

Delineating the Boundaries Between High Engagement and Problem Gaming

Jake D. Slack

*This thesis is submitted in partial fulfillment of the Honours degree of
Bachelor of Psychological Science (Honours)*

School of Psychology

University of Adelaide

September 2021

Word Count: 9,155

Table of Contents

List of Tables.....	5
Abstract.....	6
Declaration.....	7
Contribution Statement.....	8
Acknowledgements.....	9
CHAPTER 1 – Introduction.....	10
1.1 The Growth of Video Gaming.....	11
1.1.1 The Growth of Esports, Streaming and the Professionalisation of Gaming...11	
1.2 Internet Gaming Disorder.....	12
1.2.1 Internet Gaming Disorder in the DSM-5.....	13
1.2.2 Internet Gaming Disorder Compared to Other Addictions.....	14
1.2.3 The Link Between Internet Gaming Disorder and Time Spent Gaming.....	15
1.3 Internet Gaming Disorder Risk and Protective Factors.....	15
1.3.1 Quality of Life.....	16
1.3.2 Physical Health Factors.....	16
1.3.3 Psychological Factors.....	16
1.3.4 Social Relationships Factors.....	18
1.3.5 Environmental Factors.....	18
1.4 The Current Study.....	19
CHAPTER 2 – Method.....	22
2.1 Participants.....	22
2.2 Measures.....	22
2.2.1 Demographic Information.....	22
2.2.2 Gaming Characteristics Questions.....	22

2.2.3 Protective Factors Questions.....	24
2.2.4 Internet Gaming Disorder Scale.....	24
2.2.5 Motives for Online Gaming Questionnaire.....	24
2.2.6 Quality of Life Questionnaire.....	25
2.3 Design and Procedure.....	25
2.4 Analytical Approach.....	26
CHAPTER 3 – Results.....	29
3.1 Analysis of Statistical Power.....	29
3.2 Data Screening and Quality Control.....	29
3.3 Descriptive Statistics.....	29
3.4 Analysis of Research Objectives.....	32
3.4.1 Examining Group Differences in Quality of Life.....	32
3.4.2 Examining Group Differences in Gaming Motives.....	33
3.4.3 Examining Protective Factors.....	34
3.4.4 Exploratory Analysis.....	35
CHAPTER 4 – Discussion.....	41
4.1 Overview.....	41
4.2 Summary of Findings.....	41
4.2.1 Differences in Quality of Life.....	41
4.2.2 Differences in Gaming Motives.....	42
4.2.3 Differences in Protective Factors.....	43
4.3 Implications.....	44
4.4 Strengths and Limitations.....	45
4.5 Future Research Directions.....	46
4.6 Conclusion.....	47

References.....	49
Appendices.....	62
Appendix A – Prolific Advertisement.....	62
Appendix B – Information Sheet.....	63
Appendix C – Consent Form.....	66
Appendix D – Demographic Questions.....	68
Appendix E – Gaming Characteristics Questions.....	71
Appendix F – Protective Factors Questions.....	72
Appendix G – Petry’s Internet Gaming Disorder Scale.....	74
Appendix H – Motives for Online Gaming Questionnaire (MOGQ).....	75
Appendix I – Quality of Life Questionnaire (WHOQOL-BREF).....	77
Appendix J – End of Survey.....	79
Appendix K - Histograms of Variables that Violated the Assumption of Normality...80	
Appendix L – SPSS Data for Examiner.....	83

List of Tables

Table 1. Demographic Characteristics of the Sample.....	23
Table 2. Gaming Related Characteristics and Chi-Square Results of the Sample.....	30
Table 3. Summary of Descriptive Statistics for all Psychometric Measures.....	31
Table 4. Protective Factors Characteristics and Chi-Square Results of the Sample.....	38
Table 5. Hierarchical Binary Logistic Regression Analysis for Variables Predicting Problem Gaming in the Current Sample.....	39

Abstract

Despite a large amount of published research investigating internet gaming disorder (IGD), there is insufficient research investigating the boundary between positive and problematic involvement in high-frequency video gaming. This represents a significant gap in the literature as, given the constantly growing popularity and success of esports athletes and streamers, it is not always true to expect bad outcomes to be associated with high levels of use. Accordingly, the current study aimed to investigate risk and protective factors present in high-frequency gamers (30+ hours per week) who did, and did not, meet the criteria for IGD. A convenience sample of 403 participants aged between 18-67 years ($M = 27.24$, $SD = 7.8$) were recruited through Prolific advertising to complete an online questionnaire. After being classified by Petry's IGD scale as either a problem or non-problem gamer, risk and protective factors were assessed using the Motives for Online Gaming Questionnaire (MOGQ) and the abbreviated World Health Organisation Quality of Life Questionnaire (WHOQOL-BREF). Further questions were also included to capture behaviours that might serve as risk/protective factors. Three main findings emerged. First, problem gamers scored lower on all quality of life measures. Second, the motivation to escape was a significant predictor of problem gaming. Third, balancing gaming with sleep needs was a significant protective factor against problem gaming. From the results, we can infer that high-frequency gaming may only become a problem if it is used to escape real-world problems or prioritised over important everyday activities.

Keywords: high frequency gaming, internet gaming disorder, motivation, quality of life, risk and protective factors

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 material previously published except where due reference is made. I give permission for the digital version of this thesis to be made available on the web, via the University of Adelaide's digital thesis repository, the Library Search and through web search engines, unless permission has been granted by the School to restrict access for a period of time.

Signature:

September 2021

Contribution Statement

In writing this thesis, my supervisor and I collaborated to generate research questions of interest and design the appropriate methodology. I conducted the literature search, completed the ethics application, and designed the Qualtrics Survey. My supervisor dedicated personal funding provided by the University to recruit the necessary number of participants via the Prolific research platform. I was responsible for all data collection and thesis write-up. Data analysis was conducted with direct supervision.

Acknowledgements

I would first like to sincerely thank my supervisor, Dr Paul Delfabbro. Your ongoing mentorship, constructive feedback, and Star Wars puns helped me get through this challenging Honours year. I am very grateful for all your time, and your instant replies to emails (even if it was late at night on the weekend).

I would also like to extend a very special thanks to my friends and family who provided me with unwavering support this year, and throughout the duration of my studies. In particular, I would like to thank my parents who always encourage me, show an interest in what I do and call me out when I am procrastinating.

CHAPTER 1

Introduction

In recent decades video gaming has cemented itself as a healthy hobby for approximately one-third of the world's population (Newzoo, 2020). This number is only expected to rise owing to the rapid growth of *Esports* and video game *streaming*. However, despite these developments in the professionalisation and potential benefits of gaming, there has been increasing international recognition that high levels of gaming participation may lead to a wide variety of negative physical and psychosocial consequences (Griffiths et al., 2012; Chung et al., 2019). This has led to internet gaming disorder (IGD) being included in the appendix of the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5; American Psychiatric Association, 2013) as a condition warranting further study, and gaming disorder being officially recognised as a mental health condition in the eleventh edition of the *International Classification of Diseases* (ICD; World Health Organisation, 2019).

It is important to note, however, that gaming is not equivalent to problem gaming. Concerns only arise when engagement in gaming is excessive and potentially harmful (Chung et al., 2019). In fact, unlike other addictions (e.g. gambling and substances use) gaming is an activity that is associated with several benefits, such as stress reduction (Jones et al., 2014) and strengthening problem-solving skills (Granic & Engels, 2014). This makes it difficult to define the condition as there are many highly engaged gamers who play without any serious negative effects on their lives (Lehenbauer-Baum & Fohringer, 2015). It is therefore argued that there is a danger for regular gaming to be pathologized and that poorly defined or overly inclusive problem gaming criteria may not effectively differentiate problematic from adaptive gaming involvement (Brevers et al., 2020). Accordingly, there is interest in delineating this boundary so that strategies can be developed to prevent harm, while also not over-classifying

high-frequency gaming that may often reflect adaptive play and/or engagement in competitive gaming (Brevers et al., 2020). The current study aims to address this research gap.

1.1 The Growth of Video Gaming

Video gaming has come a long way since the arcade machines of the 1980s. Nowadays, games and gaming experiences have evolved in a variety of ways, including *genres* (e.g., shooter, strategy, role-playing), *platforms* (e.g., console, computer, phone), *modes* (e.g., single-player, multiplayer), and *objectives* (e.g., defeating an opponent, cooperation, survival) (King & Delfabbro, 2019). Synonymous with the evolution of video gaming technology has been its popularity. It is now estimated that 2.9 billion people play video games worldwide (Newzoo, 2020). This had led to the global games market to grow to new heights with an estimated annual revenue of USD \$175.8 billion in 2021, with this number projected to exceed USD \$200 billion by the end of 2023 (Newzoo, 2021a). To put this into perspective, the video game industry now earns, per year, more revenue than the movie and music industries combined, and draws in viewership that rivals that of traditional sports (Mangeloja, 2019).

1.1.1 The Growth of Esports, Streaming and the Professionalisation of Gaming

The growth of video gaming has led to Esports, a sub-type of video gaming, also becoming a billion-dollar business in 2021 (Newzoo, 2021b). Esports are professional video gaming tournaments where players (either individually or in teams) compete against each other in popular games (such as *DOTA 2*, *League of Legends* and *Fortnite*) for prize money (King & Delfabbro, 2019). The largest overall prize pool for an Esports event was USD \$34 million at *The International 2019* for the game *DOTA 2* (Esports Earnings, 2020). Much like traditional sports, Esports events attract audiences that fill large stadiums and require athletes

to practise for many hours per week to be good enough to participate. For example, *Team Liquid*, who have won more prize money from Esports tournaments than any other team, practise for at least 50 hours per week (Jacobs, 2015).

Similarly, online video game streaming has also become a massive global industry. Streaming is a form of entertainment similar to television broadcasting, where viewers watch others play video games (either live or pre-recorded) (King & Delfabbro, 2019). *Twitch*, the most popular streaming platform, recorded an average of 2.93 million concurrent viewers watching content in the first quarter of 2021 (Statista, 2021b). Tyler Blevins (*Ninja*) is the most followed streamer on Twitch with 16.8 million followers. He broadcasts his streams for an average of 9 hours per day (Twitch Tracker, 2021) and once had over 600,000 people watching one of his live streams at once, which broke Twitch's concurrent viewer record for a single user (Forbes, 2019). *Ninja*, like many others, has made a full-time career out of high engagement with gaming, leading to an estimated net worth of US\$17 million (Perez, 2020).

The increased popularity of video gaming indicates a major cultural shift whereby high engagement in gaming (either playing or passively watching) has become integral to many people's lives. And, as the examples above show, does not always lead to problematic outcomes. However, it is still unclear and heavily debated where to draw the line between healthy and pathological use of video gaming, and whether high levels of video gaming is generally positive or negative for those who play games as a hobby or semi-professionally (Lehenbauer-Baum & Fohringer, 2015).

1.2 Internet Gaming Disorder

IGD has emerged as a significant public health concern over the last decade (Chen et al., 2018; Young, 2009). This largely stems from growing public concerns around screen time and the fear that video gaming can evolve into a form of addiction (King & Delfabbro, 2019).

This sentiment is echoed in the DSM-5, where IGD is characterised as “a pattern of excessive and prolonged Internet gaming that results in a cluster of cognitive and behavioural symptoms, including progressive loss of control over gaming, tolerance, and withdrawal symptoms” (American Psychiatric Association, 2013, p. 796). Whilst much of the early literature stemmed from Asian countries, a recent meta-analysis by Stevens et al. (2020) extracted prevalence estimates from 53 studies across 17 countries and estimated the worldwide prevalence of IGD to fall between 1 and 3%. The researchers also reported the prevalence of IGD to be approximately 2.5 times higher in males compared to females, and higher in adolescents. Lastly, given that IGD research is still relatively new, definitions and terminology outlining harmful use has largely varied. Many of these imply addiction and pathology, which may contribute to stigma for individuals who have gaming problems (Hassan & Kyonka, 2021; Delfabbro, 2013). Subsequently, some researchers have instead begun using the term “problem gaming” to address the stigma. This also has the added benefit of encompassing a larger population that may still have problems at subclinical levels. Therefore, although the current study used an IGD measure to define the two study conditions, it uses the terms “problem gamer” and “non-problem gamer” instead of “IGD” and “non-IGD”.

1.2.1 Internet Gaming Disorder in the DSM-5

In the past, IGD has been described by several terms in the research literature, such as computer game addiction, internet gaming addiction, and pathological gaming. However, it was not until 2013 when IGD was included in the DSM-5 as a condition for further study, that cohesion was found regarding terminology. This gave legitimacy to the field and advocacy to better understand the condition (Chen et al., 2018; American Psychiatric Association, 2013). Whilst IGD is not listed as an “official” disorder in the DSM-5, it has been recognized as gaming disorder in the International Classification of Diseases-11 (World

Health Organization, 2019). However, only the DSM-5 criteria for IGD is described in this paper as the DSM-5 is the most commonly used nomenclature for the classification of mental disorders by clinicians and researchers. However, for a detailed comparison of DSM-5 IGD and ICD-11 GD Diagnostic criteria (see Jo et al., 2019).

According to the DSM-5, at least 5 of the following 9 criteria (present over a 12-month period) are required for a diagnosis of IGD: A) Preoccupation with internet games, B) Withdrawal symptoms when internet gaming is taken away, C) The need to spend increasing amounts of time engaged in internet games, D) Unsuccessful attempts to control the participation in internet games, E) Loss of interests in previous hobbies and entertainment as a result of, and with the exception of, internet games, F) Continued excessive use of internet games despite knowledge of psychosocial problems, G) Has deceived family members, therapists, or others regarding the amount of internet gaming, H) Use of internet games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety), and I) Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in internet games (American Psychiatric Association, 2013, p. 795). The DSM-5 criteria also note that gaming (separate to the use of alternative internet functions such as social media or online gambling) must cause significant impairment or distress in multiple aspects of an individual's life for consideration of an addiction (American Psychiatric Association, 2013). Finally, many standard diagnostic scales (such as Petry et al., 2014) have since been developed and validated to measure IGD against these criteria.

1.2.2 Internet Gaming Disorder Compared to Other Addictions

IGD shares many of its core clinical features (e.g., loss of control, preoccupation, lying to conceal involvement) with gambling disorder, the only other behavioural addiction listed in the DSM (Müller et al., 2014). However, it is important to note that IGD is distinct from gambling disorder as no money is at risk. Therefore, gambling on an internet game

would be classed as a gambling disorder (American Psychiatric Association, 2013). The worldwide prevalence of IGD (between 1 to 3%) is also estimated to be higher than gambling disorder (close to 1%) (Stevens et al., 2020; Calado & Griffiths, 2016). To quantify the prevalence of IGD in comparison to other disorders in the DSM-5, IGD has a similar prevalence to substance use disorders (2.6%) (Degenhardt et al., 2017) and obsessive-compulsive disorder (0.6–3.5%) (Crino et al., 2005), but is lower than generalised anxiety disorder (3.7%) (Ruscio et al., 2017).

1.2.3 The Link Between Internet Gaming Disorder and Time Spent Gaming

Among the numerous factors related to IGD, time spent playing is maybe the most debated (Triberti et al., 2018). In the DSM-5 (American Psychiatric Association, 2013) it is stated that “Individuals with IGD typically devote 8-10 hours or more per day to this activity and at least 30 hours per week” (p. 796). This is because, as shown by several studies (e.g., Liu et al., 2021; Severo et al., 2020; Ko et al., 2009), “The essential feature of Internet gaming disorder is persistent and recurrent participation in computer gaming” (American Psychiatric Association, 2013, p. 797). However, it is important to note that, although many gamers devote large periods of time to their gaming (Statista, 2021a), only a minority of them ever report this leading to any issues (Griffiths et al., 2015; King et al., 2013; Ballabio et al., 2017). This has led to the argument that time spent playing games is far less related to IGD than assumed previously and puts into question the common assumption among parents and the media at large that playing intensively is in itself a problem regardless of psycho-social context. (Demetrovics & Király, 2016; Király et al., 2017; Montag et al., 2019; Lemmens et al., 2011).

1.3 Internet Gaming Disorder Risk and Protective Factors

1.3.1 Quality of Life

In one of the first studies looking specifically at highly engaged gamers (average of 25 hours per week), Lehenbauer-Baum and Fohringer (2015) found that gamers in the problem group (as per DSM-5 IGD criteria) scored significantly lower in all four health domains (physical and psychological health, social relationships, and environment) of the World Health Organization's self-report quality of life measure (WHOQOL-BREF), compared to highly engaged gamers in the non-problem group. These findings are important as they suggest that whilst both adaptive and maladaptive gaming may involve high frequencies of use, poorer quality of life may contribute to the development of problematic gaming.

1.3.2 Physical Health Factors

The primary physical health factor identified in IGD research is extreme time investment in gaming over non-gaming related activities, people, and events (Baggio et al., 2016). This is echoed in the DSM-5, where it is stated that “individuals with Internet gaming disorder continue to sit at a computer and engage in gaming activities despite neglect of other activities” (American Psychiatric Association, 2013, p. 796). These “other activities” can range from basic everyday activities (e.g., Eating, sleeping, maintaining personal hygiene), social interaction (e.g., friends, family, relationships/marriage), or other important responsibilities (e.g., school, work, caring for children/pets) (King & Delfabbro, 2019). Research by Seay and Kraut (2007) has highlighted the importance of self-regulation as a protective factor against extreme engagement in gaming over other activities. Specifically, finding that individuals who actively regulate the amount of time and money put into gaming report significantly lower levels of future problematic use than those who do not.

1.3.3 Psychological Factors

Research investigating the psychological factors associated with IGD has highlighted the importance of gaming motivations as a predictor of later pathological use. By identifying

the specific factors that lead people to engage in gaming, the potential underlying mechanisms of healthy, excessive, and pathological gaming can be determined (Montag et al., 2019). This idea stems from research looking at other addictive disorders such as gambling, where the motivation to *escape* (playing to avoid real-life difficulties) has been found to be “the prime characteristic of the gambling experience that facilitated the continuation of problem gambling” (Wood & Griffiths 2007, p. 107).

Unsurprisingly, the escape motive has shown to be the strongest predictor of problematic gaming (Ballabio et al., 2017; Yee, 2006; Xu et al., 2012; Billieux et al., 2013; Kardefelt-Winther, 2014). As well as this, *competition* (Montag et al., 2019; Király et al., 2015; Ballabio et al., 2017), *fantasy* (Király et al., 2015; Zsila et al., 2019), and *coping* motives (Király et al., 2015; Zsila et al., 2019; Kuss et al., 2012a) show to have a slightly weaker, but still significant relationship with IGD symptoms. Interestingly, studies have also found that certain motives have a negative predictive effect on IGD and may therefore act as protective factors. Specifically, *recreation* (Montag et al., 2019; Ramos-Diaz et al., 2018), *skill development* (Ballabio et al., 2017; Bányai et al., 2019; Montag et al., 2019; Wu et al., 2017), and *social* motives (Cole & Griffiths, 2007; Yang & Liu, 2017).

Another major psychological contributing factor to IGD is comorbidity (King & Delfabbro, 2019). Numerous longitudinal studies have shown that depression predicts the occurrence of later pathological video gaming (Ko et al., 2009; Gentile et al., 2011; Seay & Kraut, 2007). This may be partly why the escape motivation is so often found to be the strongest predictor of problematic gaming, as video gaming may be an escape strategy to alleviate depression (Andreassen et al., 2016; Weinstein & Weizman, 2012). Anxiety and social phobias have also been found to be positively associated with a proneness to addictive technological behaviours (such as problematic video gaming) but not as direct predictors (Mentzoni et al., 2011; Andreassen et al., 2016; Lam & Peng, 2010). Together, these results

suggest that gaming motives may help differentiate adaptive from problematic gaming. Moreover, programmes tailored towards the specific psychological construct (e.g., inability to adaptively alleviate depression) responsible for that motive could then assist in the treatment of IGD for that person (Ballabio et al., 2017).

1.3.4 Social Relationships Factors

Over the last two decades, a large amount of research has found an association between problematic video game use and low psychosocial well-being. For example, studies have shown that problem gamers show lower social competence (Liau et al., 2015; Lo et al., 2005), increased loneliness (Seay & Kraut, 2007; Lemmens et al., 2011), and poorer quality parent-child relationships (Schneider et al., 2017; Ballabio et al., 2017) than non-problem gamers. It is believed that these gamers are particularly susceptible to problematic involvement with video games as they can provide players with a virtual community that allows them to avoid/escape their real-life difficulties (Lemmens et al., 2011). This is an issue as it may lead to these people preferring to socialise with other online players over “real” people.

1.3.5 Environmental factors

The biggest environmental factor contributing to gaming behaviour is the availability and accessibility of gaming activities, as people who have greater access to games generally play more often (Weis & Cerankosky, 2010). This effect is further magnified if gaming devices are kept in the bedroom as they are easier for individuals to turn to them if they cannot sleep. This can lead to later bedtimes, longer sleep-onset latency, shorter overall sleep duration, worse daytime functioning, and a greater risk of developing IGD (Brunborg et al., 2011; Gentile et al., 2017; King et al., 2014). The other major environmental factor outlined in the gaming literature is family structures/parent relationships (Schneider et al., 2017). This research has mainly revolved around adolescents as they have the highest prevalence of IGD

for any age group (Stevens et al., 2020). Specifically, lower engagement in family activities (Jeong and Kim, 2011), less parental trust/communication (King & Delfabbro, 2017), and less stable/supportive family environments (Liau et al., 2015; King and Delfabbro, 2019) put an individual at a higher risk of problematic gaming. Alternatively, meaningful parent relationships (Schneider et al., 2017), increased parental devotion/supervision (Rehbein & Baier, 2013), and parental monitoring of gaming time (Collier et al., 2016) have been shown to reduce symptoms of problematic gaming. These results suggest that positive family functioning may act as an important protective buffer against the development of problematic gaming. This aligns with the broader addiction literature, as positive family functioning has also been shown to help prevent both gambling (Dowling et al., 2017) and substance use disorders (Sloboda et al., 2012).

1.4 The Current study

Despite a large amount of published research investigating IGD, there is insufficient research investigating the differences between adaptive and problematic high-frequency gaming. This represents a significant gap in the literature, as it remains unclear as to whether the level of involvement and time is important to the development of IGD. Given the growing popularity and success of esports athletes and streamers, it is not always true to expect bad outcomes to be associated with high levels of use. In fact, there is a risk that the current IGD guidelines will misclassify healthy highly involved gamers (who may look like problematic cases) with a label that indicates pathology and generates stigma (van Rooij et al., 2018; Galanis et al., 2021). Therefore, it is important to identify markers, such as risk and protective factors, that delineate the boundary between high engagement and problematic video gaming. This line of research could spark the development of educational programs that help identify early markers of problematic gaming, and reduce the stigma associated with high engagement

in gaming (Brevers et al., 2020). Important protective factors emerging from the literature just reviewed include: higher self-reported quality of life (physical, psychological, social, environmental); gaming for recreation/skill development/social reasons; regulation of time and money devoted to gaming; engaging in other non-gaming related activities; making a conscious effort to get enough sleep; and, having meaningful real-world social relationships.

The current study contributes to the literature by investigating risk vs protective factors associated with IGD amongst high-frequency populations of gamers. The study had three primary aims. The first aim was to examine whether problem gamers scored lower on the World Health Organization's quality of life measure (WHOQOL-BREF) than non-problem gamers. The second aim was to examine whether problem gamers scored differently on the MOGQ than non-problem gamers which might indicate the existence of different motives for engaging in gaming. The third aim was to investigate whether non-problem gamers reported a higher prevalence of protective factors than problem gamers. Based on these aims, the following hypotheses were proposed.

Hypothesis 1: Non-problem gamers will score significantly higher on all four facets (physical health, psychological, social relationships, environment) of the WHOQOL-BREF than problem gamers.

Hypothesis 2: Non-problem gamers will record significantly higher social, skill development and recreation scores on the MOGQ than problem gamers.

Hypothesis 3: Non-problem gamers will record significantly lower escape, competition, coping and fantasy scores on the MOGQ than problem gamers.

Hypothesis 4: Non-problem gamers will report a significantly higher prevalence of protective factors than problem gamers.

CHAPTER 2

Method

2.1 Participants

A total of 403 participants ($M = 254$, $F = 149$) with an age range of 18-67 years ($M = 27.24$, $SD = 7.8$) participated in the study. The sample was recruited through the online recruitment platform *Prolific* (<https://www.prolific.co/>) from *May to July 2021*. To fit the inclusion criteria, participants had to play video games for at least 30 hours per week, be at least 16 years of age and be able to read English fluently. Participants were generally residing in several major countries, the highest proportion being from Europe (59.8%). More than half of the sample were college educated (57.1%) generally within the 18-24 age group (45.4%) and reported their relationship status as single (47.4%).

2.2 Measures

2.2.1 Demographic Information

General demographic information collected included: age, gender, relationship status, employment status, living status, highest level of education attained and nationality.

Demographic information is summarised in Table 1.

2.2.2 Gaming Characteristics Questions

Seven questions were included to capture each participant's gaming related activities. These included: number of hours playing video games per week (30-40, 40-50, 50+); future gaming aspirations; whether (Yes/ NO) participants: received an income from gaming or streaming; had put their own money into gaming; and, whether respondents had engaged in various forms of professional or semi-professional gaming (e.g., esports/live streaming).

Table 1
Demographic Characteristics of the Sample

Variable	Characteristic	Total		Problem Group		Non-Problem Group	
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Gender	Male	254	63	88	67.2	166	61
	Female	149	37	43	32.8	106	39
Age (years)	18-24	183	45.4	64	48.9	119	43.8
	25-30	113	28	43	32.8	70	25.7
	31-40	81	20.1	19	14.5	62	22.8
	41+	26	6.5	5	3.8	21	7.7
Nationality	United Kingdom	39	9.7	10	7.6	29	10.7
	Europe	202	50.1	59	45	143	52.6
	North America	82	20.4	25	19.1	57	21
	Oceania	16	4	5	3.8	11	4
	Other	64	15.8	32	24.4	32	11.7
Education	Secondary/High School	148	36.7	51	38.9	97	35.7
	Further (e.g. apprenticeship, TAFE)	21	5.2	7	5.3	14	5.1
	Higher (e.g. undergraduate, college)	157	39	48	36.6	109	40.1
	Postgraduate (e.g. masters, Ph.D)	73	18.1	24	18.4	49	18
	None of the above options	4	1	1	0.8	3	1.1
Employment	Employed full-time	164	40.7	51	39	113	41.5
	Employed part-time	67	16.6	18	13.7	49	18
	Casually employed	31	7.7	14	10.7	17	6.3
	Unemployed	140	34.8	48	36.6	92	33.8
	Retired	1	0.2	0	0	1	0.4
Relationship	Single	191	47.4	68	51.9	123	45.2
	In a relationship	146	36.2	46	35.1	100	36.8
	Divorced/separated	5	1.3	1	0.8	4	1.5
	Widowed	1	0.2	0	0	1	0.4
	Married	60	14.9	16	12.2	44	16.1
Living Circumstances	Living with a parent/guardian	192	47.6	66	50.4	126	46.3
	Living independently (renting, share house)	144	35.8	50	38.2	94	34.6
	Living independently (owner-occupier)	67	16.6	15	11.4	52	19.1

Note. $N = 403$ ($n = 131$ for the problem group; $n = 272$ for the non-problem group).

2.2.3 Protective Factors Questions

Eight questions were included to capture behaviours that might serve as protective factors against problem gaming or gaming-related harm. These included whether (Yes/NO) respondents reported: setting limits on time and money devoted to gaming; engaged in other leisure activities; engaged in sport or exercise; balanced gaming with sleep needs; ate healthy foods; and/or actively maintained their personal hygiene and living conditions.

2.2.4 Internet Gaming Disorder Scale

IGD symptoms were measured using Petry et al.'s (2014) *IGD scale*. The measure was adapted from other measures of problematic gaming, citing an international consensus on nine items that best reflect the nine DSM-5 criteria for IGD (preoccupation, withdrawal, tolerance, reduce/stop, Give up other activities, Continue despite problems, Deceive/cover-up, escape adverse moods, and risk/lose relationships/opportunities during a period of 12 months) (American Psychiatric Association, 2013). An example item measuring the criteria of withdrawal is: "Do you feel restless, irritable, moody, angry, anxious, or sad when attempting to cut down or stop gaming, or when you are unable to play?" Each item was measured on a dichotomous scale (0 = *No*, 1 = *Yes*), with respondents who answered "yes" to five or more of the questions meeting the criteria for problematic gaming status as per the DSM-5 guidelines. The internal reliability for the present sample was acceptable ($\alpha = .70$).

2.2.5 Motives for Online Gaming Questionnaire

Gaming motives were assessed using the *Motives for Online Gaming Questionnaire* (MOGQ; Demetrovics et al., 2011). The MOGQ is a 27-item self-report measure that assesses seven distinct motivational factors for engaging in gaming: social (4-items), escape (4-items), competition (4-items), coping (4-items), skill development (4-items), fantasy (4-items) and recreation (3-items). A sample item (from the social domain) is "I play online games because I can get to know new people". Items were answered on a five-point Likert scale ranging

from 1 (*almost never/never*) to 5 (*almost always/always*). Total scores were summed for each motive, ranging from 4-20 (3-15 for recreation), with higher scores indicating higher tendencies towards the corresponding motive. All seven domains of the MOGQ exhibit acceptable internal reliability for the present sample: social ($\alpha = .81$), escape ($\alpha = .87$), competition ($\alpha = .84$), coping ($\alpha = .74$), skill development ($\alpha = .90$), fantasy ($\alpha = .84$), recreation ($\alpha = .78$).

2.2.6 Quality of Life Questionnaire

To examine differences between problem and non-problem gamers in respect to quality of life, the abbreviated *World Health Organisation Quality of Life Questionnaire* (WHOQOL-BREF) was used (World Health Organization, 2012). The WHOQOL-BREF is a 26-item self-report measure that assesses 4 distinct facets relating to quality of life: physical health (7-items), psychological (6-items), social relationships (3-items), and environment (8-items). A sample item (from the psychological domain) is “how much do you enjoy life?” Items were answered on a five-point Likert scale ranging from 1 to 5 with higher scores indicating higher identification with the corresponding question. However, three questions are negatively framed and subsequently reversed for analysis. Mean scores for each domain are calculated and multiplied by 4 as per the WHOQOL-BREF scoring instructions. This score is then ranged from 4-20, with higher scores indicative of higher individual perception of quality of life for that particular domain. The WHOQOL-BREF has been shown to be one of the leading quality of life measures, demonstrating good psychometric qualities (Skevington et al., 2004). All four WHOQOL-BREF domains show acceptable internal consistency for the present sample: physical ($\alpha = .76$), psychological ($\alpha = .81$), social ($\alpha = .77$), and environment ($\alpha = .81$).

2.2 Design and Procedure

The study used a cross-sectional online survey methodology. For the purpose of this study, high-frequency gaming was defined as playing video games for at least 30 hours per week. This was decided for two reasons. The first is that this criterion references the DSM-5 (American Psychiatric Association, 2013) that gamers with IGD typically devote 30 hours to the activity. A second reason is that previous Australian research (King & Delfabbro, 2016) has found that gaming for this duration tends to lead to negative consequences for most users.

Prior to data collection, ethical approval was granted by the *University of Adelaide Human Research Ethics Subcommittee* (approval number 21/19). Participation involved completion of an online survey using their own device (phone, computer, tablet etc). The survey, advertised on *Prolific* (<https://www.prolific.co/>), provided potential participants with the opportunity to read a brief description of the study aims, risks and eligibility before committing to participation (Appendix A). A link to an information sheet (Appendix B) and consent form (Appendix C) was also attached. A button labelled “I consent” was placed at the bottom of the consent form, with participants unable to begin the survey without providing consent. After consenting, participants were directed to the survey, hosted on *Qualtrics* (<https://www.qualtrics.com/>), and spent approximately 15 minutes answering the 93 questions (Appendix D-G). Upon completion, participants were thanked for their participation (Appendix H) and received a completion code which allowed them to be paid for their participation. The survey took around 15 minutes to complete, and participants received just under 3 pounds for their participation.

2.4 Analytical Approach

Results were analysed using the *Statistical Package for the Social Sciences* (SPSS; version 27.0). All tests were two-sided, with an alpha level of $p < .05$ adopted to indicate statistical significance. The two levels of the “problem status” variable were classified based

on scores on Petry et al.'s (2014) assessing IGD scale. Specifically, the 131 (32.5%) participants who respond yes to 5 or more of the 9 items were classified into the problem group as they met the criteria for IGD. The 272 (67.5%) Participants who responded yes to less than 5 of the 9 items were classified into the non-problem group as they had not met the cut-off score for IGD.

To investigate all three research aims, independent samples t-tests were conducted to examine mean group differences. Prior to this, preliminary assumption testing was first satisfied as all dependent variables were measured at the continuous level and independent variables were dichotomous, the assumptions related to study design were met. There were no extreme outliers in the data, as assessed by inspection of a boxplot generated by SPSS. The Shapiro-Wilk statistic indicated the assumption of normality was violated for the non-problem group across all dependant variables, and both groups for the mean protective factors reported ($p < .05$). Despite this violation, the central limit theorem claims that this is unlikely to cause problems in sample sizes greater than 30. This is because the distribution tends to be normal, regardless of the shape of the data (Ghasemi and Zahediasl, 2012). Furthermore, a visual inspection of histograms revealed normal distributions (see Appendix K). The assumption of homogeneity of variances was also tested and satisfied using Levene's test for equality of variances ($p > .05$). Lastly, effect sizes were presented in accordance with Cohen's (1988) guidelines: small ($d = 0.2$), medium ($d = 0.5$), and large ($d = 0.8$).

Supplementary analysis was run using a series of 3x2 and 2x2 chi-square tests to investigate whether significant group associations existed for the protective factors or gaming characteristics questions. Prior to this, preliminary assumption testing was first satisfied as both the independent and dependent variables were mutually exclusive nominal variables. Furthermore, no cells had expected counts of less than five, except for the 50+ hour group for weekly gaming time. Despite this violation, McHugh (2013) states that as long as 80% of

cells record expected counts of at least 5, this assumption can be satisfied. Lastly, measures of association were presented in accordance with Phi (ϕ ; for 2x2 tests) and Cramer's V (for 3x2 tests) guidelines: weak ($\phi = .1$), moderate ($\phi = .3$), and strong ($\phi = .5$).

Lastly, a three-stage Hierarchical binary logistic regression was conducted to determine which variables were the best predictors of problematic gaming status. Prior to this, all seven assumptions of the statistical analysis were tested. Assumptions related to study design were met, as the sample size was adequate, there was an independence of observations, the dependant variable was dichotomous, and all independent variables were continuous or nominal and mutually exclusive. Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell (1962) procedure. Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable except for "MOGQ Social". This was however retained for analysis, but the effect must be treated with caution. There was no evidence of multicollinearity, as assessed by tolerance values greater than 0.1 and VIF values greater than 10. Lastly, using casewise diagnostics in SPSS, no significant outliers were identified as having standardized residuals greater than ± 3 standard deviations.

CHAPTER 3

Results

3.1 Analysis of Statistical Power

A priori power analysis was conducted using the statistical software *G*Power* (Version 3.1.9.4). The results indicated the following sample sizes were required to achieve a power level of .80 when adopting a significance criterion of $\alpha = .05$ and detecting medium effect sizes: $N = 51$ for an independent samples t-test; $N = 32$ for a 2x2 chi-square test of association; $N = 39$ for a 3x2 chi-square test of association; and $N = 66$ for a binary logistic regression model. Therefore, the study had sufficient statistical power for all statistical analyses that were conducted.

3.2 Data Screening and Quality Control

Prior to data analysis, participants' responses were screened for missing data and invalid responses. A total of 411 individuals completed the study. Of these participants, 8 responses were removed as part of the preliminary screening process due to missing values of more than 5% (4 questions) of the survey. For the 52 participants (13.15%) who had missing values of less than 5% of the survey, scores were calculated using mean interpolation and included in the final sample. Therefore, the final data set consisted of 403 participants.

3.3 Descriptive Statistics

Table 2 summarises the descriptive statistics for the gaming characteristics of the sample. Participants generally played video games between 30-40 hours per week (87.1%), had aspirations to continue gaming as a leisure activity only (69.7%), did not engage in competitive gaming/esports (68%) or live streaming (74.4%), and did not receive an income from competitive gaming/esports (88.1%) or live streaming (96%).

Table 2*Gaming Related Characteristics and Chi-Square Results of the Sample*

Variable	Characteristic	Total		Problem Group		Non-Problem Group		Pearson Chi-square χ^2	Phi ϕ	Cramer's V
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%			
Weekly gaming (hours)	30-40	351	87.1	119	90.9	232	85.3	5.60		0.12
	40-50	41	10.2	7	5.3	34	12.5			
	50+	11	2.7	5	3.8	6	2.2			
Gaming aspirations	No change	101	25.1	41	31.3	60	22.1	5.77		0.12
	Pursue as career	21	5.2	9	6.9	12	4.4			
	Leisure only	281	69.7	81	61.8	200	73.5			
Engage in Esports	Yes	129	32	55	42	74	27.2	8.87**	0.15	
	No	274	68	76	58	198	72.8			
Received income from gaming	Yes	48	11.9	20	15.3	28	10.3	2.08	0.07	
	No	355	88.1	111	84.7	244	89.7			
Put real money into gaming	Yes	262	65	97	74	165	60.7	6.96**	0.13	
	No	141	35	34	26	107	39.3			
Engage in live streaming	Yes	103	25.6	44	33.6	59	21.7	6.58*	0.13	
	No	300	74.4	87	66.4	213	78.3			
Received income from streaming	Yes	16	4	6	4.6	10	3.7	0.19	0.02	
	No	387	96	125	95.4	262	96.3			

Note. $N = 403$ ($n = 131$ for the problem group, $n = 272$ for the non-problem group). Cramer's V and Phi statistics are for problem gamers compared to non-problem gamers.

* $p < .05$. ** $p < .01$.

Table 3 summarises the descriptive statistics for the three psychometric measures used in the study. It shows that the mean score for participants in the sample scored slightly below the cut off for problem gaming status (5 or more). The mean score for the sample was also around the midpoint for each of the seven MOGQ gaming motives, and above average for all four domains of the WHOQOL-BREF.

Table 3

Summary of Descriptive Statistics for all Psychometric Measures

Measures	<i>M</i>	<i>SD</i>	Possible Range	Actual Range
Petry's IGD	3.48	2.27	0-9	0-9
MOGQ				
Social	9.97	3.98	4-20	4-20
Escape	11.26	4.53	4-20	4-20
Competition	11.55	4.31	4-20	4-20
Coping	11.88	3.54	4-20	4-20
Skill Development	11.71	4.39	4-20	4-20
Fantasy	10.35	4.43	4-20	4-20
Recreation	12.29	2.69	3-15	3-15
WHOQOL-BREF				
Physical	14.86	2.58	4-20	7.43-20
Psychological	12.98	2.27	4-20	6-20
Social	13.37	3.92	4-20	4-20
Environment	14.67	2.59	4-20	7-20

Note. *N* = 403. *M* = Mean. *SD* = Standard Deviation. Petry's IGD = Petry's Internet Gaming Disorder Scale. MOGQ = Motives of Online Gaming Questionnaire. WHOQOL-BREF = World Health Organisation Quality of Life Questionnaire Abbreviated.

3.4 Analysis of Research Objectives

3.4.1 Examining Group Differences in Quality of Life

The first aim of the study was to examine group differences on the World Health Organization's quality of life measure (WHOQOL-BREF). It was hypothesised that non-problem gamers would score significantly higher on all four facets (physical health, psychological, social relationships, environment) of the WHOQOL-BREF than problem gamers. A series of independent-samples t-test were used to determine if a statistically significant difference existed between comparing the means of problem, ($N = 131$) and non-problem ($N = 272$) gamers across the four dependent variables.

The results from the first t-test indicated that high frequency gamers in the non-problem group ($M = 15.28$, $SD = 2.47$) scored higher than those in the problem group ($M = 14.00$, $SD = 2.59$) on the physical domain of the WHOQOL-BREF. This difference was statistically significant, with a medium effect size, $M = 1.27$, 95% CI [0.75, 1.80], $t(401) = 4.76$, $p < .001$, $d = 0.51$. The second t-test indicated that high frequency gamers in the non-problem group ($M = 13.21$, $SD = 2.19$) scored higher than those in the problem group ($M = 12.50$, $SD = 2.38$) on the psychological domain of the WHOQOL-BREF. This difference was statistically significant with a small effect size, $M = 0.71$, 95% CI [0.24, 1.18], $t(401) = 2.96$, $p = .003$, $d = 0.31$. Results from the third t-test indicated that high frequency gamers in the non-problem group ($M = 14.02$, $SD = 3.68$) scored higher than those in the problem group ($M = 12.00$, $SD = 4.08$) on the social domain of the WHOQOL-BREF. This difference was statistically significant with a medium effect size, $M = 2.02$, 95% CI [1.23, 2.82], $t(401) = 4.99$, $p < .001$, $d = 0.53$. Results from the Fourth t-test indicated that high frequency gamers in the non-problem group ($M = 14.97$, $SD = 2.50$) scored higher than those in the problem group ($M = 14.02$, $SD = 2.66$) on the environment

domain of the WHOQOL-BREF. This difference was statistically significant with a small effect size, $M = 0.95$, 95% CI [0.42, 1.48], $t(401) = 3.51$, $p < .001$, $d = 0.37$. Together, these findings supported Hypothesis 1, as non-problem gamers scored significantly higher on all four facets (physical health, psychological, social relationships, environment) of the WHOQOL-BREF than problem gamers.

3.4.2 Examining Group Differences in Gaming Motives

The second aim of the study was to examine whether the two groups scored differently on the seven domains of the MOGQ, reflecting the existence of different motives for engaging in gaming. It was hypothesised that non-problem gamers would record significantly higher social, skill development and recreation scores on the MOGQ than problem gamers. It was also hypothesised that non-problem gamers would record significantly lower escape, competition, coping and fantasy scores on the MOGQ than problem gamers. A series of independent-samples t-tests were used to determine if a statistically significant difference existed between comparing the means of problem, ($N = 131$) and non-problem ($N = 272$) gamers across the seven dependent variables. Results from the first t-test indicated that social motives were higher for gamers in the problem group ($M = 11.05$, $SD = 4.10$) than those in the non-problem group ($M = 9.46$, $SD = 3.82$). This difference was statistically significant with a medium effect size, $M = 1.59$, 95% CI [0.77, 2.41], $t(401) = 3.82$, $p < .001$, $d = 0.41$. Results from the second t-test indicated that skill development motives were higher for gamers in the problem group ($M = 12.79$, $SD = 4.51$) than those in the non-problem group ($M = 11.20$, $SD = 4.24$). This difference was statistically significant with a small effect size, $M = 1.59$, 95% CI [0.68, 2.49], $t(401) = 3.45$, $p < .001$, $d = 0.37$. Results from the third t-test indicated that recreation motives did not differ between gamers in problem group ($M = 12.63$, $SD = 2.56$) and the non-problem group ($M = 12.13$, $SD = 2.74$).

Therefore, the difference between groups was nonsignificant, $M = 0.51$, 95% CI [0.05, 1.07], $t(401) = 1.78$, $p = .075$. Contrary to predictions, these findings do not support hypothesis 2, as non-problem gamers did not record significantly higher social, skill development and recreation scores on the MOGQ than problem gamers

Results from the fourth t-test indicated that escape motives were higher for gamers in the problem group ($M = 13.33$, $SD = 4.23$) than those in the non-problem group ($M = 10.26$, $SD = 4.34$). This difference was statistically significant with a medium effect size, $M = 3.07$, 95% CI [2.17, 3.97], $t(401) = 6.70$, $p < .001$, $d = 0.71$. Results from the fifth t-test indicated that competition motives were higher for gamers in the problem group ($M = 13.02$, $SD = 4.31$) than those in the non-problem group ($M = 10.85$, $SD = 4.14$). This difference was statistically significant with a medium effect size, $M = 2.18$, 95% CI [1.30, 3.05], $t(401) = 4.88$, $p < .001$, $d = 0.52$. Results from the sixth t-test indicated that coping motives were higher for gamers in the problem group ($M = 13.18$, $SD = 3.41$) than those in the non-problem group ($M = 11.26$, $SD = 3.44$). This difference was statistically significant with a medium effect size, $M = 1.92$, 95% CI [1.20, 2.64], $t(401) = 5.26$, $p < .001$, $d = 0.56$. Results from the seventh t-test indicated that fantasy motives were higher for gamers in the problem group ($M = 12.01$, $SD = 4.52$) than those in the non-problem group ($M = 9.55$, $SD = 4.16$). This difference was statistically significant with a medium effect size, $M = 2.46$, 95% CI [1.56, 3.35], $t(401) = 5.40$, $p < .001$, $d = 0.58$. These findings supported Hypothesis 3, as non-problem gamers recorded significantly lower escape, competition, coping and fantasy scores on the MOGQ than problem gamers

3.4.3 Examining Protective Factors

The third aim of the study was to investigate whether the two groups differed in the number of protective factors reported. It was hypothesised that non-problem gamers would

report a significantly higher prevalence of protective factors than problem gamers. An independent-samples t-test was used to determine if a statistically significant difference existed between comparing the means of problem, ($N = 131$) and non-problem ($N = 272$) gamers across the total protective factors score.

Results from the independent samples t-test indicated, in support of hypothesis 4, that the number of protective factors reported was higher for those in the non-problem group ($M = 6.07$, $SD = 1.66$) compared to those in the problem group ($M = 5.47$, $SD = 1.82$). This difference was statistically significant with a small effect size, $M = 0.60$, 95% CI [0.24, 0.96], $t(401) = 3.30$, $p = .001$, $d = 0.35$.

A supplementary analysis was run using a series of 2x2 chi-square tests to investigate whether significant group associations existed for any of the eight protective factors. Results of this analysis showed a statistically significant, weak negative association between balancing gaming with sleep needs and problem gaming status, $\chi^2(1) = 19.88$, $p < .001$, $f = -0.22$; a statistically significant, weak negative association between maintaining personal hygiene and problem gaming status, $\chi^2(1) = 4.30$, $p = .038$, $f = -0.10$; and a statistically significant, weak negative association between maintaining sanitary living conditions and problem gaming status, $\chi^2(1) = 4.22$, $p = .040$, $f = -0.10$. Table 4 summarises these results and indicates that problem gamers were less likely to balance gaming with sleep needs, maintain personal hygiene and maintain sanitary living conditions than non-problem gamers.

3.4.4 Exploratory Analysis

Exploratory analysis was run using two 3x2 and five 2x2 chi-square tests to investigate whether significant group associations existed for any of the seven gaming characteristics of the sample. Results of this analysis showed a statistically significant, weak positive association

between engaging in Esports and problem gaming status, $\chi^2(1) = 8.87, p = .003, f = 0.15$; a statistically significant, weak positive association between putting real money into gaming and problem gaming status, $\chi^2(1) = 6.96, p = .008, f = 0.13$; and a statistically significant, weak positive association between engaging in live streaming and problem gaming status, $\chi^2(1) = 6.58, p = .010, f = 0.13$. Table 2 summarises these results and indicates that problem gamers engaged in Esports, put real money into gaming and engaged in live streaming significantly more than non-problem gamers.

Lastly, a three-stage Hierarchical binary logistic regression was conducted to determine which variables were the best predictors of problematic gaming status. Only variables that reported significant differences in the univariate analysis were included. Regression statistics are reported in Table 5.

Results from Model 1 indicated that the six MOGQ domains contributed significantly to the regression model, $\chi^2(6) = 54.95, p < .001$. The model explained 18% (Nagelkerke R^2) of the variance in problem gaming status and correctly classified 71.7% of cases. Sensitivity was 34.4% and specificity was 89.7%. Of the six predictor variables, only two were statistically significant: MOGQ escape and MOGQ competition. Introducing the three risk factor variables in Model 2 contributed significantly to the regression model, $\chi^2(3) = 59.09, p < .001$, and explained an additional 1% (Nagelkerke R^2) of the variance in problem gaming status. Furthermore, 70.7% of cases were correctly classified, sensitivity was 32.8% and specificity was 89.0%. Of the nine predictor variables only MOGQ escape and MOGQ competition were still statistically significant. Lastly, introducing the three protective factor variables in Model 3 also contributed significantly to the regression model, $\chi^2(3) = 72.67, p < .001$, and explained an additional 4% (Nagelkerke R^2) of the variance in problem gaming status. Furthermore, 71.0% of cases were

correctly classified, sensitivity was 37.4% and specificity was 87.1%. Of the 12 predictor variables, only MOGQ escape and balancing gaming with sleep needs were still statistically significant. Gamers who were motivated to play for escape reasons had 1.13 times higher odds of being in the problem gamer group. Gamers who balance their commitment to gaming with their need for sleep were associated with 60% reduced odds of being in the problem gamer group.

Table 4*Protective Factors Characteristics and Chi-Square Results of the Sample*

Variable	Characteristic	Total		Problem Group		Non-Problem Group		Pearson Chi-square χ^2	Phi ϕ
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%		
Limits on gaming time	Yes	164	40.7	49	37.4	115	42.3	0.87	-0.05
	No	239	59.3	82	62.6	157	57.7		
Limits on money devoted to gaming	Yes	287	71.2	88	67.2	199	73.2	1.55	-0.06
	No	116	28.8	43	32.8	73	26.8		
Engage in other activities/ hobbies	Yes	357	88.6	113	86.3	244	89.7	1.04	-0.05
	No	46	11.4	18	13.7	28	10.3		
Engage in sport/ exercise	Yes	269	66.7	85	64.9	184	67.6	0.30	-0.03
	No	134	33.3	46	35.1	88	32.4		
Balance gaming with sleep needs	Yes	302	74.9	80	61.1	222	81.6	19.88**	-0.22
	No	101	25.1	51	38.9	50	18.4		
Eat healthy foods	Yes	262	65	77	58.8	185	68	3.32	-0.09
	No	141	35	54	41.2	87	32		
Maintain Personal hygiene	Yes	360	89.3	111	84.7	249	91.5	4.30*	-0.10
	No	43	10.7	20	15.3	23	8.5		
Maintain sanitary Living conditions	Yes	365	90.6	113	86.3	252	92.6	4.22*	-0.10
	No	38	9.4	18	13.7	20	7.4		

Note. $N = 403$ ($n = 131$ for the problem group, $n = 272$ for the non-problem group). Phi statistic is for problem gamers compared to non-problem gamers.

* $p < .05$. ** $p < .01$.

Table 5*Hierarchical Binary Logistic Regression Analysis for Variables Predicting Problem Gaming in the Current Sample*

Predictor Variables	<i>B</i>	<i>SE</i>	Wald χ^2	<i>df</i>	<i>p</i>	<i>OR</i>	95% <i>CI OR</i>		Cox & Snell R ²	Nagelkerke R ²	Chi-Square
							<i>LL</i>	<i>UL</i>			
<i>Step 1</i>											
Model 1									0.13	0.18	54.95
Constant	-3.64	0.51	50.70	1	0.00**	0.03					
MOGQ Social	-0.00	0.04	0.00	1	0.97	1.00	0.94	1.07			
MOGQ Escape	0.13	0.04	11.34	1	0.00**	1.14	1.06	1.23			
MOGQ Competition	0.09	0.03	8.45	1	0.00**	1.10	1.03	1.17			
MOGQ Coping	-0.00	0.05	0.00	1	0.96	1.00	0.90	1.11			
MOGQ Skill Development	0.00	0.04	0.01	1	0.94	1.00	0.93	1.08			
MOGQ Fantasy	0.03	0.04	0.54	1	0.46	1.03	0.96	1.10			
<i>Step 2</i>											
Model 2									0.14	0.19	59.09
Constant	-3.70	0.54	47.63	1	0.00**	0.03					
MOGQ Social	-0.01	0.04	0.06	1	0.80	0.99	0.93	1.10			
MOGQ Escape	0.13	0.04	11.56	1	0.00**	1.14	1.06	1.23			
MOGQ Competition	0.07	0.03	5.13	1	0.02*	1.08	1.01	1.15			
MOGQ Coping	-0.01	0.05	0.01	1	0.91	0.99	0.90	1.10			
MOGQ Skill Development	0.01	0.04	0.03	1	0.87	1.01	0.94	1.08			
MOGQ Fantasy	0.02	0.04	0.44	1	0.51	1.02	0.96	1.10			
Engage in Esports	0.29	0.26	1.20	1	0.27	1.33	0.80	2.23			

Predictor Variables	<i>B</i>	<i>SE</i>	Wald χ^2	<i>df</i>	<i>p</i>	<i>OR</i>	95% <i>CI OR</i>		Cox & Snell R^2	Nagelkerke R^2	Chi-Square
							<i>LL</i>	<i>UL</i>			
Put Real Money into Gaming	0.30	0.26	1.33	1	0.25	1.35	0.81	2.23			
Engage in Streaming	0.22	0.27	0.69	1	0.41	1.25	0.74	2.12			
<i>Step 3</i>											
Model 3											
Constant	-2.81	0.69	16.80	1	0.00**	0.06			0.17	0.23	72.67
MOGQ Social	0.01	0.04	0.02	1	0.89	1.01	0.94	1.10			
MOGQ Escape	0.12	0.04	8.95	1	0.00**	1.13	1.04	1.22			
MOGQ Competition	0.06	0.03	3.02	1	0.08	1.06	0.99	1.14			
MOGQ Coping	0.00	0.06	0.00	1	0.98	1.00	0.90	1.11			
MOGQ Skill Development	0.02	0.04	0.30	1	0.58	1.02	0.95	1.10			
MOGQ Fantasy	0.02	0.04	0.27	1	0.60	1.02	0.95	1.09			
Engage in Esports	0.26	0.27	0.92	1	0.34	1.29	0.76	2.20			
Put Real Money into Gaming	0.31	0.26	1.43	1	0.23	1.37	0.82	2.29			
Engage in Streaming	0.22	0.27	0.62	1	0.43	1.24	0.73	2.13			
Balance Gaming with Sleep Needs	-0.92	0.27	11.93	1	0.00**	0.40	0.24	0.67			
Maintain Personal Hygiene	-0.28	0.43	0.42	1	0.52	0.76	0.33	1.76			
Maintain Sanitary Living	-0.00	0.45	0.00	1	1.00	1.00	0.42	2.34			
Conditions											

Note. Condition is for problem gamers compared to non-problem gamers. Bolded values reach statistical significance. *B* = unstandardised beta coefficients. *SE* = standard error of the coefficients. *df* = degrees of freedom. *p* = probability. *OR* = odds ratio. *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

p* < .05. *p* < .01.

CHAPTER 4

Discussion

4.1 Overview

The current study built upon previous research examining the boundary between adaptive and maladaptive gaming by comparing the risk and protective factors present in high-frequency gamers who did, and did not, meet the criteria for IGD. The study showed that non-problem gamers scored significantly higher on all four quality of life domains (physical health, psychological, social relationships, environment) of the WHOQOL-BREF than problem gamers, although these differences were generally small. Second, whilst problem gamers scored significantly higher in all but one (recreation) motivation of the MOGQ, further analysis controlling for risk and protective factors found that only the escape motive emerged as a significant predictor of being in the problem gamer group. Third, the prevalence of protective factors was significantly higher for non-problem gamers. Lastly, exploratory analysis controlling for risk and protective factors found that balancing gaming with sleep needs emerged as the only significant protective factor, associated with 60% reduced odds of being in the problem gamer group.

4.2 Summary of Findings

4.2.1 Differences in Quality of Life

The first aim of the study was to examine group differences on the WHOQOL-BREF. The data revealed support for hypothesis 1, that non-problem gamers would score significantly higher on all four facets (physical health, psychological, social relationships, environment) of the WHOQOL-BREF than problem gamers. These findings support Lehenbauer-Baum and Fohringer (2015) who, in one of the first studies looking at highly engaged vs addicted gamers, found that addicted players reported their overall quality of life to be significantly lower than that of highly engaged players. As highlighted earlier in Section

1.3 when reviewing risk and protective factors, this finding is unsurprising as numerous studies looking at specific physical, social, psychological, and environmental factors have found that problem gamers score typically lower than non-problem gamers. It is believed that gaming provides these players with a virtual environment that allows them to avoid/escape problems in other parts of their life (Lemmens et al., 2011). Therefore, whilst both adaptive and maladaptive gaming may involve high frequencies of video-game use, poorer quality of life may contribute to the development of pathological gaming.

4.2.2 Differences in Gaming Motives

The second aim of the study was to examine whether problem and non-problem gamers scored differently on the seven domains of the MOGQ which measures different motives for engaging in gaming. Contrary to predictions, the data did not support hypothesis 2, that non-problem gamers would record significantly higher social, skill development and recreation scores on the MOGQ than problem gamers. In fact, whilst recreation scores did not significantly differ between the groups, social and skill development scores were found to be significantly lower for the non-problem group. This finding was unexpected, as multiple studies have reported these motives to be negatively associated with IGD (Montag et al., 2019; Ramos-Diaz et al., 2018; Ballabio et al., 2017; Bányai et al., 2019; Wu et al., 2017; Cole & Griffiths, 2007; Yang & Liu, 2017).

Alternatively, and in line with hypothesis 3, non-problem gamers recorded significantly lower escape, competition, coping and fantasy scores on the MOGQ than problem gamers. These findings are consistent with the previous literature (Ballabio et al., 2017; Yee, 2006; Montag et al., 2019; Király et al., 2015; Ballabio et al., 2017; Zsila et al., 2019), whereby these motives have been found to be significantly related to IGD symptoms. Interestingly, participants in the problem group scored significantly higher on six out of the seven motives (recreation showed no significant group differences). One interpretation of this

finding, with respect to studying motivation in addiction studies, is that participants in the *problem* group (namely, those with the condition) will score higher on most, if not all, dimensions of motivational measures. This is because those in the problem group tend to be more invested in and engaged with the activity, and therefore attribute higher scores than those who only engage recreationally (Delfabbro, 2012). This may also explain why recreation was the only motivation that the problem group did not score significantly higher on in the current study. Furthermore, when controlling for the other MOGQ motives (which showed significant group differences), only the escape (1.14 times higher odds) and competition motives (1.10 times higher odds) proved to be significant predictors of problem gaming. And, after controlling for risk and protective factors, only the escape motive remained a significant predictor (1.13 times higher odds). This is perhaps the most important finding of the present study as it suggests that gaming to escape may be one way of delineating the boundary between high engagement and problematic gaming. Moreover, this finding adds to a wealth of research indicating the escape motive as the strongest predictor of problematic gaming (e.g. Ballabio et al., 2017; Yee, 2006; Xu et al., 2012; Billieux et al., 2013; Kardefelt-Winther, 2014), and its inclusion in the DSM-5 criteria for IGD as: “Use of Internet games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety)” (American Psychiatric Association, 2013, p. 795).

4.2.3 Differences in Protective Factors

The third aim of the study was to investigate whether the problem and non-problem groups differed in the number of protective factors reported. Consistent with the study prediction, the data supported hypothesis 4, that non-problem gamers would report a significantly higher prevalence of protective factors than problem gamers. However, although a statistically significant difference was found between those in the problem group ($M = 5.47$) and the non-problem group ($M = 6.07$), the effect size was quite small which suggests

that the prevalence of protective factors was similar for problem and non-problem gamers. More refined analyses indicated that those in the problem group were less likely to balance gaming with sleep needs, maintain personal hygiene and maintain sanitary living conditions. These results support a common theme in the IGD literature, whereby problem gamers neglect other everyday activities in favour of gaming (American Psychiatric Association, 2013; King & Delfabbro, 2019). These findings highlight why the importance of self-regulation is so often referenced in the research literature (e.g. Seay & Kraut, 2007; Baggio et al., 2016; Weis & Cerankosky, 2010), as those who prioritise their gaming over everyday activities, social interaction and other important responsibilities may be at risk of problem gaming (King & Delfabbro, 2019).

Lastly, it is important to note that no significant correlations were found between setting limits on gaming time and problem gaming in the current study. Therefore, it may be that purely limiting gaming time irrespective of other factors may not be beneficial per se as gaming may only become a problem when gaming time is being prioritised over other daily activities. Therefore, the DSM-5 (American Psychiatric Association, 2013) claiming that “Individuals with IGD typically devote 8-10 hours or more per day to this activity and at least 30 hours per week” (p. 796) should not be interpreted literally and may not be true for all individuals.

4.3 Implications

The findings presented in this study have promising theoretical and practical implications for continued research into adaptive vs maladaptive gaming. Whilst there has been increasing public concerns that high-frequency gaming may lead to an addiction (e.g., Demetrovics & Király, 2016), gaming time alone may not be the most important factor contributing to problematic outcomes amongst highly engaged users. In fact, using gaming as an escape strategy to avoid real-life difficulty may also contribute to the development of

problematic gaming. This may also partly explain why participants in the problem group recorded significantly lower self-reported quality of life, as they were gaming to escape their real-life difficulties. Furthermore, a key protective factor against problem gaming outlined by this study was self-regulation by way of not prioritising gaming over sleep needs. This was associated with 60% reduced odds of being in the problem gamer group. This result reinforces previous research by Seay and Kraut (2007), implying that as long as gaming does not interfere with real-world priorities, it can be an enjoyable activity.

Lastly, these findings have some potential intervention implications. Although limiting gaming time may be an effective treatment for problem gamers who are neglecting important everyday activities such as sleep, it may not be an effective way to prevent problem gaming for individuals who are using gaming to escape from real-world difficulties. Rather, interventions could better be targeted towards the problems from which these gamers are trying to escape. This is because, unlike all other addictions, gaming is an activity that can be associated with benefits and does not need to be limited if it is not the root cause of any issues, such as the case for many Esports players and video game streamers.

4.4 Strengths and Limitations

To the best of the author's knowledge, the current study is one of the first studies to investigate adaptive vs maladaptive gaming amongst high-frequency gamers (30+ hours). The findings are therefore important as they help lay the foundation for why only some gamers can play for many hours per week without any serious negative effects on their lives. It is hoped that these results may also assist clinicians in supporting individuals who have gaming issues. Another strength of this study was the inclusion of the WHOQOL-BREF, Petry's IGD scale and the MOGQ measures; all of which are well-validated and have sound psychometric properties (Skevington et al., 2004; Petry et al., 2014; Demetrovics et al.,

2011). Lastly, the inclusion of participants from multiple countries and diverse gaming communities (e.g., esports players and live streamers) is a strength of this study as individuals with varied socioeconomic backgrounds were included, thus enhancing the representativeness of the current sample.

Some limitations should also be considered when interpreting the findings of this study. First, participants were recruited via a convenience sample, which provides a relatively narrow cross-section of participants and may reduce the external validity and reliability of outcomes. Therefore, even though our sample had sufficient power to detect effects, the people who responded to the survey may not be a truly random sample representative of the general population. Furthermore, whilst our findings demonstrate many consistencies with previous research, it is important to consider that the study utilised an online self-report survey methodology. Therefore, there is a possibility that data could have been biased due to social desirability bias and recall bias. A contributing factor to this is that participants were not monitored when completing the study in a controlled scientific setting. Moreover, the inability to conclude a directional relationship between quality of life and problem gaming was another limitation, as it remains unknown as to whether poor quality of life influenced problem gaming status or whether problem gaming status influenced poor quality of life. Lastly, IGD is only included in the DSM-5 as a condition warranting further research, meaning that it is not recognised as a clinical disorder yet. Therefore, it could not be concluded that participants in the problem gaming condition had a gaming disorder. Even if the disorder was included, Petry's IGD scale can only be used as a screening tool for detection of deficits, rather than provide a diagnosis as would have to be given by clinicians through observation or interview.

4.5 Future Research Directions

In line with this study's findings and limitations, there are several suggestions for future research as a considerable amount of work remains to be done before the boundaries between adaptive and maladaptive gaming can comprehensively be established. First, replication of the current findings is important to establish a larger body of evidence looking specifically at high-frequency gamers. Moreover, future research should employ more sophisticated designs to ascertain the temporal stability of the findings presented in this study. For example, using a longitudinal design, it would be interesting to find whether symptoms of IGD are reduced by way of addressing the reason gamers are using gaming as an escape strategy. Furthermore, due to time and resource constraints, two variables had to be excluded from the study. One of them was the role of parental factors. Our study was only able to incorporate a broad *social* category which included such questions as "How satisfied are you with your personal relationships?" and "How satisfied are you with the support you get from your friends?". Parental factors should be investigated further in future studies of high-frequency gamers as previous research has suggested that positive family functioning may act as an important protective buffer against the development of problematic gaming (Schneider et al., 2017; Rehbein & Baier, 2013; Collier et al., 2016). Second, we were not able to investigate high-frequency gamers based on level of gaming skill as it was too difficult to quantify across different games and game genres. Therefore, future research should seek to investigate whether skill plays a role in adaptive vs maladaptive gaming.

4.6 Conclusion

The present study makes an important contribution to the literature by being one of the first, to the author's knowledge, to investigate risk vs protective factors associated with IGD amongst high frequency (30+ hours per week) populations of gamers. Although the generalisability of the current results must be established by future research, the present study has provided clear support for a growing body of evidence suggesting that poorer quality of

life and gaming to escape may be important risk factors associated with the development and maintenance of problem gaming. Furthermore, self-regulation by way of balancing gaming with sleep needs may act as a protective buffer against future problematic gaming. Lastly, given the increased popularity of video gaming and the success of esports athletes and streamers, it is important for future research to continue to identify markers, such as risk and protective factors, that delineate the boundary between adaptive high involvement and problematic involvement in video gaming. This line of research could assist in the development of educational programs that help identify early markers of problematic gaming, and reduce the stigma associated with high engagement in gaming.

References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The Relationship Between Addictive Use of Social Media and Video Games and Symptoms of Psychiatric Disorders: A Large-Scale Cross-Sectional Study. *Psychology of Addictive Behaviors*, 30(2), 252–262. <https://doi.org/10.1037/adb0000160>
- Baggio, S., Dupuis, M., Studer, J., Spilka, S., Daeppen, J.B., Simon, O., Berchtold, A., & Gmel, G. (2016). Reframing video gaming and internet use addiction: empirical cross-national comparison of heavy use over time and addiction scales among young users: Video gaming/internet use: heavy use versus addiction. *Addiction (Abingdon, England)*, 111(3), 513–522. <https://doi.org/10.1111/add.13192>
- Ballabio, M., Griffiths, M. D., Urbán, R., Quartiroli, A., Demetrovics, Z., & Király, O. (2017). Do gaming motives mediate between psychiatric symptoms and problematic gaming? An empirical survey study. *Addiction Research & Theory*, 25(5), 397–408. <https://doi.org/10.1080/16066359.2017.1305360>
- Bányai, F., Griffiths, M. D., Király, O., & Demetrovics, Z. (2019). The Psychology of Esports: A Systematic Literature Review. *Journal of Gambling Studies*, 35(2), 351–365. <https://doi.org/10.1007/s10899-018-9763-1>
- Billieux, J., Van der Linden, M., Achab, S., Khazaal, Y., Paraskevopoulos, L., Zullino, D., & Thorens, G. (2013). Why do you play World of Warcraft? An in-depth exploration of self-reported motivations to play online and in-game behaviours in the virtual world of Azeroth. *Computers in Human Behavior*, 29(1), 103–109. <https://doi.org/10.1016/j.chb.2012.07.021>

- Box, G. E., & Tidwell, P. W. (1962). Transformation of the Independent Variables. *Technometrics*, 4(4), 531–550. <https://doi.org/10.1080/00401706.1962.10490038>
- Brevers, D., King, D. L., & Billieux, J. (2020). Delineating adaptive esports involvement from maladaptive gaming: a self-regulation perspective. *Current Opinion in Psychology*, 36, 141– 146. <https://doi.org/10.1016/j.copsyc.2020.07.025>
- Brunborg, G. S., Mentzoni, R. A., Molde, H., Myrseth, H., Skouveroe, K. J. M., Bjorvatn, B., & Pallesen, S. (2011). The relationship between media use in the bedroom, sleep habits and symptoms of insomnia: Media use in the bedroom and sleep. *Journal of Sleep Research*, 20(4), 569–575. <https://doi.org/10.1111/j.1365-2869.2011.00913>
- Calado, F., & Griffiths, M. D. (2016). Problem Gambling Worldwide: An Update and Systematic Review of Empirical Research (2000–2015). *Journal of Behavioral Addictions*, 5(4), 592–613. <https://doi.org/10.1556/2006.5.2016.073>
- Chen, K. H., Oliffe, J. L., & Kelly, M. T. (2018). Internet Gaming Disorder: An Emergent Health Issue for Men. *American Journal of Men's Health*, 12(4), 1151–1159. <https://doi.org/10.1177/1557988318766950>
- Chung, T., Sum, S., Chan, M., Lai, E., & Cheng, N. (2019). Will esports result in a higher prevalence of problematic gaming? A review of the global situation. *Journal of Behavioral Addictions*, 8(3), 384–394. <https://doi.org/10.1556/2006.8.2019.46>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2 ed.). Lawrence Earlbaum Associates Inc.
- Cole, H., & Griffiths, M. D. (2007). Social interactions in massively multiplayer online role-playing gamers. *Cyberpsychology & Behavior*, 10(4), 575–583. <https://doi.org/10.1089/cpb.2007.9988>
- Collier, K. M., Coyne, S. M., Rasmussen, E. E., Hawkins, A. J., Padilla-Walker, L. M., Erickson, S. E., & Memmott-Elison, M. K. (2016). Does Parental Mediation of Media

Influence Child Outcomes? A Meta-Analysis on Media Time, Aggression, Substance Use, and Sexual Behavior. *Developmental Psychology*, 52(5), 798–812.

<https://doi.org/10.1037/dev0000108>

Crino, R., Slade, T., & Andrews, G. (2005). The Changing Prevalence and Severity of Obsessive-Compulsive Disorder Criteria From DSM-III to DSM-IV. *The American Journal of Psychiatry*, 162(5), 876–882. <https://doi.org/10.1176/appi.ajp.162.5.876>

Degenhardt, L., Glantz, M., Evans-Lacko, S., Sadikova, E., Sampson, N., Thornicroft, G., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Helena Anade, L., Bruffaerts, R., Bunting, B., Bromet, E. J., Caldas de Almeida, J. M., de Girolamo, G., Florescu, S., Gureje, O., Maria Haro, J., Huang, Y., ... Williams, D. R. (2017). Estimating treatment coverage for people with substance use disorders: an analysis of data from the World Mental Health Surveys. *World Psychiatry*, 16(3), 299–307.

<https://doi.org/10.1002/wps.20457>

Delfabbro, P. H. (2012). *Australasian gambling review* (5th ed.). Independent Gambling Authority.

https://books.google.com.au/books/about/Australasian_Gambling_Review.html

Delfabbro, P. H. (2013). Problem and Pathological Gambling: a Conceptual Review. *The Journal of Gambling Business and Economics*, 7(3), 35–53.

<https://doi.org/10.5750/jgbe.v7i3.817>

Demetrovics, Z., & Király, O. (2016). Commentary on Baggio et al. (2016): Internet/gaming addiction is more than heavy use over time: Commentary. *Addiction (Abingdon, England)*, 111(3), 523–524. <https://doi.org/10.1111/add.13244>

Demetrovics, Z., Urbán, R., Nagygyörgy, K., Farkas, J., Zilahy, D., Mervó, B., Reindl, A., Ágoston, C., Kertész, A., & Harmath, E. (2011). Why do you play? The development

- of the motives for online gaming questionnaire (MOGQ). *Behavior Research Methods*, 43(3), 814–825. <https://doi.org/10.3758/s13428-011-0091-y>
- Dowling, N. A., Merkouris, S. S., Greenwood, C. J., Oldenhof, E., Toumbourou, J. W., & Youssef, G. J. (2017). Early risk and protective factors for problem gambling: A systematic review and meta-analysis of longitudinal studies. *Clinical Psychology Review*, 51, 109–124. <https://doi.org/10.1016/j.cpr.2016.10.008>
- Esports Earnings. (2020). *Largest Overall Prize Pools in Esports*.
<https://www.esportsearnings.com/tournaments>
- Forbes. (2019). *Tyler Blevins*. <https://www.forbes.com/profile/tyler-blevins>
- Galanis, C. R., Delfabbro, P. H., & King, D. L. (2021). Stigma-related arguments against gaming disorder: a call for research. *Addiction (Abingdon, England)*.
<https://doi.org/10.1111/add.15561>
- Gentile, D. A., Berch, O. N., Choo, H., Khoo, A., & Walsh, D. A. (2017). Bedroom Media: One Risk Factor for Development. *Developmental Psychology*, 53(12), 2340–2355.
<https://doi.org/10.1037/dev0000399>
- Gentile, D. A., Choo, H., Liau, A., Sim, T., Li, D., Fung, D., & Khoo, A. (2011). Pathological video game use among youths: a two-year longitudinal study. *Pediatrics (Evanston)*, 127(2), 319–329. <https://doi.org/10.1542/peds.2010-1353>
- Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: a guide for non-statisticians. *International Journal of Endocrinology and Metabolism*, 10(2), 486–489. <https://doi.org/10.5812/ijem.3505>
- Granic, I., Lobel, A., & Engels, R. C. M. E. (2014). The Benefits of Playing Video Games. *The American Psychologist*, 69(1), 66–78. <https://doi.org/10.1037/a0034857>
- Griffiths, M. D., Király, O., Pontes, H. M., & Demetrovics, Z. (2015). An overview of problematic gaming. In V. Starcevic & E. Aboujaoude (Eds.), *Mental health in the*

- digital age: Grave dangers, great promise* (pp. 27–45). Oxford, UK: Oxford University Press. <http://dx.doi.org/10.1093/med/9780199380183.003.0002>
- Griffiths, M. D., Kuss, D. J., & King, D. L. (2012). Video game addiction: Past, present and future. *Current Psychiatry Reviews*, 8(4), 308–318.
<https://doi.org/10.2174/157340012803520414>
- Hassan, M., & Kyonka, E. G. (2021). A Behavior Analytic Perspective on Treatment of Problem Gaming and Problem Social Media Use. *The Psychological Record*, 71(2), 219–235. <https://doi.org/10.1007/S40732-021-00465>
- Jacobs, H. (2015, May 12). Here's the crazy training schedule of young guys who make a huge salary playing video games. *Business Insider Australia*.
<https://www.businessinsider.com.au/pro-gamers-explain-the-insane-training-regimen-they-use-to-stay-on-top-2015-5>
- Jeong, E. J., & Kim, D. H. (2011). Social Activities, Self-Efficacy, Game Attitudes, and Game Addiction. *Cyberpsychology, Behavior and Social Networking*, 14(4), 213–221.
<https://doi.org/10.1089/cyber.2009.0289>
- Jo, Y. S., Bhang, S. Y., Choi, J. S., Lee, H. K., Lee, S. Y., & Kweon, Y. S. (2019). Clinical Characteristics of Diagnosis for Internet Gaming Disorder: Comparison of DSM-5 IGD and ICD-11 GD Diagnosis. *Journal of Clinical Medicine*, 8(7), 945–957.
<https://doi.org/10.3390/jcm8070945>
- Jones, C. M., Scholes, L., Johnson, D., Katsikitis, M., & Carras, M. C. (2014). Gaming well: links between videogames and flourishing mental health. *Frontiers in Psychology*, 5, 260–260. <https://doi.org/10.3389/fpsyg.2014.00260>
- Kardefelt-Winther, D. (2014). The moderating role of psychosocial well-being on the relationship between escapism and excessive online gaming. *Computers in Human Behavior*, 38, 68–74. <https://doi.org/10.1016/j.chb.2014.05.020>

- King, D. L., & Delfabbro, P. H. (2016). The cognitive psychopathology of Internet gaming disorder in adolescence. *Journal of Abnormal Child Psychology*, 44(8), 1635-1645. <http://doi.org/10.1007/s10802-016-0135-y>
- King, D. L., & Delfabbro, P. H. (2017). Features of Parent-Child Relationships in Adolescents with Internet Gaming Disorder. *International Journal of Mental Health and Addiction*, 15(6), 1270–1283. <https://doi.org/10.1007/s11469-016-9699-6>
- King, D. L., & Delfabbro, P. H. (2019). *Internet gaming disorder: theory, assessment, treatment, and prevention*. Elsevier.
- King, D. L., Delfabbro, P. H., Zwaans, T., & Kaptsis, D. (2014). Sleep Interference Effects of Pathological Electronic Media Use during Adolescence. *International Journal of Mental Health and Addiction*, 12(1), 21–35. <https://doi.org/10.1007/s11469-013-9461-2>
- King, D. L., Haagsma, M. C., Delfabbro, P. H., Gradisar, M., & Griffiths, M. D. (2013). Toward a consensus definition of pathological videogaming: A systematic review of psychometric assessment tools. *Clinical Psychology Review*, 33, 331–342. <http://dx.doi.org/10.1016/j.cpr.2013.01.002>
- Király, O., Tóth, D., Urbán, R., Demetrovics, Z., & Maraz, A. (2017). Intense Video Gaming Is Not Essentially Problematic. *Psychology of Addictive Behaviors*, 31(7), 807–817. <https://doi.org/10.1037/adb0000316>
- Király, O., Urbán, R., Griffiths, M. D., Ágoston, C., Nagygyörgy, K., Kökönyei, G., & Demetrovics, Z. (2015). The mediating effect of gaming motivation between psychiatric symptoms and problematic online gaming: an online survey. *Journal of Medical Internet Research*, 17(4), 1–15. <https://doi.org/10.2196/jmir.3515>
- Ko, C. H., Yen, J. Y., Chen, C. S., Yeh, Y. C., & Yen, C. F. (2009). Predictive Values of Psychiatric Symptoms for Internet Addiction in Adolescents: A 2-Year Prospective

Study. *Archives of Pediatrics & Adolescent Medicine*, 163(10), 937–943.

<https://doi.org/10.1001/archpediatrics.2009.159>

Kuss, D. J., Louws, J., & Wiers, R. W. (2012a). Online Gaming Addiction? Motives Predict Addictive Play Behavior in Massively Multiplayer Online Role-Playing Games. *Cyberpsychology, Behavior and Social Networking*, 15(9), 48–485.

<https://doi.org/10.1089/cyber.2012.0034>

Lam, L. T., & Peng, Z. W. (2010). Effect of Pathological Use of the Internet on Adolescent Mental Health: A Prospective Study. *Archives of Pediatrics & Adolescent Medicine*, 164(10), 901–906. <https://doi.org/10.1001/archpediatrics.2010.159>

Lehenbauer-Baum, M., & Fohringer, M. (2015). Towards classification criteria for internet gaming disorder: Debunking differences between addiction and high engagement in a German sample of World of Warcraft players. *Computers in Human Behavior*, 45, 345–351. <https://doi.org/10.1016/j.chb.2014.11.098>

Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2011). Psychosocial causes and consequences of pathological gaming. *Computers in Human Behavior*, 27(1), 144–152. <https://doi.org/10.1016/j.chb.2010.07.015>

Liau, A. K., Choo, H., Li, D., Gentile, D. A., Sim, T., & Khoo, A. (2015). Pathological video-gaming among youth: A prospective study examining dynamic protective factors. *Addiction Research & Theory*, 23(4), 301–308. <https://doi.org/10.3109/16066359.2014.987759>

Liu, Y., Gong, R., Yu, Y., Xu, C., Yu, X., Chang, R., Wang, H., Wang, S., Wang, Q., & Cai, Y. (2021). Longitudinal predictors for incidence of internet gaming disorder among adolescents: The roles of time spent on gaming and depressive symptoms. *Journal of Adolescence (London, England.)*, 92, 1–9.

<https://doi.org/10.1016/j.adolescence.2021.06.008>

- Lo, S. K., Wang, C. C., & Fang, W. (2005). Physical Interpersonal Relationships and Social Anxiety among Online Game Players. *Cyberpsychology & Behavior*, 8(1), 15–20.
<https://doi.org/10.1089/cpb.2005.8.15>
- Mangeloja, E. (2019). Economics of Esports. *Electronic Journal of Business Ethics and Organization Studies*, 24(2), 41. <https://doi.org/10.5829/ije.2018.31.02b.17>
- McHugh, M. L. (2013). The chi-square test of independence. *Biochemia Medica*, 23(2), 143–149. <https://doi.org/10.11613/BM.2013.018>
- Mentzoni, R. A., Brunborg, G. S., Molde, H., Myrseth, H., Skouverøe, K. J. M., Hetland, J., & Pallesen, S. (2011). Problematic Video Game Use: Estimated Prevalence and Associations with Mental and Physical Health. *Cyberpsychology, Behavior and Social Networking*, 14(10), 591–596. <https://doi.org/10.1089/cyber.2010.0260>
- Montag, C., Schivinski, B., Sariyska, R., Kannen, C., Demetrovics, Z., & Pontes, H. M. (2019). Psychopathological Symptoms and Gaming Motives in Disordered Gaming- A Psychometric Comparison between the WHO and APA Diagnostic Frameworks. *Journal of Clinical Medicine*, 8(10), 1-18.
<https://doi.org/10.3390/jcm8101691>
- Müller, K., Beutel, M., Egloff, B., & Wölfling, K. (2014). Investigating Risk Factors for Internet Gaming Disorder: A Comparison of Patients with Addictive Gaming, Pathological Gamblers and Healthy Controls regarding the Big Five Personality Traits. *European Addiction Research*, 20(3), 129–136.
<https://doi.org/10.1159/000355832>
- Newzoo. (2020). *2020 Global Games Market Report*.
<https://newzoo.com/insights/trend-reports/newzoo-global-games-market-report-2020-light-version/>

Newzoo. (2021a). *2021 Global Games Market Report*.

<https://newzoo.com/insights/trend-reports/newzoo-global-games-market-report-2021-light-version/>

Newzoo. (2021b) *2021 Global Esports & Live Streaming Market Report*.

<https://newzoo.com/insights/trend-reports/newzoo-global-esports-&-live-streaming-market-report-2021-light-version/>

Perez, M. (2020, January 29). Top-Earning Video Gamers: The Ten Highest-Paid Players Pocketed More Than \$120 Million In 2019. *Forbes*.

<https://www.forbes.com/sites/mattperez/2020/01/29/top-earning-video-gamers-the-ten-highest-paid-players-pocketed-more-than-120-million-in-2019/>

Petry, N., Rehbein, F., Gentile, D., Lemmens, J., Rumpf, H., Mößle, T., Bischof, G., Tao, R., Fung, D., Borges, G., Auriacombe, M., González-Ibáñez, A., Tam, P., & O'Brien, C. (2014). An international consensus for assessing internet gaming disorder using the new DSM-5 approach: Internet gaming disorder. *Addiction*, 109(9), 1399–1406.

<https://doi.org/10.1111/add.12457>

Pontes, H. M., Király, O., Demetrovics, Z., & Griffiths, M. D. (2014). The conceptualisation and measurement of DSM-5 Internet Gaming Disorder: the development of the IGD-20 Test. *PloS One*, 9(10), 1-9. <https://doi.org/10.1371/journal.pone.0110137>

Ramos-Díaz, J., Ramos-Sandoval, R., Király, O., & Demetrovics, Z. (2018, November 20). *An exploratory study on motivational predictors in internet gaming disorder among Peruvian gamers* [Paper presentation]. 2018 IEEE Sciences and Humanities International Research Conference (SHIRCON), Peru.

<https://doi.org/10.1109/SHIRCON.2018.8593048>

Ruscio, A. M., Hallion, L. S., Lim, C. C. W., Aguilar-Gaxiola, S., Al-Hamzawi, A., Alonso, J., Andrade, L. H., Borges, G., Bromet, E. J., Bunting, B., Caldas de Almeida, J. M.,

- Demyttenaere, K., Florescu, S., de Girolamo, G., Gureje, O., Haro, J. M., He, Y., Hinkov, H., Hu, C., ... Scott, K. M. (2017). Cross-sectional Comparison of the Epidemiology of DSM-5 Generalized Anxiety Disorder Across the Globe. *JAMA Psychiatry*, 74(5), 465–475. <https://doi.org/10.1001/jamapsychiatry.2017.0056>
- Schimmenti, A., Passanisi, A., Gervasi, A. M., Manzella, S., & Famà, F. I. (2014). Insecure Attachment Attitudes in the Onset of Problematic Internet Use Among Late Adolescents. *Child Psychiatry and Human Development*, 45(5), 588–595. <https://doi.org/10.1007/s10578-013-0428-0>
- Schneider, L. A., King, D., & Delfabbro, P. H. (2017). Family factors in adolescent problematic Internet gaming: A systematic review. *Journal of Behavioral Addictions*, 6(3), 321–333. <https://doi.org/10.1556/2006.6.2017.035>
- Seay, A., & Kraut, R. (2007). Project massive: self-regulation and problematic use of online gaming. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, 829–838. <https://doi.org/10.1145/1240624.1240749>
- Severo, R. B., Soares, J. M., Affonso, J. P., Giusti, D. A., de Souza Junior, A. A., de Figueiredo, V. L., Pinheiro, K. A., & Pontes, H. M. (2020). Prevalence and risk factors for internet gaming disorder. *Revista Brasileira de Psiquiatria*, 42(5), 532–535. <https://doi.org/10.1590/1516-4446-2019-0760>
- Skevington, S. M., Lotfy, M., & O’Connell, K. A. (2004). The World Health Organization’s WHOQOL-BREF Quality of Life Assessment: Psychometric Properties and Results of the International Field Trial A Report from the WHOQOL Group. *Quality of Life Research*, 13(2), 299–310. <https://doi.org/10.1023/B:QURE.0000018486.91360.00>
- Sloboda, Z., Glantz, M. D., & Tarter, R. E. (2012). Revisiting the Concepts of Risk and Protective Factors for Understanding the Etiology and Development of Substance Use

and Substance Use Disorders: Implications for Prevention. *Substance Use & Misuse*, 47(9), 944–962. <https://doi.org/10.3109/10826084.2012.663280>

Statista. (2021a). Average consecutive time spent playing video games in selected countries worldwide as of January 2021.

<https://www.statista.com/statistics/936732/consecutive-time-spent-playing-video-games-worldwide/>

Statista. (2021b). *Average number of viewers on Twitch 2021*.

<https://www.statista.com/statistics/761122/average-number-viewers-on-youtube-gaming-live-and-twitch/>

Stevens, M.W.R, Dorstyn, D., Delfabbro, P. H., & King, D. L. (2020). Global prevalence of gaming disorder: A systematic review and meta-analysis. *Australian & New Zealand Journal of Psychiatry*, 55(6), 553-568. <https://doi.org/10.1177/0004867420962851>

Triberti, S., Milani, L., Villani, D., Grumi, S., Peracchia, S., Curcio, G., & Riva, G. (2018). What matters is when you play: Investigating the relationship between online video games addiction and time spent playing over specific day phases. *Addictive Behaviors Reports*, 8, 185–188. <https://doi.org/10.1016/j.abrep.2018.06.003>

Twitch Tracker. (2021). *Ninja*. <https://twitchtracker.com/ninja/statistics>

Van Rooij, A. J., Ferguson, C. J., Colder Carras, M., Kardefelt-Winther, D., Shi, J., Aarseth, E., Bean, A. M., Helmersson Bergmark, K., Bruss, A., Coulson, M., Deleuze, J., Dullur, P., Dunkels, E., Edman, J., Etchells, P. J., Elson, M., Fiskaali, A., Granic, I., Jansz, J., ... Przybylski, A. K. (2018). A weak scientific basis for gaming disorder: Let us err on the side of caution. *Journal of Behavioral Addictions*, 7(1), 1–9. <https://doi.org/10.1556/2006.7.2018.19>

- Weinstein, A., & Weizman, A. (2012). Emerging Association Between Addictive Gaming and Attention-Deficit/Hyperactivity Disorder. *Current Psychiatry Reports, 14*(5), 590–597. <https://doi.org/10.1007/s11920-012-0311>
- Weis, R., & Cerankosky, B. C. (2010). Effects of Video-Game Ownership on Young Boys' Academic and Behavioral Functioning: A Randomized, Controlled Study. *Psychological Science, 21*(4), 463–470. <https://doi.org/10.1177/0956797610362670>
- Wood, R. T. A., & Griffiths, M. D. (2007). A qualitative investigation of problem gambling as an escape-based coping strategy. *Psychology and Psychotherapy, 80*(1), 107–125. <https://doi.org/10.1348/147608306X107881>
- World Health Organization. (2012). *WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment*. <https://www.who.int/publications/i/item/WHOQOL-BREF>
- World Health Organization. (2019). 6C51 Gaming Disorder. In *International statistical classification of diseases and related health problems* (11th ed.). <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/338347362>
- Wu, A. M., Lai, M. H., Lau, J. T., Lei, M. W., & Yu, S. (2017). Motives for online gaming questionnaire: Its psychometric properties and correlation with Internet gaming disorder symptoms among Chinese people. *Journal of Behavioral Addictions, 6*(1), 11–20. <https://doi.org/10.1556/2006.6.2017.007>
- Xu, Z., Turel, O., & Yuan, Y. (2012). Online game addiction among adolescents: motivation and prevention factors. *European Journal of Information Systems, 21*(3), 321–340. <https://doi.org/10.1057/ejis.2011.56>
- Yang, C., & Liu, D. (2017). Motives Matter: Motives for Playing Pokémon Go and Implications for Well-Being. *Cyberpsychology, Behavior and Social Networking, 20*(1), 52–57. <https://doi.org/10.1089/cyber.2016.0562>

Yee, N. (2006). Motivations for Play in Online Games. *Cyberpsychology & Behavior*, 9(6), 772–775. <https://doi.org/10.1089/cpb.2006.9.772>

Young, K. (2009). Understanding online gaming addiction and treatment issues for adolescents. *The American Journal of Family Therapy*, 37(5), 355–372. <https://doi.org/10.1080/01926180902942191>

Zsila, Á., Orosz, G., Bőthe, B., Tóth-Király, I., Király, O., Griffiths, M., & Demetrovics, Z. (2018). An empirical study on the motivations underlying augmented reality games: The case of Pokémon Go during and after Pokémon fever. *Personality and Individual Differences*, 133, 56–66. <https://doi.org/10.1016/j.paid.2017.06.024>

Appendices

Appendix A – Prolific Advertisement



Understanding high frequency gaming

Hosted by *Paul Delfabbro*

£1.25 • 15 minutes • £5.00/hr • 250 places remaining

The purpose of this study is to expand upon the currently limited knowledge regarding the risk vs. protective factors associated with problem gaming amongst high frequency (30+ hours) gamers.

You are invited to participate in this survey if you are at least 16 years of age and play video games for at least 30 hours per week.

Participating in this study will require you to answer questions about yourself (e.g., gender, age) your video game use, and gaming protective factors. The survey also includes questions from gaming motive, quality of life, and gaming pathology measures. All responses will be anonymous.

The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2019-21/19).

Devices you can use to take this study:

Desktop 

Mobile 

Tablet 

Open study link in a new window

Appendix B – Information Sheet



PARTICIPANT INFORMATION SHEET

PROJECT TITLE: Delineating the Boundaries Between High Engagement and Problem Gaming

HUMAN RESEARCH ETHICS COMMITTEE APPROVAL NUMBER: H-2019-21/19

PRINCIPAL INVESTIGATOR: Professor Paul Delfabbro

STUDENT RESEARCHER: Jake Slack

STUDENT'S DEGREE: Honours Degree of Bachelor of Psychological Science

Dear Participant,

You are invited to participate in the research project described below.

What is the project about?

The purpose of this study is to expand upon the currently limited knowledge regarding the risk vs. protective factors associated with problem gaming amongst high frequency (30+ hours) gamers.

Who is undertaking the project?

This project is being conducted by Jake Slack and Professor Paul Delfabbro of the School of Psychology at the University of Adelaide. This research is performed for a thesis as part of an Honours Degree of Bachelor of Psychological Science at the University of Adelaide.

Why am I being invited to participate?

You are invited to participate in this survey if you are at least 16 years of age, English-speaking and play video games for at least 30 hours per week.

What am I being invited to do?

Consenting to participate in the study will require you to answer questions about yourself (e.g., gender, age) your video game use, and gaming protective factors. The survey also includes questions from gaming motive, quality of life, and problem gaming measures. You can complete the questions online, on your own device, and at a time and location of your choosing. All of your responses will be anonymous and kept confidential.

How much time will my involvement in the project take?

The survey will take approximately 15 minutes for you to complete.

- If you are participating in this survey through the Prolific site, you will be eligible for monetary reimbursement as per Prolific policy.
- If you are participating in this survey as a member of the community, you will be offered the opportunity to provide your email address at the conclusion of the survey and go in the draw to win one of 3 prizes (\$150, \$100 and \$50).

Are there any risks associated with participating in this project?

Participation in this survey may be a burden on your time and there is a possibility that some questions in this survey may cause you to feel slight discomfort. However, it is not expected that you will experience any harm because of your participation.

What are the potential benefits of the research project?

This research may provide greater insights into the boundaries between high engagement and problem gaming. The results of this study could be beneficial for two reasons: firstly, it may help lead to protective strategies being developed that prevent harm to this ever-growing population, secondly, it could help reduce the over-classification of high-frequency gaming as problematic.

Can I withdraw from the project?

Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time.

What will happen to my information?

Your privacy is very important to us. Your participation in this study and any information you provide will be treated in a confidential manner. Your participation will be anonymous, and data will be collated for the purpose of analysis. As this study is being conducted as part of the requirements of an honours degree, summary data will be presented in the form of a thesis. The findings may also be written with intent for journal publication under the guidance of supervisor Paul Delfabbro. Individual responses will not be identifiable in any reporting of results. After submitting your survey responses, you are welcome provide your email address and we will email a summary of our findings to you. If you provide your email address, this will not be connected to your survey responses.

All data you provide will be de-identified and kept secure on password-protected and secure databases for a period of 5 years. The data may be used in the future as a source of comparison for other data collected on a similar topic or made available as a secondary data-set to assist Honours research.

Because some of the research team are teaching staff associated with this university, whether you elect to participate or not will be kept entirely confidential. Any members of the research team associated with the coordination or administration of University of Adelaide Psychology units will not know whether you have elected to participate and will only view anonymous data.

Your information will only be used as described in this participant information sheet and it will only be disclosed according to the consent provided, except as required by law.

Who do I contact if I have questions about the project?

If you have any questions, you are welcome to contact either researcher via the details listed below:

Principal Researcher: *Professor Paul Delfabbro*

[Redacted contact information for Professor Paul Delfabbro]

Student Researcher: *Jake Slack*

[Redacted contact information for Jake Slack]

What if I have a complaint or any concerns?

The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2019-21/19). This research project will be conducted according to the NHMRC National Statement on Ethical Conduct in Human Research 2007 (Updated 2018). 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. If you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant, please contact the acting chair of the Subcommittee, Dr. Diana Dorstyn (Diana.Dorstyn@adelaide.edu.au).

If I want to participate, what do I do?

If you are happy to participate in our study please click "**Next**" at the bottom of the page and you will be directed to the consent form.

Yours sincerely,

Professor Paul Delfabbro, and Jake Slack

Next

Appendix C – Consent Form

Human Research Ethics Committee (HREC)

CONSENT FORM

1. I have read the attached Information Sheet and agree to take part in the following research project:

Title: Delineating the boundaries between high engagement and problem gaming

Ethics Approval Number: H-2019-21/19

2. I have had the project, so far as it affects me, and the potential risks and burdens fully explained to my satisfaction by the research worker. I have had the opportunity to ask any questions I may have about the project and my participation. My consent is given freely.

3. I have had the project, so far as it affects me, and the potential risks and burdens fully explained to my satisfaction by the research worker. I have had the opportunity to ask any questions I may have about the project and my participation. My consent is given freely.

4. Although I understand the purpose of the research project, it has also been explained that my involvement may not be of any benefit to me.

5. I agree to participate in the activities outlined in the participant information sheet.

6. I understand that as my participation is anonymous, I can withdraw at any time up until submission of the survey.

7. I acknowledge that I may no longer be eligible for monetary reward in remuneration if I withdraw from the study at any point before completion.

8. I have been informed that the information gained in the project will likely be published as a thesis and may be published as a journal article.

9. I have been informed that in the published materials I will not be identified, and my personal results will not be divulged.

10. I agree to my information being used for future research purposes as follows:

	Yes	No
Research undertaken by these same researcher(s)	☐	☐
Research undertaken by any researcher(s)	☐	☐

11. I hereby provide 'extended' consent for the use of my data or tissue in future research projects that are:

	Yes	No
(i) an extension of, or closely related to, the original project:	☐	☐
(ii) in the same general area of research (for example, genealogical, ethnographical, epidemiological, or chronic illness research):	☐	☐

Or

12. I hereby provide 'unspecified' consent for the use of my data in any future research:

Yes	No
☐	☐

13. I understand my information will only be disclosed according to the consent provided, except where disclosure is required by law.

14. I am aware that I should keep a copy of this Consent Form when completed, and the attached Information Sheet. You can download a copy [below](#).

[Participant info sheet/Consent form](#)

Should you wish to proceed, please click "**I consent**" below. If you do not wish to proceed with the survey, please simply close this window to exit.

[Previous](#)

[I consent](#)

Appendix D – Demographic Questions



Understanding high-frequency gaming

PART 1: DEMOGRAPHICS

What is your age?

With which gender do you identify?

☐ Male

☐ Female

☐ Prefer not to say

☐ Other (please specify)

In what part of the world do you live?

☐ Australia / New Zealand or Oceania

☐ North America

☐ South America

☐ Europe

☐ United Kingdom

☐ Other (please specify)

In which country do you currently reside?

Are you currently engaged in secondary or tertiary education (e.g. High School, University, Other technical or non-University based qualification)?

- ☐ Yes, High School
- ☐ Yes, University Full-time
- ☐ Yes, University Part-time
- ☐ Yes, Other qualification Full-time
- ☐ Yes, Other qualification Part-time
- ☐ No

What is the highest level of education you have attained?

- ☐ Secondary / High school
- ☐ Further (e.g. apprenticeship, TAFE)
- ☐ Higher (i.e., undergraduate, college)
- ☐ Postgraduate (e.g., Masters, Ph.D)
- ☐ None of the above options
- ☐ Other (please specify)

What is your current employment status?

- ☐ Employed full time
- ☐ Employed part-time
- ☐ Casually employed
- ☐ Unemployed
- ☐ Retired
- ☐ Other (please specify)

What is your current relationship status?

- ☐ Single
- ☐ In a relationship
- ☐ Married
- ☐ Divorced / Separated
- ☐ Widowed
- ☐ Other (please specify)

What are your current living circumstances?

- ☐ Living with a parent / guardian
- ☐ Living independently (renting, share house)
- ☐ Living independently (owner-occupier)
- ☐ Other (please specify)

[Previous Part](#)

[Next Part](#)

Appendix E – Gaming Characteristics Questions

PART 2: GAMING RELATED QUESTIONS

On average, how many hours per week do you spend gaming?

- ☐ 30-40 hours per week (equivalent to about 4-6 hours per day)
- ☐ 40-50 hours per week (equivalent to about 6-7 hours per day)
- ☐ 50+ hours per week (equivalent to about 7+ hours per day)

What are your future gaming aspirations?

- ☐ To continue playing 30+ hours per week alongside another job
- ☐ To pursue gaming (either playing or streaming) as a professional activity
- ☐ To continue as a leisure activity only
- ☐ Other (please specify)

Do you engage in competitive esports / gaming?

- ☐ Yes
- ☐ No

Do you / have you recieved an income from gaming?

- ☐ Yes
- ☐ No

Not including the initial purchase of a game, do you / have you put your own money into a game (otherwise known as microtransactions)?

- ☐ Yes
- ☐ No

Do you engage in live streaming (such as Twitch etc.)?

- ☐ Yes
- ☐ No

Do you / have you received an income from streaming?

- ☐ Yes
- ☐ No

[Previous Part](#)[Next Part](#)

Appendix F – Protective Factors Questions

PART 3: PROTECTIVE FACTORS

Do you set limits on the amount of time you spend gaming?

☐ Yes

☐ No

Do you set limits on the amount of money you devote to gaming?

☐ Yes

☐ No

Do you balance gaming with other leisure activities / hobbies?

☐ Yes, I engage in other leisure activities / hobbies other than gaming

☐ No, I do not engage in other leisure activities / hobbies other than gaming

Do you balance your commitment to gaming with exercise and / or playing sport?

☐ Yes

☐ No

Do you balance your commitment to gaming with your need for sleep?

☐ Yes

☐ No

Do make a conscious effort to eat some healthier food during weeks of gaming?

☐ Yes

☐ No

Do you make a conscious effort to maintain your personal hygiene during weeks of gaming (shower/bath, cleaning teeth, changing into clean clothes etc.)?

☐ Yes

☐ No

Do you make a conscious effort to maintain sanitary living conditions (removing garbage, cleaning dirty dishes etc.)?

☐ Yes

☐ No

Have you ever arrived late to work because of gaming (a prolonged session, losing track of time etc.)?

☐ Yes

☐ No

☐ I have never had a job

Do you ever feel socially isolated when gaming (feeling alone etc.)?

☐ Yes

☐ No

Do you ever feel regret, shame, or guilt when spending time gaming in preference over other activities?

☐ Yes

☐ No

[Previous Part](#)

[Next Part](#)

Appendix G – Petry’s Internet Gaming Disorder Scale

PART 4: Issues Related to Gaming

In the last 12 months...

	Yes	No
Have you spent a lot of time thinking about games even when you were not playing, or planning when you could play next?	☐	☐
Have you felt restless, irritable, moody, angry, anxious or sad when attempting to cut down or stop gaming, or when you were unable to play?	☐	☐
Did you feel the need to play for increasing amounts of time, play more exciting games, or use more powerful equipment to get the same amount of excitement you used to get?	☐	☐
Did you feel that you should play less, but were unable to cut back on the amount of time you spent playing games?	☐	☐
Did you lose interest in or reduce participation in other recreational activities (hobbies, meetings with friends) due to gaming?	☐	☐
Did you continue to play games even though you were aware of negative consequences, such as not getting enough sleep, being late to school/work, spending too much money, having arguments with others, or neglecting important duties?	☐	☐
Did you lie to family, friends or others about how much you game, or try to keep your family or friends from knowing how much you game?	☐	☐
Did you game to escape from or forget about personal problems, or to relieve uncomfortable feelings such as guilt, anxiety, helplessness or depression?	☐	☐
Did you risk or lose significant relationships, or job, educational or career opportunities because of gaming?	☐	☐

Appendix H - Motives for Online Gaming Questionnaire (MOGQ)

PART 5: GAMING MOTIVATIONS

People play online games for different reasons. Some reasons are listed below. Please indicate how often you play online games for the reasons listed below by selecting the appropriate response.

I play online games...

	almost never / never	some of the time	half of the time	most of the time	almost always / always
... because I can get to know new people	☐	☐	☐	☐	☐
... because gaming helps me to forget about daily hassles	☐	☐	☐	☐	☐
... because I enjoy competing with others	☐	☐	☐	☐	☐
... because gaming helps me get into a better mood	☐	☐	☐	☐	☐
... because gaming sharpens my senses	☐	☐	☐	☐	☐
... because I can do things that I am unable to do or I am not allowed to do in real life	☐	☐	☐	☐	☐
... for recreation	☐	☐	☐	☐	☐
... because I can meet many different people	☐	☐	☐	☐	☐
... because it makes me forget real life	☐	☐	☐	☐	☐
... because I like to win	☐	☐	☐	☐	☐
... because it helps me get rid of stress	☐	☐	☐	☐	☐
... because it improves my skills	☐	☐	☐	☐	☐
... to feel as if I was somebody else	☐	☐	☐	☐	☐
... because it is entertaining	☐	☐	☐	☐	☐
... because it is a good social experience	☐	☐	☐	☐	☐

... because gaming helps me escape reality	☐	☐	☐	☐	☐
... because it is good to feel that I am better than others	☐	☐	☐	☐	☐
... because it helps me channel my aggression	☐	☐	☐	☐	☐
... because it improves my concentration	☐	☐	☐	☐	☐
... to be somebody else for a while	☐	☐	☐	☐	☐
... because I enjoy gaming	☐	☐	☐	☐	☐
... because gaming gives me company	☐	☐	☐	☐	☐
... to forget about unpleasant things or offences	☐	☐	☐	☐	☐
... for the pleasure of defeating others	☐	☐	☐	☐	☐
... because it reduces tension	☐	☐	☐	☐	☐
... because it improves my coordination skills	☐	☐	☐	☐	☐
... because I can be in another world	☐	☐	☐	☐	☐

[Previous Part](#)[Next Part](#)

Appendix I – Quality of Life Questionnaire (WHOQOL-BREF)

PART 6: QUALITY OF LIFE

Please read each question, assess your feelings, and select an answer on the scale for each question that gives the best answer for you.

	Very poor	Poor	Neither poor nor good	Good	Very good
How would you rate your quality of life?	☐	☐	☐	☐	☐
	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your health?	☐	☐	☐	☐	☐

The following questions ask about how much you have experienced certain things in the last two weeks.

	Not at all	A little	A moderate amount	Very much	An extreme amount
To what extent do you feel that physical pain prevents you from doing what you need to?	☐	☐	☐	☐	☐
How much do you need any medical treatment to function in your daily life?	☐	☐	☐	☐	☐
How much do you enjoy life?	☐	☐	☐	☐	☐
To what extent do you feel your life to be meaningful?	☐	☐	☐	☐	☐
	Not at all	A little	A moderate amount	Very much	Extremely
How well are you able to concentrate?	☐	☐	☐	☐	☐
How safe do you feel in your daily life?	☐	☐	☐	☐	☐
How healthy is your physical environment?	☐	☐	☐	☐	☐

The following questions ask about how completely you experience or were able to do certain things in the last two weeks?

	Not at all	A little	Moderately	Mostly	Completely
Do you have enough energy for everyday life?	☐	☐	☐	☐	☐
Are you able to accept your bodily appearance?	☐	☐	☐	☐	☐
Have you enough money to meet your needs?	☐	☐	☐	☐	☐
How available to you is the information that you need in your day-to-day life?	☐	☐	☐	☐	☐
To what extent do you have the opportunity for leisure activities?	☐	☐	☐	☐	☐

	Very poor	Poor	Neither good nor poor	Good	Very good
How well are you able to get around?	☐	☐	☐	☐	☐

	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
How satisfied are you with your sleep?	☐	☐	☐	☐	☐
How satisfied are you with your ability to perform your daily living activities?	☐	☐	☐	☐	☐
How satisfied are you with your capacity for work?	☐	☐	☐	☐	☐
How satisfied are you with yourself?	☐	☐	☐	☐	☐
How satisfied are you with your personal relationships?	☐	☐	☐	☐	☐
How satisfied are you with your sex life?	☐	☐	☐	☐	☐
How satisfied are you with the support you get from your friends?	☐	☐	☐	☐	☐
How satisfied are you with the conditions of your living place?	☐	☐	☐	☐	☐
How satisfied are you with your access to health services?	☐	☐	☐	☐	☐
How satisfied are you with your transport?	☐	☐	☐	☐	☐

The following question refers to how often you have felt or experienced certain things in the last two weeks?

	Never	Seldom	Quite often	Very often	Always
How often do you have negative feelings such as blue mood, despair, anxiety, depression?	☐	☐	☐	☐	☐

[Previous Part](#)
[Next Part](#)

Appendix J – End of Survey



Thank you for completing our survey!

The study you have just participated in was designed to delineate the boundaries between high engagement (30+ hours per week spent gaming) and problem gaming. This is achieved by classifying all participants into two groups (based on certain responses to the survey): problem gamer, non-problem gamer. From here researchers are able to compare the risk vs. protective factors between the two groups.

In recent decades video gaming has cemented itself as a healthy hobby for approximately one-third of the world's population. This number is only expected to rise owing to the rapid growth of Esports, which can be defined as any sporting competition that features video gaming. Esports events draw in enormous numbers of players and spectators from around the globe. However, despite these developments in the professionalisation and potential benefits of gaming, there has been increasing global recognition of the potential public health issues associated with engaging in very frequent gaming. Specifically, it has been observed that excessive video gaming may lead to a wide variety of negative physical and psychosocial consequences. This has led to Internet gaming disorder being included in the appendix of the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders as a condition warranting further study, and Gaming disorder being officially recognised as a mental health condition in the eleventh edition of the International Classification of Diseases. The term 'problematic gaming' is therefore used to encompass both the DSM-5 and ICD-11 classifications.

It is important to note however, that gaming is not equivalent to problem gaming. Concerns only arise when engagement in gaming is excessive and potentially harmful. In fact, unlike other at-risk behaviours, such as smoking and substances use, gaming is an activity that is associated with several benefits. It is therefore argued that there is a danger for regular gaming to be overpathologised and that poorly defined or overly inclusive problem gaming criteria may not effectively distinguish harmful from adaptive gaming involvement. Accordingly, there is interest in understanding the boundary between positive and problematic involvement in video gaming so that strategies can be developed to prevent harm, while also not over-classifying high frequency gaming that may often reflect adaptive play and/or engagement in competitive gaming.

Therefore, in this study we are looking to build on the currently limited research about the boundaries between high engagement (30+ hours per week spent gaming) and problem gaming. In particular, we're investigating:

1. Whether problem gamers score lower on all four facets (physical health, psychological, social relationships, environment) of the WHOQOL-BREF than those who do not meet the criteria.
2. Whether problem gamers record higher escape and fantasy scores on the MOGQ than those who do not meet the criteria.
3. Whether problem gamers record lower social, competition, coping and skill development scores on the MOGQ than who do not meet the criteria.
4. Whether problem gamers report fewer protective factors than those who do not meet the criteria.

If you found that completing this survey caused you to feel distressed or anxious, you should contact one of the support services listed below. All offer free services and information.

Kids Helpline: 1800 55 1800
counsellor@kidshelpline.com.au
<https://kidshelpline.com.au/teens/get-help/webchat-counselling/>

Lifeline: 13 11 14
<https://www.lifeline.org.au/get-help/online-services/crisis-chat>

Headspace: <https://www.headspace.org.au/headspace-centres/>
<https://www.eheadspace.org.au/>

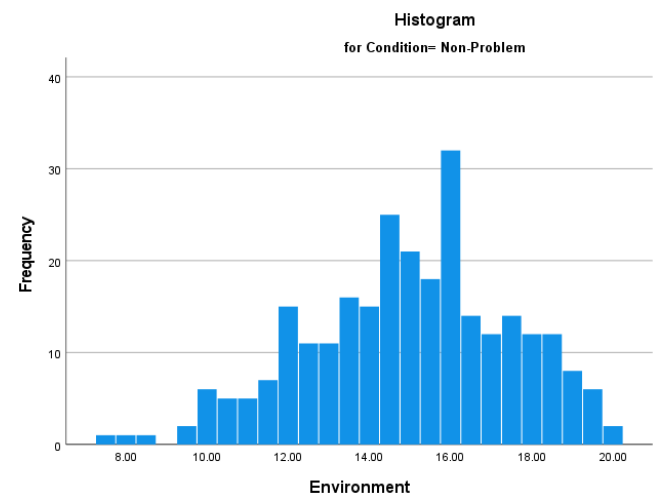
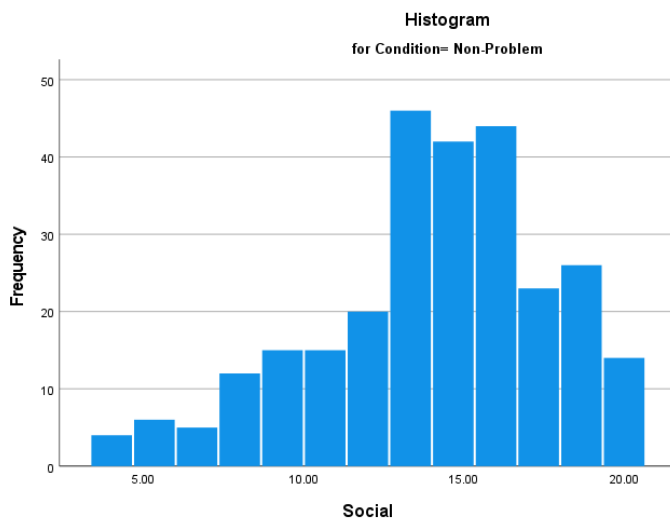
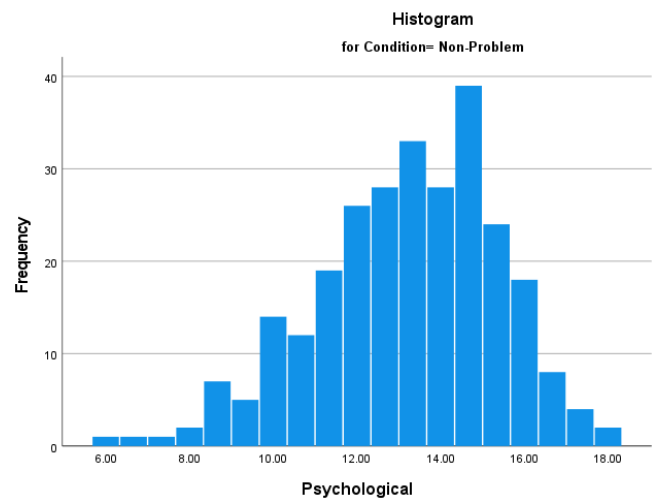
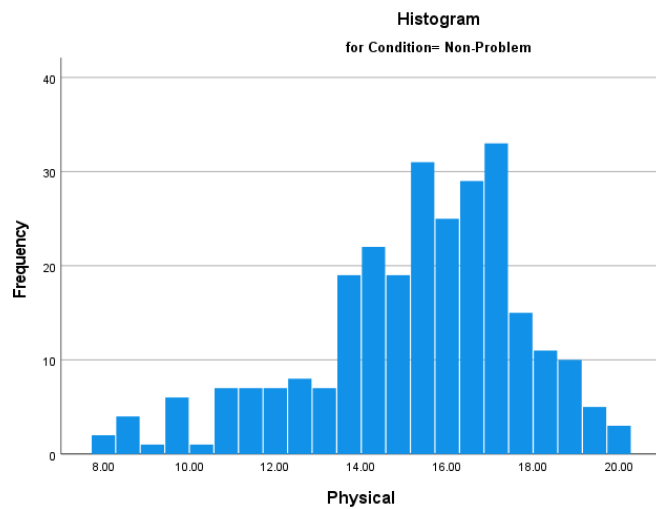
If these are not suitable for any reason, the researchers will help you seek alternative support. You can contact them on:

Paul Delfabbro: paul.delfabbro@adelaide.edu.au

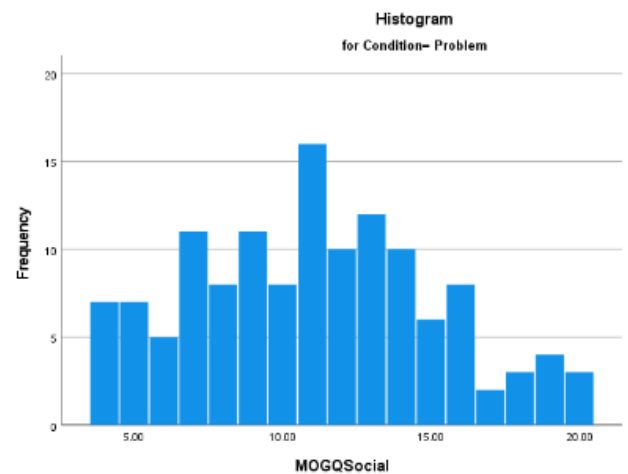
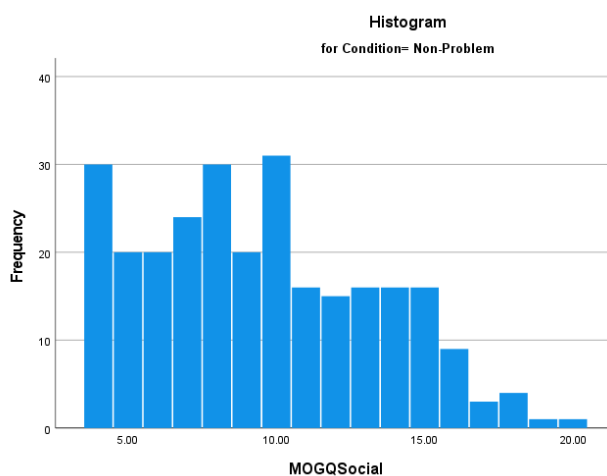
Jake Slack: jake.slack@student.adelaide.edu.au

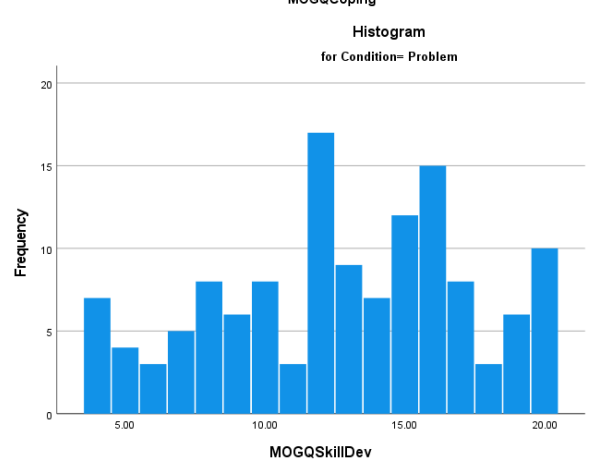
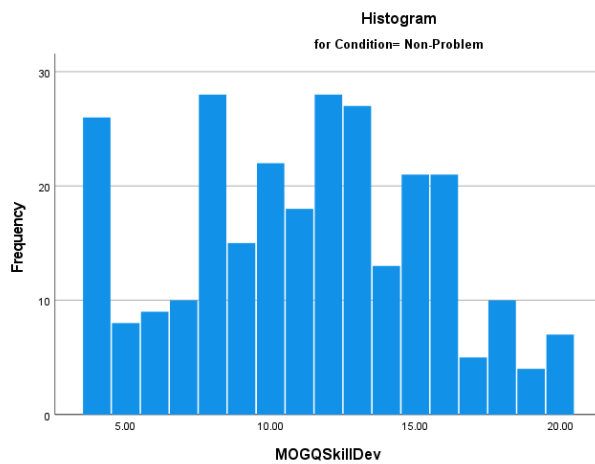
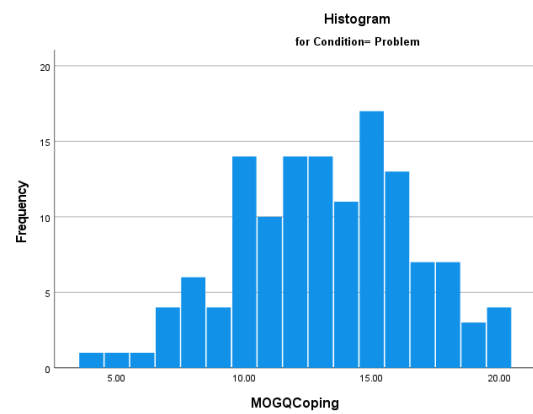
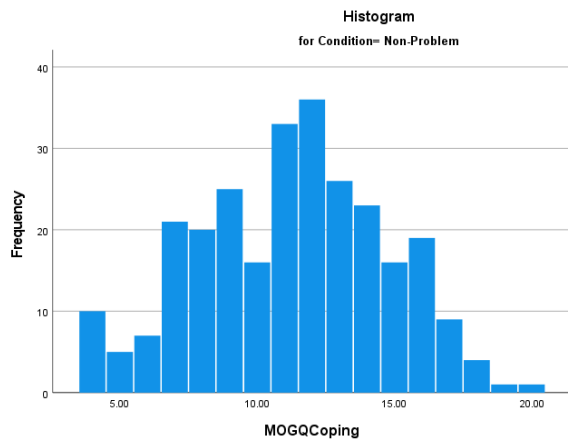
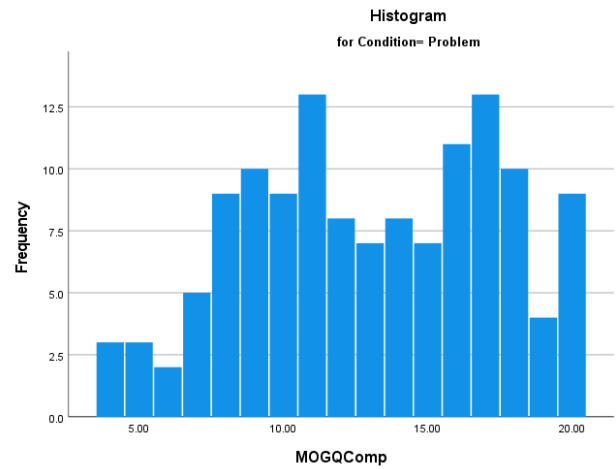
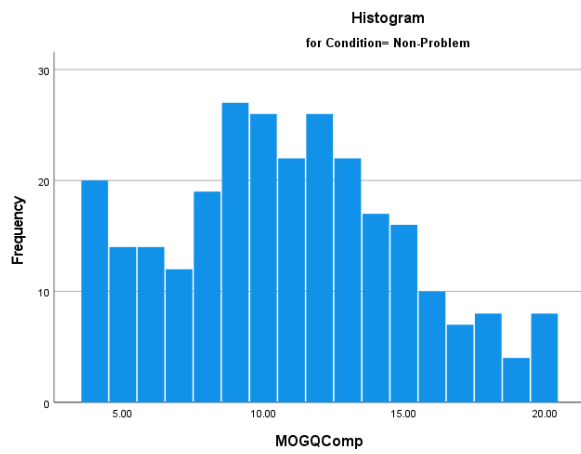
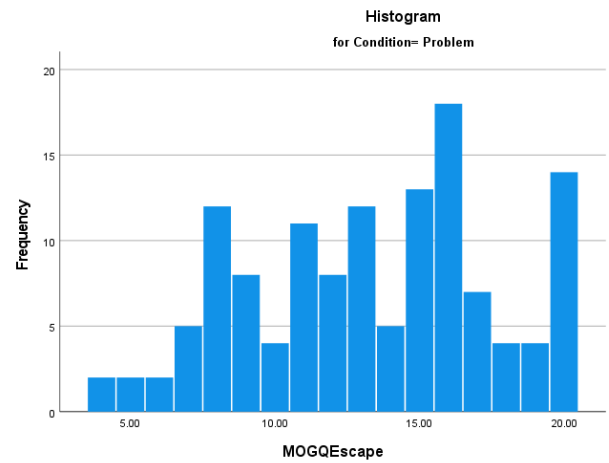
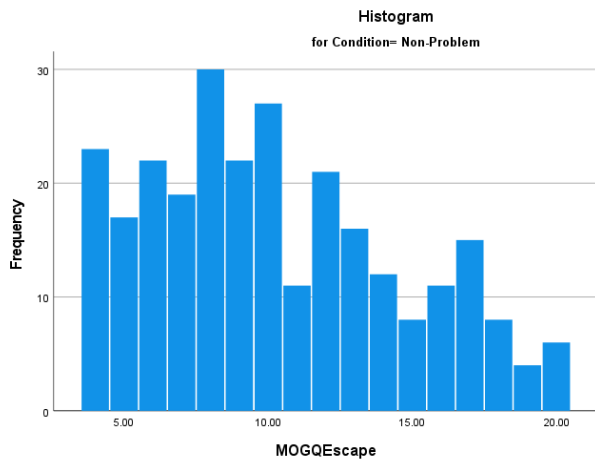
Appendix K – Histograms of Variables that Violated the Assumption of Normality

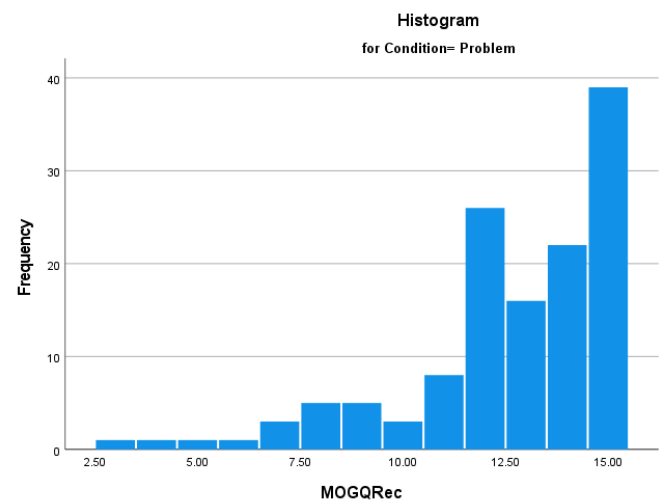
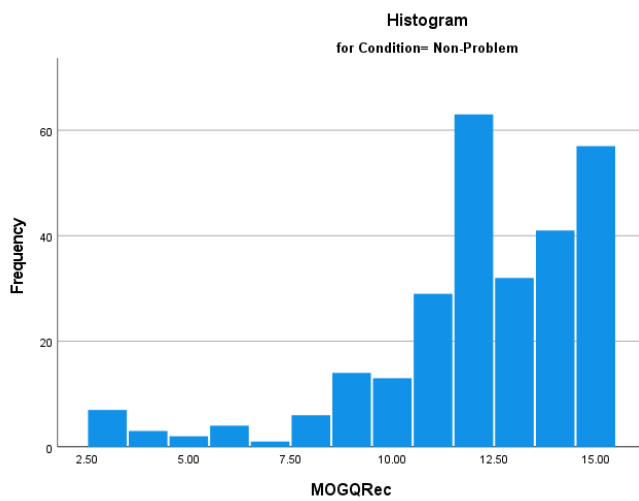
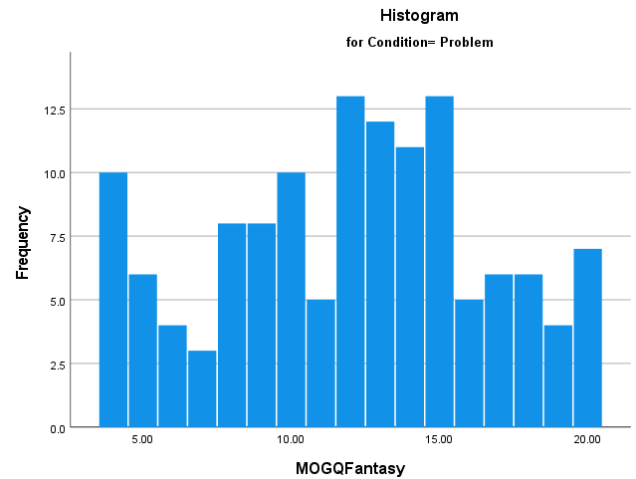
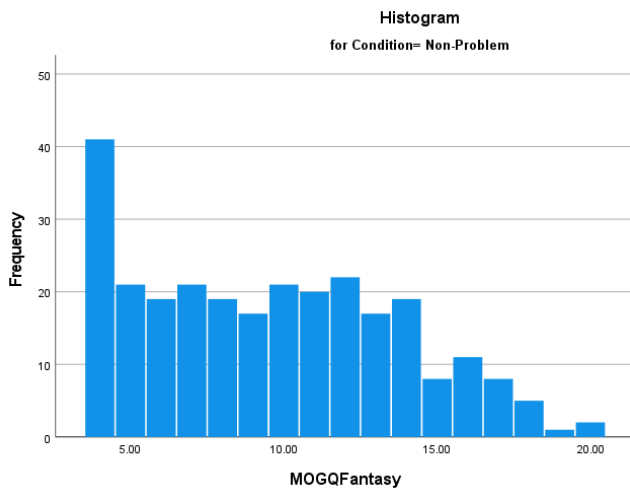
K.1 Non-Problem Group for all four Domains of the WHOQOL-BREF



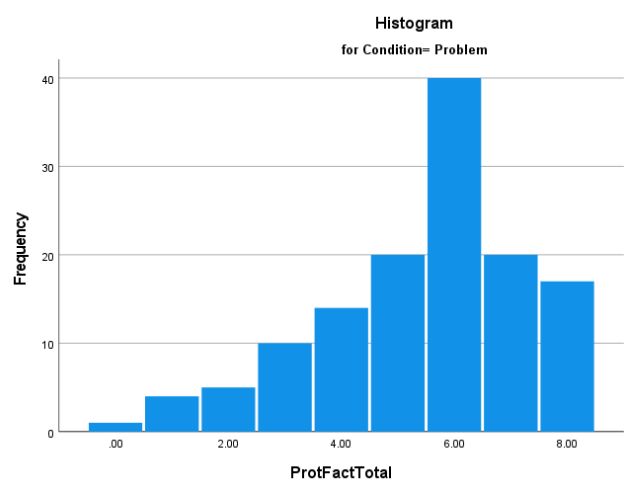
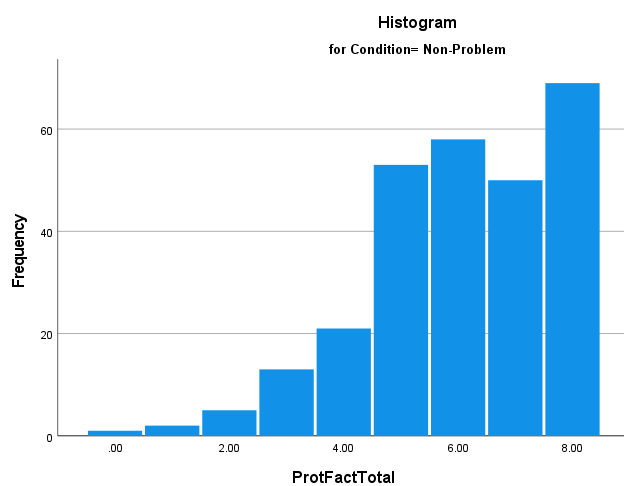
K.2 Both Groups for all seven Factors of the MOGQ







K.3 Both Groups for Prevalence of Protective Factors



Appendix L – SPSS Data for Examiner

L.1 Independent Samples T-Tests for Hypothesis 1

Group Statistics

	Condition	N	Mean	Std. Deviation	Std. Error Mean
WHOPhysical	Non-problem	272	15.2752	2.47391	.15000
	Problem	131	14.0022	2.59295	.22655
WHOPsych	Non-problem	272	13.2059	2.18762	.13264
	Problem	131	12.4987	2.37558	.20756
WHOSocial	Non-problem	272	14.0245	3.67781	.22300
	Problem	131	12.0000	4.07787	.35629
WHOEnviro	Non-problem	272	14.9743	2.49562	.15132
	Problem	131	14.0229	2.66087	.23248

Independent Samples Effect Sizes

		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
WHOPhysical	Cohen's d	2.51312	.507	.295	.718
	Hedges' correction	2.51783	.506	.294	.716
	Glass's delta	2.59295	.491	.273	.707
WHOPsych	Cohen's d	2.25027	.314	.104	.524
	Hedges' correction	2.25449	.314	.104	.523
	Glass's delta	2.37558	.298	.086	.509
WHOSocial	Cohen's d	3.81211	.531	.319	.742
	Hedges' correction	3.81925	.530	.319	.741
	Glass's delta	4.07787	.496	.279	.713
WHOEnviro	Cohen's d	2.55037	.373	.163	.583
	Hedges' correction	2.55515	.372	.162	.582
	Glass's delta	2.66087	.358	.144	.570

a. The denominator used in estimating the effect sizes.
Cohen's d uses the pooled standard deviation.
Hedges' correction uses the pooled standard deviation, plus a correction factor.
Glass's delta uses the sample standard deviation of the control group.

Independent Samples Test

		Levene's Test for Equality of Variances				t-test for Equality of Means					
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
WHOPhysical	Equal variances assumed	2.625	.106	4.763	401	<.001	<.001	1.27303	.26727	.74761	1.79845
	Equal variances not assumed			4.685	246.267	<.001	<.001	1.27303	.27171	.73786	1.80819
WHOPsych	Equal variances assumed	1.002	.317	2.955	401	.002	.003	.70715	.23931	.23669	1.17762
	Equal variances not assumed			2.871	238.768	.002	.004	.70715	.24632	.22192	1.19239
WHOSocial	Equal variances assumed	3.281	.071	4.994	401	<.001	<.001	2.02451	.40541	1.22751	2.82151
	Equal variances not assumed			4.817	234.540	<.001	<.001	2.02451	.42032	1.19643	2.85259
WHOEnviro	Equal variances assumed	.736	.391	3.508	401	<.001	<.001	.95136	.27123	.41816	1.48457
	Equal variances not assumed			3.430	242.596	<.001	<.001	.95136	.27739	.40496	1.49776

L.2 Independent Samples T-Tests for Hypotheses 2 and 3

Group Statistics

	PetryStatus	N	Mean	Std. Deviation	Std. Error Mean
MOGQSocial	Non-Problem	272	9.4559	3.82238	.23177
	Problem	131	11.0458	4.09665	.35793
MOGQEscape	Non-Problem	272	10.2574	4.33725	.26298
	Problem	131	13.3282	4.23437	.36996
MOGQComp	Non-Problem	272	10.8456	4.14030	.25104
	Problem	131	13.0229	4.31182	.37673
MOGQCoping	Non-Problem	272	11.2574	3.43736	.20842
	Problem	131	13.1756	3.41373	.29826
MOGQSkillDev	Non-Problem	272	11.1985	4.24233	.25723
	Problem	131	12.7863	4.50642	.39373
MOGQFantasy	Non-Problem	272	9.5478	4.15803	.25212
	Problem	131	12.0076	4.52429	.39529
MOGQRec	Non-Problem	272	12.1250	2.73945	.16610
	Problem	131	12.6336	2.56067	.22373

Independent Samples Effect Sizes

		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
MOGQSocial	Cohen's d	3.91340	-.406	-.616	-.196
	Hedges' correction	3.92074	-.406	-.615	-.195
	Glass's delta	4.09665	-.388	-.601	-.174
MOGQEscape	Cohen's d	4.30417	-.713	-.927	-.499
	Hedges' correction	4.31224	-.712	-.926	-.498
	Glass's delta	4.23437	-.725	-.950	-.498
MOGQComp	Cohen's d	4.19668	-.519	-.730	-.307
	Hedges' correction	4.20455	-.518	-.729	-.306
	Glass's delta	4.31182	-.505	-.721	-.287
MOGQCoping	Cohen's d	3.42972	-.559	-.771	-.347
	Hedges' correction	3.43615	-.558	-.770	-.346
	Glass's delta	3.41373	-.562	-.780	-.342
MOGQSkillDev	Cohen's d	4.32971	-.367	-.576	-.157
	Hedges' correction	4.33783	-.366	-.575	-.156
	Glass's delta	4.50642	-.352	-.564	-.139
MOGQFantasy	Cohen's d	4.28020	-.575	-.787	-.362
	Hedges' correction	4.28823	-.574	-.785	-.361
	Glass's delta	4.52429	-.544	-.761	-.324
MOGQRec	Cohen's d	2.68280	-.190	-.398	.019
	Hedges' correction	2.68783	-.189	-.398	.019
	Glass's delta	2.56067	-.199	-.408	.012

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
MOGQSocial	Equal variances assumed	.308	.579	-3.820	401	<.001	<.001	-1.58992	.41619	-2.40810	-.77174
	Equal variances not assumed			-3.729	241.503	<.001	<.001	-1.58992	.42641	-2.42988	-.74996
MOGQEscape	Equal variances assumed	.031	.860	-6.709	401	<.001	<.001	-3.07089	.45774	-3.97077	-2.17102
	Equal variances not assumed			-6.765	262.429	<.001	<.001	-3.07089	.45391	-3.96465	-2.17713
MOGQComp	Equal variances assumed	1.792	.182	-4.878	401	<.001	<.001	-2.17731	.44631	-3.05471	-1.29991
	Equal variances not assumed			-4.810	247.664	<.001	<.001	-2.17731	.45271	-3.06896	-1.28566
MOGQCoping	Equal variances assumed	.005	.941	-5.259	401	<.001	<.001	-1.91822	.36475	-2.63527	-1.20117
	Equal variances not assumed			-5.272	258.401	<.001	<.001	-1.91822	.36386	-2.63474	-1.20170
MOGQSkillDev	Equal variances assumed	.668	.414	-3.448	401	<.001	<.001	-1.58773	.46046	-2.49295	-.68251
	Equal variances not assumed			-3.376	243.387	<.001	<.001	-1.58773	.47031	-2.51412	-.66134
MOGQFantasy	Equal variances assumed	.395	.530	-5.404	401	<.001	<.001	-2.45984	.45519	-3.35470	-1.56497
	Equal variances not assumed			-5.247	238.358	<.001	<.001	-2.45984	.46885	-3.38345	-1.53623
MOGQRec	Equal variances assumed	.009	.923	-1.783	401	.038	.075	-.50859	.28531	-1.06948	.05231
	Equal variances not assumed			-1.825	273.022	.035	.069	-.50859	.27865	-1.05716	.03998

L.3 Independent Samples T-Test for Hypothesis 4

Group Statistics

	PetryStatus	N	Mean	Std. Deviation	Std. Error Mean
ProFactTotal	Positive	131	5.4656	1.82419	.15938
	Negative	272	6.0662	1.65782	.10052

Independent Samples Effect Sizes

		Standardizer ^a	Point Estimate	95% Confidence Interval	
				Lower	Upper
ProFactTotal	Cohen's d	1.71353	-.350	-.560	-.140
	Hedges' correction	1.71674	-.350	-.559	-.140
	Glass's delta	1.65782	-.362	-.573	-.151

Independent Samples Test

		Levene's Test for Equality of Variances				t-test for Equality of Means					
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
ProFactTotal	Equal variances assumed	1.374	.242	-3.295	401	<.001	.001	-.60053	.18223	-.95878	-.24228
	Equal variances not assumed			-3.187	236.073	<.001	.002	-.60053	.18843	-.97175	-.22931

L.3.1 Chi-Square Tests for Hypothesis 4

Do you set limits on the amount of time you spend gaming?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.871 ^a	1	.351		
Continuity Correction ^b	.680	1	.409		
Likelihood Ratio	.875	1	.350		
Fisher's Exact Test				.387	.205
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 53.31.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.046	.351
	Cramer's V	.046	.351
N of Valid Cases		403	

Do you set limits on the amount of money you devote to gaming?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.546 ^a	1	.214		
Continuity Correction ^b	1.267	1	.260		
Likelihood Ratio	1.526	1	.217		
Fisher's Exact Test				.240	.130
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 37.71.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.062	.214
	Cramer's V	.062	.214
N of Valid Cases		403	

Do you balance gaming with other leisure activities / hobbies?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.039 ^a	1	.308		
Continuity Correction ^b	.726	1	.394		
Likelihood Ratio	1.011	1	.315		
Fisher's Exact Test				.319	.196
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.95.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.051	.308
	Cramer's V	.051	.308
N of Valid Cases		403	

Do you balance your commitment to gaming with exercise and / or playing sport?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.304 ^a	1	.582		
Continuity Correction ^b	.192	1	.661		
Likelihood Ratio	.302	1	.582		
Fisher's Exact Test				.652	.329
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 43.56.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.027	.582
	Cramer's V	.027	.582
N of Valid Cases		403	

Do you balance your commitment to gaming with your need for sleep?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	19.879 ^a	1	<.001		
Continuity Correction ^b	18.800	1	<.001		
Likelihood Ratio	19.094	1	<.001		
Fisher's Exact Test				<.001	<.001
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 32.83.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.222	<.001
	Cramer's V	.222	<.001
N of Valid Cases		403	

Do make a conscious effort to eat some healthier food during weeks of gaming?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.316 ^a	1	.069		
Continuity Correction ^b	2.922	1	.087		
Likelihood Ratio	3.278	1	.070		
Fisher's Exact Test				.075	.044
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 45.83.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.091	.069
	Cramer's V	.091	.069
N of Valid Cases		403	

Do you make a conscious effort to maintain your personal hygiene during weeks of gaming (shower/bath, cleaning teeth, changing into clean clothes etc.)?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.304 ^a	1	.038		
Continuity Correction ^b	3.619	1	.057		
Likelihood Ratio	4.096	1	.043		
Fisher's Exact Test				.057	.031
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.98.

b. Computed only for a 2x2 table

Symmetric Measures

	Value	Approximate Significance
Nominal by Nominal	Phi	-.103
	Cramer's V	.103
N of Valid Cases	403	

Do you make a conscious effort to maintain sanitary living conditions (removing garbage, cleaning dirty dishes etc.)?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.224 ^a	1	.040		
Continuity Correction ^b	3.509	1	.061		
Likelihood Ratio	4.008	1	.045		
Fisher's Exact Test				.046	.033
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.35.

b. Computed only for a 2x2 table

Symmetric Measures

	Value	Approximate Significance
Nominal by Nominal	Phi	-.102
	Cramer's V	.102
N of Valid Cases	403	

L.4 Output for Exploratory Analysis

L.4.1 Chi-Square tests for Gaming Questions

On average, how many hours per week do you spend gaming?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.604 ^a	2	.061
Likelihood Ratio	6.095	2	.047
N of Valid Cases	403		

a. 1 cells (16.7%) have expected count less than 5. The minimum expected count is 3.58.

Symmetric Measures

	Value	Approximate Significance
Nominal by Nominal	Phi	.118
	Cramer's V	.118
N of Valid Cases	403	

What are your future gaming aspirations?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.772 ^a	2	.056
Likelihood Ratio	5.655	2	.059
N of Valid Cases	403		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.83.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.120	.056
	Cramer's V	.120	.056
N of Valid Cases		403	

Do you engage in competitive esports / gaming?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	8.873 ^a	1	.003		
Continuity Correction ^b	8.207	1	.004		
Likelihood Ratio	8.693	1	.003		
Fisher's Exact Test				.004	.002
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 41.93.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.148	.003
	Cramer's V	.148	.003
N of Valid Cases		403	

Do you / have you recieved an income from gaming?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	2.084 ^a	1	.149		
Continuity Correction ^b	1.637	1	.201		
Likelihood Ratio	2.012	1	.156		
Fisher's Exact Test				.188	.102
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.60.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.072	.149
	Cramer's V	.072	.149
N of Valid Cases		403	

Not including the initial purchase of a game, do you / have you put your own money into a game (otherwise known as microtransactions)?**Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1- sided)
Pearson Chi-Square	6.963 ^a	1	.008		
Continuity Correction ^b	6.387	1	.011		
Likelihood Ratio	7.156	1	.007		
Fisher's Exact Test				.010	.005
N of Valid Cases	403				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 45.83.

b. Computed only for a 2x2 table

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.131	.008
	Cramer's V	.131	.008
N of Valid Cases		403	

Do you engage in live streaming (such as Twitch etc.)?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	6.577 ^a	1	.010		
Continuity Correction ^b	5.967	1	.015		
Likelihood Ratio	6.398	1	.011		
Fisher's Exact Test				.014	.008
N of Valid Cases	403				

Symmetric Measures

	Value	Approximate Significance
Nominal by Nominal	Phi	.128
	Cramer's V	.128
N of Valid Cases	403	

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 33.48.

b. Computed only for a 2x2 table

Do you / have you received an income from streaming?

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.189 ^a	1	.663		
Continuity Correction ^b	.027	1	.871		
Likelihood Ratio	.185	1	.667		
Fisher's Exact Test				.786	.424
N of Valid Cases	403				

Symmetric Measures

	Value	Approximate Significance
Nominal by Nominal	Phi	.022
	Cramer's V	.022
N of Valid Cases	403	

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 5.20.

b. Computed only for a 2x2 table

L.4.2 Hierarchical Binary Logistic Regression Output

Model 1

Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.
Step 1			
Step	54.950	6	<.001
Block	54.950	6	<.001
Model	54.950	6	<.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	453.335 ^a	.127	.178

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Classification Table^a

		Predicted		Percentage Correct
		PetryStatus		
Observed	PetryStatus	Non-Problem	Problem	
Step 1	PetryStatus	244	28	89.7
		86	45	34.4
	Overall Percentage			71.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	MOGQSocial	.001	.035	.001	1	.974	1.001	.936	1.071
	MOGQEscape	.128	.038	11.317	1	<.001	1.137	1.055	1.225
	MOGQComp	.092	.032	8.499	1	.004	1.097	1.031	1.167
	MOGQCoping	-.002	.052	.002	1	.964	.998	.900	1.106
	MOGQSkillDev	.003	.037	.006	1	.940	1.003	.933	1.078
	MOGQFantasy	.026	.035	.538	1	.463	1.026	.958	1.100
	Constant	-3.641	.511	50.698	1	<.001	.026		

a. Variable(s) entered on step 1: MOGQSocial, MOGQEscape, MOGQComp, MOGQCoping, MOGQSkillDev, MOGQFantasy.

Model 2**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	4.143	3	.246
	Block	4.143	3	.246
	Model	59.093	9	<.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	449.192 ^a	.136	.190

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table^a

			Predicted		Percentage Correct
			PetryStatus		
Step 1	Observed	Non-Problem	Problem		
	PetryStatus	Non-Problem	242	30	89.0
		Problem	88	43	32.8
	Overall Percentage				70.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	MOGQSocial	-.009	.035	.061	1	.804	.991	.925	1.062
	MOGQEscape	.130	.038	11.562	1	<.001	1.139	1.057	1.228
	MOGQComp	.075	.033	5.126	1	.024	1.078	1.010	1.151
	MOGQCoping	-.006	.053	.012	1	.914	.994	.897	1.103
	MOGQSkillDev	.006	.038	.025	1	.874	1.006	.935	1.083
	MOGQFantasy	.024	.035	.444	1	.505	1.024	.955	1.098
	Do you engage in competitive esports / gaming?(1)	.288	.263	1.204	1	.273	1.334	.797	2.231
	Not including the initial purchase of a game, do you / have you put your own money into a game (otherwise known as microtransactions)?(1)	.298	.258	1.332	1	.249	1.347	.812	2.234
	Do you engage in live streaming (such as Twitch etc.)(1)	.223	.269	.689	1	.406	1.250	.738	2.115
	Constant	-3.696	.536	47.631	1	<.001	.025		

a. Variable(s) entered on step 1: Do you engage in competitive esports / gaming?, Not including the initial purchase of a game, do you / have you put your own money into a game (otherwise known as microtransactions)?, Do you engage in live streaming (such as Twitch etc.)?.

Model 3**Omnibus Tests of Model Coefficients**

		Chi-square	df	Sig.
Step 1	Step	13.573	3	.004
	Block	13.573	3	.004
	Model	72.667	12	<.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	435.618 ^a	.165	.230

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table^a

		Predicted			
		PetryStatus		Percentage Correct	
Observed		Non-Problem	Problem		
Step 1	PetryStatus	Non-Problem	237	35	87.1
		Problem	82	49	37.4
	Overall Percentage				71.0

a. The cut value is .500

Variables in the Equation									
		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1 ^a	MOGQSocial	.005	.036	.018	1	.894	1.005	.936	1.079
	MOGQEscape	.118	.039	8.947	1	.003	1.125	1.041	1.215
	MOGQComp	.060	.034	3.017	1	.082	1.062	.992	1.136
	MOGQCoping	.001	.055	.000	1	.983	1.001	.900	1.114
	MOGQSkillDev	.021	.039	.304	1	.581	1.022	.947	1.103
	MOGQFantasy	.019	.036	.273	1	.602	1.019	.949	1.094
	Do you engage in competitive esports / gaming?(1)	.258	.270	.915	1	.339	1.294	.763	2.195
	Not including the initial purchase of a game, do you / have you put your own money into a game (otherwise known as microtransactions)?(1)	.314	.263	1.433	1	.231	1.369	.818	2.291
	Do you engage in live streaming (such as Twitch etc.)(1)	.216	.274	.620	1	.431	1.241	.725	2.125
	Do you balance your commitment to gaming with your need for sleep? (1)	-.917	.266	11.925	1	<.001	.400	.237	.673
	Do you make a conscious effort to maintain your personal hygiene during weeks of gaming (shower/bath, cleaning teeth, changing into clean clothes etc.)(1)	-.277	.430	.416	1	.519	.758	.327	1.760
	Do you make a conscious effort to maintain sanitary living conditions (removing garbage, cleaning dirty dishes etc.)(1)	-.003	.445	.000	1	.995	.997	.417	2.388
Constant		-2.807	.685	16.803	1	<.001	.060		

a. Variable(s) entered on step 1: Do you balance your commitment to gaming with your need for sleep?, Do you make a conscious effort to maintain your personal hygiene during weeks of gaming (shower/bath, cleaning teeth, changing into clean clothes etc.)(1), Do you make a conscious effort to maintain sanitary living conditions (removing garbage, cleaning dirty dishes etc.)(1).