

# GAME PLAYER TYPES AND ITS INFLUENCE ON GAME DEPENDENCY

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### Abstract

This study investigates the relationship between video game dependency and player type typology.

As video gaming grows to become an integral part of the lives of many youths, concerns about the consequences of excessive gaming have arisen too. These concerns appear to be grounded as video games have been reported to damage family, school, social and psychological functioning – collectively describing the effects of game dependency (akin to pathological gaming measures). Moreover, over the years, various gamer typologies have been developed to provide insights into the different behaviours and motivations of gamers. While these typologies were initially developed for game designers to create more appealing games, their applicability has since extended beyond. This study adopts such gamer typologies and establishes a framework of player types (Achiever, Guru, Socializers, Explorers) and investigates its influence on game dependency. Through literature review, this study hypothesised that (H1) Achievers will be positively associated with Game Dependency, and (H2) Socializers and Explorers will be negatively associated with Game Dependency.

Secondary school students, aged 13-17, were invited through schools to participate in an online survey. Data was collected with the permission of the respective schools to be used for research purposes. A total of students (n=999) was included in the sample, gathered from three secondary schools in Singapore. Game Dependency measure satisfied the reliability criteria with a Cronbach alpha of 0.94. Correlational analysis and comparison of means were performed on the data collected.

Our findings showed statistically significant support for H1 and H2. This study explains that the Socializer player type, who are more people- than game-centric, are more likely to follow their social contacts in a game and expand their social network and resources. And as such, they are more likely to play with their friends and would hence have a lower game dependency. On the other hand, the Explorer player type may spend less time in games due to the limited exploratory possibilities present; they may choose to exhibit these tendencies by viewing videos or talking to other players. These constitute activities outside video gaming that are not captured in the current tool used to capture game dependency. The Explorer player type also does not enjoy challenges within the game and may thus stop playing once games get difficult. Therefore, the Explorer player type requires the least measure of commitment (i.e., time, effort, money), which in turn causes an opposite influence on their game dependence.

While the measures used are theoretically derived and consistent with other studies, this study went a step further by quantitatively showing its association between the two variables and discriminating between game dependency groups. This study provides a nuanced understanding of the Uses and Gratifications Theory, demonstrating how different gamer types (akin to gratifications) play the game (akin to game dependency). While nascent, this venture has proven useful for identifying problematic in-game tendencies, thus informing the rehabilitative work among pathological video gamers, which the authors seek to undertake.

**Keywords:** Game Payer Types, Game Dependency, Achiever, Socialiser, Explorer

## 1. INTRODUCTION

With the upsurge of Internet use in the past decade, the gaming industry has burgeoned, turning into a multi-billion-dollar industry (Mander et al., 2019). Video gaming is now one of the most popular recreational activities today, especially among children and adolescents (Insider Intelligence, 2023). As such, it is no surprise that the amount of time spent by these teens on video games is increasing steadily (The Nielson Company, 2018), with self-report accounts going up to an excessive amount of 73 hours a week (Torres-Rodríguez et al., 2019). As video gaming grows to become an integral part of the lives of many youths, concerns about the consequences of excessive gaming have emerged too. These concerns appear to be grounded as video games have been reported to damage family, school, social and psychological functioning, finding support in many studies (Brunborg et al., 2014; Ferguson, 2015; Jiow, 2014; von der Heiden et al., 2019). A preponderance of studies has associated excessive video gaming with poorer academic performance (Ferguson, 2015; Hartanto et al., 2018), increased sleep disturbance (King et al., 2013; Peracchia & Curcio, 2018), higher levels of aggressive behaviours (Drummond et al., 2020; Prescott et al., 2018) and attention problems such as attention deficit hyperactivity disorder (ADHD) (Masi et al., 2021).

In Southeast Asia, a meta-analysis revealed that the prevalence rate of gaming addiction was about 10.1 per cent, with Singapore being the highest in the region at 13 per cent (Doris et al., 2020). Although the meta-analysis suffers from several limitations – such as only involving Thailand and Singaporean samples on top of small sample sizes – the region's prevalence rates are substantially higher as compared to other world regions (Kuss & Griffiths, 2012).

The first known large study in Singapore on gaming addiction was conducted by Choo et al. (2010) and Gentile et al. (2011), who assessed the prevalence rates and correlates of the disorder through a two-year longitudinal study. Taken from

a sample of Singaporean children in primary and secondary schools, those children displayed five or more symptoms of damage to their family, school, social and psychological functioning. The overall prevalence rate was estimated to be between 7.6 to 9.9 per cent (Gentile et al., 2011), which is in line with the prevalence rate found in other countries like America and Spain (Gentile, 2009; Tejeiro Salguero & Morán, 2002).

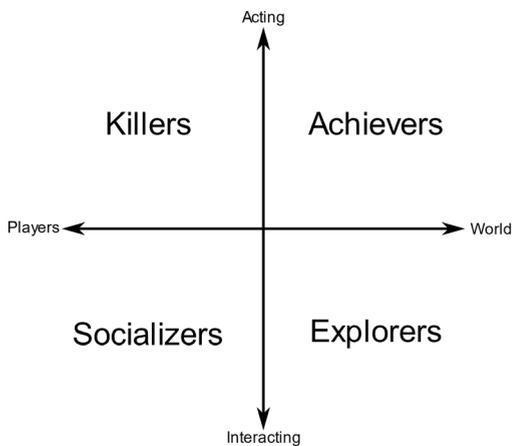
However, a later study on 1251 Singaporeans ranging from 13 to 40 years old reported a prevalence rate of 17.7 per cent, a substantial increase from the initial study (Subramaniam et al., 2016). The researchers had conducted the study online and administered the 9-item Internet Gaming Disorder Questionnaire for the assessment. These findings were similarly corroborated in a subsequent study that assessed gaming addiction in a multinational sample, reporting a prevalence rate of 15.4 per cent in the Singaporean sample alone (Tang et al., 2017; Tang et al., 2018). Besides the increasing trend in prevalence rates, it is key to note that the average time spent each week on video games is markedly higher in Singaporean youths at 20.2 hours than in American youths at 13.2 (Choo et al., 2010). These findings together demonstrate an increasing trend in the prevalence rates of gaming addiction in Singapore, highlighting an urgent need to understand it and mitigate the detrimental effects of video gaming on Singaporeans.

### 1.1 GAMER TYPES AND MOTIVATIONS

Over the years, various gamer typologies have been developed to provide insights into the different behaviours and motivations of gamers (Monterrat et al., 2015). While these typologies were initially developed for game designers to create more appealing games, their applicability has since extended beyond (Sezgin, 2020).

Bartle's taxonomy is one of the earliest classifications of player types (Bartle, 1996). Developed through "informal observations" (Zubek, 2020, p.45), this widely recognized taxonomy proposed four different gamer types (Killers, Socializers,

Explorers and Achievers), as well as two scales which appealed to those types (World, Players, Acting, and Interacting). These 4 player types are borne out of the interaction on 2 scales: the preference of game actions (Interacting or Acting) and the object of game actions (Player or World). See *Figure 1* for a visual representation.



**Fig. 1**  
 Player Type Scale.

On one end of the player-world scale, Killers are driven to act on other players within the game, taking action towards them typically without their consent. On the other end of the scale, Achievers are driven to act on the virtual game world by making it do what they want it to do. On the acting-interacting scale, Socializers are driven to interact with other players by communicating and cooperating with them, while Explorers are driven to interact with the world through exploration (Bartle, 1996). Although Bartle’s taxonomy provided a key framework for video game designers, it was not developed empirically, which thus limits the validity of the framework (Dixon, 2011; Yee, 2005).

Building on Bartle’s work, Yee (2002; 2006; 2007) sought to investigate the underlying motivations of gamers with an empirical approach, now known as Gamer Motivations. A factor analysis of over 3,000 Massively Multiplayer Online Role-playing Games (MMORPG) gamers revealed that gamers had five

primary motivations in continuing to play a game: Achievement, Relationship, Immersion, Escapism, and Manipulation. These factors were subsequently reduced into three main components in a later study: Achievement, Social Aspects, and Immersion with 10 subfactors (Yee, 2008).

Achievement refers to one’s desire to become powerful in the virtual world through collecting powerful items and achieving goals; Social Aspect refers to the desire for social interaction and meaningful relationships, while Immersion refers to the desire to immerse in the fantasy world through roleplay. The findings of Achievement and Social Aspects were in line with Bartle’s proposed Achievers and Socializers respectively, though Immersion was unaccounted for in Bartle’s model. However, Yee’s Gamer Motivations lacked generalisability due to the narrow focus on MMORPGs (Nacke et al., 2004), despite building upon Bartle’s shortcomings and taking on an empirical approach. Furthermore, Yee’s study mainly surveyed invested and expert players (de Castell, 2011), leaving out players who took a more casual approach toward their games.

To develop a more generalisable typology of gamers, Bateman and Boon (2005) developed the Demographic Game Design model (DGD1). The DGD1 was empirically developed by surveying 400 different gamers, supplemented by follow-up interviews to gather data on the case study (Bateman & Boon, 2005). Similar to Bartle’s taxonomy, the DGD1 is comprised of four main gamer types, the Conqueror, Manager, Participant and Wanderer.

### 1.2 COMEBACK PLAYER TYPES

As the existing gamer typologies are used for game design purposes only, we sought to establish a framework of player types for intervention purposes in this study. This study theoretically adapted four gamer types based on Bartle’s (1996), and Bateman and Boon’s (2005) findings, along with COMEBACK’s experience with the gaming communities. Refer to Table 1 below for a summary of the four gamer types.

**Table 1**  
Summary of Gamer Player Types

Gamer Player Type	Description
Achiever	Achievers are highly competitive players that are motivated toward improving their gaming progress against other players. They typically enjoy multiplayer video games that allow them to compete against other players.
Guru	Gurus are motivated toward the acquisition and mastery of skills, as opposed to competition (e.g., achieving better scores than other players). They typically enjoy single-player video games that facilitate multitasking abilities and experimentation of different game elements, such as strategies.
Socialiser	Socialisers are motivated toward the community aspect of the games, such as interacting with other players and engaging in different roleplays. They typically enjoy multiplayer games that allow them to interact with other players, often in a cooperative manner.
Explorer	Explorers are motivated toward unique and novel aspects of the games, focusing on the elements such as the storylines, relationships and/or the aesthetics of the game characters. They typically enjoy single-player games that facilitate continued exploration of the gaming world.

### 1.2.1 ACHIEVER

The Achiever type is based on the Killer type in Bartle's (1996) taxonomy and Conqueror type in the DGD1 model (Bateman & Boon, 2005). Gamers who are predominantly Achievers naturally seek to defeat the game. For single-player games, this refers to completing all challenges within the game, while in the multiplayer variants, it refers to defeating other players. Difficult challenges motivate Achievers, as they are driven toward experiencing *fiero* – the feeling of triumph when overcoming difficult odds. Achievers are highly competitive and enjoy comparing their progress against other players. They are willing to dedicate large amounts of time to improve their progress to exert their power over others. Due to their competitiveness, they are susceptible to experiencing intense emotions of anger, frustration and boredom, especially when their competitive in-game goals are not met. Their pursuit to achieve power

and exert it onto other players makes it similar to the Killers in Bartle's taxonomy (1996), as well as the Advancement and Competition subtypes under the Achievement motivation in Yee's Gamer Motivations model (2006; 2008).

### 1.2.2 GURU

The Guru gamer type is based on the Achiever type in Bartle's Taxonomy (1996) and *Manager* type in the DGD1 model (Bateman & Boon, 2005). Gamers who are predominantly Gurus are often concerned with mastering the game and its systems. Winning, in the eyes of Gurus, refers to the acquisition of necessary skills in the game rather than focusing on the end outcome. This is in contrast with the Achievers who are motivated towards defeating the game and other players. Winning is meaningless to the Gurus if they have not yet mastered the methods to do so. They may even leave a game

incomplete if they feel that they have mastered the process; on the contrary, they may repeat a completed game if they have not fully mastered it. Hence, Gurus are characterised by their tactical and strategic competence and are usually proficient in games that require dealing with multiple factors simultaneously (i.e., multitasking). Their tendency to act on the virtual world, as opposed to players, makes it similar to the Achiever type in Bartle's taxonomy (1996). The optimisation and analytical aspects of a Guru are similar to the Mechanics subtype under the Achievement motivation in Yee's Gamer Motivations model (2006; 2008).

### 1.2.3 SOCIALIZERS

The Socializer gamer type is based on the Socializer type in Bartle's Taxonomy (1996) and Participant type in the DGD1 model (Bateman & Boon, 2005). Gamers who are predominantly Socializers are driven toward social experiences which games provide. This can refer to playing multiplayer games which allow for interactions with others or roleplaying characters. Unlike Achievers, Socializers do not enjoy games that require them to compete against others (i.e., non-competitive), preferring games that focus on cooperation instead. They are most drawn to games with high social elements as it allows them to interact with the gaming community. Their social motivation makes this type highly similar to the Socializers type in Bartle's taxonomy (1996), as well as the Social Aspect factor in Yee's Gamer Motivations model (2006; 2008).

### 1.2.4 EXPLORERS

The Explorer gamer type is based on the Explorer type in Bartle's Taxonomy (1996) and Wanderer type in the DGD1 (Bateman & Boon, 2005). Gamers who are predominantly Explorers are motivated toward unique and interesting experiences in a game. These can refer to an intriguing storyline, beautiful aesthetics, or a novel experience. Explorers do not desire challenge but are capable of tolerating them until it gets too difficult. In this case, they either seek help from other

player types, typically Achievers or Gurus, or give up on the challenge. Through their games, Explorers seek to experience the emotions of wonder, awe and mystery, to satisfy their curiosity for information. They are also more likely to play single-player games, as compared to Achievers and Socializers. The description of an Explorer is highly similar to the Explorer type described in Bartle's taxonomy (1996), as well as the Immersion factor in Yee's Gamer Motivations model (2006; 2008).

While the COMEBACK Player Type Test (CPT) (see below in Methods) distinguishes between the gamers' in-game behaviour and motivations, gamers do not demonstrate only one player type; rather, they gravitate to a dominant one while exhibiting behaviours found in a different type.

## 1.3 PLAYER TYPE AND GAME DEPENDENCY

There is a scarcity of quantitative studies that examine the relationship of both player types and gaming motivations on game dependency, with existing studies focused on examining gamer motivations (i.e., Yee's Gamer Motivation; Yee, 2006; 2008) and MMORPG players. An exploratory study by Hussain et al. (2015) investigated the relationship between gaming addiction and different types of gaming motivations, based on Yee's Gamer Motivations model, on 1,167 MMORPG gamers. The authors sought to distinguish between different groups of motivation (e.g., competition, social, discovery), and their association toward different profiles of addiction (e.g., low, intermediate, high risk), based on their responses toward a game addiction assessment. One key finding was that players who demonstrated highest risk of game addiction also exhibited both higher competitive and social motivations (Hussain et al., 2015), which is akin to the Achievement factor of Yee's Gamer Motivations (i.e., Advancement and Competition subfactors; Yee, 2006; 2008). The findings were corroborated by several studies that highlighted competitiveness and desire for in-game advancements as a potential risk for problematic gaming in MMORPGs (Cole & Griffiths, 2007; Hussain

& Griffiths, 2009; Hussain et al., 2012). As such, suggestive that competitive players tend to invest more time in gaming (Kelly et al., 2021) in order to advance their in-game progress and standing compared to other players, which in turn reduces their time involvement in other real life behaviours (Gentile, 2009). Competitive players are also more likely to experience higher levels of frustration (Breuer & Scharnow, 2013; Dowsett & Jackson, 2019), which has been positively associated with problematic video gaming (von der Heiden et al., 2019). Given that competitiveness is the hallmark of Achievers in the COMEBACK Player Types and Conqueror in DGD1 model (Bateman & Boon, 2005), this study posits that Achievers would show a significantly higher game dependency as compared to the other player types.

Another key finding by Hussein et al. (2015) is that players who exhibited socially-motivated, discovery-motivated, or a combination of both, had the lowest risk of addiction. This association between social motivations (i.e., Social factor; Yee, 2006; 2008) and game dependency has been more widely studied, although some studies have demonstrated mixed findings. While qualitative studies have often described sociability to be a risk factor of problematic gaming (Beranuy et al., 2013; Haagsma et al., 2013; Karlsen, 2011), existing quantitative studies has yet to support such findings (Caplan et al., 2009; Hussain et al., 2015). Furthermore, the theory of expanding social capital (Zhong, 2011) suggests that these social motivations can be a resource, as the online platform allows socially-inclined players to expand their social support, subsequently improving their personal well-being (Trepte et al., 2012). Based on the existing literature, this study posits that Socializers (COMEBACK Player Types) would be at lower risk of game dependency.

On the other hand, research on the association between discovery-oriented motivation and game dependency is scarce. Discovery motivation relates to elements of the Immersion factor under Yee's Gamer Motivations (i.e., Discovery sub factor; Yee, 2006; 2008), and refers to players who exhibit

explorative behaviours and immersion in the storyline, seeking novelty in their games. Hussain et al. (2015) explained that discovery-oriented players derived a lower level of enjoyment in their games, and hence were less likely to play excessively compared to other types of players. Such players also tend to seek novelty (i.e., new content) in their gaming world, which is often a limited resource. For instance, once the existing world has been thoroughly explored, there is a lack of novel content for discovery-oriented players to explore in the gaming world unless new content is added through developer updates. Hence, such players may be left with little incentive to carry on gaming once they have fully explored a particular game. As discovery is a key aspect of Explorers in the COMEBACK Player Types, we posit that Explorers would be at lower risk of game dependency. As such, the following are the hypotheses:

H1: Achievers will be positively associated with Game Dependency

H2: Socializers and Explorers will be negatively associated with Game Dependency

The game dependency score will be calculated by adding up the scores for each item, with 1 being Strongly Agree and 5 being Strongly Disagree. A score of 80 and more would be considered high dependency.

## 2. METHODS

### 2.1 SAMPLE

Secondary school students participated in an online survey as part of Game Addiction Talks conducted by COMEBACK Pte Ltd in 2020. The CGDT and CPT were filled up by the students voluntarily after the Game Addiction Talk. Data was collected with the permission of the respective schools to be used for research purposes. Approval was also sought and obtained from the Singapore Institute of Technology's Institutional Review Board (Ref: 2020163) to collect retrospective

anonymised data. A total of students ( $n=999$ ) was included in the sample, gathered from three secondary schools in Singapore. Correlational analysis and comparison on means were performed on the data collected.

### 3. MEASURES

#### 3.1 COMEBACK PLAYER TYPE TEST

The CPT is a 30-item, self-report questionnaire that assesses the user's dominant player type (tendencies) based on their responses. It was created by the authors to measure the four gamer player types. It utilises a binary-choice question format that was adapted from Bartle Test of Gamer Psychology, the most widely used online test for Bartle's player taxonomy with over 800,000 uses in 2011 (Radoff, 2011). Users are required to choose between two answers which represent the characteristics of two different player types. For example, in one question asking, "Is it better to be:", participants are required to choose between "Feared" or "Loved", which are Achiever and Socializer characteristics respectively. There are a total of 15 answers for each player type, whereby users will have a score across each of the four player type categories.

Users can only score a maximum of 15 for each category, with the sum of all four categories not exceeding 30. For instance, a user may score 15 for Achiever, eight for Socializer, seven for Guru and zero for Explorer. This would indicate that the player's dominant player type is Achiever, based on the highest scoring.

#### 3.2 COMEBACK GAME DEPENDENCY TEST

Despite the numerous tools available, there are currently no gold standard measures to assess gaming addiction (King et al., 2020). The COMEBACK Game Dependency Test (CGDT) is a 20-item, self-report questionnaire that was developed to assess gaming dependency. It was adapted from the Internet

Addiction Test (IAT) (Young, 1998), the most commonly used measure to assess Internet addiction in both clinical and research settings (Frangos et al., 2012; Moon et al., 2018; Pan et al., 2020). The CGDT closely follows the IAT in the adaptation, only changing the words "Internet usage" to "gaming". The IAT was developed based on the DSM-IV criteria of gambling disorder, which largely follows the proposed criteria of Internet Gaming Disorder in the DSM-V as both are behavioural impulse control disorders (American Psychiatric Association, 2013).

The items examine the degree of gaming dependency with a five-point Likert Scale of 1 (Very Rarely) to 5 (Very Frequently), with scores ranging from 20 to 100. IAT operates on a 4-band scoring system, with a score of 0 to 30 reflecting a normal level of Internet usage; 31 to 49 indicating the presence of mild Internet addiction; 50 to 79 reflecting the presence of a moderate level; and 80 to 100 indicating a severe dependence upon the Internet (Young, n.d.). The CGDT adopted a 3-band system instead, though the highest band remains consistent with IAT's scoring. As such, a score of 20 to 59 indicates no game dependency; 60 to 79 indicates moderate game dependency; 80 to 100 indicates significant game dependency. The CGDT showed good internal consistency (Cronbach's Alpha coefficient of 0.94) for this study. The scale is available on the COMEBACK website (<https://www.comeback.world/comeback-game-dependency-test/>).

### 4. RESULTS

Table 2 below summarises the correlations between CPT and CGDT, as well as our sample characteristics.

**Table 2**  
Pearson's Correlations

Variable	Game Dependency Score	
Achiever Score	Pearson's r	0.272
	p-value	<.001
Guru Score	Pearson's r	-0.014
	p-value	0.652
Socialiser Score	Pearson's r	-0.075
	p-value	0.018
Explorer Score	Pearson's r	-0.235
	p-value	<.001

Our hypotheses (H1 & H2) were supported. It was found that Achiever player types were positively correlated (H1) with game dependency ( $r=0.272^{**}$ ), which is consistent with the literature. It was also found that Socializer and Explorer types had negative correlations (H2) with game dependency ( $r=-0.075^*$  and  $r=-0.235^{**}$  respectively), while Guru player types had no statistically significant relationship with game dependency.

A simple linear regression was conducted to see which player type has the strongest influence on game dependency. Table 3 below shows our findings.

**Table 3**  
Model Summary: Game Dependency Score

Model	R	R2	Adjusted R2	RMSE	R2 Change	F Change	df1	df2	p
H0	0.000	0.000	0.000	17.455	0.000		0	998	
H1	0.283	0.080	0.077	16.765	0.080	28.923	3	995	<.001

**ANOVA**

Model		Sum of Squares	df	Mean Square	F	p
H1	Regression	24388.301	3	8129.434	28.923	<.001
	Residual	279670.798	995	281.076		
	Total	304059.099	998			

Note. The intercept model is omitted, as no meaningful information can be shown.

**Coefficients**

Model		Unstandardized	Standard Error	Standardized	t	p
H0	(Intercept)	47.030	0.552		85.162	<.001
H1	(Intercept)	43.625	6.129		7.118	<.001
	Achiever Score	1.220	0.317	0.209	3.846	<.001
	Socializer Score	0.026	0.260	0.004	0.098	0.922
	Explorer Score	-0.723	0.353	-0.101	-2.048	0.041

Descriptives

	N	Mean	SD	SE
Game Dependency Score	999	47.030	17.455	0.552
Achiever Score	999	6.808	2.992	0.095
Socializer Score	999	8.446	2.834	0.090
Explorer Score	999	7.074	2.434	0.077

**Table 4**  
ANOVA

Player Type	Achiever ( $p < 0.01$ )	Explorer ( $p < 0.01$ )	Socialiser ( $p < 0.01$ )	Guru ( $p = 0.856$ )
Significant Game Dependency ( $n = 51$ )	9.275	5.667	7.275	7.784
Moderate Game Dependency ( $n = 163$ )	7.748	6.429	8.215	7.607
No Game Dependency ( $n = 785$ )	6.452	7.299	8.571	7.678

Most of these variables statistically significantly predicted game dependency,  $F(3, 995) = 28.923$ ,  $p < 0.001$ ,  $R^2 = .080$ . However, only Achiever significantly predicted Game Dependency ( $\beta = 0.209$ ,  $p < 0.001$ ). This confirms again that Achievers have the strongest influence on game dependency.

Regarding game dependency, our sample showed the following statistics: No Game Dependency ( $n = 785$ ), Moderate Game Dependency ( $n = 163$ ), Significant Game Dependency ( $n = 51$ ). We compared the means of the player type in different categories of game dependency through the use of one-way ANOVA. Table 4 below shows our findings, with supporting details appended in Appendix A to Appendix D.

We found that players who fall into the Significant Game Dependency (SGD) category demonstrate high Achiever tendencies and low Explorer tendencies. This finding is consistent with our findings on the association between variables. In the No Game Dependency (NGD) group, we found low Achiever tendencies and a pronounced Socializer tendency. While having low Achiever tendencies was expected, it was not indicative in our findings where Explorer tendencies had a stronger influence compared to Socializer tendency.

## 5. DISCUSSION

Our study found that Achiever player type is positively correlated to game dependency. This is consistent with studies which found that gamers who demonstrated aggressive in-game behaviours, similar to that of Achiever player type, were shown to be at high risk of game addiction (Cole & Griffiths, 2007; Hussain & Griffiths, 2009; Hussain et al., 2012; Hussain et al., 2015). Furthermore, the Socializer and Explorer player type were also found to be negatively correlated to game dependency, with Explorer player type displaying almost equal correlational strength as Achiever player type. This is in line with the findings by Hussain et. al. (2015), who reported that socially motivated and discovery-oriented players are at significantly lower risk of game addiction. Therefore, we posit that the Socializer player type, who are more people- than game-centric, are more likely to follow their social contacts in a game, and expand their social network and resources (i.e., expanding social capital; Zhong, 2011). As socially motivated players, gamers are more likely to play with their friends and would hence have a lower game dependency. On the other hand, the Explorer player type may spend less time in games

due to the limited exploratory possibilities present; they may choose to exhibit these tendencies by viewing videos or talking to other players. These constitute activities outside video gaming that are not captured in the current CGDT. The Explorer player type also does not enjoy challenges within the game and may thus stop playing once games get difficult. Therefore, Explorer player type requires the least measure of commitment (i.e., time, effort, money), which in turn causes an opposite influence on their game dependence. We noted that while the Socializer player type demonstrated a statistically significant negative correlation with game dependency, it was low in strength. The Guru player type did not show any statistically significant correlation with game dependency.

Second, while we found that Achiever player type is positively correlated to game dependency, the SGD group also demonstrated high Achiever tendencies with low Explorer tendencies. We opine that this group of players typically tend to take on challenges and spend time grinding, hence neglecting their other priorities such as school, which unfavourably impacts their game dependency score. The Explorer tendencies are not pronounced in this group, as such activities are either done out-of-game or do not have the appropriate effect on the CGDT score, as previously explained. The NGD consists of players with low Achiever tendencies but surprisingly high Socializer tendencies. This group of players likely play only with friends, which is consistent with what we know of the youths' onboarding process into gaming.

Third, we explored the effectiveness of the measures used. While they are theoretically derived and consistent with other studies, we went a step further by quantitatively showing its association between the two variables and discriminating between game dependency groups. While nascent, this venture has proven useful for identifying problematic in-game tendencies, thus informing the rehabilitative work among pathological video gamers, which the authors seek to undertake.

## 6. CONCLUSION

Comparing player types and their interaction with game dependency through a quantitative study is novel and what our study sought to do. While data was analysed retrospectively, we were able to gather some valuable insights through secondary data analysis: First, is the statistically significant strong effect of Achievers and Explorers on game dependency; second, is discriminating between player tendencies within the game dependency groups, which shows the characteristics of players in SGD and NGD. Such findings help inform the intervention work that the authors are currently conducting. Future research could refine the data collection items to further validate the measures used, which we intend to pursue.

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**Appendix A**  
 Compare Achiever means of No, Moderate, Significant

**ANOVA**

ANOVA – Achiever Score

Cases	Sum of Squares	df	Mean Square	F	p	$\eta_p^2$
Game Dependency Category	553.797	2	276.898	32.905	< .001	0.062
Residuals	8381.303	996	8.415			

Note. Type III Sum of Squares

**Descriptives**

Descriptives – Achiever Score

Game Dependency Category	Mean	SD	N
Moderate Game Dependency	7.748	2.881	163
No Game Dependency	6.452	2.917	785
Significant Game Dependency	9.275	2.699	51

**Post Hoc Tests**

**Standard**

Post Hoc Comparisons – Game Dependency Category

		Mean Difference	SE	t	P <sub>Tukey</sub>
Moderate, Game, Dependency	No, Game, Dependency	1.296	0.250	5.191	< .001
	Significant, Game, Dependency	-1.526	0.465	-3.279	0.003
No, Game, Dependency	Significant, Game, Dependency	-2.822	0.419	-6.733	< .001

Note. P-value adjusted for comparing a family of 3

## Appendix B

### Compare Explorer means of No, Moderate, Significant

#### ANOVA ▾

ANOVA – Explorer Score

Cases	Sum of Squares	df	Mean Square	F	p	$\eta_p^2$
Game Dependency Category	208.597	2	104.298	18.206	< .001	0.035
Residuals	5705.922	996	5.729			

Note. Type III Sum of Squares

#### Descriptives

Descriptives – Explorer Score

Game Dependency Category	Mean	SD	N
Moderate Game Dependency	6.429	2.398	163
No Game Dependency	7.299	2.383	785
Significant Game Dependency	5.667	2.543	51

#### Post Hoc Tests

##### Standard

Post Hoc Comparisons – Game Dependency Category

		Mean Difference	SE	t	Ptukey
Moderate, Game, Dependency	No, Game, Dependency	-0.870	0.206	-4.222	< .001
	Significant, Game, Dependency	0.763	0.384	1.986	0.116
No, Game, Dependency	Significant, Game, Dependency	1.633	0.346	4.721	< .001

Note. P-value adjusted for comparing a family of 3

## Appendix C

### Compare Socializer means of No, Moderate, Significant

#### ANOVA ▾

##### ANOVA – Socializer Score ▾

Cases	Sum of Squares	df	Mean Square	F	p	$\eta_p^2$
Game Dependency Category	90.917	2	45.459	5.712	0.003	0.011
Residuals	7925.968	996	7.958			

Note. Type III Sum of Squares

#### Descriptives

##### Descriptives – Socializer Score

Game Dependency Category	Mean	SD	N
Moderate Game Dependency	8.215	2.678	163
No Game Dependency	8.571	2.841	785
Significant Game Dependency	7.275	2.953	51

#### Post Hoc Tests

##### Standard

##### Post Hoc Comparisons – Game Dependency Category

		Mean Difference	SE	t	P <sub>tukey</sub>
Moderate, Game, Dependency	No, Game, Dependency	-0.356	0.243	-1.466	0.308
	Significant, Game, Dependency	0.940	0.453	2.077	0.095
No, Game, Dependency	Significant, Game, Dependency	1.296	0.408	3.180	0.004

Note. P-value adjusted for comparing a family of 3

## Appendix D

### Compare Guru means of No, Moderate, Significant

#### ANOVA

ANOVA – Guru Score

Cases	Sum of Squares	df	Mean Square	F	p	$\eta_p^2$
Game Dependency Category	1.350	2	0.675	0.156	0.856	3.132e –4
Residuals	4308.958	996	4.326			

Note. Type III Sum of Squares

#### Descriptives

Descriptives – Guru Score

Game Dependency Category	Mean	SD	N
Moderate Game Dependency	7.607	1.837	163
No Game Dependency	7.678	2.128	785
Significant Game Dependency	7.784	2.062	51

#### Post Hoc Tests

##### Standard

Post Hoc Comparisons – Game Dependency Category

		Mean Difference	SE	t	Ptukey
Moderate, Game, Dependency	No, Game, Dependency	–0.070	0.179	–0.393	0.918
	Significant, Game, Dependency	–0.177	0.334	–0.530	0.857
No, Game, Dependency	Significant, Game, Dependency	–0.107	0.301	–0.355	0.933

Note. P-value adjusted for comparing a family of 3