Entrapment and Predatory Monetization in DotA 2's Multi-Million Dollar Battlepass

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Abstract

Video game monetisation has seen rapid development the past decade, with engagement-focused monetisation models such as the Battlepass achieving global financial success. "Defence of the Ancients 2" (DotA 2), is a popular free-to-play online game which introduced the Battlepass and contains a unique system of monetisation where players are exposed to gambling (loot-boxes, etc). Loot-boxes and gambling in online games has been explored in the past, but little research has examined DotA 2's Battlepass and how it exposes and habituates players to monetisation and gambling, while also entrapping them in cycles of gameplay. A sample of 773 participants aged between 16-54 recruited through the online subreddit r/DotA 2, completed an online questionnaire. Measures included the Problem Gambling Severity Index, the Online Fear-of-Missing-Out Scale, the Internet Gaming Disorder Scale, and the Short UPPS-P Impulsive Behaviour Scale. Participants engagement in the Battlepass and other facets of DotA 2's monetisation, as well as their susceptibility to monetisation was also measured. The results showed that Online-FoMO, but not impulsivity was related to monetisation susceptibility. IGD scores were generally higher amongst individuals with greater microtransaction/Battlepass engagement. Individuals exposed to gambling through the Battlepass were more likely to spend more money on other microtransactions. Finally, higher problem gambling scores were associated with greater monetisation engagement. These results provide evidence that problem gaming/gambling are related to Battlepass engagement and suggests that ON-FoMO does play a role in monetisation susceptibility.

Keywords: predatory monetisation, Battlepass, loot-boxes, pay-to-win, online gaming, gambling, online games

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Contributor Roles Table

ROLE	ROLE DESCRIPTION	STUDENT	SUPERVISOR 1	SUPERVISOR 2
CONCEPTUALIZATION	Ideas; formulation or evolution of overarching research goals and aims.	X	X	
METHODOLOGY	Development or design of methodology; creation of models.	X	X	
PROJECT ADMINISTRATION	Management and coordination responsibility for the research activity planning and execution.	X	X	
SUPERVISION	Oversight and leadership responsibility for the research activity planning and execution, including mentorship external to the core team.			
RESOURCES	Provision of study materials, laboratory samples, instrumentation, computing resources, or other analysis tools.	X	X	
SOFTWARE	Programming, software development; designing computer programs; implementation of the computer code and supporting algorithms; testing of existing code.			
INVESTIGATION	Conducting research - specifically performing experiments, or data/evidence collection.	X	X	
VALIDATION	Verification of the overall replication/reproducibility of results/experiments.	X		
DATA CURATION	Management activities to annotate (produce metadata), scrub data and maintain research data (including software code, where it is necessary for interpreting the data itself) for initial use and later re-use.	X		
FORMAL ANALYSIS	Application of statistical, mathematical, computational, or other formal techniques to analyze or synthesize study data.	X	X	
VISUALIZATION	Visualization/data presentation of the results.	X	X	
WRITING – ORIGINAL DRAFT	Specifically writing the initial draft.	X		
WRITING – REVIEW & EDITING	Critical review, commentary or revision of original draft	X	X	

Introduction

The online video game industry is currently valued at over 56 billion dollars and is projected to be worth over 132 billion by 2030 (Acumen Research and Consulting, 2022). The number of users in the online gaming market is also expected to grow to 1.25 billion by 2027 (Clement, 2021). Online gaming continues to grow in other areas as well, with competitive gaming known as "eSports" achieving greater mainstream appeal and an anticipated global audience of over 640 million global viewers by 2025 (Newzoo, 2022). However, differences in gaming growth are evident and vary by demographics. For example, offline or single-player gaming is preferred by 73% of gamers aged 55 and older and 58% of gamers aged 35-44, but only by roughly 42.5% of gamers aged 16-24 (Severing, 2022). Online gaming is increasingly growing in popularity over offline gaming, especially amongst younger players, seemingly set to overtake offline games in terms of popularity in the coming years. Over the past decade following the shift to online gaming, the strategies publishers utilise to monetise their games have shifted as well (Zendle, Meyer & Ballou, 2020). In this review, a summary is provided of gaming's transition from early ownership models to the gradual development of monetised models including the Battlepass system, which is the focus of this research investigation.

1.1 Microtransactions

Initially, game publishers made profit through selling copies of their game, subscriptions to access their game, or selling additional "downloadable content" (DLC) for their game. This would change in the early 2000s as "microtransactions" (purchasable items, goods, or services within a game), began to be included in online games (Zendle, Meyer &

Ballou, 2020). South-Korean role-playing game "MapleStory", is one of the earliest examples of an online game containing the microtransaction monetisation model, and allowed players to purchase items/abilities within the game that gave them advantages over other players (Davidovici-Nora, 2013). This monetisation method proved its value almost instantly, and two years after the games release in 2005, "Nexon" the company behind MapleStory would report a yearly revenue of $230 million dollars, with 80% of that revenue coming from microtransactions (Sheffield, 2007). MapleStory's widespread success led to a growing plethora of games adopting similar microtransactional monetisation models throughout the late 2000s, which spread outside of Asia to the West as well (Shokrizade, 2012). While the model was successful in Eastern countries, it wasn't well established or received in the West (Heimo et al., 2018).

1.2 "Pay-to-Win"

A particular aspect of microtransactions which ultimately enhanced their desirability amongst players, was the ability to "pay-to-win". Games become pay-to-win when they offer microtransactions that allow players to gain significant advantages over others, especially players who don't spend money (Heimo et al., 2018). While pay-to-win models of game monetisation were generally more accepted in the East, in the West they were highly criticised for disrupting the competitive balance and equity of games. In effect, games became not only based on player skill, but rather how much money a player spent (Heimo et al., 2018). Researchers criticised these models for facilitating player entrapment/FoMO, by allowing microtransactions to greatly speed up game progress, or continue game progress when you had failed, which encouraged further paying to win (Karlsen, 2011).

Players who clearly spent money on pay-to-win microtransactions, were even perceived as having lower skill and status by other players in-game (Evers, Van de Ven & Weeda, 2015).

1.3 Cosmetic Microtransactions

As a result of such criticisms, many publishers and developers moved away from "pay-to-win" microtransaction models and focussed on cosmetic microtransactions instead. Cosmetic microtransactions are any form of in-game purchase that afford no advantage and are purely cosmetic (Zendle, Meyer & Ballou, 2020). Examples of cosmetic microtransactions include character "skins" (different outfits for character in-game), or different designs on their weapons/items.

Clear evidence for the changing business model in modern gaming is reported by Zendle, Meyer and Ballou (2020), who analysed the history of the 463 most played games and their changing monetisation models on Valve's online PC gaming platform known as "Steam", from 2010-2019. Pay-to-win microtransactions were prevalent in 17.3% of the sampled games in 2015 but had declined to almost zero by 2019. Meanwhile, the prevalence of cosmetic microtransactions skyrocketed, with 85.89% of games analysed containing them by 2019.

1.4 Loot-boxes and Problem Gambling

Loot-boxes are items which can be bought with or require real money to "open", containing randomised contents of varying probabilities and rarities (Zendle & Cairns, 2018). From 2010-2019, loot-boxes grew significantly in popularity, with 71.2% of analysed games

containing them (Zendle, Meyer & Ballou, 2020). Although loot-boxes can contain pay-to-win items, in almost all major online games today they primarily contain cosmetics, with more valuable and unique cosmetics being increasingly difficult to attain (Nguyen, 2022). For example, in the game "Counter-Strike:Global-Offensive", the rarest and most valuable cosmetics in loot-boxes have rarities ranging from a 0.64% to a 0.026% chance of being attained (Scott-Jones, 2017). Loot-boxes have been linked to problem gambling repeatedly, with cross sectional research by Zendle (2019), outlining that engagement in gambling-like gaming practice was significantly associated with problem gambling and disordered gambling, with roughly 18.5% of a 1000 participant sample engaging in such activities. Similarly, a meta-analysis of loot-boxes and video game gambling literature concluded that there was at minimum a moderate association between loot-box spending and problem gambling (Garea et al., 2021).

One potential reason for the association between problem gambling and loot-box purchases, is that both activities may attract people with similar traits. One of these is impulsivity which has been identified as having a strong relationship with problem gambling (Wardle & Zendle, 2021) and problem gaming (Blinka, Škařupová & Mitterova, 2016). Age and impulsivity also have been found to correlate, with younger gamers often more impulsive (Blinka, Škařupová & Mitterova, 2016). Impulsivity is positively associated with general spending in-game (Costes & Bonnaire, 2022), with research finding specific correlations between impulsivity and loot-box spending as well (Garrett et al., 2023). Loot-boxes have been deemed "predatory monetisation schemes", designed to promote addiction and habituation amongst players (Lemmens, 2022), and this has led to variety of countries regulating them. For example, Belgium imposed an outright ban, whereas China requires transparency surrounding the odds of obtaining items in loot-boxes, although it is

unclear whether these measures have been effective, because individuals can use virtual

private networks (VPNs) to access the internet elsewhere (Xiao et al., 2022).

1.5 Problem Gaming

A further concern is that loot-boxes appear to attract higher risk gamers who

experience problems with gaming. Internet Gaming Disorder (IGD) was officially recognised

in 2021 by the World Health Organisation in the ICD-11 (11th revision of the International

Classification of Diseases) (World Health Organisation, 2023). IGD is also included in the

DSM-5-TR (Diagnostic and Statistical Manual of Mental Disorders) as a condition requiring

further research, classified as persistent and recurrent preoccupation with online games,

characterised by withdrawal symptoms from gaming, a need to spend increasing amounts of

time gaming and unsuccessful attempts to control gaming amongst other criteria (American

Psychiatric Association, 2022). Systematic reviews on IGD have revealed its prevalence to be

roughly 2% worldwide, although substantially more prevalent amongst males (Stevens et al.,

2020), with further research demonstrating it increasing globally (Taechoyotin et al., 2020).

A further systematic review outlined that loot-boxes are significantly associated with

problem gaming behaviours, with individuals who purchase loot-boxes more likely to report

increased time engaged in gaming (Gibson et al., 2022). Likewise, Raneri et al (2022)

concluded in their systematic review that general microtransaction engagement was

associated with gaming disorder.

1.6 The First "Battlepass"

Although loot-boxes and cosmetic microtransactions are an extremely successful method of game monetisation, an issue remains. Pay-to-win microtransactions/loot-boxes are significantly more likely to be purchased, then microtransactions/loot-boxes that don't offer in-game advantages. This is evidenced by a study tracking the revenue of Minecraft servers, where a 223% revenue disparity between a pay-to-win and non-pay-to-win monetised server was present (MCEULA, 2017). To compensate for this, a new method of game monetisation building upon existing systems was developed.

In 2013, popular online game "Defence of the Ancients 2" (DotA 2) released "The International 2013 Interactive Compendium", an additional $10 in-game "pass", that granted players the ability to earn additional cosmetic content (Valve, 2013). DotA 2 is a free-to-play game, and the "Compendium" was purchased 1.15 million times earning Valve (DotA 2's developers) a total of 11.5 million dollars throughout the brief period it was purchasable (Valve, 2013). The Compendium only lasted a set few months, and allowed players to earn exclusive cosmetic rewards that wouldn't be obtainable ever again when it ended. The Compendium was also tied to a large yearly DotA 2 eSports tournament ("The International"), with part of the earnings from Compendium sales going towards the tournaments prize pool, and players who purchased the Compendium were able to participate in match wagering to earn special rewards.

Valve would continue to release yearly Compendiums which grew in scale and profit, eventually being renamed the "Battlepass" in 2016. A progression system involving tiers with varying levels of rewards ranging from 1 to 2000+ was established, with each tier requiring an increasing number of "points" to achieve (Valve, 2016). As players got further

into the Battlepass unlocking more tiers, the rewards would become increasingly more valuable and desirable, with players also able to purchase tiers with real money. The most desirable rewards were often only obtainable at tiers well into the 100s, requiring a significant amount of time (or money) to obtain. To earn points, players could undergo "quests" in-game, specific tasks which would grant them rewards upon completion, and could also gamble points on matches through wagering. Rewards for each tier ranged from in-game cosmetic skins to loot-boxes known as "treasures" and other gambling-centred items such as the roulette themed "Rylai Wheel" (Valve, 2016). The 2016 Battlepass earned Valve a total of over 83 million dollars, with every Battlepass in the following years earning more and containing increasingly monetised content and exclusive cosmetics. A variety of other games such as "Apex Legends", "Overwatch 2" and "Fortnite" have also adapted their own versions of the Battlepass since, and it has become one of the most widely used and successful monetisation strategies in online gaming today (Joseph, 2021).

1.7 Battlepass Criticisms

Schemes such as the Battlepass have been criticised for exploiting "Fear of Missing Out" (FoMO), to pressure players into spending money to achieve specific limited time rewards (Petrovskaya & Zendle, 2020). For example, in 2021 one-of-a-kind exclusive cosmetics were locked behind very high tiers of the Battlepass, almost impossible to achieve through normal gameplay, which led to significant backlash against Valve from players who could not afford to buy them (Araullo, 2021). In past Battlepasses, certain social needs could only be fulfilled through access to "guilds", which involve social groups where players could play together but only if they had the Battlepass (Gibson et al., 2022). Furthermore, a

significant number of the rewards and methods of obtaining rewards in the Battlepass involve gambling mechanics. Research by Zanescu, French and Lajeunesse (2020), analysed and criticised the "gamblification" of DotA 2's Battlepass, on the grounds that its staggered reward system could entrap players into cycles which encouraged them to log in everyday to complete various tasks.

The impact of Battlepass mechanics on players emotions has also been investigated, with match wagering found to be associated with very high "highs" when successful, but also very low "lows" when unsuccessful (Zanescu, French, & Lajeunesse, 2020). Petrovskaya and Zendle (2020) in a mixed-methods analysis of players emotions, revealed Battlepass goals were perceived to be unrealistic and unachievable without spending additional money. Players felt distrusting of Valve, believing they squeeze players of as much money as possible, with more desirable cosmetics and rewards being too high in the Battlepass and too difficult to obtain. However, strong social desires to achieve the more sought-after items from the Battlepass as status symbols, led many players to feel frustrated that they must participate in the Battlepass or miss out forever, even though they disliked participating (Zanescu, French and Lajeunesse, 2020). Such strategies appear to have achieved commercial returns, in that while DotA 2's average player count has gradually declined the past half decade, the Battlepass has continued to become more profitable (Petrovskaya and Zendle, 2020). For this reason, research on the Battlepasses implementation in other games has also labelled their design as a "series of disguised shops", where players are constantly exposed to the Battlepass and its mechanics when accessing game menus (Joseph, 2021).

1.8 The Current Study

Although previous studies have investigated the monetisation methods employed by DotA 2's Battlepass and player attitudes, little research has examined: (a) whether gaming schemes such as Battlepass alter player behaviour (Petrovskaya & Zendle, 2020), or (b) which individuals might be most susceptible to influence. This research therefore aims investigate the following hypotheses:

1. It is hypothesised that individuals with higher impulsivity scores will be more susceptible to video-game monetisation.

2. It is hypothesised that individuals scoring higher on the FOMO scale will be more likely to spend more money on in-game purchases.

3. It is hypothesised that individuals who are more problematic gamers will be more likely to report increasing their time and monetary commitment to gaming when in possession of a Battlepass (e.g., complete it and play more regularly).

4. It is hypothesised that individuals who are exposed to gambling mechanics through the Battlepass, will be more likely to have spent money on other in-game features.

5. It is hypothesised that higher problem gambling scores will be associated with greater engagement in all forms of monetised gaming.

Method

Participants

A total of 773 (*M = 736, F = 17, Other = 20*) individuals were sampled for the study (Table 1). Participants ranged from ages 16-54 with 54% of participants falling within the 25-34 age group, and 35% within the 18-24 age group. Participants were recruited from the online platform Reddit, specifically the large subforum or "subreddit" for discussion of DotA 2 known as r/DotA2 (https://www.reddit.com/r/DotA2/). To participate, respondents had to be 16 years or older and have played or currently played DotA 2. The sample was mostly representative of the major regions who played DotA 2, with North America/Canada (27.94%), South-East Asia (23.80%), Western Europe (20.05%), Eastern Europe (9.31%) and Oceania (5.95%) making up majority of locations. A majority of the sample had completed a Bachelor's (48.38%), Postgraduate (15.01%) or high school degree (20.44%), with 66.75% in some form of employment and 69.34% reporting a stable income flow.

Measures

(a) Demographics

Basic demographics on participants were collected through 6 items. These demographics (age, gender, region, education level, employment status and income flow) are summarised in Table 1.

Table 1

Demographics of the Sample

Variable	Characteristic	Total	
		N	*%*
Gender	Male	736	95.21
	Female	17	2.20
	Non-Binary	9	1.15
	Prefer not to say	11	1.42
Age (years)	16-17	11	1.42
	18-24	275	35.58
	25-34	424	54.85
	35-44	60	7.76
	45-54	3	0.39
Region	North America/Canada	216	27.94
	South America	34	4.40
	Oceania	46	5.95
	Russia	8	1.03
	China	2	0.26
	South-East Asia	184	23.80
	Western Europe	155	20.05
	Eastern Europe	72	9.31
	The Middle East	16	2.07
	Other	40	5.17
Education Level	Partial high school/secondary school	11	1.42
	Completed high school/secondary school	158	20.44
	Diploma/non-degree related study	86	11.13
	Bachelor's Degree	374	48.38
	Postgraduate Degree	116	15.01
	Other	28	3.62
Employment Status	Studying	157	20.31
	Casual employment	37	4.79
	Part-time employment	48	6.21
	Full-time employment	431	55.76
	Unemployed	73	9.44
	Retired	2	0.26
	Other	25	3.23
Income Flow	Stable income flow (Yes)	536	69.34
	Unstable income flow (No)	237	30.66

Note. N = 773

(b) Game Participation and Spending

Several questions captured participants' game participation and microtransaction spending behaviour, including how much time participants spent playing games per week (in hours) and how many years they've been playing online games and DotA 2. Other questions relating to what types of microtransactions participants purchased (loot-boxes, Battlepasses, cosmetics, etc) and how much money they spend on microtransactions per month on average were also included.

(c) Battlepass Attitudes and Engagement

The prevalence of Battlepass purchases was assessed. A simple yes/no question initially gauged how many participants had purchased the Battlepass at least once. 700 of the participants (89%) had purchased the Battlepass before, and a further question indicated that 219 of those participants had bought the Battlepass 2-3 times (31%), 231 had bought it 4-5 times (33%) with 185 buying it 6 times or more (26%).

(d) Perceived Behavioural Impact of The Battlepass

A series of 9 yes/no questions measured participants attitudes and behaviours surrounding the Battlepass. For example, "do you feel compelled to play more often due to the limited time nature of the Battlepass and its rewards?". These 9 questions were operationalised and summated into a numerical scale (0 = no, 1 = yes), with a range of 0 to 9. Finally, a further 8 questions assessed participants gambling exposure and behaviours

(loot-box participation, match wagering, etc) stemming from the Battlepass. For example, "have you ever placed wagers on other matches, for battlepass rewards?".

(e) Problem Gambling Severity Index (PGSI)

The PGSI was employed to assess problematic gambling (Ferris & Wynne, 2001). Items did not pertain to just gambling in DotA 2 but gambling in general. A total of nine questions with four Likert-scale type responses were included, varying from "Never" (0) to "Always" (3). Results from the PGSI were summated into an overall score, which was then used to classify participants risk/problematic gambling. Scores of 0 indicate a non-problematic gambler, 1-2 indicate low-risk gamblers, 3-7 indicate moderate-risk gamblers and 8+ indicated problematic gamblers. The PGSI had good internal consistency with the current sample (α = .89).

(f) Impulsivity Scale

A shortened 20-item version of the UPPS-S Impulsive Behaviour Scale was employed to assess participants degree of impulsivity (Billieux et al., 2015). The scale includes questions such as "my thinking is usually careful and purposeful", with four Likert-scale type responses ranging from "Agree Strongly" (1) to "Disagree Strongly" (4), where higher overall scores indicate higher impulsivity. The items are grouped into and measure 5 different dimensions of impulsivity, including negative urgency, lack of perseverance, lack of premeditation, sensation seeking and positive urgency. However, 12 items relating to negative urgency, positive urgency and sensation seeking were reverse scored to reduce

potential response bias. To ensure results remain easily interpretable, final scores were

recoded so that higher scores indicate greater impulsivity with a score range of 20-80. The

impulsivity scale had acceptable internal consistency with the current sample (α = .69).

(g) Online Fear of Missing Out Inventory (ON-FoMO)

An adapted version of the "Fear of Missing Out" (FoMO) scale was employed for this

study, to gauge participants online behaviour (Sette et al., 2020). This 20-item inventory was

chosen over the traditional 10-item FoMO scale, as its items pertain to online/social media

use, more relevant and appropriate to the current study. The ON-FoMO Inventory

correlated highly with the FoMO scale, and measures 4 distinct aspects of FoMO, anxiety,

addiction, need to belong and need for popularity. Items on the scale include questions such

as "I get sad to learn from posts that my friends went to events, and I wasn't invited", which

can be extrapolated to the social elements of DotA 2's Battlepass and rewards. Items are

measured on 4 Likert-scale type responses, ranging from "Has nothing to do with me" (1) to

"Has a lot to do with me" (4), with higher scores indicating a higher degree of Online-FoMO

(total scores range from 20-80). The ON-FoMO Inventory had good internal consistency with

the current sample (α = .88).

(h) Internet Gaming Disorder Scale (IGD)

A shortened version of the Internet Gaming Disorder Scale, known as the Internet

Gaming Disorder Scale–Short-Form (IGDS9-SF) was then employed. This 9-item measure

includes questions such as "Do you feel more irritability, anxiety or even sadness when you

try to either reduce or stop your gaming activity?", which encompass all 9-internet gaming addiction criteria outlined by the APA (American Psychiatric Association, 2022). Items are measured on a dichotomous yes/no scale (no = 0, yes = 1). Higher overall scores indicate a greater degree of internet gaming disorder, and participants who responded "Very Often" to at least 5 of the items presented can be classed as having an internet gaming addiction (Pontes & Griffiths, 2015). The IGDS9-SF had acceptable internal consistency with the current sample (α = .75).

Procedure

Prior to conducting analyses, engagement in monetised gaming and susceptibility to game monetisation were operationalised. Engagement in monetised gaming was measured through dichotomous yes/no questions relating to microtransaction and Battlepass participation. Initially participants were asked if they had purchased a microtransaction before, and those who responded "yes" were asked further about Battlepass purchases, as well as other kinds of microtransactions. Susceptibility to video game monetisation was measured through dichotomous yes/no questions relating to microtransaction spending behaviour, with questions such as "have you ever felt pressured to make a microtransactional purchase" and "do you regret making a microtransaction".

An online survey was utilised for the current study, and the *University of Adelaide Human Research Ethics Subcommittee* granted ethics approval (approval number 23/80)**.** The survey was hosted on the online survey platform Qualtrics (https://www.qualtrics.com/) and could be completed in 10-20 minutes on any device with internet access, consisting of roughly 100 multiple choice questions (Appendix C-J). The

study was advertised on Reddit, specifically in the subreddit dedicated to DotA 2

(https://www.reddit.com/r/DotA2/) (Appendix A). A post was made on the subreddit

inviting anybody above 16 years old to participate, which contained information

surrounding the survey and a linked google document with information about the research

(Appendix B). Participants who completed the survey had the option to provide an email or

reddit username, that would grant them entry to a giveaway for a $25 "Steam gift card",

which are gift cards that can be used to purchase goods on the online platform Steam (of

which DotA 2 is on).

Analyses

IBM's *SPSS Statistics Data Editor* was utilised for analyses. All analyses conducted

were two-sided with significance tested against an alpha level of $p < .05$. First, independent

samples t-tests were employed to compare scores on psychometric tests (PGSI, ON-FoMO

and Impulsivity), with engagement in and susceptibility to monetised gaming. Levene's Test

for equal variance was conducted for each variable, with most satisfying homogeneity ($p >$

.05), but some such as engagement in microtransactions and PGSI scores ($F = 4.49$, $p = 0.04$)

didn't. This was resolved using t-test values associated with pooled variance estimates

instead**.** Shapiro-Wilks tests also exhibited that many of the variables deviated from

normality ($p < .05$). However, considering the relatively large sample size employed within

this study, the effects of deviations from normality shouldn't cause issues and non-

parametric tests aren't required (Ghasemi & Zahediasl, 2012).

Correlational analyses including a selection of 2 x 2 Pearson Chi-squared tests then

explored associations between gambling mechanics within the Battlepass, and money spent

on other microtransactions. All Chi-squared tests had no cells with expected counts of less than five. Spearman Correlations were also employed to analyse the direction and strength of the relationship between IGD scores and Battlepass ownership, as well as PGSI scores and engagement in monetised gaming.

Exploratory Analyses

To gain further insights into the characteristics of individuals with greater monetised gaming engagement and susceptibility, additional exploratory analyses were conducted. Binary logistic regressions were employed to gain a deeper understanding of the dimensions of ON-FoMO and Impulsivity, and if they could predict monetisation engagement and susceptibility. The dimensionality of each factor relating to the perceived behavioural impact of the Battlepass, were then analysed through a principal components analysis. Variables which loaded higher (0.5 and above) on specific components then formed subscales that captured a more nuanced measure of elements of Battlepass engagement, and compulsive behaviour associated with it.

Results

Analysis of Statistical Power

A *G*Power* analysis was conducted to ascertain the required sample sizes to detect medium effect sizes for the proposed analyses, tested at $p < .05$ with power = .80. The largest requirement was for an independent samples t-test, $N = 128$ in ach group. The current study with $N = 773$ more than met all power requirements.

Preliminary Data Screening

A total of 12 participants (1.53%) were removed due to inconsistent responding (no microtransactions reported but had purchased a Battlepass).

Descriptive Statistics

Table 2 summarises the level of microtransaction engagement, monthly expenditure, and IGD/PGSI scores. Nearly all ($N = 760$) participants had purchased a microtransaction this month (98.3%), with 668 (89.17%) purchasing the Battlepass. A total of 314 (40.6%) participants could be classified as "problem gamers" and 62 (8%) could be classified as problem gamblers, with another 244 (31.6%) considered low or moderate risk gamblers. Table 3 displays comparisons of individual difference measures based on engagement with any or the specific (Battlepass) microtransactions.

PREDATORY MONETISATION IN MODERN GAMING

Table 2

Engagement in Monetised Gaming

Grouping Variable	Tests Variable(s)	Total		Purchased a Microtransaction		Purchased a Battlepass (BP)		Purchased Micro + (BP)		No Monetised Engagement	
		n	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Total		773	100	760	98.3	688	89.17	542	70.12	25	3.18
	$0	13	1.7	0	0	0	0	0	0	13	100
Amount spent	$1-$20	572	74	572	75.3	509	74.0	388	71.6	0	0
on	$20-$50	106	13.7	106	13.9	99	14.4	83	15.3	0	0
microtransactions	$50-$100	42	5.4	42	5.5	42	6.1	35	6.5	0	0
(monthly)	$100-$200	31	4.0	31	4.1	29	4.2	27	5.0	0	0
	$200-$500	5	0.6	5	0.7	5	0.7	5	0.9	0	0
	$500-$1000	1	0.1	1	0.1	1	0.2	1	0.2	0	0
	$1000+	3	0.4	3	0.4	3	0.4	3	0.6	0	0
	$10,000+	0	0	0	0	0	0	0	0	0	0
Petry's IGD	Non-problem	459	59.4	449	59.1	413	61.8	321	59.2	10	76.9
	Problem Gamer	314	40.6	311	40.9	275	41.2	221	40.8	3	23.1
PGSI	Non-problem	467	60.4	456	60	415	62.1	317	58.5	11	84.6
	Low Risk	134	17.3	134	17.6	117	17.5	94	17.3	0	0
	Moderate Risk	110	14.2	108	14.2	100	15.0	83	15.3	2	15.4
	Problem Gambler	62	8.0	62	8.2	56	8.4	48	8.9	0	0

Note. *N* = 773. IGD = Internet Gaming Disorder. PGSI = Problem Gambling Severity Index. BP = Battlepass. Purchased Micro + BP = Participants who purchased both the Battlepass and Microtransactions.

Table 3

Susceptibility to Monetisation

Measures	Possible Range	Actual Range	Total		Purchased a Microtransaction		Purchased a Battlepass (BP)		Purchased Micro + (BP)		No Monetised Engagement	
			M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
ON-FoMO												
FoMO (Total)	20-80	20-66	32.4	9.4	32.4	9.4	32.1	9.3	32.6	9.4	28.2	8.1
Need to Belong	5-20	5-20	8.4	3.3	8.4	3.3	8.3	3.3	8.5	3.4	7.1	2.1
Need for Popularity	5-20	5-19	8.7	2.9	8.7	2.9	8.7	2.9	8.8	3.0	7.3	2.4
Anxiety	5-20	5-20	8.0	3.2	8.0	3.2	7.9	3.2	8.0	3.2	7.2	2.4
Addiction	5-20	5-20	7.2	2.7	7.2	2.7	7.2	2.7	7.2	2.8	6.6	2.5
S-UPPS-P												
Impulsivity (Total)	20-80	23-73	47.5	6.3	47.5	6.3	47.6	6.3	47.4	6.4	48.8	7.1
Negative Urgency	4-16	4-16	10.6	2.7	10.6	2.7	10.7	2.6	10.6	2.6	11.5	2.3
Lack Perseverance	4-16	4-16	8.1	2.0	8.1	2.0	8.1	1.9	8.1	1.9	8.1	1.9
Lack Premeditation	4-16	4-16	7.3	2.0	7.4	2.0	7.4	2.1	7.3	2.1	6.6	1.8
Sensation Seeking	4-16	4-16	9.5	2.6	9.5	2.6	9.5	2.6	9.5	2.7	10.4	3.2
Positive Urgency	4-16	4-16	11.9	2.6	11.9	2.6	12.0	2.5	11.9	2.5	12.2	2.7

Note. *N* = 773. ON-FoMO = Online Fear of Missing Out Scale. S-UPPS-P = Short Impulsive Behaviour Scale. BP = Battlepass. Purchased Micro + BP = Participants who purchased both the Battlepass and Microtransactions.

Analysis of Research Aims

(a) Impulsivity, ON-FoMO and Monetisation Susceptibility

Inconsistent with Hypothesis 1, t-test comparisons (Table 4) show that there was no difference in impulsivity, FOMO or IGD scores for those who had, or had not, made a microtransaction. The second aim of the study was to analyse the relationship between ON-FoMO and spending behaviour. It was hypothesised that individuals with higher ON-FoMO scores, would be more likely to spend more money on in-game purchases. Table 4 indicates that Hypothesis 2 wasn't consistently supported. Although ON-FoMO scores were higher for individuals who made microtransactional purchases, ON-FoMO scores were lower for those who purchased a Battlepass. However, On-FOMO scores were also higher for individuals who engaged in both behaviours (microtransactions and Battlepass), but this may again reflect the higher scores for those who had made microtransactional purchases.

Given that FoMO involves individuals' behaviour rather than just the activities they partake in, refined analyses on monetisation susceptibility were conducted (Table 5). These indicated that ON-FoMO scores were higher amongst individuals who felt pressured to make microtransactions, had broken their set spending limits, and regretted making microtransactions. These results imply that while the samples spending behaviour may be inconsistent in relation to ON-FoMO, it appears that individuals with higher ON-FoMO were more susceptible to making a microtransaction and regretting it, partially supporting Hypothesis 2.

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(b) Problem Gaming's Relationship with The Battlepass

The study also examined whether the Battlepass had any association with problematic gaming. Hypothesis 3 stated that individuals who are more problematic gamers will be more likely to increase their time and monetary commitment to gaming when in possession of a Battlepass. A Spearman correlation found a moderate positive correlation between both variables, $r(678) = .35$, $p < .01$, which is consistent with Hypothesis 3. Furthermore, Table 4 indicated that individuals who had purchased both the Battlepass and microtransactions had significantly higher IGD scores then their counterparts. Moreover, t-tests in Table 5 indicated that there was a significant difference in IGD scores between individuals who had broken their spending limits, and individuals who felt more pressure to purchase microtransactions. Overall, these results provide support for Hypothesis 3.

Table 4

T-test Comparisons of Psychometric Scores Defined by Engagement in Monetised Gaming

Variable	Engaged in Microtransactions		Did not engage in Microtransactions		t(771)*	p	Cohen's d
	M	SD	M	SD			
Impulsivity	47.5	6.3	48.8	7.1	0.78	.44	.22
PGSI	1.9	3.7	0.5	1.1	4.10	< .01	.38
ON-FoMO	32.4	9.4	28.2	8.1	1.59	.11	.44
IGD	4.1	2.4	3.3	2.2	1.25	.21	.35
Variable	Purchased Battlepass		Did Not Purchase Battlepass		t(771)**	P	Cohens d
	M	SD	M	SD			
Impulsivity	47.6	6.3	46.3	6.9	1.79	.07	.21
PGSI	1.9	3.7	1.5	2.9	0.86	.39	.10
ON-FoMO	32.1	9.3	34.5	9.8	2.20	.03	.26
IGD	4.1	2.4	4.4	2.0	1.37	.17	.14
Variable	Purchased Micro + BP		Only Purchased BP		t(686)	p	Cohens d
	M	SD	M	SD			
Impulsivity	47.4	6.4	48.4	5.8	1.70	.09	.16
PGSI	2.0	3.8	1.5	3.6	1.40	.16	.13
ON-FoMO	32.6	9.4	30.2	8.6	2.73	< .01	.25
IGD	4.2	2.4	3.7	2.4	2.08	.04	.19

Note. N = 773 (*n* = 760 engaged in microtransactions, *n* = 13 did not engage; *n* = 688 bought a Battlepass, *n* = 72 did not buy a Battlepass). BP = Battlepass. Purchased Micro + BP = Participants who purchased both the Battlepass and Microtransactions. *Degrees of freedom ranged from 17 to 771. **Degrees of freedom ranged from 155 to 771.

Table 5

T-test Comparisons of Psychometric Scores Defined by Susceptibility to Video-game Monetisation

Variable	Pressured to Make Micro		Not Pressured to Make Micro		$t(771)$*	p	Cohen's d
	M	*SD*	*M*	*SD*			
Impulsivity	47.0	6.3	48.1	6.3	2.39	.02	.17
PGSI	2.3	4.1	1.2	2.8	4.62	< .01	.32
ON-FoMO	33.8	9.6	30.2	8.7	5.45	< .01	.39
IGD	4.6	2.4	3.4	2.2	7.05	< .01	.51
Variable	Broke Spending Limit		Did Not Break Spending Limit		$t(466)$**	p	Cohens d
	M	*SD*	*M*	*SD*			
Impulsivity	46.0	6.6	47.6	6.5	2.52	.01	.23
PGSI	2.6	4.1	1.1	2.8	4.50	< .01	.42
ON-FoMO	34.4	9.4	31.6	8.8	3.32	< .01	.31
IGD	4.8	2.3	3.7	2.3	5.02	< .01	.46
Variable	Regretted Microtransaction		Did Not Regret Microtransaction		$t(758)$***	p	Cohens d
	M	*SD*	*M*	*SD*			
Impulsivity	47.0	6.3	48.3	6.2	2.75	< .01	.21
PGSI	2.2	4.0	1.1	2.9	4.64	<.01	.32
ON-FoMO	33.7	9.7	29.8	8.2	5.91	< .01	.43
IGD	4.6	2.3	3.1	2.2	8.76	< .01	.66

Note. N = 773 (*n* = 453 felt pressured to make a microtransaction, *n* = 320 did not feel pressured; *n* = 230 set a spending limit and broke it, *n* = 238 set a spending limit and did not break it; *n* = 502 regretted making a microtransaction, *n* = 258 did not regret making a microtransaction). *Degrees of freedom ranged from 719 to 771. **Degrees of freedom ranged from 404 to 466. ***Degrees of freedom ranged from 541 to 758.

(c) The Battlepass and Monetisation Habituation

The fourth aim of this study investigated whether rewards/mechanics of the Battlepass can encourage users to spend money. It was hypothesised that individuals who are exposed to gambling mechanics through the Battlepass, would be more likely to spend money on other in-game features. Using 2x2 Pearson Chi-square tests, it was found that there was no significant association between spending money on other in-game features and loot-boxes obtained from the Battlepass χ^2(1, N = 688) = 2.24, p = 0.13, as well as participating in fantasy esports χ^2(1, N = 688) = 3.17, p = 0.075. However, there were significant associations between spending money on in-game features and recycling old items to earn loot-boxes/wheel spins χ^2(1, N = 688) = 11.68, p < .01, placing wagers on one's own matches χ^2(1, N = 688) = 6.85, p < .01, and placing wagers on other matches χ^2(1, N = 688) = 13.64, p < .01. Most of the sample who purchased additional in-game microtransactions, also engaged in recycling old items (90.4%) and placing wagers on their own matches (70.3%), with a large portion further engaging in wagering on other matches (39.9%).

Additional analyses further explored such relationships. Chi-squared tests indicated that there was a significant association between purchasing additional Battlepass tiers and being exposed to loot-boxes through the battlepass, χ^2(1, N = 688) = 14.69, p < .01. There were also significant associations between purchasing additional Battlepass tiers and recycling old items to earn loot-boxes/wheel spins χ^2(1, N = 688) = 69.11, p < .01, as well as placing wagers on individuals' own matches χ^2(1, N = 688) = 33.70, p < .01.

Further t-tests indicated that individuals who placed wagers on other matches, were more likely to have spent more money (*M* = 1.71, *SD* = 1.14) in comparison to those who didn't place wagers (*M* = 1.31, *SD* = 0.75). This difference was statistically significant with a medium effect size *t*(374.4) = 4.92, *p* < .01, *d* = 0.44. Combined with results of previous chi-squared tests, these findings are consistent with Hypothesis 4.

(d) Overall Engagement in Monetised Gaming

The final aim of this study investigated problem gambling's overall relationship with monetised gaming. It was hypothesised that higher problem gambling scores will be associated with greater engagement in all forms of monetised gaming. A Spearman correlation displayed a small positive correlation between both variables, *r*(678) = .25, *p* < .01. Furthermore, Table 4 indicated that individuals who engaged in microtransactions had significantly higher PGSI scores.

Additional independent samples t-tests indicated that there was a significant difference in PGSI scores amongst individuals who placed wagers on their own matches (*M* = 2.15, *SD* = 3.95) compared to those who didn't (*M* = 1.27, *SD* = 3.18), *t*(526.4) = 3.13, *p* < .01, *d* = 0.28. A similar significant result can be observed amongst PGSI scores of individuals who placed wagers on other matches (*M* = 3.45, *SD* = 4.73) and those who didn't (*M* = 0.97, *SD* = 2.64), *t*(339.1) = 7.65, *p* < .01, *d* = 0.70. These results provide support for Hypothesis 5.

Exploratory Multivariate Analyses

Exploratory analyses were conducted to gain a deeper understanding of engagement in monetised gaming and susceptibility to game monetisation. A logistic regression first analysed if personality type variables relating to ON-FoMO and impulsivity would predict monetisation engagement (Table 6). Except for ON-FoMO's anxiety dimension having a significant relationship with the "Purchased Battlepass" predictor variable, all other dimensions of impulsivity and ON-FoMO had non-significant results. A further logistic regression then analysed if the same variables would predict monetisation susceptibility (Table 7). The need to belong dimension of ON-FoMO was significantly associated with the "Broke Spending Limit" and "Regretted Making Microtransaction" variables, with the need for popularity dimension significantly associating with the "Pressured to Make Microtransaction" variable. The only dimension of impulsivity that had a significant association with a variable was negative urgency with the "Regretted Making Microtransaction" variable.

However, total ON-FoMO and Impulsivity scores were also contrasted with monetisation engagement/susceptibility. ON-FoMO was significantly associated with the "Purchased Battlepass and Microtransaction" variable, as well as all susceptibility to monetisation variables. Impulsivity was only significantly associated with the "Broke Spending Limit" variable.

Table 6

Binary Logistic Regression Analysis – Engagement in Monetisation

Predictor Variable: Purchased a Micro	B	Wald	df	p	OR	95% CI OR LL	UL
ON-FoMO							
Need to Belong	.07	.32	1	.58	.93	.73	1.19
Need for Popularity	.17	1.53	1	.22	.84	.64	1.11
Anxiety	.02	.03	1	.86	.98	.76	1.26
Addiction	.00	.00	1	1.00	1.00	.74	1.35
Impulsivity							
Negative Urgency	-.15	1.01	1	.31	1.16	.87	1.53
Lack Perseverance	-.03	.04	1	.84	1.03	.77	1.39
Lack Premeditation	.24	1.98	1	.16	.79	.57	1.10
Sensation Seeking	-.15	1.79	1	.18	1.17	.93	1.46
Positive Urgency	.18	1.36	1	.24	.83	.62	1.13

Predictor Variable: Purchased BP	B	Wald	df	p	OR	95% CI OR LL	UL
ON-FoMO							
Need to Belong	-.04	1.14	1	.29	1.04	.96	1.13
Need for Popularity	.09	3.55	1	.06	.91	.83	1.00
Anxiety	-.11	6.14	1	.01	1.12	1.02	1.22
Addiction	.01	.01	1	.93	1.00	.89	1.11
Impulsivity							
Negative Urgency	.07	1.67	1	.20	.93	.84	1.04
Lack Perseverance	.01	.01	1	.91	.99	.87	1.10
Lack Premeditation	.08	1.50	1	.22	.92	.81	1.05
Sensation Seeking	-.03	.54	1	.46	1.04	.94	1.13
Positive Urgency	.02	.12	1	.73	.98	.87	1.10

Predictor Variable: Purchased Micro + B	B	Wald	df	p	OR	95% CI OR	
						LL	UL
ON-FoMO							
Need to Belong	.05	1.75	1	.19	.95	.88	1.02
Need for Popularity	.04	1.00	1	.32	.96	.88	1.04
Anxiety	.04	1.05	1	.31	.96	.88	1.04
Addiction	-.03	.48	1	.49	1.04	.94	1.14
Impulsivity							
Negative Urgency	-.04	.60	1	.44	1.04	.95	1.13
Lack Perseverance	-.01	.01	1	.92	1.01	.91	1.11
Lack Premeditation	-.03	.38	1	.54	1.03	.93	1.15
Sensation Seeking	-.01	.15	1	.70	1.01	.94	1.09
Positive Urgency	-.01	.02	1	.89	1.01	.91	1.11

Predictor Variable Totals:	B	Wald	df	p	OR	95% CI OR	
						LL	UL
Purchased A Micro:							
ON-FoMO Total	.06	2.09	1	.15	1.06	.98	1.15
Impulsivity Total	-.02	.16	1	.69	.98	.90	1.08
Purchased BP:							
ON-FoMO Total	-.02	3.44	1	.06	.98	.96	1.00
Impulsivity Total	.03	1.77	1	.18	1.03	.99	1.06
Purchased BP + Micro:							
ON-FoMO Total	.03	5.84	1	.02	1.03	1.01	1.05
Impulsivity Total	-.02	1.30	1	.25	.98	.95	1.01

Note. Predictors classified as 0 = No, 1 = Yes. *B* = unstandardised beta coefficients. *df* = degrees of freedom. *OR* = odds ratio. *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

Table 7

Binary Logistic Regression Analysis – Susceptibility to Monetisation

Predictor Variable: Pressured to Make Micro	B	Wald	df	p	OR	95% CI OR	
						LL	UL
ON-FoMO							
Need to Belong	.01	.06	1	.80	1.01	.95	1.06
Need for Popularity	.14	17.67	1	< .01	1.15	1.08	1.23
Anxiety	.05	2.54	1	.11	1.05	.99	1.12
Addiction	-.05	1.79	1	.18	.95	.88	1.03
Impulsivity							
Negative Urgency	-.07	3.52	1	.06	.93	.87	1.00
Lack Perseverance	.03	.58	1	.45	1.03	.95	1.12
Lack Premeditation	-.01	.09	1	.76	.99	.91	1.07
Sensation Seeking	-.00	.02	1	.93	1.00	.94	1.06
Positive Urgency	-.03	3.80	1	.54	.98	.90	1.06

Predictor Variable: Broke Spending Limit	B	Wald	df	p	OR	95% CI OR	
						LL	UL
ON-FoMO							
Need to Belong	.07	4.22	1	.04	1.08	1.00	1.15
Need for Popularity	-.04	1.17	1	.28	.96	.89	1.04
Anxiety	.05	1.39	1	.24	1.05	.97	1.13
Addiction	.01	.06	1	.81	1.01	.92	1.11
Impulsivity							
Negative Urgency	-.01	.05	1	.82	.99	.90	1.09
Lack Perseverance	-.08	1.99	1	.16	.92	.83	1.03
Lack Premeditation	.05	.66	1	.42	1.05	.94	1.17
Sensation Seeking	.02	.22	1	.63	1.02	.94	1.10
Positive Urgency	-.08	2.85	1	.09	.92	.84	1.01

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Predictor Variable: Regretted Micro	B	Wald	df	p	OR	95% CI OR	
						LL	UL
ON-FoMO							
Need to Belong	.11	13.14	1	< .01	1.12	1.05	1.19
Need for Popularity	-.01	.02	1	.88	1.00	.93	1.07
Anxiety	.06	2.42	1	.12	1.06	.99	1.14
Addiction	-.02	.23	1	.63	.98	.90	1.07
Impulsivity							
Negative Urgency	-.14	13.18	1	< .01	.87	.80	.94
Lack Perseverance	.01	.07	1	.80	1.01	.93	1.10
Lack Premeditation	.09	3.61	1	.06	1.09	1.00	1.19
Sensation Seeking	.01	.19	1	.67	1.01	.95	1.08
Positive Urgency	.02	.23	1	.64	1.02	.94	1.11
Predictor Variable Totals:	B	Wald	df	p	OR	95% CI OR	
						LL	UL
Pressured to Make Micro:							
ON-FoMO Total	.04	23.02	1	< .01	1.04	1.03	1.06
Impulsivity Total	-.02	1.48	1	.22	.99	.96	1.01
Broke Spending Limit:							
ON-FoMO Total	.03	8.33	1	< .01	1.03	1.01	1.05
Impulsivity Total	-.03	3.87	1	.05	.97	.95	1.00
Regretted Micro:							
ON-FoMO Total	.05	24.52	1	< .01	1.05	1.03	1.07
Impulsivity Total	-.02	2.41	1	.12	.98	.96	1.01

Note. Predictors classified as 0 = No, 1 = Yes. B = unstandardised beta coefficients. df = degrees of freedom. OR = odds ratio. CI = confidence interval; LL = lower limit; UL = upper limit.

A principal components analysis then established the dimensionality of data regarding the perceived behavioural impact of the Battlepass. The 9 yes/no questions were factor analysed to determine what factors explained variance in results (Table 8), which resulted in 3 factors explaining majority of the variance. Eigenvalues displayed that Factor 1 was primarily responsible for explaining most of the variance (30.44%), whereas Factor 2 (13.42%) and 3 (11.27%) explained smaller amounts of variance. Factor 1 has strong positive loadings for variables relating to individuals playing differently, and utilising deliberate strategies to complete the Battlepass. Factor 2 has strong positive loadings with variables relating to individuals feeling pressured to play more and spend more when in possession of a Battlepass. Factor 3 has strong negative loadings with motivation and goal-centred playing when in possession of a Battlepass.

The 3 factors were then used in correlational analyses involving the psychometric measures (Table 9). Correlations between the 3 factors and IGD, PGSI and ON-FoMO were significant and positive, but were weak besides a moderate correlation between IGD and Factor 2. Correlations between the 3 factors and impulsivity were all significant but with weak negative correlations.

Table 8

Principal Components Analysis – Perceived Behavioural Impact of The Battlepass

Variable	PCA Factor		
	1	2	3
Do you find yourself often thinking about or planning activity related to the Battlepass?	0.21	0.01	- 0.68
Do you feel motivated to complete the Battlepass?	0.22	- 0.13	- 0.71
Do you feel compelled to play more often, due to the limited time nature of the Battlepass and its rewards?	0.59	- 0.08	- 0.09
Do you plan out, or research certain strategies to complete the Battlepass?	0.61	- 0.02	- 0.25
Do you play differently, or play different gamemodes/modes you wouldn't normally play, to complete the Battlepass?	0.77	- 0.05	0.04
Do you feel pressured to spend additional money on tiers/levels of the Battlepass?	- 0.06	0.76	- 0.14
Is your main goal of the battlepass, to earn notable specific limited time rewards? (e.g. specific hero Arcana's/persona's, which cannot be obtained outside of the Battlepass)	- 0.22	0.25	- 0.67
Have you spent more money than you intended on a Battlepass?	0.02	0.78	- 0.00
Do you feel a need to keep playing the game, because you've already invested so much time into the Battlepass?	0.49	0.51	0.15
Eigenvalue	2.74	1.21	1.01
Percentage of variance explained	30.44	13.42	11.27

Note. N = 773 (n = 760 engaged in microtransactions, n = 13 did not engage; n = 688 bought a Battlepass, n = 72 did not buy a Battlepass). Factor 1 refers to playing differently/strategizing; Factor 2 refers to pressure to play/spend more; Factor 3 refers to motivation and goal-centred playing.

Table 9

Bivariate Correlations Between Each Factor and Scores on Psychometric Measures

Variable	Factor		
	1	2	3
IGD	.19**	.39**	.21**
PGSI	.09*	.22**	.13**
ON-FoMO	.17**	.28**	.12**
Impulsivity	-.18**	-.19**	-.14**

Note: Pearson two-tailed correlations (p < .05; ** p < .01).* Factor 1 refers to playing differently/strategizing; Factor 2 refers to pressure to play/spend more; Factor 3 refers to motivation and goal-centred playing.

Discussion

4.1 Overview

This study aimed to investigate the predatory nature of DotA 2's monetisation schemes like the Battlepass, and how it can facilitate player entrapment. Several hypotheses were investigated. First, analyses indicated that impulsivity did not play a role in monetisation susceptibility. Second, ON-FoMO was not consistently associated with monetisation engagement, but was consistently associated with monetisation susceptibility. Third, IGD scores were generally higher amongst individuals with greater microtransaction and Battlepass engagement. Fourth, individuals exposed to gambling through the Battlepass were more likely to spend more money on other microtransactions. Finally, as predicted, higher problem gambling scores were associated with greater monetisation engagement.

4.2 Summary of Findings

4.2.1 Monetisation Susceptibility and Impulsivity

The finding that individuals with higher impulsivity scores were not more susceptible to game monetisation, is not consistent with current literature that has often reported significant associations between money spent and impulsivity (Costes & Bonnaire, 2022; Garrett et al., 2023). An explanation for this inconsistency could be that majority of the sample engaged in microtransactions, meaning there were very few non-engaging individuals against which to compare (i.e., attenuated variability). Furthermore, the sampling was conducted on a DotA 2 forum where individuals are likely to be more dedicated to the game. Casual players are generally less invested in the game and unlikely

to be active on forums, also spending less money (Howard, 2019). Therefore, the sample may over-represent spending players and make it more difficult to detect differences in engagement, that might be easier to outline in a broader population of people.

4.2.2 ON-FoMO and Spending Behaviour

The results indicated that Hypothesis 2 was not entirely supported. While individuals who engaged in both the Battlepass and microtransactions did have higher ON-FoMO, individuals who only purchased microtransactions or the Battlepass did not score significantly higher ON-FoMO. However, individuals with higher ON-FoMO scores were more susceptible to video game monetisation, providing partial support for Hypothesis 2.

Results indicate that, even though FoMO does not play a significant role in monetisation engagement, it does relate to greater monetisation susceptibility. This is consistent with Petrovskaya and Zendle's (2020) qualitative analysis, which revealed that players felt frustrated and displeased with the Battlepass but did not want to miss out on valuable limited time rewards. Furthermore, Zanescu, French and Lajeunesse (2020) showed that the staggered nature behind Battlepass rewards, is a successful ploy to increase Battlepass retention and habituate players to continually chase the next reward. The discrepancy between FoMO scores in monetisation engagement and monetisation susceptibility can be explained by this ploy. Rather than attention surrounding the Battlepass decreasing after its release, it receives constant attention through its staggered release reward system, continually increasing FoMO of non-buyers.

4.2.3 Problematic Gaming, Gambling and The Battlepass

Hypothesis 3 was supported with higher IGD scores correlating significantly with time and monetary commitment to gaming. In addition, individuals who engaged in both the Battlepass and microtransactions had higher IGD scores, with IGD scores also being higher for those more susceptible to monetisation. A total of 40.9% of the sample who engaged in microtransactions could be considered problematic gamers, whereas 23.1% of the non-engaging sample were considered so. These results are consistent with much of the current literature in systematic reviews, that outline associations between problem gaming and microtransaction engagement (Gibson et al., 2022; Raneri et al., 2022).

A similar outcome is present with problem gambling in Hypothesis 4, which was also supported. Significant associations between spending money and engagement in gambling related behaviours (recycling items to earn loot-boxes and placing wagers on matches) were found. This is consistent with prior research on the relationship between gambling and monetisation engagement (Zendle, 2019; Garea et al., 2021). Lemmens (2022) outlined the predatory nature of loot-boxes, which promote habituation and addiction. Unlike most games where loot-boxes are separate microtransactions, DotA 2 exposes players to loot-boxes through Battlepass rewards. This study is one of the first to explore the associations between the Battlepass and gambling behaviours and, consistent with Lemmens (2022), there were significant associations between individuals exposed to loot-boxes through the Battlepass and purchasing battlepass tiers, as well as engagement in Battlepass gambling related behaviours (match wagering and item recycling) and purchasing additional Battlepass tiers.

4.2.4 Problem Gambling and Overall Engagement in Monetisation

Hypothesis 5 was supported as problem gambling scores were higher amongst individuals who engaged in microtransactions. These results are once again consistent with Zendle (2019) and Garea et al (2021), who found associations between problem gambling and monetisation engagement. PGSI scores were also higher amongst individuals who placed wagers on their own and other matches, further displaying how the Battlepass exposes players to gambling.

4.2.5 Personality Types and Monetisation Engagement/Susceptibility

Exploratory analyses investigated the relationships between personality dimensions of ON-FoMO/Impulsivity, and monetisation engagement/susceptibility. There did not appear to be consistent correlations between personality dimensions and monetisation engagement/susceptibility, even though some significant associations between dimensions of ON-FoMO (anxiety and need to belong) were present. There also did not appear to be consistent correlations between total scores for Impulsivity and monetisation engagement/susceptibility, but total ON-FoMO scores were associated with all facets of monetisation susceptibility. This is inconsistent with literature outlining associations between impulsivity and spending (Costes & Bonnaire, 2022; Garret et al., 2023). An explanation for this inconsistency could be the samples older age due to DotA 2's complexity appealing to an older player base. Other large games analysed in monetisation research such as Fortnite and Apex Legends, tend to have younger player bases primarily composed of ages 14-24 (Shewale, 2023). Prior research has indicated that impulsivity

correlates with age (Blinka, Škařupová & Mitterova, 2016), which may explain why the older

DotA 2 samples expenditure is high, yet impulsivity is inconsistent with prior research.

4.3 Implications and Further Research

This research further adds to the growing pool of literature displaying the harmful

effects of modern game monetisation. While the prevalence of IGD is roughly 2% worldwide

(Stevens et al., 2020), this sample had a substantially higher prevalence rate (40%), although

this figure was still high amongst participants who didn't engage in microtransactions (23%).

This could indicate that the added engagement and habituation of the Battlepass, is

contributing to the growing rates of IGD reported by Taechoyotin et al (2020). Additional

research should include the Battlepass and similar engagement-based monetisation

strategies, rather than primarily focus on loot-boxes/normal microtransactions.

Furthermore, a dimension of DotA 2's Battlepass and game monetisation not well

analysed yet is match wagering. This study indicated that there were a variety of

relationships between match wagering and problem gambling/gaming, with individuals who

placed wagers on other matches, more likely to spend more money. Match wagering is like

sports betting where Battlepass owners bet on DotA 2 eSports matches (Valve, 2018).

Research on eSports betting has demonstrated that compared to traditional sports betting,

eSports gamblers were more likely to be younger, gamble more frequently, meet problem

gambling criteria and have experienced a gambling related harm (Greer et al., 2021).

Considering the ease of access of eSports betting over sports betting (no government

identification required), the growing population of underage individuals playing online

games (Severin, 2022), the growing popularity of eSports (Clement, 2021) and the increased

vulnerability of younger consumers (Greer et al., 2021), eSports gambling is an area of online gaming which needs regulation and further research.

4.4 Strengths and Limitations

The key strength of this study is its focus on the Battlepass, a topic of game monetisation which has seen little attention. Results from this study will draw more attention to the Battlepass and engagement focussed monetisation models, enabling a deeper understanding of modern game monetisation. Furthermore, the studies relatively large sample size and use of psychometric measures, lends itself well to replication and application in other popular online games which have similar monetisation strategies.

Limitations of this study can be attributed to its sample, which while relatively large is comprised of monetisation participators almost exclusively. A greater understanding of differences between individuals who engaged and didn't engage in monetisation, could be gained from a more balanced sample. Second, several of the studies analysis techniques lack the ability to draw causal inferences. Third, measures did not include frequency of microtransactional engagement for microtransactions besides the Battlepass, making it difficult to analyse the extent to which players engagement is with the Battlepass exclusively or other microtransactions. This could be improved in future research by asking participants to access their DotA 2 accounts purchase history and report the data.

4.5 Conclusion

This study adds to the growing body of literature analysing one of the largest entertainment industries worldwide. Online video games continue to evolve, and research needs to evolve with it, which is why monetisation models such as the Battlepass need to be explored in increasing detail. This study provides evidence to indicate that the Battlepass and DotA 2's monetisation can facilitate greater monetisation engagement and susceptibility, with individuals exposed to gambling through the Battlepass, more likely to spend more money. With evidence from this study and past literature indicating the relationship between problem gambling/gaming and monetisation susceptibility, it is understandable why the Battlepass has become such a monetarily successful model of monetisation outside of DotA 2 as well. This implications of this study may raise awareness into modern online game monetisation models and encourage the development of better and more accessible guidelines/regulations, surrounding player manipulation and gambling exposure in online video games.

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Appendices

Appendix A – Reddit Post

Battlepass/Gambling Survey for my Honours Thesis - $75 worth of steam giftcards for participants!

`Other`

TLDR: Investigating relationship between Dota 2's monetisation (battlepass, etc) and how it changes the way players interact with Dota in general. **10-15 minute survey**, which if you complete, can enter a giveaway for **one of 3 steam giftcards**.

Hey everyone, I'm writing my Psychology Honours Thesis on video game monetisation strategies. I am specifically looking at Dota 2's monetisation, and I need your help so I can gather data!

The survey includes questions about the battlepass (which coincidentally is no longer going to be a thing), gambling, microtransactions and your experiences with both as a paying and non-paying player. The survey also includes a couple questions related to your own behaviours/personality traits.

The goal with this research is to investigate how Dota's monetisation can impact, influence or even alter the way players interact with and play the game in general, as well as exploring the potential relationships between certain gameplay/spending behaviours and personality traits, with Dota's many methods of monetisation (e.g. gambling/betting).

The survey will only take about 10-15 minutes to complete, and at the end you can enter your reddit username or an email, to **enter a giveaway for one of 3 $25 steam giftcards**.

Heres the survey link - https://adelaide.qualtrics.com/jfe/form/SV_eV4DuhY2ugX3Kei

If you would like some more information on the project, you can read this document. Thank you all so much for the help, let me know if you have any questions or want clarification on anything in the comments. Now if you don't mind, I need to get back to spamming TA.

💬 25 Comments   ↗ Share   🔖 Save   🏷   ⋯

Appendix B - Participant Information Sheet

Participant Information Sheet

PROJECT TITLE: Entrapment and Predatory Monetization in DotA 2's Multi-Million Dollar Battlepass

HUMAN RESEARCH ETHICS COMMITTEE APPROVAL NUMBER: H-2022-23/80

PRINCIPAL INVESTIGATOR: Paul Delfabbro

STUDENT RESEARCHER: ███████████

Dear Participant,

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

What is the project about?

The survey you are about to undergo, is part of a study examining DotA 2's monetisation strategies (primarily the Battlepass), and how they may influence or alter the way individuals play the game. This study also aims to investigate if individuals with certain traits/behaviours, are more susceptible to the monetisation strategies Valve has created.

Who is undertaking the project?

This project is being conducted by ███████████ and Paul Delfabbro.

Why am I being invited to participate?

You are being invited to participate in this study, as you play, or have played DotA 2.

What am I being invited to do?

You are being invited to fill out a brief online survey about your experiences with DotA 2, as well as your own opinions and thoughts on DotA 2's monetisation strategies like the battlepass. You will also be asked to fill out some questions related to problematic gambling, fear of missing out, internet gaming disorder and impulsivity.

How much time will my involvement in the project take?

The survey will take roughly 15-30 minutes to complete, but you may take as long as you need to answer the questions.

Are there any risks associated with participating in this project?

There are no foreseeable risks to participating in this study, all participants will remain entirely anonymous, and the only information you may need to provide (public reddit username or email) is optional.

What are the potential benefits of the research project?

Little research has been conducted on the effects of DotA 2's battlepass on its players, and how it may alter the ways in which they play. As I'm sure most of you are aware, the battlepass is renowned for being extremely difficult to complete and has been the centre of quite a few controversies over the past few years, with the best cosmetics like arcana's, being locked further and further along the battlepass, becoming harder to obtain. There won't be any immediate benefits to you the players, Valve is unlikely to listen to a random survey, but I'm sure many of you may find the data and statistics that we collect interesting, and this may challenge you to reflect on how you interact with the battlepass, giving you a broader perspective on whether you should purchase it or not.

Can I withdraw from the project?

Participation in this project is completely voluntary. You may stop the survey whenever you wish, you do not need to complete the survey if you don't want to.

What will happen to my information?

Your information will remain entirely confidential and anonymous. Data will be stored anonymously and securely on the online platform chosen to host the survey, with only researchers initially able to access it. Once data collection has finished, all results will be collected and analysed together where they will then be reported in an overall summarised format in a paper. Data will become publicly available at this time as well, where anybody can access and utilise it. The paper may be published in the journal of Behavioural Addictions or the International Journal of Mental Health and Addiction. A brief 5-minute presentation will also be given discussing results.

An update post will be then made to the subreddit, where the final paper and research findings will be shared. Your information will only be used as described in this participant information sheet and it will only be disclosed according to the consent provided, except as required by law.

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

For questions regarding the project, feel free to leave a comment on the reddit post or direct message us.

What if I have a complaint or any concerns?

The study has been approved by the Human Research Ethics Committee at the University of Adelaide (approval number H-2022-23/80). This research project will be conducted according to the NHMRC National Statement on Ethical Conduct in Human Research 2007 (Updated 2018). If you have questions or problems associated with the practical aspects of your participation in the project or wish to raise a concern or complaint about the project, then you should consult the Principal Investigator. If you wish to speak with an independent person regarding concerns or a complaint, the University's policy on research involving human participants, or your rights as a participant, please contact the Human Research Ethics Committee's Secretariat on:

Phone: +61 8 8313 6028

Email: hrec@adelaide.edu.au

Post: Level 3, Rundle Mall Plaza, 50 Rundle Mall, ADELAIDE SA 5000

Any complaint or concern will be treated in confidence and fully investigated. You will be informed of the outcome.

If I want to participate, what do I do?

If you would like to participate, simply continue scrolling and answer the following survey questions!

Yours sincerely,

Paul Delfabbro

Appendix C – Survey Demographic Questions

Please answer all questions to the best of your ability. Feel free to take breaks or come back and finish later.

The survey should take about **10-15 minutes** to complete.
At **the end of the survey**, you will be given the opportunity to enter the **giveaway** for the **steam card codes.**

1. What is your age (in years)?

a. 16-17	○

b. 18-24	○

c. 25-34	○

d. 35-44	○

e. 45-54	○

f. 55+	○

2. What is your gender?

Male	○

Female	○

Non-binary / third gender	○

Prefer not to say	○

3. What region of the world do you live in?

a. North America/Canada ○

b. South America ○

c. Oceania ○

d. Russia ○

e. China ○

f. South-East Asia ○

g. Western Europe ○

h. Eastern Europe ○

i. The Middle East ○

j. Other ○

4. What is the highest level of education you have attained?

a. Partial high school/secondary school ○

b. Completed high school/secondary school ○

c. Diploma/non-degree related study ○

d. Bachelor's Degree ○

e. Postgraduate Degree ○

f. None of the above ○

g. Other (please specify) ○

[   ]

5. What is your current employment status?

a. Studying (Highschool, Secondary school, undergraduate) ○

b. Casual employment ○

c. Part-time employment ○

d. Full-time employment ○

e. Unemployed ○

f. Retired ○

g. Other (please specify) ○

[   ]

6. Do you currently have a stable income flow?

a. Yes	○

b. No	○

1. How many hours do you spend gaming per week, on average?

a. 10 hours or less per week ○

b. 10-20 hours per week (roughly 1.5 – 3 hours per day) ○

c. 20-30 hours per week (roughly 3 – 4.5 hours per day) ○

d. 30-40 hours per week (roughly 4.5 – 6 hours per day) ○

e. 40-50 hours per week (roughly 6 – 7.5 hours per day) ○

f. 50+ hours per week (7.5 hours+ per day) ○

2. How many years have you been playing online games?

a. 1 year or less ○

b. 2-5 years ○

c. 4-7 years ○

d. 6-9 years ○

e. 9-12 years ○

f. 12-15 years ○

g. 15+ years ○

3. How many years have you been playing DotA 2?

a. 1 year or less	○

b. 2-4 years	○

c. 4-6 years	○

d. 6-8 years	○

e. 8-10 years	○

f. Since the beta (2011-2013)	○

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

a. Yes	○

b. No	○

PREDATORY MONETISATION IN MODERN GAMING

Appendix D – Microtransaction Questions

1. Have you ever felt pressured to make a microtransactional purchase within an online game?

a. Yes	○

b. No	○

2. If you have decided not to make a microtransaction before, for what primary reason did you not?

a. The microtransaction was too expensive for me to afford	○

b. I had no interest in the microtransaction	○

c. I did not see the value/worth in the microtransaction	○

d. I did not understand the microtransaction	○

3. Have you ever made a microtransaction purchase within an online game?

a. Yes	○

b. No	○

4. What microtransactional purchases have you made? (Select all that apply)

a. Lootboxes/crates/card packs and other random chance-based purchases. ☐

b. In-game currencies ☐

c. Cosmetics (e.g. player skin, weapon skins, etc) ☐

d. In-game advantages (items which increase progression, and offer advantages over non-paying players) ☐

e. Expiration purchases (limited-time purchases to continue playing) ☐

f. Battlepass ☐

g. Other (please specify) ☐

[ ]

5. How much money do you spend on microtransactions per month on average? *Please specify in USD*

a. $1-$20 ○

b. $20-$50 ○

c. $50-$100 ○

d. $100-$200 ○

e. $200-$500 ○

f. $500-$1000 ○

g. $1000+ ○

h. $10,000+ ○

6. When making microtransactions, do you set a limit to how much you spend?

a. Yes ○

b. No ○

7. Have you broken or ignored that limit in the past?

a. Yes ○

b. No ○

8. If the desired result of your microtransaction was not obtained (e.g. you did not receive the item you wanted from a loot-box), what would you do?

a. Continue making microtransactions until the desired outcome is reached ○

b. Continue making microtransactions until you can no longer justify spending money ○

c. Discontinue making microtransactions ○

9. Have you ever regretted making a microtransactional purchase after purchasing it?

a. Yes ○

b. No ○

10. Are you likely to continue purchasing microtransactions in the future?

a. Very likely ○

b. Likely ○

c. Unlikely ○

d. Very unlikely ○

PREDATORY MONETISATION IN MODERN GAMING

Appendix E – Battlepass Questions

1. Do you like DotA 2's Battlepasses?

a. Yes	○

b. No	○

2. Do you feel as if specific rewards/tiers in the battlepass are unachievable?

a. Yes	○

b. No	○

3. Do you believe "the end" of the battlepass (level 1000+) is achievable?

a. Yes	○

b. No	○

PREDATORY MONETISATION IN MODERN GAMING

1. Have you purchased a DotA 2 battlepass before?

a. Yes	○

b. No	○

2. How many times have you purchased a DotA 2 battlepass?

a. Once	○

b. 2-3 times	○

c. 4-5 times	○

d. 6+ times	○

3. What is the main reason you purchased the battlepass? (Select all that apply)

a. Its exclusive battlepass only rewards	☐

b. My friends also bought it	☐

c. To make money from selling battlepass rewards	☐

d. The additional content/gamemodes unlocked with it	☐

e. It's fun to level up and progress	☐

f. I wanted to contribute to The Internationals Prize Pool	☐

g. Other (please specify)	☐

4. Do you purchase the battlepass as soon as it releases, or do you purchase it throughout it's run-time?

a. As soon as it releases (within a week of its release)	○

b. Throughout the season (more then a week after its release)	○

c. Not sure/it varies	○

5. Do you make any other purchases in DotA 2 besides the battlepass? e.g. skins from the market, lootboxes, etc

a. Yes, I make other purchases besides just the battlepass	○

b. No, I only purchase the battlepass	○

6. Have you purchased additional battlepass tiers before?

a. Yes	○

b. No	○

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Appendix F – Perceived Behavioural Impact of The Battlepass Questions

Please give your opinions on the battlepass below

	Yes	No
Do you find yourself often thinking about or planning activity related to the Battlepass?	○	○
Do you feel motivated to complete the battlepass?	○	○
Do you feel compelled to play more often, due to the limited time nature of the battlepass and its rewards?	○	○
Do you plan out, or research certain strategies to complete the battlepass?	○	○
Do you play differently, or play different gamemodes/modes you wouldn't normally play, to complete the battlepass?	○	○
Do you feel pressured to spend additional money on tiers/levels of the battlepass?	○	○
Is your main goal of the battlepass, to earn notable specific limited time rewards? (e.g. specific hero Arcana's/persona's, which cannot be obtained outside of the battlepass)	○	○
Have you spent more money than you intended on a battlepass?	○	○
Do you feel a need to keep playing the game, because you've already invested so much time into the battlepass?	○	○

Have you ever received lootboxes or other related items involving gambling from a battlepass?

a. Yes	○
b. No	○

Have you ever recycled old items, to earn more lootboxes or wheel spins?

a. Yes	○

b. No	○

Have you participated in "fantasy esports" before?

a. Yes	○

b. No	○

If yes, why did you participate?

a. It's fun	○

b. I had the chance to earn battlepass rewards/points	○

c. I follow the eSport and like to participate in conjunction	○

d. Other (please specify)	○

Have you ever placed wagers on your own matches, for battlepass rewards?

a. Yes	○

b. No	○

If yes, why did you participate?

a. It's fun ○

b. I had the chance to earn battlepass rewards/points ○

c. Other (please specify) ○

Have you ever placed a wager or bet on another match?

a. Yes ○

b. No ○

If yes, why did you participate?

a. It's fun ○

b. I had the chance to earn battlepass rewards/points ○

c. Other (please specify) ○

Appendix G – Problem Gambling Severity Index Questions

We are also interested in whether certain gaming behaviours are related to engagement in other activities such as gambling, which involve financial commitments.
Could you please answer the following questions which include **experiences outside of DotA 2 and online games.**

In the past 12 months:

	Never	Sometimes	Most of the time	Always
1. Have you ever gambled more than you could afford to lose?	○	○	○	○
2. Have you needed to gamble with larger amounts of money to get the same feeling of excitement?	○	○	○	○
3. Have you gone back on another day to try to win back the money you lost?	○	○	○	○
4. Have you borrowed money or sold anything to gamble?	○	○	○	○
5. Have you felt that you might have a problem with gambling?	○	○	○	○
6. Have people criticised your betting, or told you that you had a gambling problem, whether or not you thought it was true?	○	○	○	○
7. Have you felt guilty about the way you gamble or what happens when you gamble?	○	○	○	○
8. Has gambling caused you any health problems, including stress or anxiety?	○	○	○	○
9. Has your gambling caused any financial problems for you or your household?	○	○	○	○

Appendix H – Short UPPS-P Impulsive Behaviour Scale Questions

The following questions include experiences outside of DotA 2 and
online games in general.

	Disagree Strongly	Disagree	Agree Somewhat	Agree Strongly
1. I generally like to see things through to the end.	○	○	○	○
2. My thinking is usually careful and purposeful.	○	○	○	○
3. When I am in great mood, I tend to get into situations that could cause me problems.	○	○	○	○
4. Unfinished tasks really bother me.	○	○	○	○
5. I like to stop and think things over before I do them.	○	○	○	○
6. When I feel bad, I will often do things I later regret in order to make myself feel better.	○	○	○	○
7. Once I get going on something I hate to stop.	○	○	○	○
8. Sometimes when I feel bad, I can't seem to stop what I am doing even though it is making me feel worse.	○	○	○	○
9. I quite enjoy taking risks.	○	○	○	○
10. I tend to lose control when I am in a great mood.	○	○	○	○
11. I finish what I start.	○	○	○	○
12. I tend to value and follow a rational, "sensible" approach to things.	○	○	○	○
13. When I am upset, I often act without thinking.	○	○	○	○
14. I welcome new and exciting experiences and sensations, even if they are a little frightening and unconventional.	○	○	○	○
15. When I feel rejected, I will often say things that I later regret.	○	○	○	○
16. I would like to learn to fly an airplane.	○	○	○	○
17. Others are shocked or worried about the things I do when I am feeling very excited.	○	○	○	○
18. I would enjoy the sensation of skiing very fast down a high mountain slope.	○	○	○	○
19. I usually think carefully before doing anything.	○	○	○	○
20. I tend to act without thinking when I am excited.	○	○	○	○

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Appendix I – Internet Gaming Disorder Scale Questions

The following questions relate to gaming in general.

In the last 12 months:

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

Appendix J – Online Fear of Missing Out Inventory Questions

*Almost done, this is the **final section!***

The following questions include experiences outside of DotA 2 and online games in general.

	Has nothing to do with me	Has a little to do with me	Has a moderate amount to do with me	Has a lot to do with me
1. When I see on a social network that a friend is somewhere where I wanted to go too, I feel bad.	○	○	○	○
2. I get annoyed when my friends do not tag me in posts.	○	○	○	○
3. I get sad to learn from posts that my friends went to events, and I wasn't invited.	○	○	○	○
4. Often, I feel sad seeing on social networks that people are happier than I am.	○	○	○	○
5. I feel distant from people when I see them happy in posts.	○	○	○	○
6. I get annoyed when my posts do not get many likes and/or comments.	○	○	○	○
7. I only post photos or videos that I know my friends will like.	○	○	○	○
8. I need people to like or comment on my posts.	○	○	○	○
9. I am indifferent to my friends' reactions to my posts.	○	○	○	○
10. I would like to have more likes and/or comments on my posts.	○	○	○	○
11. I get anxious when my cell phone does not have internet signal.	○	○	○	○
12. If I do not have access to social networks, I think of ways to get connected.	○	○	○	○
13. I think a lot about social networks when I do not have access to them.	○	○	○	○
14. I get restless when I cannot access social networks.	○	○	○	○
15. I usually feel irritated by staying disconnected from social networks too long.	○	○	○	○
16. When I'm on social networks, I forget my problems.	○	○	○	○
17. My family and friends complain that I spend a lot of time connected to social networks.	○	○	○	○
18. When I start checking for updates, I find it hard to leave social networks.	○	○	○	○
19. In social situations, I pay more attention to my cell phone than to my friends.	○	○	○	○
20. I am late to appointments because of social network use.	○	○	○	○