

**Examining Risk Factors for Internet Gaming Disorder: Spending Habits, Self-Worth and
Impulsivity**

Dean Polisena

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TABLE OF CONTENTS

LIST OF TABLES.....	iv
LIST OF FIGURES.....	v
ABSTRACT.....	vi
DECLARATION.....	vii
ACKNOWLEDGMENTS.....	viii
CHAPTER 1: INTRODUCTION.....	1
1.1 Background.....	1
1.2 Internet Gaming Disorder.....	4
1.3 Spending on In-Game Items and Internet Gaming Disorder.....	6
1.4 Predictors of Problematic Gaming Use.....	8
1.4.1 Gaming-Contingent Self-Worth.....	8
1.4.2 Impulsivity.....	10
1.5 The Current Study	12
1.6 Study Aims and Hypotheses	12
CHAPTER 2: METHOD.....	14
2.1 Participants.....	14
2.2 Study Design	14
2.3 Materials	15
2.3.1 Demographic Information.....	15
2.3.2 Monthly Spending on In-Game Items.....	15
2.3.3 Gaming-Contingent Self-Worth.....	15
2.3.4 Impulsivity.....	16
2.3.5 Internet Gaming Disorder.....	16
2.4 Procedure.....	17
CHAPTER 3: RESULTS.....	18
3.1 Data Screening and Quality Control	18
3.2 Power Analysis.....	20
3.3 Descriptive Data: Internet Gaming Disorder.....	20
3.4 Preliminary Data Analysis.....	21
3.5 Hypothesis 1.....	21
3.6 Hypothesis 2.....	23
3.6.1 Data Analysis Overview and Assumption Testing.....	23
3.6.2 Hypothesis 2 Results.....	24
3.7 Hypothesis 3.....	25
3.7.1 Data Analysis Overview and Assumption Testing	25
3.7.3 Hypothesis 3 Results.....	26
CHAPTER 4: DISCUSSION.....	29
4.1 Overview.....	29
4.2 Summary of Findings.....	30
4.3 Limitations and Methodological Considerations.....	33

TABLE OF CONTENTS

4.4 Significance and Implications for Future Research.....	35
4.5 Conclusion.....	36
REFERENCES.....	38
APPENDIX A (Complete Study Survey).....	48
APPENDIX B (Participant Information Sheet and Consent Form).....	57
APPENDIX C (SPSS Output: Reliability Measures).....	59
APPENDIX D (Boxplots)	60
APPENDIX E (Frequency Histograms)	62
APPENDIX F (Scatterplots)	64
APPENDIX G (SPSS Output for Examiner)	65

LIST OF TABLES

Table 1	Descriptive Statistics of the Sample ($N = 478$).....	19
Table 2	Summary of Descriptive Statistics for all Measures ($N = 478$)	20
Table 3	Bivariate Correlations among the Study Variables.....	22
Table 4	Means and Standard Deviations of Monthly Spending on In-Game Items, Split by IGD Classification	24
Table 5	Hierarchical Multiple Regression Analysis for Variables Predicting IGD Symptoms	28

LIST OF FIGURES

Figure 1	Boxplot of monthly spending on in-game items, split by IGD classification...	25
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Abstract

Internet gaming has become an incredibly popular recreational activity, globally. The latest innovation in online gaming has been the introduction of ‘free-to-play’ systems whereby gamers play free of charge and are provided the option to purchase game items during game play. Alongside this rise in the popularity of gaming, “Internet gaming disorder (IGD)” has been proposed for inclusion in some international health classifications, including the DSM-5 and ICD-11. IGD refers to repetitive use of Internet-based games that leads to significant interference with functioning in daily life. A current gap in the literature is knowledge on how in-game spending (i.e., using real money) may relate to symptoms of IGD. The aim of the current study was to examine the relationship between spending in the world’s most popular online free-to-play game, *Fortnite*, and IGD symptoms, accounting for other variables known to affect IGD risk such as gaming-contingent self-worth and impulsivity. A convenience sample of 478 regular gamers was recruited through online gaming forums. Participants completed an online survey that measured monthly spending on game items, gaming-contingent self-worth, impulsivity, and IGD symptoms. Quantitative analysis involved bivariate correlations, a Kruskal Wallis H Test and a hierarchical multiple regression. It was found that participants at higher risk of IGD reported higher monthly spending in online game items compared to non-problem players. Spending, self-worth and impulsivity were significant predictors of IGD symptoms. The results of the study provide preliminary evidence that IGD may in some ways be related to specific behaviours, which have implications for the treatment and conception of IGD.

Declaration

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

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Examining Risk Factors for Internet Gaming Disorder: Spending Habits, Self-Worth and Impulsivity

Chapter 1 Introduction

1.1 Background

Internet gaming is now rapidly evolving across multiple gaming platforms. As availability has increased, the online game markets have expanded in size to an estimated size of 400 million gamers in the last two years worldwide (Statista, 2019c). Average gaming usage is also increasing, particularly among males, with recent Australian data indicating males aged 15-24 years play games for an average of 155 min/day (Brand, Todhunter, & Jervis, 2017). Players are not only spending time on games but are increasingly spending money in-games. The recent expansion of digital purchase options within the online gaming industry, including the emergence of virtual goods that gamers can purchase within games, has fuelled industry development. Global spending on in-game purchases is expected to grow from \$22 billion U.S. dollars to \$32 billion U.S. dollars by 2020 (Statista, 2019a). Concerns regarding problematic use of Internet-based games, as well as increased popularity in gaming, has seen Internet Gaming Disorder (IGD) emerge as an area for further research within the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) (American Psychiatric Association [APA], 2013).

While popularity in gaming continues to grow, new Internet gaming revenue models have contributed to the increase in popularity. The more recent ‘free-to-play’ business model allows gamers to play free of charge; but access to various additional game items involves payment (Osathanunkul, 2015). Referred to as ‘microtransactions’, gamers can purchase additional virtual items such as textures, skins, currency or power-ups, which provide a special ability and/or new visual appearance (King & Delfabbro, 2018). One particular game that has been extremely

successful in generating income using a ‘free-to-play’ business model is Epic Games’s *Fortnite*. Fortnite is a free-to-play ‘battle royale’ game that enables players to control a virtual character and play simultaneously with many other players from around the world online. In addition to its free-to-play system, Fortnite also offers gamers opportunities to purchase ‘microtransactions’. In 2018, Fortnite became the most played online game in the world; with reported sales of 2.4 billion U.S dollars, which was the highest among all game titles for that year (Statista, 2019b). Fortnite’s uptake and popularity grants a useful opportunity to study how in-game spending may contribute to different behavioral patterns including recreational use and overuse that creates problems.

In the context of growing awareness and concern about IGD, King and Delfabbro (2018) claimed that game monetization schemes, such as those used in Fortnite, may be considered ‘predatory’, in the sense that they may entrap some players into spending more money. Some preliminary evidence of this can be found in recent media reports of gamers spending thousands of dollars on microtransactions leading to large debts that cause distress (Molloy, Dias, & Lyons, 2018). Internationally, politicians and gambling awareness organisations have recommended increased regulation around video-game monetization schemes (Busby, 2018). These have been calls for further research to understand whether gamers’ financial expenditure may be associated with IGD.

Currently, research has investigated the interaction of person-level vulnerabilities including personality traits and neurobiology in IGD (Choi et al., 2014; Ko et al., 2011; Kuss, 2013; Kuss & Griffiths, 2012). Investigations within problematic online gaming include reward aspects such as randomness, immersion, and social factors (Billieux et al., 2011; Cole & Griffiths, 2007; Karlsen, 2010; Yee, 2016). However, existing literature has also investigated

gaming as a time investment (Kaczmarek & Drażkowski, 2014; Kuss, Louws, & Wiers, 2012; Snodgrass et al., 2014). Currently, the considerations surrounding problematic gameplay include the influences of monetary reward and spending as concerns have been raised within monetarization schemes in online games (Griffiths, 2018; King & Delfabbro, 2018; Macey & Hamari, 2018). With new considerations surrounding the influences of financial aspects within gaming it has led us to reconsider what makes gaming reinforcing and how in-game purchases may bring the activity closer to gambling.

An important focus within the gaming literature has been the investigation of predictors of problematic gaming use, in particular, personality traits. Recent research has found that self-worth that is dependent on online gaming performance is an accurate predictor of IGD symptoms (Wickham & Beard, 2016). Referred to as gaming-contingent self-worth (GCSW), the construct provides an opportunity for exploration into understanding IGD as a cognitive process in that Internet gamers may over rely on gaming to meet self-esteem needs (King & Delfabbro, 2014). Trait impulsivity is another personality trait that has associations with IGD symptoms (Lee et al., 2012).

Accordingly, the aim of the present study is to examine the importance of spending on in-game items to IGD in the context of considering other strong risk factors of IGD, namely, GCSW and impulsivity. As gaming models change, research on IGD and influences of monetization schemes and financial risks need to be continuously examined within an ever-evolving gaming industry. This research is important, as it will also ensure that descriptions of IGD are consistent within changing games. The following sections will explore the relationships between spending on in-game items and the personality traits of GCSW and impulsivity, with IGD.

1.2 Internet Gaming Disorder

Years of research of individuals who engage in persistent or excessive gaming behavior has shown that they can experience adverse impacts on their psychological functioning and mental health (Griffiths, 2005). In severe circumstances, players can feel they cannot control or prevent further gaming without external influence or intervention (Young, 2007). IGD is defined in the DSM-5 as a pattern of excessive and prolonged Internet gaming that results in a cluster of cognitive and behavioral symptoms which can lead to failure in school, job loss and marriage failure (APA, 2013). The disorder has been included in the DSM-5 as a condition for further study which means that IGD is not an "official" disorder in the DSM, but one on which the APA requests additional research (APA, 2013), while the 11th edition of the International Classification of Diseases (ICD-11) has included IGD as a recognised condition (Brand et al., 2017). Currently, the DSM-5 includes nine criteria for IGD diagnosis: A) preoccupation with Internet games, B) withdrawal symptoms when Internet games are removed, C) tolerance, the need to spend more time gaming, D) loss of control in participating in online games, E) continued use irrespective of problem awareness, F) neglect of alternative recreational activities due to involvement of Internet gaming, G) deceiving family, friends or others about the amount of gaming, H) escapism and mood modification from participating in Internet gaming, and I) jeopardization or loss of relationship, job or educational opportunity because of Internet games. Diagnosis of IGD requires at least five of the criteria to be present over a 12-month period (APA, 2013). The DSM-5 criteria note that gaming must cause significant impairment or distress in multiple aspects of an individual's life for consideration of addiction. In addition, the distress and impairment must directly be impacted by gaming and not the use of alternative Internet functions (e.g. social media, online gambling, online shopping). Although there is ongoing debate on the

criteria for assessing IGD (Kuss, Griffiths, & Pontes, 2017), and international experts had difficulty reaching a consensus on the best approach to measuring symptoms of problematic online gaming use (Griffiths et al., 2016), standard diagnostic scales have been developed and validated to measure IGD (e.g., Petry et al., 2014).

While the DSM-5 includes substance-related addiction disorders, Gambling Disorder (GD) is the only recognised behavioural addiction (APA, 2013). Behavioural similarities between IGD, GD and substance-related addiction disorders have been documented in recent research. Individuals with GD and individuals with IGD have higher psychopathological scores and less functional personality traits, including higher emotional distress, harm avoidance and reward dependency, when compared to a normative population sample (Mallorquí-Bagué et al., 2017). Similarities have also been observed in other addiction behaviours, including tolerance, withdrawal, repeated unsuccessful attempts to cut back or quit, and impairment of normal functioning, suggesting IGD shares common traits to substance addictions (Ismael & Baltieri, 2014; Michalowski & Erbllich, 2014). The IGD literature does, however, show consistent demographic differences between IGD and other addiction disorders, including having a younger age of onset and a lower average yearly income (Mallorquí-Bagué et al., 2017). Overall, the consensus of IGD classified as a form of addiction due to similarities in traits of GD is a belief among some researchers (Carbonell, Guardiola, Fuster, Gil, & Panova, 2016). While other authors suggest the characteristics of ‘compulsive game play’ represent similarities of an impulse control disorder that lends to developing a behavioural addiction (Shapira, Goldsmith, Keck, Khosla, & McElroy, 2000). In addition, research on motivations for gaming indicate that the addiction extends beyond basic behavioral reward (Pontes & Griffiths, 2014). With research expanding into new areas of IGD, a gap exists in examining spending and IGD.

1.3 Spending on In-Game Items and Internet Gaming Disorder

Cognitive and behavioural theories can be used to explain why people with IGD may spend more money on online game items. King and Delfabbro (2014) found that “IGD cognition may involve the persistent overvaluation of video gaming rewards, activities and identities” (p. 298). King and Delfabbro conducted a systematic review of 29 qualitative studies on Internet gaming condition and seven treatment studies employing cognitive therapy for IGD, to identify cognitive factors underlying IGD. The authors identified “beliefs about game reward value and tangibility” (p. 301) as a cognitive factor underlying IGD. The specific cognitions within the cognitive factor included the overvaluation of gaming items, rewards, and/or virtual currency where there is a perception of a larger value and importance than other activities in life, including, self-care, work, schooling and/or relationships. Accordingly, because individuals with IGD may see more value in in-game items, spending on in-game items will be higher for individuals with more symptoms of IGD. Therefore, it is expected that IGD may be related to greater spending.

Growing concern surrounding gaming and gambling similarities suggest that online games can increase the potential of financial harm to individuals with IGD. Recently, King and Delfabbro (2018) claimed that monetization schemes within online games may be considered predatory in that they use game-related knowledge of the players such as spending habits, available funds and game preferences to advertise offers that aim to draw players into spending more money. The authors also claimed that ‘free-to-play’ gamers may experience a ‘sunk cost’ effect, whereby an investment of money in pursuit of a desirable virtual item may make the player perceive they are increasing the likelihood of receiving a certain desirable online item. An example where a ‘sunk cost’ effect may occur in Internet gaming and specifically Fortnite,

includes the purchase of a ‘loot box’, whereby a player purchases a virtual box that randomly determines the virtual prize within (King & Delfabbro, 2018).

Another theory that explains the relationship between IGD and spending on in-game items is the partial reinforcement effect (Craighead, Huskey, & Weber 2015). This behavioural theory applies when reinforcement occurs at irregular intervals to encourage continuous behaviour (Griffiths, 2010). There are powerful effects of partial reinforcement, and behaviours that have been rewarded intermittently continue for longer during periods of non-reward than behaviours that have been rewarded continuously (‘the partial reinforcement extinction effect’). The suggestion that gambling is influenced by schedules of partial reinforcement is widely accepted in theories and empirical investigations of gambling (Horsley et al., 2012). Arguably, the partial reinforcement schedules in gambling are similar to those found in Internet game ‘loot boxes’. For example, in Fortnite, a player may not receive their desired item after purchasing a ‘loot box’. Accordingly, in the absence of receiving the reinforcement of the desired item, they will continue to purchase ‘loot boxes’ until they receive the item (reward) they want. With problem gambling conditioned by reward systems and research identifying that problem gambling is promoted by partial reinforcement schedules similar to those found in Internet games ‘loot boxes’, it indicates similarities of gambling in monetization schemes that online gamers are exposed to, which can lead to behaviour that is resistant to decreased spending (England & Göttestam, 1991).

The notion that Internet gaming monetization schemes share similarities to problematic gambling was found in a recent study conducted by Zendle and Cairns (2018). Results showed that higher amounts of spending on online monetization schemes such as ‘loot boxes’ were associated with higher symptoms of problem gambling within online gamers. The study

identified that a stronger relationship existed between spending on monetization schemes when compared to other known risk factors of problem gambling including depression, alcohol dependence and major drug problems (Feigelman, Kleinman, Lesieur, Millman, & Lesser, 1995; Welte, Wieczorek, Barnes, & Tidwell, 2006). With evidence suggesting that online monetization schemes contain similarities of gambling reward patterns that can reinforce spending behavior in gamers, it is possible that similar results will apply when investigating symptoms of IGD and spending in online games.

Currently, there has been international regulatory response to categorise Internet gaming ‘loot boxes’ as a form of gambling. For example, the Belgium Gaming Commission has prohibited online game loot boxes in Belgium because they violate their gambling legislation (Lee, 2018). Additionally, the Netherlands Gaming Authority ruled that prizes from loot box purchases that could be converted into real-world currency were a form of gambling (Yin-Poole, 2018). Accordingly, the current study will investigate if spending in online games is related to symptoms of IGD, amid raising concerns around monetization schemes and consumer spending in online games.

1.4 Predictors of Problematic Gaming Use

While the aforementioned literature highlighted the need to investigate the association between spending within online games and IGD, previous research has also identified personality traits that may act as risk factors for IGD. For this reason, the present study aims to investigate the importance of spending to IGD in the context of other known risk factors for IGD, namely gaming-contingent self-worth (GCSW) and impulsivity.

1.4.1 Gaming-Contingent Self-Worth. GCSW can be defined as the degree to which a person’s sense of self-worth is staked on the performance in online gaming environments (Beard

& Wickham, 2016). The construct of GCSW was developed by drawing on self-esteem deriving from the gaming environment (King & Delfabbro, 2014) which draws on the cognitive conceptualization of IGD. Initial research examining the relationships of self-esteem and problematic gaming behavior indicates that low levels of self-esteem relates to a higher risk of gaming activities that are problematic (Aydin & Sari, 2011; Caplan, 2002). These findings are consistent with literature that established a relationship between self-esteem and for decisions of interacting in the online world (Caplan, 2005; Davis, 2001). In an effort to develop a cognitive conceptualization of IGD, King and Delfabbro (2014) conducted a systematic review to identify cognitive factors underlying IGD. The authors identified over-reliance on gaming to meet-self esteem needs as a cognitive factor underlying IGD. According to the authors, this cognitive factor services as a function to build self-esteem by providing a sense of mastery, accomplishment, and autonomy, suggesting that problematic gaming is not the result of low self-esteem but, rather, online gaming acts as an environment that allows self-worth affirmation.

King and Delfabbro's (2014) finding that problematic gamers' may over rely on gaming to meet self-esteem needs was supported in a study conducted by Beard and Wickham (2016). Beard and Wickham developed a measure of contingent self-worth specific to gaming experiences within Massively-Multiplayer Online Role Playing Games. The authors found that GCSW was a multidimensional construct, that included validation seeking, reward orientation, and competition focus. Using a sample of $N = 600$ gamers, the researchers found GCSW served as a better predictor of IGD than behavioural motivations of gaming behavior. The study provided evidence that online gaming did not serve as a cause of low self-esteem, but rather affirmed gamer's self-worth (Beard & Wickham, 2016). The results indicated that players felt pressured to continue playing online games in order to meet self-esteem needs and fulfill their

sense of self-worth (Beard & Wickham, 2016).

With the current literature displaying a relationship of GCSW on problematic gaming, continued examination of personality traits such as GCSW is needed in order to understand risk factors of IGD within the ever-evolving gaming industry. Specifically, while the study conducted by Beard and Wickham (2016) presented a valid measure of GCSW as a predictor of IGD, the study did not investigate problematic gaming within the ‘free-to-play’ model. Accordingly, the present study aims to investigate the relationship between GCSW and IGD within this new ‘free-to-play’ model of gaming.

1.4.2 Impulsivity. It has been suggested that problematic online gaming is caused by an interaction of bio-psycho-social factors (Ryu et al., 2018). A core biological factor is trait impulsiveness (Ryu et al., 2018). Impulsivity has been defined as an individual’s swift action without forethought or conscious judgment (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). Prior research indicates impulsivity is a central facilitator in attaining short-term rewards, particularly in substance and gambling addictions (Leeman & Potenza, 2011), with research confirming that mechanisms of reward-based learning directly lead to compulsive behaviour (Leeman & Potenza, 2011). Research has also shown that impulsivity plays a role in the development of behavioural addiction (Cuzen & Stein, 2014) and impulsivity during childhood may later predict GD as adults (Pagani, Derevensky, & Japel, 2009). With this stated, the DSM-5 has called for research to establish more certainty on similarities and comparability of problematic gaming with drug and behavioural addictions.

Researchers examining the relationships between impulsivity and IGD have found problematic gamers display higher levels of impulsivity when compared with a control group (Cao, Su, Liu, & Gao, 2007; Choi et al., 2014; Lee et al., 2012; Zhou et al., 2010). Studies have

also identified impulsivity as a marker for vulnerability to problematic gaming. (Dalbudak et al., 2013; Lee et al., 2012). Dalbudak et al. found that Internet addiction was correlated with severity of impulsivity among university students, while Lee et al. found impulsivity was a vulnerability factor for internet addiction within young adults. In a recent mediation analysis, Ryu et al. (2018) found, even after controlling for age, high impulsivity was related to greater difficulty with interpersonal relationships; which increased risk of depression and IGD symptoms.

Interestingly, Choi et al. (2014) compared levels of trait impulsiveness between individuals with IGD, GD and alcohol abuse disorder with a healthy control group. Results showed that levels of trait impulsiveness were higher amongst participants with IGD than GD, and comparable between IGD and alcohol abuse participants. These findings suggest IGD shares similar personality characteristics to currently recognized addictive disorders (Walther, Morgenstern, & Hanewinkel, 2012). Similarly, Lee et al. (2012) found levels of trait impulsivity were similar amongst individuals with problematic gaming symptoms and pathological gamblers.

Neurobiological studies of individuals with IGD suggest a relationship between impulsivity and IGD pathophysiology (Lee, Namkoon, Lee, & Jung, 2017). In a study of 45 young male adults with IGD and 35 age-matched male controls, Lee et al. (2017) found that participants with IGD had differences in areas of the cortex responsible for evaluating reward values, error processing, and adjusting behaviour. IGD subjects also had a thinner cortex in the right lateral orbitofrontal cortex that significantly associated with higher cognitive impulsivity, after comorbid conditions were included as covariates. This indicated that individuals with IGD were more likely to make decisions based on short-term gratification (Lee et al., 2017).

1.5 The Current Study

The current study aims to investigate spending in online game microtransactions and its relationship with IGD. Given the concerns by researchers of predatory monetization schemes becoming harmful to users, the current study aims to investigate the relationship of IGD and spending in the current online gaming environment. Given the literature on IGD as a cognitive process that includes self-worth affirmation, and research demonstrating impulsivity as contributors to IGD, it was considered important to include these two variables in the present study. As IGD is a recommended area for further research, the benefit of these findings are expected to provide added clarity on spending as a risk factor and identification of personality traits that may act as risk factors.

1.6 Study Aims and Hypotheses

The current study has two main aims. The first aim is to examine the relationship between IGD and spending behaviors, by examining whether gamers' overall average monthly spending on in-game items differs according to level of IGD symptoms. The second aim is to investigate the predictive power of spending, GCSW and impulsivity in predicting IGD symptoms. It is important to consider that gaming models and monetization schemes within online games are constantly changing in the current market. It is therefore imperative that research is continuously conducted on new content within online games to identify risk factors and an understanding of IGD is maintained to accurately represent gamers suffering from IGD. This will ensure psychoeducation and consumer behaviour information is tailored to assist individuals suffering with IGD based on knowledge of the genre and game models they are engaging in. Based on these aims the following hypothesis were proposed:

Hypothesis 1: IGD will have a positive correlation with in monthly spending on in-game items,

GCSW and impulsivity.

Hypothesis 2: Gamers at high-risk of IGD will show higher monthly spending compared to at-risk and low-risk gamers..

Hypothesis 3: Monthly spending on in-game items, GCSW and impulsivity will be positive predictors of IGD symptoms.

Chapter 2 Method

2.1 Participants

Participants were a convenience sample, recruited through advertising posted on online gaming forums (e.g., <https://www.reddit.com/r/FortNiteBR>). Forums were exclusively Fortnite related and had over one thousand members. Permission was gained from reddit administrators prior to posting the survey. The final sample consisted of 478 participants, comprised of 445 males (93.09%), 29 females (6.07%) and 4 other (0.84%). Participants were aged between 18 and 60 years ($M = 23.12$, $SD = 6.67$). The highest percentage of participants were born in the United States ($N = 232$, 48.53%), used PC's as their preferred platform to play Fortnite ($N = 205$, 42.89%), and had an estimated annual income between \$0 to \$20,000 dollars ($N = 205$, 42.89%). Table 1 displays descriptive statistics of the final sample. Eligible participation required currently playing Fortnite on a weekly basis, a minimum age of 18 years and proficiency in English. As an incentive to complete the survey participants were able to enter into a draw to win one of ten \$50 visa gift card vouchers.

2.2 Study Design

The study used a correlational design with cross-sectional online survey methodology. Data were collected via an online survey entitled "Perceptions of Value in Fortnite Game Items" that was created using the software *SurveyMonkey*. The survey included demographic items, spending on Fortnite in-game items, and three established measures that assessed: beliefs about self-worth and gaming; impulsivity; and problematic gaming (see Appendix A). After completing these measures, participants were provided with three optional open-ended questions that examined influences in spending, value in game items and regret in online game item purchases.

2.3 Materials

2.3.1 Demographic Information. General demographic information collected included: age, gender, nationality and yearly taxable income. Specific gaming demographic information included: number of close friends that played Fortnite, preferred platform to play Fortnite, number of hours playing online games per week, and the number of years participant's had played online games.

2.3.2 Monthly Spending on In-Game Items. Spending on in-game items was measured by asking participants how much money they spent daily, weekly, monthly or/and yearly on Fortnite online game items. Participants were first asked to select the column that best matched their spending habit on Fortnite. Possible responses included three different microtransactions available to purchase in Fortnite: Battle Royale mode skins; loot boxes; and Save the World mode purchases. Responses included estimated time of purchase (daily, weekly, monthly and yearly). Average spending for each participant was then calculated on a total monthly scale.

2.3.3 Gaming-Contingent Self-Worth. GCSW was measured using the 29-item GCSW scale developed by Beard and Wickham (2016) to measure online gamers dependency of self-worth through performances in online games. The CGSW scale includes items that reference several domains within gameplay including social, competition, competence, virtue, character appearance, social, and global items. The GCSW scale comprises four components: validation seeking (9-items, e.g., "My self-esteem would decrease if I were not competent in playing my class"), reward-orientation (7-items, e.g., "When I am successful at navigating a new game, my self-esteem improves"), competition focus (7-items, e.g., "Having more achievement points than other players increases my self-worth"), and detachment from the gaming environment (6-items, e.g., "My self-esteem is not related to how well I am doing in the game"). Participants were

asked to base their responses on how it best related to Fortnite and responded on a 5-point Likert-scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). Total CGSW scores were calculated by adding the validation seeking, reward orientation and competition factors, and subtracting the detachment factor (Beard & Wickham, 2016). Higher scores indicate a stronger dependency on online gaming to derive self-worth. The measure exhibits a high internal consistency for the total GCSW scale ($\alpha = .94$), and the four subscales: validation seeking ($\alpha = .91$), reward orientation ($\alpha = .86$), competition focus ($\alpha = .87$), and detachment ($\alpha = .82$) (Beard & Wickham, 2016). The total GCSW scale was used in the present study.

2.3.4 Impulsivity. Trait impulsivity was measured using the 8-item Barratt Impulsiveness Scale-Brief (BIS-Brief) (Steinberg, Sharp, Stanford, & Tharp, 2013). The BIS-Brief is a unidimensional scale that measures general impulsivity. The BIS-Brief is an adaption from the original 30-item scale (BIS-11; Patton, Stanford, & Barratt, 1995) due to concerns about the psychometric properties of the BIS-11, in particular the three subscales, concentration difficulties (attentional impulsiveness), acting without thinking (motor impulsiveness), and lack of self-control and intolerance of cognitive complexity (nonplanning impulsiveness) (Fields et al., 2015). A sample item is, “I act on the spur of the moment”. Items were answered on a 4-point scale ranging from 1 (*Rarely/Never*) to 4 (*Almost Always/Always*). Steinberg et al. (2013) found the BIS-Brief demonstrates similar indices of construct validity as the original BIS-11 and acceptable internal reliability ($\alpha s = .73-.83$).

2.3.5 Internet Gaming Disorder. IGD symptoms were measured according to the nine dichotomous items for assessing IGD scale (Petry et al., 2014). The 9-item measure is a short adaptation from existing measures of problematic gaming with international consensus on 9-items that best reflect the nine DSM-5 criteria for IGD (APA, 2013), i.e., preoccupation,

withdrawal, tolerance, displacement, escape, problems, deception, and conflict during a period of 12 months. An example item measuring the criteria of preoccupation is: “Do you spend a lot of time thinking about games even when you are not playing, or planning when you can play next?” Each item was rated on a dichotomous scale (0 = *No*, 1 = *Yes*). In line with the DSM-5 guidelines, participants were classified with IGD if they answered ‘yes’ to five or more of the nine items. The 9-item IGD scale has previously demonstrated acceptable internal reliability ($\alpha = .78$; King & Delfabbro, 2016).

2.4 Procedure

The Human Research Ethics Subcommittee in the University of Adelaide’s School of Psychology approved the study design and procedure (approval number 18/90). Participants were presented with an opportunity to read a brief description of the study on advertised Fortnite reddit webpages. A link to an information sheet and consent page on *SurveyMonkey* was also attached. Potential participants were directed to a description of the study aims, risks and eligibility, which appeared on their mobile device, tablet or PC. Participants were informed that completion of the survey was voluntary and anonymous, and that they were able to withdraw from the study at any point in time. Additionally, contact details of the researchers, ethics committee and counselling services were provided to all participants on the information sheet. Eligibility requirements and a consent button were displayed at the end of the information sheet, with participants unable to begin the survey without providing consent (see Appendix B). After consenting, participants spent, on average, 10 minutes to complete the survey. Upon completion, participants were given the option to enter a draw for one of ten \$50 gift vouchers by providing their email address (Appendix B).

Chapter 3 Results

3.1 Data Screening and Quality Control

The statistics software, SPSS Statistics® Version 25, was used to perform data screening and quality control. Prior to analysis, data were screened for missing data and invalid responses. A total of 835 individuals consented to participate in the study. Of these participants, 350 participants only opened the survey or completed the survey demographic questions and were therefore removed due to missing data on the study variables. Of the remaining 485 participants, seven participants were removed due to invalid responses (i.e., uniform responses, leaving a total of $N = 478$ respondents for final analysis. Table 1 displays descriptive statistics of the final sample, including the average monthly spending on in-game items for each demographic characteristic.

As can be seen in Table 1, men had higher average spending than women, and average monthly spending was higher for participants who earn more than \$121,000 annually. Additionally, average monthly spending was higher for 26-30 year olds, when compared to younger age groups. This may be due to their higher annual income enabling increased spending. While the gender category of 'other' and the age category of 49+ had the highest average monthly spending, the low participation rates in these categories ($n = 4$ and $n = 2$, respectively), means it is difficult to accurately draw conclusions on the sample categories. It is also noted that a total of 32 participants in the sample of 478 (6.69%) reported spending no money on game items.

Table 1

Descriptive Statistics of the Sample (N = 478)

Variable	Characteristic	<i>n</i>	Average Monthly Spending (\$)	%
Gender	Male	445	79.11	93.10
	Female	29	32.97	6.07
	Other	4	1,770.00	0.83
Age (Years)	18-21	277	73.36	57.95
	22-25	86	74.21	17.99
	26-30	51	145.90	10.67
	31-40	50	38.58	10.46
	41-48	12	20.15	2.51
	49+	2	3,530.00	0.42
Nationality	USA	232	69.81	48.53
	Australia	32	104.99	6.70
	Canada	32	77.25	6.70
	United Kingdom	28	20.93	5.86
	Other	154	133.83	32.22
Annual Income (\$1,000's)	0-20	205	25.85	42.89
	21-40	102	107.67	21.34
	41-60	51	61.97	10.67
	61-80	54	141.35	11.30
	81-120	35	20.07	7.32
	121-160	14	503.95	2.93
	161+	17	900.01	3.56

Descriptive statistics and internal reliability coefficients (Cronbach's, 1951 alpha) for each measure are displayed in Table 2. As proposed by Nunnally (1978), a Cronbach's α of 0.70 or higher was considered acceptable when assessing internal reliability of measures. As can be seen in Table 2, all measures demonstrated acceptable internal consistency.

Table 2

Summary of Descriptive Statistics for all Measures (N = 478)

Measure	Internal Reliability α	<i>M</i>	<i>SD</i>	Min	Max
Gaming-Contingent Self-Worth	.89	45.72	20.66	-7.00	92.00
Impulsivity	.75	2.12	0.51	1.00	3.63
Internet Gaming Disorder	.76	3.36	2.39	0.00	9.00

3.2 Power Analysis

Prior to analyses, power analysis was conducted using the statistical software G*Power 3.1.9.1 to determine the minimum sample sizes to test the study hypotheses. Results indicated the required sample sizes to achieve 80% power for detecting medium size effects, at a significance criterion of $\alpha = 0.05$, were: $N = 64$ for a bivariate correlation model (Hypothesis 1); $N = 159$ for a one-way analysis of variance (Hypothesis 2); $N = 77$ for a hierarchical multiple regression analysis with three tested predictors and seven total predictors (Hypothesis 3). As a total of 478 participants were included for all statistical analyses, the study had sufficient statistical power.

3.3 Descriptive Data: Internet Gaming Disorder

To examine the prevalence of IGD in the present sample, participants were delineated into the following three sub-groups based on the number of IGD symptoms they endorsed (King & Delfabbro, 2016): (1) Non-problem users (two or fewer IGD symptoms); (2) At-risk users (three or four IGD symptoms); and (3) High-risk users (five or more IGD symptoms). The prevalence of IGD (i.e., high-risk users) in the sample was 26.84% ($n = 113$). Within the present study sample, the most commonly endorsed IGD symptoms among clinical cases of IGD were: deception of others about the amount of gaming (85.96%; $n = 96$), escapism and mood modification from participating in Internet gaming (80.53%; $n = 91$) and preoccupation with

Internet games (72.57%; $n = 82$). The prevalence of at-risk users and non-problem users within the present sample was 26.84% and 40.62%, respectively.

3.4 Preliminary Data Analysis

Preliminary correlation analyses were conducted to examine the relationships between the demographic variables, predictors, and outcome variable (see Table 3 for bivariate correlations between the variables). Relationships between the demographic variables and IGD symptoms showed there were significant weak negative correlations between age and IGD symptoms ($r = -.17, p = .018$) and number of years playing online games and IGD symptoms ($r = -.16, p = .001$), indicating younger people and people who had spent fewer years playing online games, displayed more IGD symptoms. There were significant weak positive correlations between the number of close friends that spend money in Fortnite and IGD symptoms ($r = .14, p = .006$), and weekly hours gaming and IGD symptoms ($r = .19, p < .001$), indicating people with more close friends that spend money on game items, and people who spent more hours gaming, displayed more IGD symptoms. The demographic variables of annual income ($r = .274, p < .001$) and number of close friends who spend money on online games ($r = .15, p = .001$) were also weakly positively correlated with monthly spending, while the demographic variable of weekly hours gamed was weakly correlated with monthly spending ($r = .14, p = .002$).

3.5 Hypothesis 1: IGD will have a positive correlation with monthly spending, gaming-contingent self-orth and impulsivity

Hypothesis 1 predicted that impulsivity, GCSW, and monthly spending on in-game items would be positively related to IGD. To test Hypothesis 1, a Pearson correlation matrix was run to examine the bivariate relationships between the variables. Table 3 displays the bivariate correlations between the variables.

Table 3

Bivariate Correlations among the Study Variables

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Age	23.12	6.67	-							
2. Annual Income (\$)	41,171	40,725	.31***	-						
3. Number of Years Played Online	8.55	4.87	.28***	.86	-					
4. Friends that Spend Money on Fortnite	4.96	2.61	-.13***	.10*	-.10*	-				
5. Weekly Hours Gaming	27.33	13.90	.11	.36	-.07	.22***				
6. Impulsivity	2.12	0.51	-.08	-.12**	-.08	.23	.05			
7. Gaming-Contingent Self-Worth	45.73	20.67	.16**	-.01	-.12*	.19***	.24***	.13**		
8. Monthly Spending	90.51	432.74	.17***	.28***	.05	.15**	.14***	.03	.10*	
9. IGD Symptoms	3.36	2.39	-.12*	.04	-.16**	.14*	.19***	.23***	.51***	.14**

* $p < .05$ ** $p < .01$ *** $p < .001$

As can be seen in Table 1, results supported Hypothesis 1, as a Pearson correlation showed GCSW was moderately positively correlated with IGD symptoms ($r = .51, p < .001$), and impulsivity was weakly positively correlated with IGD symptoms ($r = .23, p < .001$). Further in support of Hypothesis 1, there was a weak positive correlation between monthly spending on in-game items and IGD symptoms ($r = .14, p = .004$). Although not hypothesized, correlation analysis showed GCSW also had a weak statistically significant positive correlation with monthly spending ($r = .10, p = .044$), indicating an interaction between the more participants' self-worth on performance in online-games, the more money they spent on games per month.

3.6 Hypothesis 2: Gamers at high-risk of IGD will show higher monthly spending compared to at-risk and low-risk gamers.

3.6.1 Data Analysis Overview and Assumption Testing. Hypothesis two predicted that monthly spending on in-game items in Fortnite would be significantly higher amongst gamers with high-risk levels of IGD symptoms, compared to gamers with at-risk or non-problem levels of IGD symptoms. To test Hypothesis two, a one-way analysis of variance (ANOVA) was conducted to compare differences in estimated monthly spending on in-game items across the three categories of IGD symptoms (high-risk, at-risk, non-problem). Prior to analysis, the assumptions required for a one-way ANOVA were examined. In support of the assumptions related to study design, the dependent variable (spending) was measured at a continuous level and the independent variable (IGD symptoms) consisted of three categorical, independent groups, and the groups had independence of observations. Five cases were identified as univariate outliers due to z-scores of more than +3.29 ($p < .001$) on the monthly spending variable. Univariate cases were retained as they were deemed accurate responses and true members of the population upon further observation. Visual analysis of histograms and

examination of standardized skewness values that exceeded ± 3.29 , indicated the spending variable was positively skewed and a violation of normality was present. Therefore, due to a violation of the assumption of normality, a non-parametric test was used. The effects of problem gaming (high risk, at-risk, non problem users) on monthly spending on in-game items were tested via a Kruskal Wallis H Test.

3.6.2 Hypothesis 2 Results. Results of the Kruskal Wallis H Test indicated there was a statistically significant effect of the IGD subgroups on monthly estimated spending on virtual game items ($H(2) = 7.51, p = .023$). Pairwise comparisons with adjusted p -values showed there was a statistical significance on monthly estimated spending of game items between people with high-risk IGD symptoms compared to non-problem users ($p = .020, r = -.16$). Pairwise comparisons with adjusted p -values however showed there were no significant differences in monthly spending between high-risk and at-risk users ($p = .165, r = -.12$) and between at-risk and non-problem users ($p = 1.00, r = -.04$). Means and standard deviations of monthly spending, split by IGD symptom severity is presented in Table 4. Figure 1 displays a boxplot of the classifications of IGD symptoms and how much gamers spent of microtransactions monthly.

Table 4

Means and Standard Deviations of Monthly Spending on In-Game Items, Split by IGD

Classification

IGD Classification	<i>M</i>	<i>SD</i>	<i>n</i>
High risk users	188.68	752.31	113
At-risk users	52.94	146.47	137
Non-problem users	69.39	337.26	171

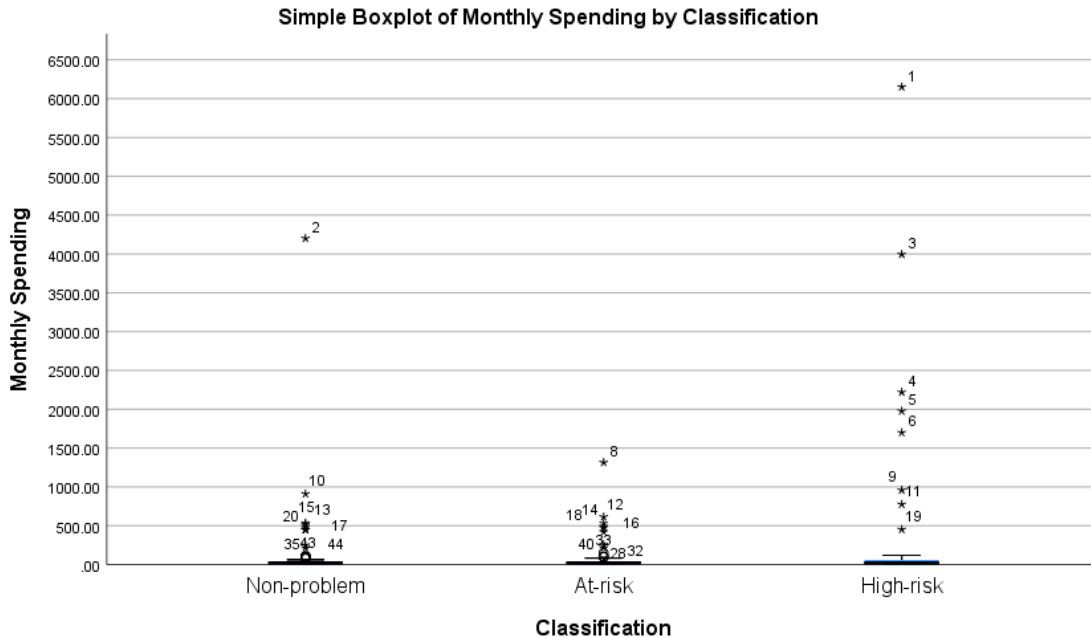


Figure 1. Boxplot of monthly spending on in-game items, split by IGD classification

3.7 Hypothesis 3: Monthly Spending, Gaming-Contingent Self-Worth and Impulsivity will be Positive Predictors of IGD symptoms

3.7.1 Data Analysis Overview and Assumption Testing. Hypothesis 3 predicted that monthly spending on on-game items, GCSW, and impulsivity would each be significant positive predictors of levels of IGD symptoms. To test Hypothesis 3, a hierarchical multiple regression (HMR) analysis was conducted for the outcome variable of IGD symptoms. Due to the significant correlations between age, number of years playing online games, number of close friends that spend money on Fortnite, and average weekly hours gaming with IGD symptoms, these four demographic variables were controlled for in the HRM. Accordingly, the four control variables were entered in Step 1 and monthly spending, GCSW, and impulsivity scores were then entered in Step 2 of the HMR.

Prior to analysis, the assumptions of multivariate analysis were examined. Assumptions related to study design were met, as all variables were measured at a continuous level. Univariate

outliers were identified by transforming raw scores into standardized scores (z-scores) and examining scores that were greater than ± 3.29 , as well as inspection of stem and leaf plots, which identified no univariate outliers. Visual analysis of histograms and examination of standardized skewness values did not exceed ± 3.29 , which indicated the assumption of normality was met for all variables, with the exception of monthly spending, which was positively skewed. Due to the violation of normality, the monthly spending variable was transformed and the analyses run with and without transformations (Tabachnick & Fidell, 2013). Because data transformations did not modify the substantive interpretations of the results the original data were reported for ease of interpretation. The normal probability plot of standardised residuals and the scatterplot of standardised residuals against standardised predicted values were examined and indicated that the assumptions of normality, linearity and homoscedascity of residuals were met. Mahalonobis distance exceeded the critical χ^2 for $df = 7$ (at $\alpha = .001$) of 24.32, and two cases were identified as multivariate outliers. The multivariate outliers were inspected and deemed true and accurate responses to the data set and were not removed. Lastly, all tolerance values were greater than .1 and all VIF values were less than 10, indicating that multicollinearity would not inhibit the interpretation of the HMR.

3.7.2 Hypothesis 3 Results. Table 5 displays a summary of the HMR model and results. Results from the HMR indicated that on step 1, the four control variables accounted for a significant 6.88% of variance in IGD symptoms, $R^2 = .06$, $F(4, 416) = 7.69$, $p < .001$. As can be seen in Table 4, weekly hours gaming, $\beta = .03$, $p = .001$, and number of years playing online games, $\beta = -.05$, $p = .025$, were each significant predictors of increased problematic gaming symptoms in Step 1 of the model. In support of Hypothesis 3, entry of average monthly spending, GCSW and impulsivity in Step 2 accounted for an additional 23.28% of the variance

Table 5

Hierarchical Multiple Regression Analysis for Variables Predicting IGD Symptoms (N = 478)

Step and Predictor Variables	<i>B</i>	<i>SE B</i>	β	<i>t</i>	<i>p</i>	95% <i>CI</i>	<i>R</i> ²	Adjusted <i>R</i> ²	ΔR^2	<i>p</i>
<i>Step 1</i>										
<i>Model 1</i>							.07	.06	.07	.000***
Constant	2.89	0.39		7.42	.000**	2.12, 3.65				
Age (Years)	-0.27	0.02	-0.08	-1.58	.114	-0.06, 0.01				
Years Played Online Games	-0.05	0.02	-0.11	-2.42	.025*	-0.10, -0.01				
Friends that Spend Money on Fortnite	0.07	0.05	0.08	1.54	.125	-0.02, 0.16				
Weekly Hours Gaming	0.03	0.08	0.17	3.43	.001**	0.01, 0.04				
<i>Step 2</i>										
<i>Model 2</i>							.30	.29	.23	.000***
Constant	-0.62	0.57		-1.10	.274	-1.74, 0.50				
Age (Years)	-0.01	0.02	-0.02	-0.50	.619	-0.04, 0.02				
Years Played Online Games	-0.04	0.02	-0.07	-1.72	.098	-0.08, 0.01				
Friends that Spend Money on Fortnite	0.01	0.04	0.01	0.26	.793	-0.07, 0.90				
Weekly Hours Gaming	0.01	0.01	0.06	1.33	.183	-0.05, 0.02				
Gaming-Contingent Self-Worth	0.05	0.01	0.47	10.86	.000***	0.04, 0.06				
Impulsivity	0.78	0.20	0.17	3.97	.000***	0.39, 1.17				
Monthly Spending	0.00	0.00	0.09	1.99	.047*	0.00, 0.01				

* $p < .05$ ** $p < .01$ *** $p < .001$

in IGD symptoms, $\Delta R^2 = .23$, $\Delta F(3, 413) = 49.90$, $p < .001$, after controlling for age, average weekly hours gaming, years played online games and number of friends who purchase Fortnite game items. By Cohen's (1988) recommendations a "medium" effect size was found ($f^2 = 0.43$). Ultimately, average monthly spending on in-game items ($\beta = .00$, $p = .047$), overall GCSW ($\beta = .05$, $p < .001$) and impulsivity ($\beta = .78$, $p < .001$) were each significant predictors of problematic gaming symptoms. Interestingly, none of the demographic variables were significant predictors of IGD symptoms in the final regression model.

Chapter 4 Discussion

4.1 Overview

As popularity in Internet gaming continues to grow, IGD is an increasingly important area for further research. There are also concerns around game monetization schemes used within free-to-play Internet games, which have been considered “predatory” in that they may entrap players into spending money (King & Delfabbro, 2018). Yet, a current gap in the literature exists in understanding how spending on such ‘microtransactions’ may relate to symptoms of IGD. The primary purpose of the current study was to examine the relationship between in-game spending in the world’s most popular online free-to-play game, *Fortnite*, and IGD symptoms, while accounting for personality traits known to affect IGD risk, namely, GCSW and impulsivity. Given the recent calls to investigate spending on microtransactions within online games (King & Delfabbro, 2018) and with explorations of IGD as a cognitive process extending beyond basic behaviour and reward needs (King & Delfabbro 2014; Wickham & Beard, 2016), added research is needed to understand IGD as a future clinical disorder. Additionally, the high number of high-risk participants in the present study ($N = 113$, 26.7%) suggests that IGD may be common in gamers that engage in ‘free-to-play’ online games. It is suggested that future research investigates prevalence rates of IGD within different gaming models as monetization schemes within the games may be considered predatory when compared to other models (King & Delfabbro, 2018).

The present study found that participants with clinical (high-risk) IGD symptoms had higher average monthly spending on in-game items in the free-to-play game, *Fortnite*, compared to non-problem users. Second, consistent with existing literature, both GCSW (Beard & Wickham, 2016) and impulsivity (Rho et al., 2017) were significant predictors of IGD symptoms. Monthly spending on microtransactions was also found to be a significant predictor of IGD symptoms. The

results of the current study contribute to further understanding of the risk factors of IGD, highlighting that gamers' spending amounts, GCSW and impulsivity are useful explanatory factors in the development of symptoms. The study findings suggest that behavioral and personality traits can be targeted in future prevention strategies for the development of IGD.

4.2 Summary of Findings

The first aim of this study was to examine the correlation between IGD and predictors GCSW, impulsivity and monthly spending on in-game items. Researchers have tried to find personality traits that are predictors of IGD, with impulsivity remaining one of the dominant traits in cases of symptoms of IGD (Argyriou, Davison, & Lee, 2017). Further, GCSW has emerged as a new trait that requires further replication and investigation, while spending on online games has only recently been explored in regard to microtransactions within online games by symptoms of IGD (Zendle & Cairns, 2018). In support of Hypothesis 1, results showed a moderate positive correlation between GCSW and IGD, which supports previous research conducted by Wickham and Beard (2016) who found a significant strong relationship between overall GCSW and IGD. The weak positive correlation between impulsivity and IGD was inconsistent with previous research findings showing strong to moderate relationships between these variables (Ryu et al., 2018; Zhang et al., 2015). A weak positive correlation between monthly spending on in-game items and IGD symptoms was found in the current study, and this relationship was further explored in Hypothesis 2 and 3.

Results from the correlational analysis also increase our understanding of the relationship between demographic variables and IGD symptoms. The significant positive correlation between weekly hours gaming and IGD symptoms is consistent with previous research that has demonstrated a positive correlation between time spent gaming and IGD symptoms (Triberti et al.,

2018). Other consistent findings include the significant weak negative correlations between age and years played online games with IGD symptoms. This is consistent with previous research that has found earlier age of gaming initiation to be negatively associated with IGD symptomatology (Beard, Haas, Wickham, & Stavropoulos, 2017), suggesting symptoms of IGD may be more prevalent in individuals who begin gaming at a younger age. Additionally, number of friends who spent money on in-game items was positively correlated with both IGD symptoms and monthly spending, which to the best of our knowledge has not been investigated in previous research. It is possible that gamers who have a high number of friends who spend money on online games feel socially influenced and pressured to spend more money on games, which may be related to the development of IGD symptoms.

The second aim of this study was to examine whether levels of IGD symptoms influenced monthly spending on in-game items. The data supported Hypothesis 2: monthly spending on in-game items was significantly higher amongst gamers who exhibited high-risk symptoms of IGD compared to non-risk users. These findings are consistent with Zendle and Cairns (2018) who found participants with higher classifications of GD symptoms had significantly higher averages of spending on loot box purchases in-game items. While our results demonstrate consistency with previous research, there are additional factors that need to be considered. First, the present study examined spending on all types of microtransaction purchases and did not look into specific microtransactions (e.g. loot box, cosmetic purchases, etc). As such, additional research is needed to investigate certain monetization schemes within gaming to assess if certain modes are stronger predictors of IGD symptoms. Additionally, this study only measured paid microtransactions. Further research examining the relationship between unpaid microtransactions purchases (i.e., earned in-game time, increased leveling and completing in-game missions and tasks) and IGD

symptoms may lead to further understanding between behaviours and development of problem gaming.

Although not hypothesised, there were no statistically significant differences in the amount of spending between high-risk and at-risk users, and at-risk and non-problem users. These findings are in contrast to Zendle and Cairns (2018) who, in a study of microtransaction spending and GD, found that as classifications of GD increased in severity, average spending on loot boxes significantly increased. Consistent with the present study, however, Zendle and Cairns found when loot boxes were excluded from analysis, higher classifications of GD did not display a higher mean spending on other microtransactions. However, high-risk participants did have a higher mean average than all other classifications, which was consistent with the present study's hypothesis that high-risk users would show a higher degree of spending than low-risk users. A potential explanation for this discrepancy is that loot boxes may be more predatory in that they are subject to creating higher financial harm as they show similar features to mechanisms of gambling, highlighting the importance of further research into microtransaction methods and IGD.

The third aim of this study was to examine the relationship between spending and IGD symptoms, while accounting for personality traits known to affect IGD risk, namely, GCSW and impulsivity. In support of Hypothesis 3, monthly spending on in-game items, GCSW, and impulsivity were each significant positive predictors of IGD after controlling for participant's age, number of close friends that spend money on gaming, number of years played online games and average weekly hours playing online games. The positive relationship between spending and IGD provides new evidence that higher spending on microtransactions within free-to-play games may act as a risk factor for development of IGD. This finding is important because it addresses a current gap in the literature and highlights a need to consider gamers' financial expenditure within

gaming. The results provide preliminary evidence that IGD may in some ways be related to specific behaviours, which have implications for the treatment and conception of IGD.

The positive relationship between GCSW and IGD found in the present study supports King and Delfabbrio's (2014) cognitive conceptualization of IGD and suggests that self-esteem may derive from performances in gaming, which may potentially promote problematic use. These findings suggest that modifying GCSW may be important in the treatment of individuals with IGD. As suggested by Crocker and Wolfe (2001), when self-worth is highly dependent upon a certain activity, individuals who withdraw from the domain will find an alternative domain to stake their self-esteem. Therefore, in a push to develop approaches in improving treatments of IGD, shifting contingent self-worth on gaming to alternative or multiple activities may alleviate the individuals who depend on gaming for self-worth and reduce symptoms of IGD.

The significant relationship between impulsivity and IGD symptoms supports literature that has shown personality traits as a risk factor of IGD (Choi et al., 2014; Ryu et al., 2018). With clear results that illustrate impulsivity as a predictor of IGD in gamers in the current study, these findings should contribute to the advancement of targeted prevention of IGD with clinicians understanding the importance of personality traits influencing behaviors and developments of symptoms of IGD.

4.3 Limitations and Methodological Considerations

When interpreting the results, several methodological limitations need to be considered. First, participants were recruited via a convenience sample, which targeted only gamers who engage in reddit Fortnite online forums. Future research should target other free-to-play game genres for participation, as the study results may not be representative of the entire free-to-play gaming population, and may reduce the external validity and reliability of results. Second, the

current study did not examine gender differences due to the low percentage of female responders (6.07%). Accordingly, the results may not be generalizable to female gamers. A recommendation for future studies is to establish an equal distribution of men and women and explore gender differences on an equilibrium sample level. Alternative advertising targeting female participants may be required to broaden the population.

Third, this study utilized a cross-sectional design and therefore fails to measure causality effects of IGD. It is suggested that expansion from the current study would include a longitudinal approach to investigate possible causalities within IGD. Due to the correlational nature of the study, reverse causality cannot be ruled out. Therefore, it is not possible to distinguish if monthly spending on microtransactions leads to problem gaming or if problem gaming leads to increased spending on microtransactions. As discussed by Zendle and Cairns (2018), this relationship may coincide in both ways: problem gamers may spend more on microtransactions and spending on microtransactions may lead to problem gaming. Further research addressing the direction of causality between spending and IGD is required. However, regardless of the direction, it can be stated that a clear relationship does exist between IGD and spending. Accordingly, regulations around microtransaction may be a necessary precaution that should be implemented within online games. For example, Drummond and Sauer (2018) have advocated for game rating agencies to restrict games that include predatory monetizations to individuals above the legal gambling age of the country they reside in. In addition, Apple Inc (2019) has recently decided to disclose the odds of receiving certain items to individuals prior to when they purchase a randomized virtual item. Equally, the author of the present study suggests that disseminating awareness and education around IGD within public domains including schools, universities and online media outlets (i.e. Facebook, Television, Instagram) will increase understanding of IGD as a real concern within

society. With strategies of prevention needed, other steps of awareness need to concurrently occur before restrictions within games are taken more seriously.

A fourth limitation of the current study was that all data was obtained from self-report measures. No clinical interviews were conducted. As such, false positive responses may have biased the data. Although conducting clinical interviews in such a large sample size may not be feasible or efficient, it is suggested that future studies are conducted with smaller samples that include both clinical interviews and self-reported measures to limit potential false positive answers and validate participant responses.

Additionally, with most previous studies on Internet gaming focusing on adolescents or young adults, an opportunity exists to explore differences between older age groups (i.e., 35 or older). Although the current study included adults from all age groups (i.e., 18-60+ years), exploring IGD in older participants was not a primary aim. In order to further understand IGD, and develop evidence-based treatments for different age groups, future research could investigate whether there are different risk factors for younger and older problematic gamers.

4.4 Significance and Implications for Future Research

Despite the study limitations, a key strength included the large sample size ($N = 478$) and the use of reliable and validated measures to assess the study variables. With IGD as a recommended area for further research (APA, 2013), the study findings are important, because they provide added clarity on spending as a risk factor and identify personality traits that may act as risk factors for IGD. By exploring predictors of spending, GCSW and impulsivity, our findings support past literature and expose the direction of future research into IGD. The study was able to explain problematic gaming by traits of CGSW and impulsivity, and also the behavior of monthly spending on microtransactions. Furthermore, our results suggest exploration into IGD and

spending warrant further research as high-risk symptoms of IGD displayed higher average monthly spending than non-problem users. These results suggest there may be accurate claims that monetization schemes within online games may be exploiting gamers' vulnerabilities into spending more, similar to those who experience gambling-related harm. Therefore, future research should compare monetization scheme purchases within online games to assess if certain microtransactions are more accurate predictors of IGD than others. A study that assesses the predictive ability between different microtransactions can provide valuable awareness of potentially harmful and predatory schemes.

Future research should also explore IGD, CGSW, impulsivity and spending through cross-cultural comparisons and investigate the differences in social economical classes. Replication of the current study is encouraged, in order to establish additional literature into the understanding of personality traits and spending in IGD. To increase the generalizability of the results, future studies should replicate the study variables within alternative game genres and gaming models, as it is imperative to research and understand new gaming models and how they influence symptoms of IGD.

4.5 Conclusion

The present study presents promising theoretical and practice implications for research into IGD and potential predictors of IGD. Results provide added understanding and awareness into how personality traits such as GCSW and impulsivity can be used to predict IGD. The study also found behavioural actions of spending money on online game items to be both higher within high-risk symptoms of IGD and act as a predictor of IGD. With Internet gaming participation increasing, and IGD being a relatively new area of research, added replication and research on predictors of personality traits and spending behaviours is necessary to continue to understand

IGD. Added research is needed to continue developing the classification of IGD within the DSM-5, and expand awareness of the disorder within online gaming communities and the general public.

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Appendix A
Complete Study Survey

Basic Information

Please read the following questions and select next to go to the next page once completed.

* 2. What is your age?

* 3. What is your gender?

Male

Female

Other

* 4. What is your nationality?

* 5. What is your estimated annual income?

* 6. Approximately how much disposable income do you have each week?

* 7. What is your Fortnite tier ranking?

0 100

* 8. What is your Fortnite tracker rating (TRN)?

- | | |
|---------------------------------|---------|
| <input type="checkbox"/> Scout | Epic |
| <input type="checkbox"/> Ranger | Legend |
| <input type="checkbox"/> Agent | Top 500 |

* 9. What is your Fortnite level ranking?

0 100

* 10. How many years have you played online games?

* 11. What game mode do you play most as a percentage?

Note: Answer must add to 100. Do not add % signs.

Battle royale	<input type="text"/>
Save the world	<input type="text"/>

* 12. How many hours per day in a typical week do you play Fortnite?

(You can leave options blank to indicate 0)

Monday	<input type="text"/>
Tuesday	<input type="text"/>
Wednesday	<input type="text"/>
Thursday	<input type="text"/>
Friday	<input type="text"/>
Saturday	<input type="text"/>
	<input type="text"/>

* 13. Which platform/s do you use to play Fortnite

- | | |
|--|--|
| <input type="checkbox"/> Mobile Phone Device | <input type="checkbox"/> Playstation |
| <input type="checkbox"/> PC | <input type="checkbox"/> Nintendo Switch |
| <input type="checkbox"/> Xbox One | |

* 14. What are your payment method/s for V-Bucks

- | | |
|--|---|
| <input type="checkbox"/> Xbox gift card | <input type="checkbox"/> Parent credit/debit card |
| <input type="checkbox"/> Playstation gift card | <input type="checkbox"/> Prepaid visa/mastercard |
| <input type="checkbox"/> Debit card | <input type="checkbox"/> Other |
| <input type="checkbox"/> Credit card | <input type="checkbox"/> I don't buy V-Bucks |

15. Select the column/s that best matches your spending habit on Fortnite....

	Daily	Weekly	Monthly	Yearly
Loot Boxes				<input type="text"/>
Battle Royale Skins	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Save the World Skins	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

* 16. How much of your time do you spend playing with friends?

0% 100%

* 17. How many close friends do you have that spend money on Fortnite?

* 18. Thinking of your closest friend that spends money on Fortnite, how often do you estimate they buy

	Never	Yearly	Monthly	Weekly	Daily
Loot Boxes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Battle Royale Skins	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Save the World Skins	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* 19. How much would you estimate that friend spent on Fortnite in total?

Perceptions of Value in Fortnite Game Items

Your Fortnite feelings and decisions

These questions are about how you make decisions about Fortnite game items. Please indicate your agreement below.

* 20. Perception of Fortnite game items

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
When I use game items I enjoy the game more.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I use game items I find the game more exciting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I use game items I feel happier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I buy game items I can increase my game level quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I buy game items I can get more game points than before.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I buy game items I become more powerful in the game.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I buy game items I can adorn my game characters to be more fashionable or stylish.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I buy game items I can make my game characters look better.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I buy game items I am more noticed by others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I buy game items I can make a better impression on others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some game items are worth more than what they cost.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The items are worth spending money on.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Some items are very good value for money.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I consider the game character as my 'second self'.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I play an online game, I feel almost like the game character.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I play an online game, the goals of the character become my own goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I can relate to my character like it's part of me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with Fortnite.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am satisfied with my decision to play Fortnite.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I think Fortnite is a very good game	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My choice to play Fortnite is a wise one.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I intend to buy game items in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I predict that I will buy game items in the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hope to buy game items soon.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Perceptions of Value in Fortnite Game Items

Thinking and actions

The following questions relate to your thinking and actions.

* 21. Please answer each question as it best relates to you

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

Perceptions of Value in Fortnite Game Items

Fortnite and Your Sense of Self and Identity

The following questions will ask about your feelings in relation to Fortnite use

* 22. Please answer each question as it best relates to you

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
<input type="radio"/>				

Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
<input type="radio"/>				<input type="radio"/>
My self-esteem would decrease if I stopped playing the game.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I play the game when I feel bad about myself in order to feel better.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If I did not have a gaming life, I would be a second-rate person.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My self-esteem would decrease if I were not competent in playing my class.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My self-esteem would decrease if I had continuous game losses.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When others in the game criticize me it affects my overall sense of self-worth.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If my character was not unique or special, I would feel worse about myself overall.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My sense of self-worth is boosted by wearing expensive or unique items.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I do better in the game, I feel better in general.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My self-esteem is positively affected by helping others in the game.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Helping newer players makes me feel like a better person overall.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When other players value my skills, my self-esteem is improved.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When I am successful at navigating a new game, my self-esteem improves.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When my guild supports me, I feel better about myself overall.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
When other players praise me, I feel better about myself overall.				
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Neither agree nor

Strongly disagree Disagree disagree Agree Strongly agree Having more achievement points than other players

increases my self-worth.

When I outperform others in the game, I feel better about myself in real life.

Being the best in the game gives me confidence in real life.

Playing a hero or allied character in the game increase my self respect.

An important measure of my self-worth is obtaining difficult achievements within the game.

Creating an attractive character gives me an overall self-esteem boost.

When the unique features of my character are recognized. I feel better overall.

When I have a bad day playing. My self-esteem remains unaffected.

My self-esteem is not related to how well I am doing in the game.

When I perform worse than others in the game, my self-esteem remains unaffected.

When I have repeated losses within the game, my self-esteem remains unaffected.

When other players value my skills, my self-esteem remains unaffected.

My self-esteem is not affected by the opinions others hold of me within the game.

Perceptions of Value in Fortnite Game Items

Gaming and life conflict

These questions refer to gaming interfering with aspects of daily life.

* 23. Please answer each question as it best relates to you

No

Yes

Do you spend a lot of time thinking about games even when you are not playing, or planning when you can play next?

Do you feel restless, irritable, moody, angry, anxious or sad when attempting to cut down or stop gaming, or when unable to play?

Do 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?

Do you feel you should play less, but are unable to cut back on the amount of time you spend playing games?

Do you lose interest in or reduce participation in other recreational activities (hobbies, meetings with friends) due to gaming?

Do 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?

Do you continue to play games even though you are 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?

Do you game to escape from or forget about personal problems, or to relieve uncomfortable feelings such as guilt, anxiety, helplessness or depression?

Do you risk or lose significant relationships, or job, educational or career opportunities because of gaming?

Perceptions of Value in Fortnite Game Items

24. OPTIONAL QUESTION: What factor would you say influences your spending on Fortnite more than anything else?

25. **OPTIONAL QUESTION:** What makes a Fortnite game item more personally valuable?

26. **OPTIONAL QUESTION:** Have you ever regretted purchasing a Fortnite game item? Do you remember what had made you make that purchase?

27. Thanks for participating in the study - We'd appreciate any other comments or feedback.

Perceptions of Value in Fortnite Game Items

Thank you!

28. Thank you for participating in our survey. If you would like to be placed into the draw to win a \$50 V-Buck voucher, please provide your email address below.

Appendix B

Participant Information Sheet and Consent Form

Perceptions of Value in Fortnite Game Items

Information sheet and consent form

PLEASE SCROLL TO THE BOTTOM TO BEGIN

Hello,

My name is Dean Polisenia and I am an Honours Psychology Student at the University of Adelaide.

You have been invited to participate in a study that aims to investigate why there has been an increase in young adults spending in Fortnite game items. The study aims to understand how people perceive value in purchasable items.

Participation: Voluntary, data will be kept anonymous. If you wish to enter a draw to win one of ten \$50 vouchers, please provide your email address at the end of the survey. To be eligible to participate, you must be aged 18+ and play Fortnite.

Survey: This survey will include questions about your demographics (age, nationality etc.). There will be questions about your gaming habits and how you generally play and spend money on Fortnite. There are also standard psychological questions about your personality and mood states.

The study should take about 15 minutes.

Any risks? There are no foreseeable risks. If you feel the study has raised or caused concerns with you, please contact the University of Adelaide (Contact Information below), or seek help from Lifeline, a crisis support line (ph. no: 13 11 44) or Beyond Blue (ph. no: 1800 010 630)

For more information: The study has been approved by the Human Research Ethics subcommittee by the school of Psychology at the University of Adelaide (HREC approval number 18/90). Please do not hesitate to contact me [REDACTED]

**If you would like to speak with a member of the ethics Subcommittee please contact Paul Delfabbro, on:
Email: paul.delfabbro@adelaide.edu.au**

* 1. Informed Consent

By Providing consent below:

- You fully understand the information sheet provided on the study.
- You agree to take part in the study truthfully and honestly.
- You are 18+ years of age.
- Any potential foreseeable risks have been understood.
- Agree that information from the study may be used in a publication in the future.

I CONSENT



Appendix C

SPSS Output: Reliability Measures

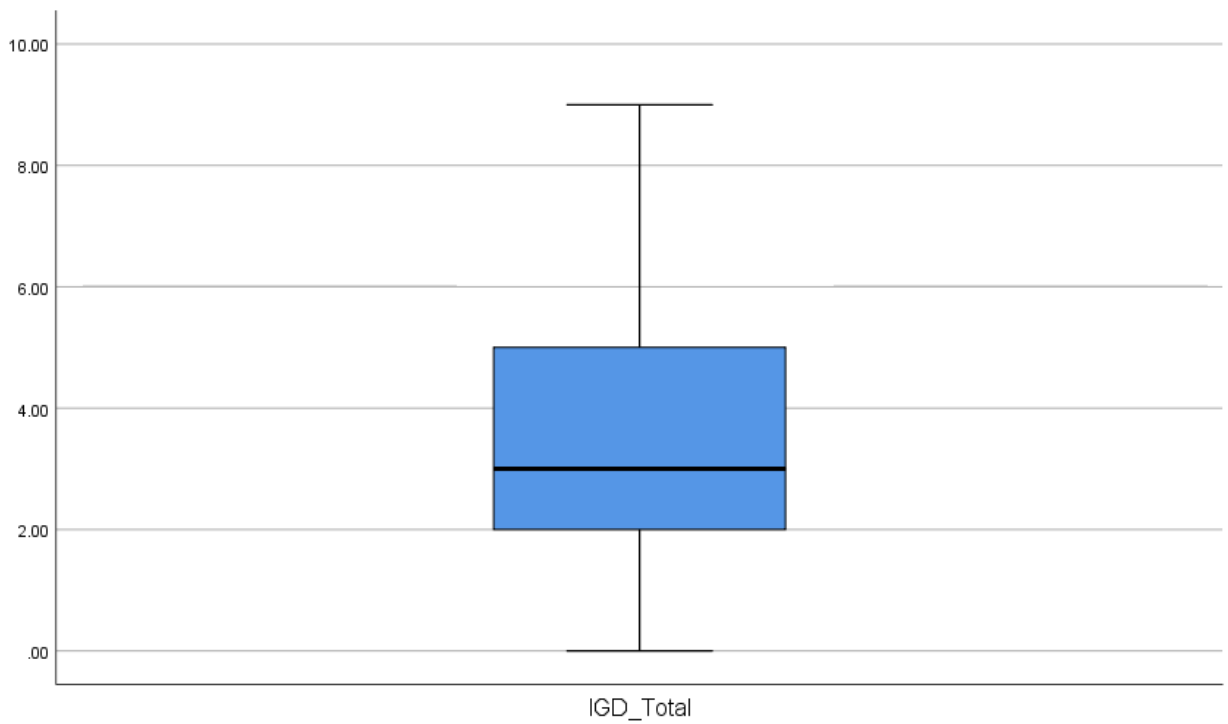
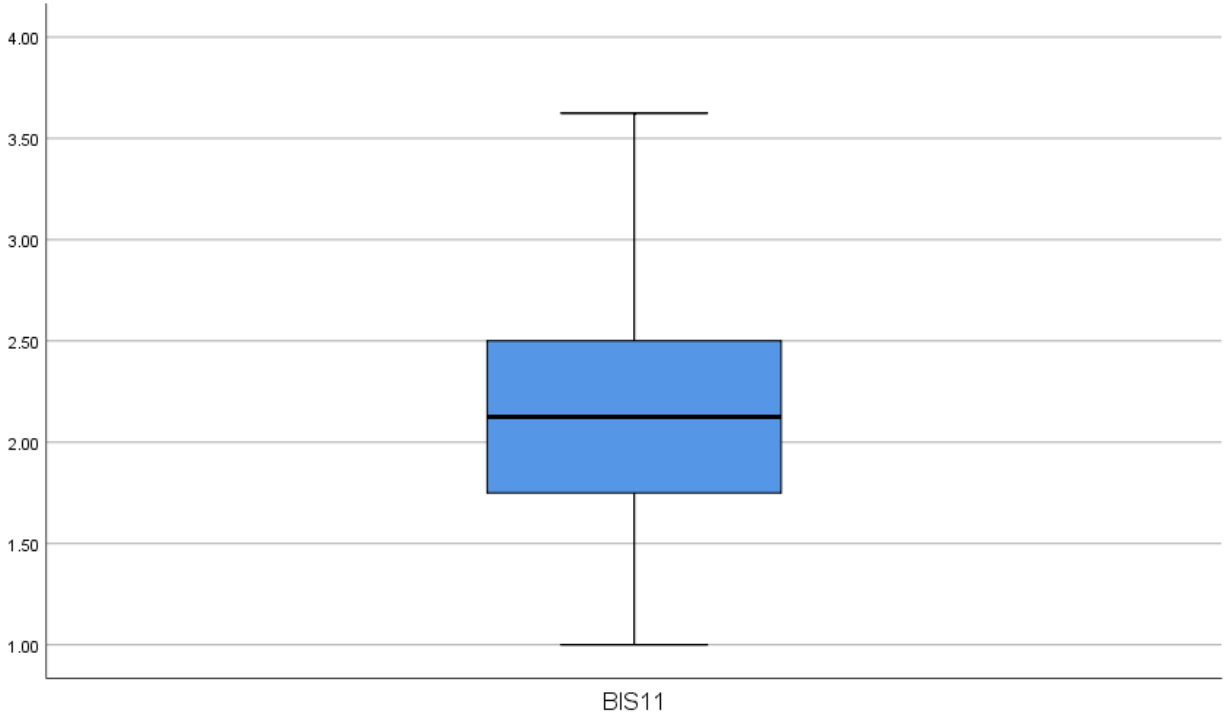
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.891	.891	29

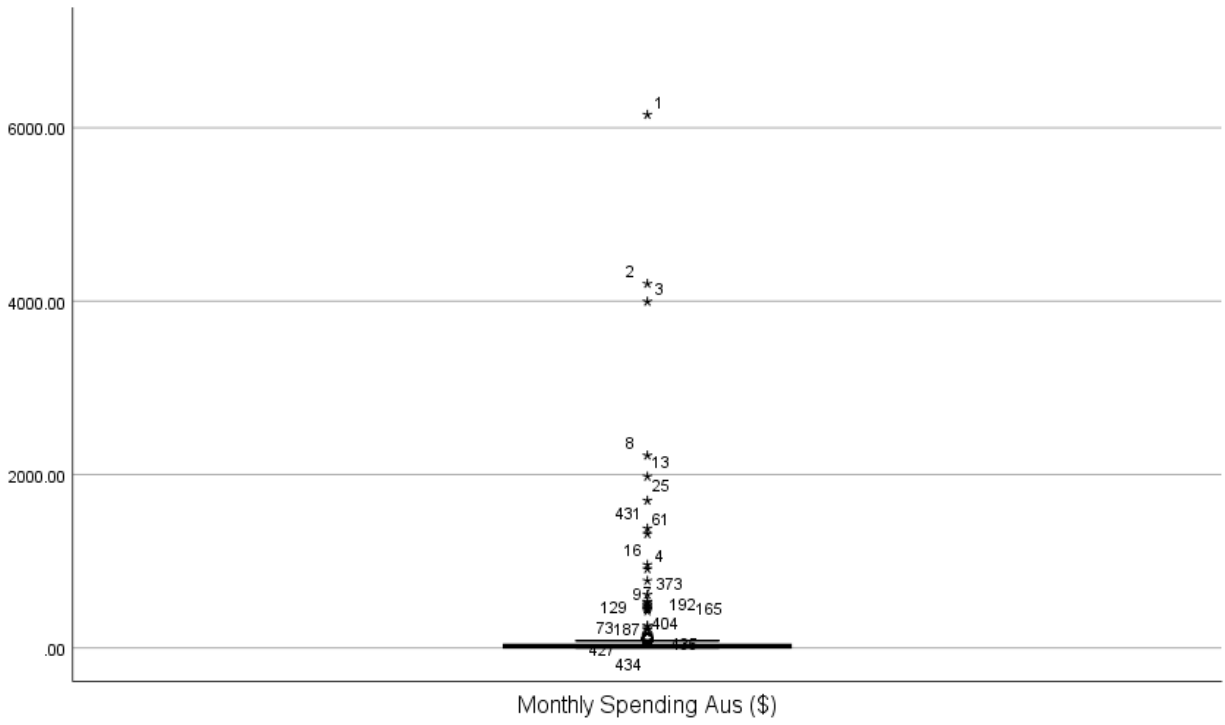
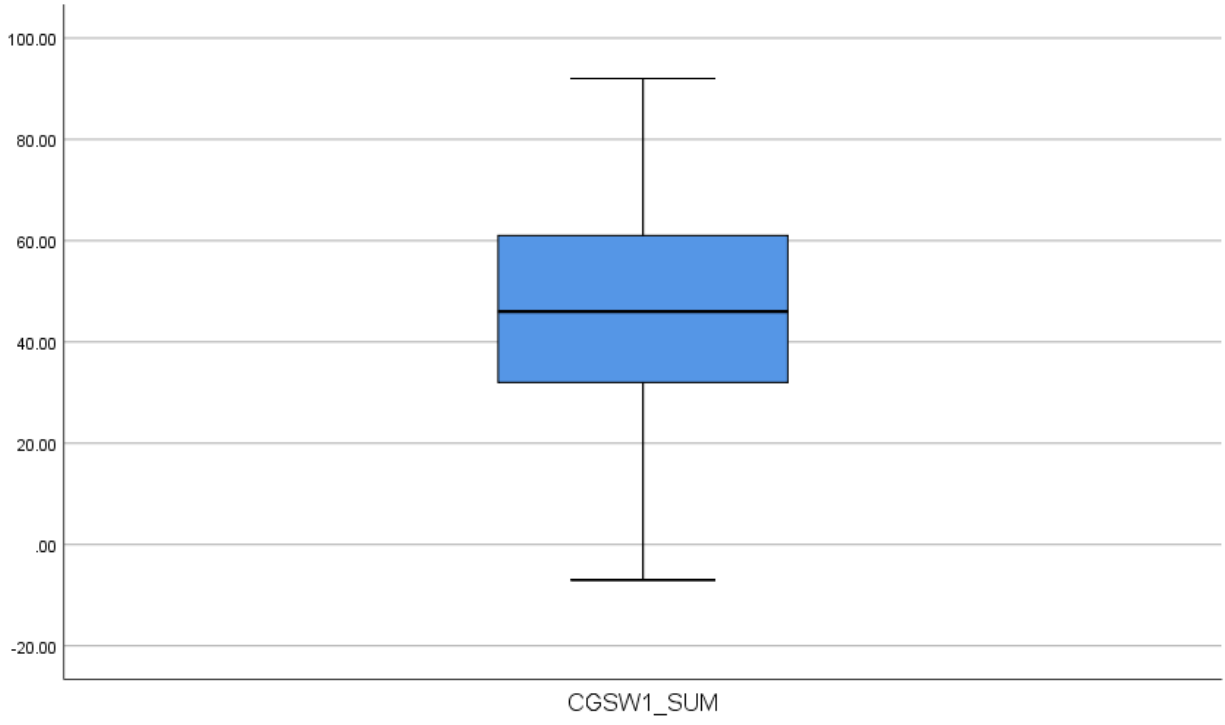
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.749	.751	8

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.760	.767	9

Appendix D

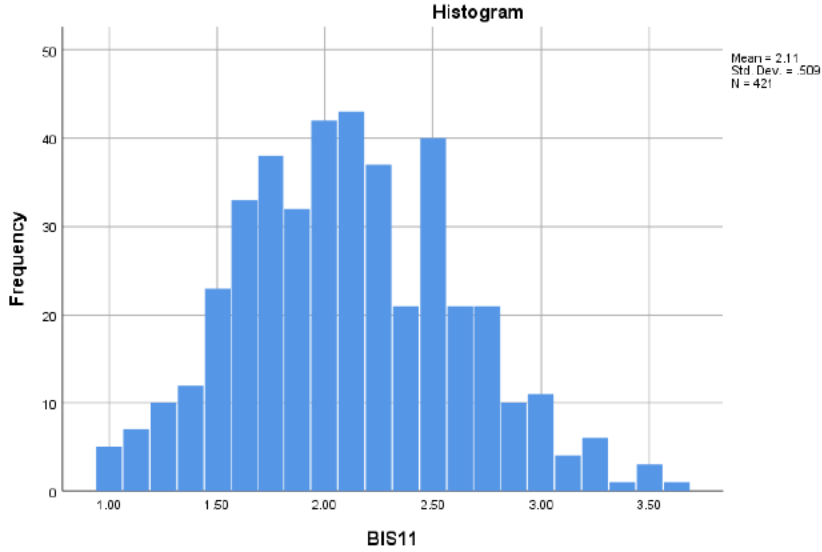
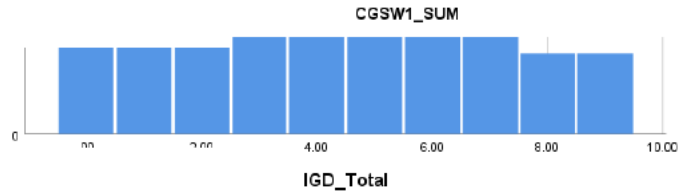
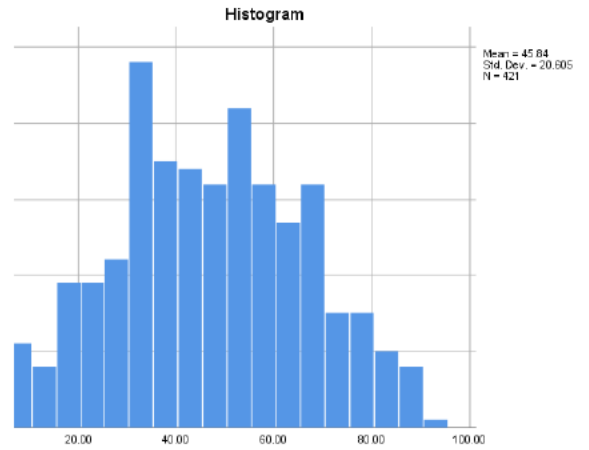
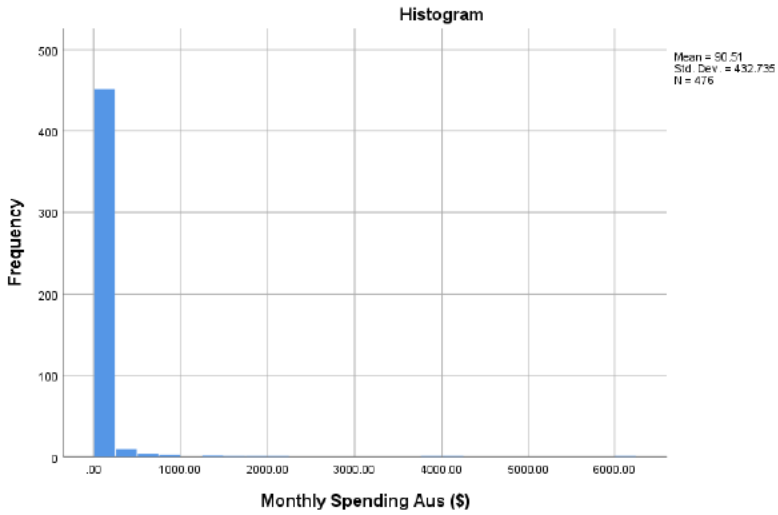
Boxplots of Impulsivity, IGD, GCSW and Monthly Spending

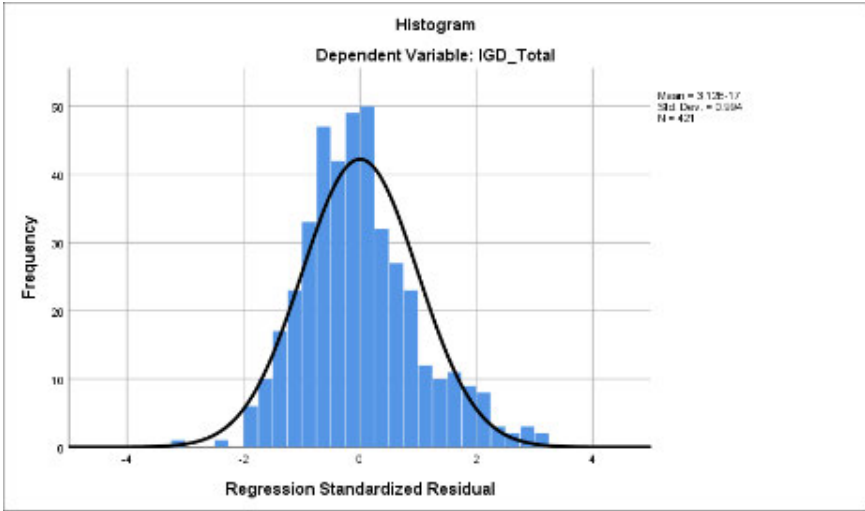




Appendix E

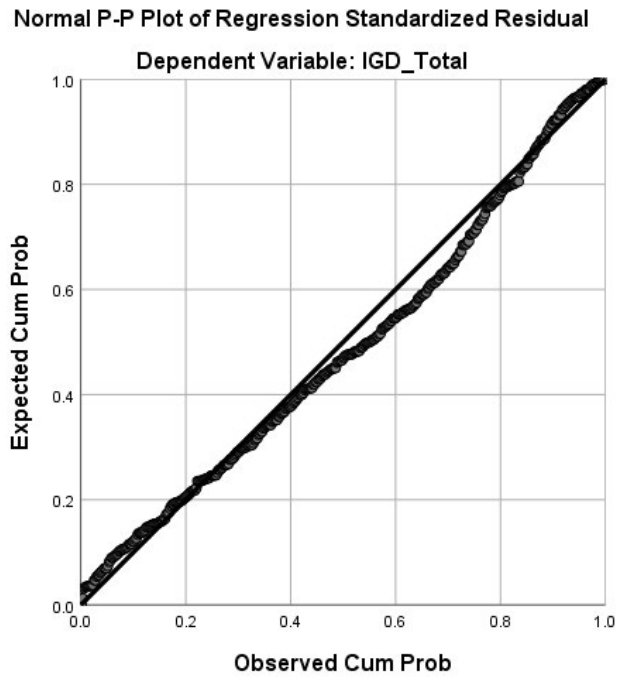
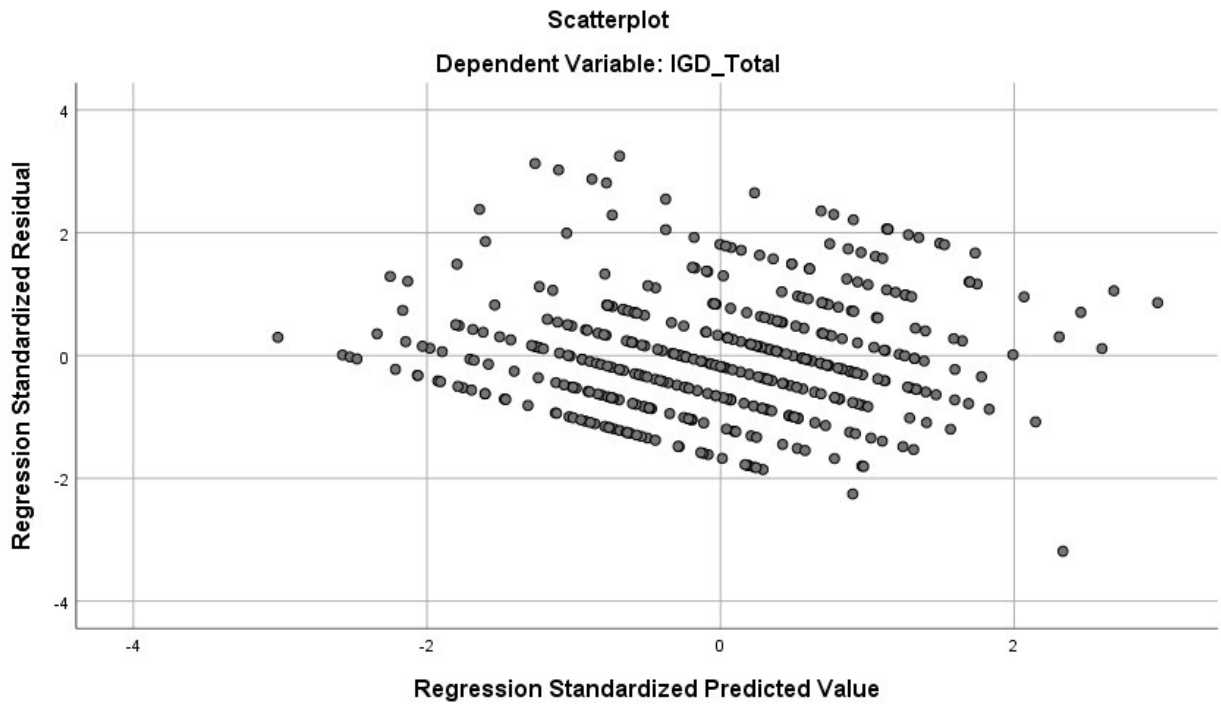
Frequency Histograms of Monthly Spending, GCSW, Impulsivity and IGD Symptoms





Appendix F

Scatterplots



Appendix G

SPSS Output Data for Examiner

Report

Monthly Spending Aus (\$)

Classification	Mean	N	Std. Deviation
Non-problem	69.3850	171	337.26302
At-risk	52.9465	137	146.47084
High-risk	188.6807	113	752.31269
Total	96.0556	421	455.10183

Model Summary^c

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	Change Statistics			
						F Change	df1	df2	Sig. F Change
1	.262 ^a	.069	.060	2.31719	.069	7.691	4	416	.000
2	.549 ^b	.302	.290	2.01398	.233	45.896	3	413	.000

Hypothesis Test Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Monthly Spending is the same across categories of IGD_3.	Independent-Samples Kruskal-Wallis Test	.023	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is .05.

Each node shows the sample average rank of IGD_3.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
1.00-2.00	-10.090	13.698	-.737	.461	1.000
1.00-3.00	-39.174	14.483	-2.705	.007	.020
2.00-3.00	-29.084	15.181	-1.916	.055	.166

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same. Asymptotic significances (2-sided tests) are displayed. The significance level is .05. Significance values have been adjusted by the Bonferroni correction for multiple tests.

a. Predictors: (Constant), Weekly Hours played, What is your age?, How many close friends do you have that spend money on Fortnite?, How many years have you played online games?

b. Predictors: (Constant), Weekly Hours played, What is your age?, How many close friends do you have that spend money on Fortnite?, How many years have you played online games?, BIS11, Monthly Spending Aus (\$), CGSW1 SUM

c. Dependent Variable: IGD_Total

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	165.179	4	41.295	7.691	.000 ^b
	Residual	2233.662	416	5.369		
	Total	2398.841	420			
2	Regression	723.663	7	103.380	25.488	.000 ^c
	Residual	1675.178	413	4.056		
	Total	2398.841	420			

a. Dependent Variable: IGD Total

b. Predictors: (Constant), How many close friends do you have that spend money on Fortnite?, How many years have you played online games?, Weekly Hours played, What is your age?

c. Predictors: (Constant), How many close friends do you have that spend money on Fortnite?, How many years have you played online games?, Weekly Hours played, What is your age?, BIS11, Monthly Spending Aus (\$), CGSW1 SUM

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.887	.389		7.424	.000					
	What is your age?	-.027	.017	-.078	-1.584	.114	-.116	-.077	-.075	.916	1.092
	How many years have you played online games?	-.054	.024	-.111	-2.242	.025	-.155	-.109	-.106	.916	1.091
	How many close friends do you have that spend money on Fortnite?	.070	.045	.075	1.538	.125	.135	.075	.073	.930	1.075
	Weekly Hours played	.028	.008	.167	3.433	.001	.194	.166	.162	.942	1.062
2	(Constant)	-.623	.569		-1.096	.274					
	What is your age?	-.008	.015	-.022	-.498	.619	-.116	-.024	-.020	.860	1.163
	How many years have you played online games?	-.035	.021	-.072	-1.657	.098	-.155	-.081	-.068	.908	1.102
	How many close friends do you have that spend money on Fortnite?	.011	.040	.011	.263	.793	.135	.013	.011	.894	1.119
	Weekly Hours played	.010	.007	.058	1.333	.183	.194	.065	.055	.893	1.120
	BIS11	.755	.196	.161	3.860	.000	.233	.187	.159	.972	1.029
	CGSW1_SUM	.052	.005	.447	10.212	.000	.505	.449	.420	.882	1.134
Monthly Spending Aus (\$)	.000	.000	.086	1.990	.047	.140	.097	.082	.913	1.095	

a. Dependent Variable: IGD_Total