported a total score between 23-29, which indicated a higher level of impulsivity.

### 3.2.6 Mental Health Measure

Participants were required to reflect on their experiences over the last 4-week period to measure for psychological distress consistent with depression and anxiety. 48.89% of participants (N=154) reported a score under 20 suggesting they were not experiencing psychological distress. 18.1% of participants (N=57) reported a score between 20-24 which indicated they were experiencing a mild level of psychological distress. 13% of participants (N=41) reported a score between 25-29, which indicated they were experiencing a moderate level of psychological distress. 9.52% (N=63) of participants reported a score over 30 which indicated they were experiencing a severe level of psychological distress. Over half the participants (51.1%) reported a psychological distress score level of 20 or higher. (M=21.68, SD= 9.36).

### 3.2.7 Internet Gaming Disorder Measure

The IGD measure results indicated that within the sample, 34% (N= 106) of participants scored 5 or higher out of 9 which indicated they met the criteria for IGD. 66% of participants (N= 206) had a score not meeting the criteria for IGD.

### 3.3 Normality Testing of Variable Distributions

Prior to conducting inferential analyses, statistical test assumptions were checked. Normality assumptions were checked using the Shapiro-Wilk and Kolmogrov-Smirnov tests. The null hypotheses for the Shapiro-Wilk that the data is normally distributed was rejected, as the p-value was  $<0.05$ , indicating the data is not normal. Normality assumptions were also checked through inspection of diagnostic plots and skew (Field, 2013). Observation of histograms revealed non-normality. As the data was non-normally distributed, it was decided that non-parametric tests would be used for further analysis (Pallant, 2016). Assumptions were checked for the independent samples t-tests using Levene's test for equality of variances. Equal variance was not assumed ( $p = .00$ ).

### 3.4 Correlation Analysis

Table 3 presents a Pearson's correlation matrix used to identify correlations across demographic, video game playing, microtransaction spending, mental health, impulsivity and IGD survey questions that related to major variables of the study. The matrix showed there were several statistically significant correlations between watching streamers and spending.

Watching a streamer promote skin gambling was significantly positively correlated with a participant's monthly spending on skins ( $r = .13$ ,  $n = 365$ ,  $p = .02$ ). Watching a streamer promote microtransactions was also significantly positively correlated with IGD ( $r = .14$ ,  $n = 365$ ,  $p = .02$ ).

Three spending variables had a significant relationship with IGD. Total money spent on microtransactions over the last 6 months was significantly positively correlated with IGD. ( $r = .11$ ,  $n = 312$ ,  $p = .05$ ). Monthly spending on loot boxes was also significantly positively correlated with IGD. ( $r = .14$ ,  $n = 312$ ,  $p = .01$ ). Monthly spending on in-game pay-to-win features was significantly positively correlated with IGD ( $r = .14$ ,  $n = 374$ ,  $p = .02$ ).

Table 4 presents a Pearson's correlation matrix used to identify correlations between participant and peer microtransaction spending. All correlations in the matrix were positive, ranging in strength from weak to strong. Self spending on cosmetic items was significantly correlated with peer spending on skins ( $r = .12$ ,  $n = 322$ ,  $p = .04$ ). Self spending on virtual currency was significantly correlated with peer spending on cosmetic items ( $r = .11$ ,  $n = 322$ ,  $p = .05$ ). These correlations indicate there are significant positive relationships between particular microtransactions purchases made by the sample and certain microtransactions purchases made by the samples' peers.

A partial correlation was used to explore the relationship between total microtransaction spending over the last 6 months and problem gaming, while controlling for frequency of hours played across gaming devices. There was an insignificant weak, positive partial correlation between total microtransaction spending over the last 6 months and problem gaming, controlling for hours played across gaming devices ( $r = .09$ ,  $p = .15$ ). An inspection of the zero order correlation ( $r = .114$ ) suggested controlling for hours played across gaming devices had very little effect on the strength of the relationship.



Table 3: Pearson's *r* correlations for survey responses to main variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age				.									
2. Access to games	.01			.									
3. Watch a streamer play games	-.05	.07			.								
4. Watch a streamer promote microtransactions	-.03	.10	<b>.11*</b>										
5. Watch a streamer promote skin gambling	-.02	.04	<b>.12*</b>	<b>.83**</b>									
6. Spent on skins	.05	.04	.06	.09	<b>.13*</b>								
7. Spent on loot boxes	-.08	.10	-.02	<b>.25**</b>	<b>.26**</b>	<b>.41**</b>							
8. Spent on virtual currency	.01	<b>.13**</b>	.02	<b>.23**</b>	<b>.20**</b>	<b>.56**</b>	<b>.61**</b>						
9. Spent on cosmetics	.07	<b>.13*</b>	.08	<b>.14**</b>	<b>.12*</b>	<b>.72**</b>	<b>.44**</b>	<b>.63**</b>					
10. Spent on pay-to-win	.03	.05	.06	<b>.25**</b>	<b>.28**</b>	<b>.48**</b>	<b>.60**</b>	<b>.53**</b>	<b>.55**</b>				
11. Total \$\$\$ spent on microtransactions	-.07	<b>.12*</b>	-.04	.04	.04	<b>.30**</b>	<b>.62**</b>	<b>.41**</b>	<b>.44**</b>	<b>.39**</b>			
12. Mental health	-.09	-.06	.02	<b>.18**</b>	<b>.20**</b>	.05	<b>.14*</b>	.12	.05	.10	<b>.12*</b>		
13. Impulsivity	-.01	.10	-.00	.06	.02	-.04	.06	.04	-.00	.02	.08	.06	
14. IGD	-.02	-.08	.05	<b>.14*</b>	<b>.15**</b>	.08	<b>.14*</b>	.06	.10	<b>.14*</b>	<b>.11*</b>	<b>.24**</b>	-.04

Note. \* = correlation is sig at the 0.05 level (2-tailed), \*\* = correlation is sig at the 0.01 level (2-tailed). All spending refers to monthly spending.

Table 4: *Pearson's r correlations for participant self spending and peer spending*

Spending Variable	1	2	3	4	5	6	7	8	9
1.Self spending- virtual currency									
2.Self spending- cosmetic items	<b>.63**</b>								
3.Self spending- pay-to-win	<b>.53**</b>	<b>.55**</b>							
4.Self- skins	<b>.56**</b>	<b>.72**</b>	<b>.48**</b>						
5.Self spending- loot boxes	<b>.61**</b>	<b>.44**</b>	<b>.60**</b>	<b>.41**</b>					
6.Peer spending- virtual currency	<b>.24**</b>	<b>.19**</b>	<b>.20**</b>	<b>.20**</b>	<b>.15**</b>				
7.Peer spending- cosmetic items	<b>.11*</b>	<b>.17**</b>	.09	<b>.16**</b>	.06	<b>.69**</b>			
8.Peer spending- pay-to-win	.08	.06	.09	.10	.05	<b>.69**</b>	<b>.68**</b>		
9.Peer spending- skins	.04	<b>.12*</b>	.04	<b>.17**</b>	-.01	<b>.51**</b>	<b>.66**</b>	<b>.45**</b>	
10.Peer spending- loot boxes	.07	.07	.08	.06	.08	<b>.61**</b>	<b>.59**</b>	<b>.61</b>	<b>.64**</b>

Note. \*= correlation is sig at the 0.05 level (2-tailed), \*\*=correlation is sig at the 0.01 level (2-tailed). All spending refers to monthly spendin

### 3.5 Exploratory Analyses

#### 3.5.1 Independent Samples *T*-Tests

Several ad-hoc exploratory analyses were undertaken using Welch's independent samples *t*-tests, to reveal further insights on mean differences for problem gamers and non-problem gamers.

There was a significant difference in mean scores for monthly spending on loot boxes between problem gamers ( $M = 1.84$ ,  $SD = 2.22$ ) and non-problem gamers ( $M = 1.34$ ,  $SD = 1.27$ ;  $t(141.29) = -2.17$ ,  $p = .03$ , 95% CI  $[-.96, -.04]$ ). The magnitude of the differences in the means measured with Cohen's  $d$  was small ( $d = .28$ ).

There was no significant difference in mean scores for monthly spending on skins between problem gamers ( $M = 2$ ,  $SD = 2.32$ ) and non-problem gamers ( $M = 1.66$ ,  $SD = 1.89$ ;  $t(178.42) = -1.32$ ,  $p = .19$ , 95% CI  $[-.86, .17]$ ). The magnitude of the differences in the means measured with Cohen's  $d$  was small ( $d = .16$ ).

There was also no significant difference in mean spending on microtransactions over the last 6 months for problem gamers ( $M = 89.34$ ,  $SD = 227.61$ ) and non-problem gamers ( $M = 178.82$ ,  $SD = 554.39$ ;  $t(123.53) = -1.59$ ,  $p = .11$ , 95% CI  $[-200.58, 21.63]$ ). The magnitude of the differences in the means measured with Cohen's  $d$  was small ( $d = .21$ ).

There was no significant difference in mean scores for spending money or skins to bet on an eSports match between problem gamers ( $M = 1.37$ ,  $SD = .82$ ) and non-problem gamers ( $M = 1.20$ ,  $SD = .58$ ;  $t(160.91) = -1.84$ ,  $p = .07$ , 95% CI  $[-.34, .01]$ ). The magnitude of the difference in the means measured with Cohen's  $d$  was small ( $d = .24$ ).

To address hypothesis 3, three additional *t*-tests were run to examine the differences in mean scores for problem gaming and engaging in each of the streamer/YouTube personality videos categories. These being: watching a streamer play video games, promote microtransactions and promote skin gambling. Engagement was measured by video watching

frequency. There was not a significant result in differences in means for watching a streamer play video games between problem and non-problem gamers.

There was a significant result in differences in mean scores of promoting microtransactions between problem gamers ( $M = 22.31, SD = 71.62$ ) and non-problem gamers ( $M = 7.22, SD = 37.23; t(125.77) = -1.98, p = .05, 95\% CI [-30.16, -.01]$ ). The magnitude of the differences in the means measured with Cohen's  $d$  was small ( $d = .26$ ).

There was a significant result in differences in mean scores of watching a streamer promote skin gambling between problem gamers ( $M = 21.02, SD = 71.61$ ) and non-problem gamers ( $M = 5.28, SD = 31.05; t(117.51) = -2.10, p = .04, 95\% CI [-30.56, -.92]$ ). The magnitude of the differences in the means measured with Cohen's  $d$  was small ( $d = .29$ ).

Figure 1. displays the mean spending results.

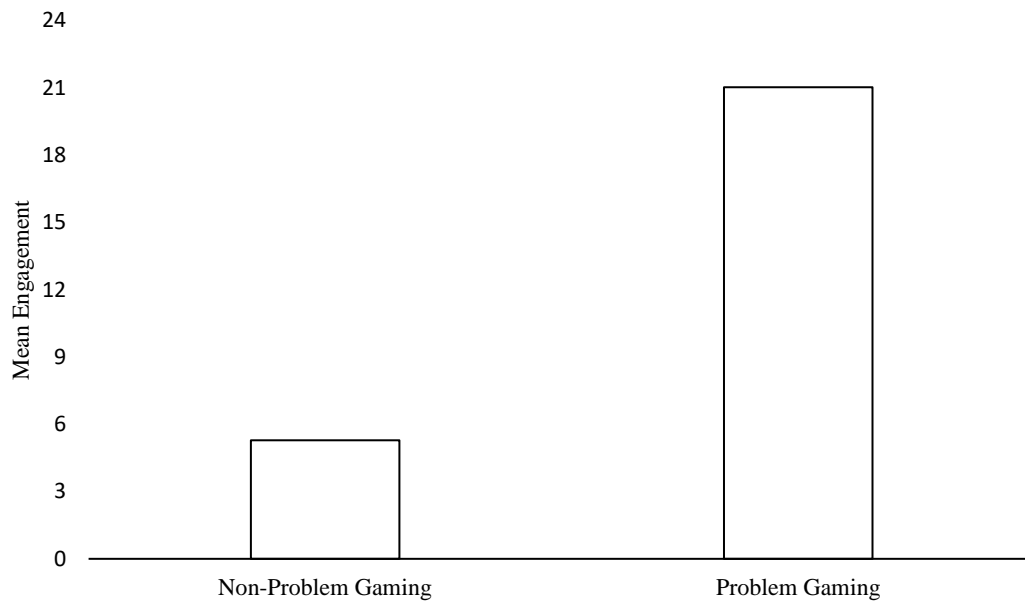


Figure 1. Comparison of Means for Stream Engagement- Watching a Streamer Promote Skin Gambling

### 3.5.2 Standard Multiple Regression

To assess hypothesis 4, standard multiple regression analysis was used to evaluate the predictive power of impulsivity and mental health on problem gaming. The results of the

regression indicated together the two predictors explained 25% of the variance ( $R^2 = .25$ ,  $F(9.96) = 2$ ,  $p = .00$ ). The individual predictors were examined further and indicated mental health was a significant predictor of the model, and explained 24% of the variance ( $R^2 = .24$ ,  $t = .4.37$ ,  $p = .00$ ). Impulsivity was not a significant predictor of the model, and explained less than 1% of the variance ( $R^2 = .04$ ,  $t = -.63$ ,  $p = .53$ ).

### 3.6 Qualitative Analysis

At the end of the survey, there were three open ended qualitative questions to gain further insight not possible through quantitative answers. The first question asked participants how they felt their friends influenced the amount of time they played games online. The responses varied greatly. A common response was participants reporting their friends influenced them to play games, even when they didn't feel like playing. This was seen in responses such as *'we all play together and when I don't feel like playing, I get an invite to play and I will play anyways. visa versa'* and *'they have a huge impact on the time I spend playing video games as most of the time I don't have anything to do so when they ask if I want to play something I just accept.'* There were also many responses where participants indicated their only friends were other gamers they had met online. This can be seen in the response *'currently my best friends are the ones I met on the internet, so I think it does influence it a lot.'*

The second qualitative question asked participants if they could recall a time they had spent money on microtransactions due to friends spending on microtransactions. Responses included *'My friend bought a cosmetic makeover and we both agreed if one of us was going to, both of us should'*, *'Often when one friends is buying loot boxes, me and other friends will do it too for the fun of it'* and *'When Overwatch came out, I only bought it because my friends did.'*

## **Chapter 4. Discussion**

### **4.1 Overview of the Study and Main Findings**

The principal aim of this study was to broadly examine what social influences may be increasing the risk for young adults to meet the criteria for IGD. It also looked to explore whether social influences could be contributing to increased microtransaction spending, also adding to the risk of problem gaming among young adults. Four hypotheses were constructed around these notions. In general, there was partial to strong support for all of the hypotheses. Overall the study demonstrated there are significant links between microtransaction spending and meeting the criteria for IGD. There was also significant links between self spending and peer spending on particular microtransaction items. This showed support for hypotheses 1 and 2. Exploratory analysis revealed support for hypothesis 3 by showing problem gamers were having significantly higher levels of engagement with watching streamers promote microtransactions and skin gambling. There was also partial support for hypothesis 4, as it was demonstrated psychological distress was a significant predictor for meeting the criteria for IGD.

### **4.2 Main Findings**

#### **4.2.1 Microtransaction Spending**

The results showed strong support, consistent with the literature, that microtransaction spending is related to individuals becoming more invested in their video gaming (Balakrishnam & Griffiths, 2018; Wang et al., 2014). Several kinds of microtransaction spending were found to be positively related to meeting the criteria for IGD. Correlational analysis showed total spending on microtransactions over the last 6 months was significantly positively correlated to meeting the criteria for IGD. This finding shows support for a main

theory of the study that spending on microtransactions has a positive relationship with IGD. It is also consistent with findings in the literature between spending money on free-to-play games and symptoms of problem gaming (Drier et al, 2017).

Monthly spending on loot boxes was also found to be significantly correlated with IGD. This is a noteworthy finding, as out of all the microtransactions available for purchase, loot boxes are what could be considered most akin to gambling (Baglin, 2017; King, 2018). This suggests there is some kind of addictive element (potentially the randomly determined outcome) of opening loot boxes. This shares strong similarities with gambling, potentially increasing the gamers' investment and making the activity more problematic for certain individuals.

Correlational analysis also found there was a significant link between streamers promoting skin gambling and the samples monthly spending on skins. This finding demonstrates a link between engaging with a social influence and spending on gaming. This infers the social influence of watching streamers gamble skins in videos could be encouraging gamers to want to buy their own skins and potentially gamble with them.

#### 4.2.2 Streamers and eSports Influence

Hypothesis 3 predicted a greater engagement with streamers and eSports would be positively related to meeting the criteria for IGD. There was strong support for this hypothesis in relation to engagement with streamers, as it was found greater engagement with streamers was significantly positively related to meeting the criteria for IGD. Exploratory analysis revealed engagement levels with watching streamers promote microtransactions and promote skin gambling were also significantly higher for problem gamers than non-problem gamers. Interestingly, there was not a significant difference between problem gamers and non-problem gamers watching a streamer play video games. This suggests problem gamers

are more heavily influenced by streamer videos that involve spending money or gambling content over regular video gaming type content. This lends further support to the literature that suggests gambling like structures in gaming content could be making gaming more problematic for certain individuals (Griffiths, 2015; King, 2018). As the links between streamer engagement and spending/problem gaming has yet to be properly explored in the literature, these findings help to add to the preliminary research on new activities being introduced to the gaming world.

Exploratory analysis revealed there was no significant difference in mean spending on eSport match betting between problem gamers and non-problem gamers. However, this relationship could have been impacted by the sample size, as only a small percentage of the sample indicated they had placed a bet on eSports in the last 6 months. This indicates eSport betting was not particularly popular among this male dominated young adult sample and not considered a strong social influence for spending or problem gaming.

#### 4.2.3 Peer Influence

Correlational analysis demonstrated support for hypothesis 2, that peer microtransaction spending would be positively correlated with the participant's own microtransaction spending. The Pearsons's  $r$  correlation matrix in table 4 showed all but one self/peer spending was positively correlated and several types of self/peer spending were significantly correlated.

There was a significant positive correlation between self spending on cosmetic items and peer spending on skins. This was a noteworthy relationship, as skins are considered as a cosmetic item in gaming. This demonstrates gamers who were buying cosmetic items themselves had friends who were also buying a type of cosmetic item. This lends support for the argument that there are strong social motivations for purchasing of virtual goods in



general, particularly that of visual alterations other players can easily see and show off to one another (Lehdonvirta, 2009; Hamari et al., 2016).

There was also a significant positive correlation between self spending on virtual currency and peer spending on cosmetic items. Usually gamers are able to purchase cosmetic items without having to buy additional virtual currency. However, this relationship could indicate if peers are spending at a rapid rate, it may be that players feel it is necessary to spend additional money on virtual currency to keep up with their peers' spending.

The peer influence on microtransaction spending was further supported by the high number of qualitative responses indicating gamers had made cosmetic microtransaction purchases solely because their gaming friends did. These responses show that unlike usual everyday spending, desire for purchases are less salient in the decision making process and rather what friends are buying is a stronger determinant for choosing to spend. This was consistent with the literature that found social factors were strongly associated with whether an individual spent real money within a game (Wohn, 2014). An insinuation drawn from this is that games and gaming related content don't necessarily need to offer value, but only need to present offers that are appealing to groups of young gamers.

#### 4.2.4 Mental Health and Impulsivity

The psychological measures run to test impulsivity and psychological distress provided interesting results. The psychological distress measure revealed the sample had a total score that was consistent with a mild level of anxiety and/or depression. High psychological distress was also a significant predictor of meeting the criteria for IGD, supporting hypothesis 4. This was consistent with a number of clinical research studies that have found correlations between gaming overuse and disorders like addiction, anxiety and depression (Gentile et al., 2011; Mentzoni et al., 2011; Lawrence et al., 2015).

Interestingly, the sample reported medium levels of impulsivity, but it was found impulsivity was not a significant predictor for streamer engagement, microtransaction spending or meeting the IGD criteria. This was inconsistent with the literature that had found links between impulsivity and problem gaming (Muller et al., 2014; Walther et al., 2012). It was also inconsistent with links made between microtransaction purchases and higher levels of impulsivity (Kim et al., 2017). This suggests that impulsivity cannot be used to help explain microtransactions spending and the prevalence of IGD found among the current sample.

### **4.3 Implications and Future Directions**

This study highlights that external social influences could be major risk factors for problematic gaming, particularly for young male gamers. Problem gaming is often conceptualised in terms of individual risk factors such as high impulsivity. This is evident as current addiction models have suggested that problematic gamers tend to have difficulties with impulsivity due to the short-term benefits in-game purchases provide (Brand et al, 2016; Dong & Potenza, 2014). However, the current study findings go against these addiction models, as the sample only reported a medium level of impulsivity and multiple regression showed impulsivity explained less than 1% of the variance in problem gaming scores. These results do not fit the profile of addicted problem gamers who are highly impulsive buyers. Therefore, an implication from this study is that there is not just one type of problem gamer.

The current study suggests the sample was a cohort that was mildly depressed and/or anxious, socially influenced by peers and video streamers, who were making considered and more intentional decisions about spending money online not heavily influenced by a feeling of loss of control with impulsive behaviour. This spending could potentially be seen as an effort to make a long-term investment in the game or to justify continued expenditure due to

sunk cost effects (Drell, 2013; Garland, 1990). These findings expose a gap in the literature as they suggest the area of focus for current addiction models is too narrow. It is suggested future research develop more models and theories exploring subtypes of problem gaming rather than view the disorder simply in terms of addiction vs non-addiction. This would help to better understand the spending behaviour of this sample.

A partial correlation run, controlling for time spent playing showed this had very little effect on a participant's relationship with IGD. This was surprising and leads to another implication of the study that for this sample microtransaction spending was more of an indication for problem gaming than frequency of game play. This could raise the possibility of editing the DSM, as the current DSM refers to time investment in video games, but does not refer to a users' financial investment (APA, 2013). As research adds to the growing literature of significant links found between microtransaction spending and IGD, it is suggested the DSM looks to edit future guidelines to also recognise the financial aspects of IGD.

#### **4.4 Limitations of the Current Study**

A limitation of the current study was that the data was not truly representative of the entire gaming community, as the sample was recruited from a website very popular among PC gamers. This could have led to skewed results in favour of PC gaming. This was supported by the results which indicated participants played for an average of 4.51 hours per day on a PC. This was over double the second most popular console, the smartphone, (2.15 hours per day). This suggests this gaming sample had a predisposition to favour the PC computer. It also could be argued the participants in the sample may be more invested in video gaming than the average user, due to their activity on an internet gaming forum. This

potential bias could be removed by reaching out to a more general sample of gaming young adults, such as a general university cohort.

Another limitation of the current study was the heavy reliance on accurate self-reporting. Although it is trusted the survey was filled out to the best of the participants' abilities, it can be assumed that several biases would have occurred. Firstly, the participant may not have had the introspective ability to provide an accurate response to the questions, as we all to an extent are unable to completely introspectively assess ourselves accurately. Secondly, the survey was sent out online and it was unsupervised which meant there was little control over how much attention the sample paid to various parts of the questionnaire. There was also no way for the researcher to clarify any confusion there might be over questions. There is evidence for these biases occurring among the sample, as the final comments section saw participants leave comments that indicated they felt they struggled to accurately recall their own or their peers' spending. This could be improved in future studies by extracting specific data such as hours played and money transactions from the participants' own consoles removing the requirement for participants to estimate these figures.

Another limitation of the overall study was the challenge of collecting data from South Australian private schools. This challenge can be largely attributed to the timing of the study and the school semester dates, as there was a very small window of opportunity for collecting data from schools before the 2018 school year finished. Several schools said they would have been fully prepared to participate had the study been run earlier in the year, but this was not possible with the project timeline. Although the lack of data from schools led to the change in focus to young adults, the initial findings from the small adolescent sample indicated gaming and spending is prevalent and should be explored further with a larger

sample. Future studies that plan to work with schools should be mindful of school term dates and assess the likeliness of school participation due to semester timetables.

#### **4.5 Conclusion**

Since online gaming has become easier to access and more immersive than ever, there have been serious concerns raised over the investment in playing time and the amount of money being spent on microtransactions. These concerns are due to the hypothesis that an over investment in gaming and gaming related spending could increase the risk of problem gaming. However, what is driving these gaming and spending patterns has been less explored in the current literature. Therefore, this study aimed to address that gap in the research by examining social influences related to the risk of IGD for young adults. It also explored whether social influences could be contributing to increased microtransaction spending. The study findings demonstrated preliminary support for modest relationships between social influences, spending and IGD.

The current study extends the literature on the relationship between social influences and video gaming. The results indicate video gaming is becoming more social affected. Furthermore, the results demonstrate that spending behaviour can be driven by external influences such as social reinforcements rather than just individual characteristic traits like impulsivity, particularly in relation to young adult male PC gamers and suggest there is more than one type of problem gamer. Although the findings from the study are important, they are still very exploratory in nature. Therefore, future studies should look to broaden the scope for addiction research to include social influences, spending behaviour and explore different sub-types of problem gamers to gain a more comprehensive understanding of why some gamers develop IGD.

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## Chapter 6: Appendices

### 6.1 Appendix A: Correspondence letter sent to South Australian schools

To whom it may concern,

Hi, my name is Georgia Nelson I am currently studying Psychology Honours at Adelaide University and for my fourth year thesis project I am looking to administer a voluntary online survey to a sample of school students. I am therefore inquiring as to whether (school name) would be interested in contributing to this study by handing out the survey hyperlink to middle and senior school students that fall between the age of 13-17 years old.

The survey is investigating adolescent online video gaming issues and their relation with peer influences and mental health. It would take approximately 15 minutes for the students to complete and all results would be anonymous. As the survey is online, it would not be a requirement for it to be conducted in class or under supervision. Students would just need to be provided with a URL hyperlink to the survey. It would then be up to them whether they wish to go to the website and fill in the survey in their own time. The study has also been approved by the Psychology Ethics Committee and deemed low-risk. As the data results would be anonymous we would not be able to provide individual participant feedback, however we would be able and very willing to share the overall results from the study with the school.

I have had another private school hand out the survey link in the last week and we are getting some very interesting initial results indicating that approx. 25% of respondents are playing online video games on their phones and consoles for more than 2 hours on week nights and even more on weekends. Responses are also indicating that some participants and their friends are spending upwards of \$50 in single gaming sessions.

If you are interested in discussing this possibility further, I can be contacted at [georgia.nelson@student.adelaide.edu.au](mailto:georgia.nelson@student.adelaide.edu.au) or on my mobile at 0435 070 405. If you wish to speak to my thesis supervisor Dr. Daniel King, he can be contacted at [daniel.king@adelaide.edu.au](mailto:daniel.king@adelaide.edu.au). Thank you very much for your consideration, I hope to hear from you soon.

Kind regards,  
Georgia Nelson

## 6.2 Appendix B: Parents Information Sheet



### PARENT INFORMATION SHEET PROJECT TITLE: PEER INFLUENCES ON

### ADOLESCENT GAMING PRINCIPAL INVESTIGATOR: Georgia Nelson

Hello parents!

My name is Georgia Nelson and I am a Honours Psychology student at the University of Adelaide and I am currently conducting a study for my fourth year of education. The study will be made up of an online survey that is investigating adolescent gaming and its relationship with friendships and mental health. I am inviting your child to partake in this 15-20-minute survey.

#### **What is the project about?**

This research project is about....

Your child is invited to participate in a unique study about how much they play online video games, if they spend money on video game related content and if their friends participate in the same gaming and spending activities.

**Participation:** Your child's choice to participate in this study is completely voluntary. They are invited to participate as their school has agreed to take part in the study, they fall into the adolescent age category (13-17) and speak English. If they decide to participate in the study, they are free to change their mind and withdraw at any time before the survey has been completed. All the responses to the survey will be anonymous. The information gained from the survey responses will be published in a thesis.

**Survey:** This survey includes a range of questions, including basic demographic information (age, gender etc...). We will also be enquiring about the amount of time your child spends playing video games, money they spend on video game related content and about how much your child's friends play and spend on games. There will also be questions related to impulsivity, problem gaming and mental health. This is a once off survey and there will be no follow ups to your response. Your child's feedback is greatly appreciated.



**Any risks?** This study has no anticipated risks. However, if your child feels upset by anything they come across in this survey, we encourage them to contact us with any concerns (see below) or to seek help from Lifeline, crisis support line (ph. no: 13 11 44) or Beyond Blue (ph. no: 1800 010 630) They can also contact the Kids help line via phone, email or web-chat. This is a free mental health service that provides services to children, teenagers and young adult. Services are provided across Australia- Telephone: (1800 55 1800)- <https://kidshelpline.com.au/teens>

**For more information:** This study has been approved by the School of Psychology Committee. If you have any queries regarding the study, please contact me at [a1688107@student.adelaide.edu.au](mailto:a1688107@student.adelaide.edu.au) or my supervisor at the School of Psychology, University of Adelaide: Dr Daniel King, [daniel.king@adelaide.edu.au](mailto:daniel.king@adelaide.edu.au).

**What if I have a complaint or any concerns?** If you have questions or problems associated with the practical aspects of your child's participation in this project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. For any questions concerning the ethics of this project, please contact the convener of the Subcommittee for Human Research in the School of Psychology, Dr. Paul Delfabbro, 8 313 4936. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

Yours sincerely, Georgia Nelson

### 6.3 Appendix C: Survey Version 1 Information and Consent Sheet



#### **PARTICIPANT INFORMATION SHEET & CONSENT FORM**

**PROJECT TITLE: PEER INFLUENCES ON ADOLESCENT GAMING**

**PRINCIPAL INVESTIGATOR: Georgia Nelson**

Hello!

My name is Georgia Nelson and I am a Honours Psychology student at the University of Adelaide.

#### **What is the project about?**

This research project is about...

You are invited to participate in a unique study about how much you play online video games, if you spend money on video game related content such as loot boxes or skins and if your friends participate in the same gaming and spending activities.

**Participation:** Your choice to participate in this study is completely voluntary. You are invited to participate as your school has agreed to take part in the study, you fall into the adolescent age category of 13 to 17 years old and speak English. You must be over 13 years old to participate in this study. If you decide to participate in the study, you are free to change your mind and withdraw at any time before the survey has been completed. All your responses will be anonymous.

**Survey:** This survey includes a range of question areas, including basic demographic information (age, gender etc...) about you. We will also be enquiring about the amount of time you spend playing video games and money you spend on video game related content. There are some questions about general gaming participation and spending, how much your friends play and spend on games. There will also be questions related to impulsivity, problem gaming and mental health. This is a once off survey and there will be no follow ups to your response.

The study should only take about 15-20 minutes of your time and your feedback is greatly appreciated.

**Any risks?** This study has no anticipated risks. But, if this study makes you feel upset, we encourage you to contact us with any concerns (see below) or if you feel upset, to seek help from Lifeline, a crisis support line (ph. no: 13 11 44) or Beyond Blue (ph. no: 1800 010 630)

You can also contact the Kids help line via phone, email or web-chat. This is a free mental health service that provides services to children, teenagers and young adult. Services are provided across Australia. Telephone: (1800 55 1800)- <https://kidshelpline.com.au/teens>

**For more information:** This study has been approved by the School of Psychology Committee. If you have any queries regarding the study, please contact me at

[REDACTED]

**What if I have a complaint or any concerns?** If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. For any questions concerning the ethics of this project, please contact the convener of the Subcommittee for Human Research in the School of Psychology, Dr. Paul Delfabbro, 8 313 4936. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If you wish to still participate after reading all of this information sheet please give your consent by clicking the electronic 'I CONSENT' button below and press the 'next' button to begin the survey. Thank-you!

Yours sincerely,  
Georgia Nelson

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### **Informed Consent**

**By giving your consent below, you affirm that:**

- **You have read and fully understand the information on the study.**
- **You agree to take part in the study as described in the study information sheet.**
- **Procedures and potential risks of the study have been explained to your satisfaction.**

I CONSENT

.

## 6.4 Appendix D: Version 1 of the Survey Questionnaire Items

\*Only the demographic section of version 1 of the survey is attached, due to the rest of the survey being identical to version 2, found under appendix \*.

### D.1 Demographic Measures


\* 2 How old are you?

\* 3 What is your gender?  
 Male  
 Female  
 Prefer not to say

\* 4 What year level are you in at school?

\* 5 Who do you live with most of the time?  
Number of parents/step-parents?   
Number of siblings?

## 6.5 Appendix E: Post on *Reddit*

 **r/leagueoflegends** · Posted by u/HelpaStudentOut1 · 3 months ago






**Want to to win a \$50 Steam Voucher? Help a University student out and do my 10 minute gaming survey! :)**

Hi fellow Reddit gamers! My name is Georgia and I'm a Psychology Honours University student from Australia and I'm looking for some young adults (18-25 years old) to invite to participate in my online survey for my thesis project. There is a \$50 Steam voucher up for grabs!

The survey is investigating young adults online video gaming, spending on micro-transactions, peer influences and mental health. It would take approx. 10 minutes to complete and all results would be anonymous. You are free to leave the survey at any point. Your feedback would be greatly appreciated and a massive help to my studies and education! Thank you so much! :D








[Survey link](#)

Georgia

 11 Comments  Share  Edit Post  Save  Hide ... 50% Upvoted

Comment as **HelpaStudentOut1**

What are your thoughts?

**B** *i*        ... Switch to markdown **COMMENT**

## 6.6 Appendix F: Survey Version 2 Information and Consent Sheet



### **PARTICIPANT INFORMATION SHEET & CONSENT FORM**

**PROJECT TITLE: SOCIAL INFLUENCES ON GAMING**

**PRINCIPAL INVESTIGATOR: Georgia Nelson**

Hello!

My name is Georgia Nelson and I am a Honours Psychology students at the University of Adelaide, South Australia.

#### **What is the project about?**

This research project is about...

You are invited to participate in a unique study about how much you play online video games, if you spend money on video game related content such as loot boxes or skins and if your friends participate in the same gaming and spending activities.

**Participation:** Your choice to participate in this study is completely voluntary You are invited to participate as you use a online gaming forum and fall into the young adult age category of 18 to 25 years old and speak English. If you decide to participate in the study, you are free to change your mind and withdraw at any time before the survey has been completed. All your responses will be anonymous. If you would like to be placed into the draw to win a \$50 Steam voucher, please provide your email address at the end of the survey.

**Survey:** This survey includes a range of question areas, including basic demographic information (age, gender etc...) about you. We will also be enquiring about the amount of time you spend playing video games and money you spend on video game related content. There are some questions about general gaming participation and spending, how much your friends play and spend games. There will also be questions related to impulsivity, problem gaming and mental health. This is a once off survey and there will be no follow ups to your response.

The study should only take about 15-20 minutes of your time and your feedback is greatly appreciated.

**Any risks?** This study has no anticipated risks. But, if this study makes you feel upset, we

encourage you to contact us with any concerns (see below) or if you feel upset, to seek help from Lifeline, a crisis support line (ph. no: 13 11 44) or Beyond Blue (ph. no: 1800 010 630)

**For more information:** This study has been approved by the School of Psychology Committee. If you have any queries regarding the study, please contact me at

[REDACTED]

What if I have a complaint or any concerns? If you have questions or problems associated with the practical aspects of your participation in the project, or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. For any questions concerning the ethics of this project, please contact the convener of the Subcommittee for Human Research in the School of Psychology, Dr. Paul Delfabbro, 8 313 4936. Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If you wish to still participate after reading all of this information sheet please give your consent by clicking the electronic 'I CONSENT' button below and press the 'next' button to begin the survey. Thank-you!

Yours sincerely,

Georgia Nelson

---

### **Informed Consent**

**By giving your consent below, you affirm that:**

- **You have read and fully understand the information on the study.**
- **You agree to take part in the study as described in the study information sheet.**
- **Procedures and potential risks of the study have been explained to your satisfaction.**

I CONSENT.

## 6.7 Appendix G: Version 2 of the Survey Questionnaire Items

### Participant Demographics

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\* 2 How old are you?

\* 3 What is your gender?

- Male
- Female
- Prefer not to say

\* 4 What is your household environment?

- Live at home with parents/guardian
- Live out of home with roommates
- Live out of home alone
- Other (please specify)

\* 5 What is your employment status?

- Student
- Employed (full-time)
- Employed (Casually)
- Unemployed
- Other (please specify)



## Video Game and Microtransaction Spending Habits

\* 6 How many gaming devices do you own or have access to?

- 0  3  
 1  4+  
 2

\* 7 Please record the hours in a typical week that best describes your online gaming activity (in the last 6 months)

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Smartphone	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
PC	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Gaming console	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Tablet device	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

\* 8 How many different online video games are you playing right now?

- 1 game  4 games  
 2 games  5 games  
 3 games  6+ games

\* 9 How often would you watch a streamer or youtube personality (i.e. Ninja, PewDiePie etc)...

	Never	Yearly	Monthly	Weekly	Daily
Play games	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promote micro-transactions (e.g. loot boxes)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Promote skin gambling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

\* 10 Select the column that best matches your spending on the following...

	Never	Yearly	Monthly	Weekly	Daily
Loot boxes	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Skins	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

\* 11 Select one option from each row that best matches your spending on the following...

	Never	Yearly	Monthly	Weekly	Daily
Virtual currency	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Cosmetic items (e.g. avatar clothing)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Consumables/Unlocks (e.g. pay to win options)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

\* 12 Which of the following payment methods do you use for these micro-transaction purchases?

- Your own credit/debit card
- A parent's credit/debit card
- Gift Vouchers
- Other (please specify)

\* 13 How much \$\$\$ in total have you spent on micro-transactions in the last 6 months?

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\* 14 Do you have a budget for spending per month on micro-transactions?

- No
- Yes, it is..

\* 15 Which of the following eSports streams have you watched in the last 6 months?

- |  |   |
|--|---|
| <input type="checkbox"/> I do not watch eSport streams | <input type="checkbox"/> PUBG (PlayerUnknown's Battlegrounds) |
| <input type="checkbox"/> Fortnite                      | <input type="checkbox"/> LOL (League of Legends)              |
| <input type="checkbox"/> Overwatch                     | <input type="checkbox"/> Dota 2                               |
| <input type="checkbox"/> Other (please specify)        |   |

\* 16 Have you ever used money or skins to bet on an eSports match?

- No, I have never
- Yes, to skins
- Yes, to money
- Yes, to both skins and money

\* 17 In the last 6 months, how much money have you spent betting on eSport betting?

- None
- .

## Peer Video Game and Microtransaction Spending Habits

- \* 18 Thinking of your 7 best friends (friends you hang out with most of the time), how many of them play online video games?

Now thinking of these best friends who play video games..

- \* 19 How many of your friends watch a streamer or youtube personality (i.e. Ninja, PewDiePie etc)...

	Number of friends
Play games	<input type="text"/>
Promote micro-transactions (e.g. loot boxes)	<input type="text"/>
Promote skin gambling	<input type="text"/>

- \* 20 How many of your friends spend money on

	Number of friends
Loot boxes	<input type="text"/>
Skins	<input type="text"/>

- \* 21 How often and how much would one of your average gaming friends spend on the following micro-transactions?

	Never	Yearly	Monthly	Weekly	Daily
Loot boxes	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Skins	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

- \* 22 How many of your friends spend money on

	Number of friends
Virtual currency	<input type="text"/>
Cosmetic items (e.g. avatar clothing)	<input type="text"/>
Consumables/Unlocks (e.g. pay to win options)	<input type="text"/>

- \* 23 Select one option from each row on how often and how much would one of your average gaming friends spend on the following micro-transactions?

	Never	Yearly	Monthly	Weekly	Daily
Virtual currency	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Cosmetic items (e.g. avatar clothing)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Consumables/Unlocks (e.g. pay to win options)	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

- \* 24 How much \$\$\$ would your highest spending friend usually spend in a typical online gaming session?

- \* 25 How much \$\$\$ would your lowest spending friend usually spend in a typical online gaming session?

- \* 26 How many of your close friends watch eSports streams?

- \* 27 Have these friends (and how many) have ever spent money or skins to bet on an eSport match?

	Number of friends
Yes, to skins	<input type="text"/>
Yes, to money	<input type="text"/>
Yes, to both skins and money	<input type="text"/>

## Barratt Impulsiveness Scale-Brief (BIS-Brief)

\* 28 For each of the following statements, select the response which indicates how well it describes you:

	Rarely/ Never	Occasionally	Often	Almost Always
I act on the spur of the moment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do things without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I say things without thinking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I plan tasks carefully	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a careful thinker	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I concentrate easily	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't pay attention	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am self-controlled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Kessler Psychological Distress Scale (K10)

\* 29 These questions concern how you have been feeling over the past 30 days. Pick an option for each question that best represents how you have been. About how often did you feel...

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
...tired out for no good reason?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...nervous?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...so nervous that nothing could calm you down?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...hopeless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...restless or fidgety?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...so restless you could not sit still?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...depressed?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...that everything was an effort?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...so sad that nothing could cheer you up?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...worthless?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Internet Gaming Disorder Scale-Short-Form (IGDS9-SF)

\* 30

During the last year...

	Yes	No
...have there been periods when all you could think of was the moment that you could play a game?	<input type="radio"/>	<input type="radio"/>
...have you felt unsatisfied because you wanted to play more?	<input type="radio"/>	<input type="radio"/>
...have you been feeling miserable when you were unable to play a game?	<input type="radio"/>	<input type="radio"/>
...were you unable to reduce your time playing games, after others had repeatedly told you to play less?	<input type="radio"/>	<input type="radio"/>
...have you played games so that you would not have to think about annoying things?	<input type="radio"/>	<input type="radio"/>
...have you had arguments with others about the consequences of your gaming behaviour?	<input type="radio"/>	<input type="radio"/>
...have you hidden the time you spend on games from others?	<input type="radio"/>	<input type="radio"/>
...have you lost interest in hobbies or other activities because gaming is all you wanted to do?	<input type="radio"/>	<input type="radio"/>
...have you experienced serious conflicts with family, friends or partner because of gaming?	<input type="radio"/>	<input type="radio"/>