

## **THE RELATIONSHIP BETWEEN LONELINESS, PERSONALITY DIFFERENCES, MOTIVATION AND VIDEO GAME ADDICTION IN THE CONTEXT OF GACHA GAMES IN F2P MOBILE GAMES: A GLOBAL SETTING**

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### **Abstract**

As of recent years, the problem of video game addiction (VGA) has been on the rise amongst the youth. A new type of genre, gacha games, have been fairly popular and even addictive for some personality types. This study aimed to determine whether there exists a significant correlation between loneliness and VGA; in addition to whether the same exists between one's personality differences and tendencies for VGA. Furthermore, it also aimed to identify whether there is a significant correlation between the factors that motivates a player's in-game spending habits and VGA. An online survey was distributed to players of three well-known gacha games; Fate/Grand Order, Fire Emblem Heroes and Granblue Fantasy, on Reddit. The 377 participants were selected using purposive sampling procedures. Four questionnaires were used, the UCLA-Loneliness Scale (UCLA-LS), Big Five Personality Test (BFI-S), Video Game Addiction Scale for Adolescents (GAS) and the motivation for gacha. Pearson correlation was utilised to analyse the correlation of the study variables. The results revealed that there was a significant correlation between loneliness and VGA, and amongst the motivational factors and VGA. The study also found that high neuroticism and extraversion increased the tendencies for VGA, indicating that personality differences were associated with VGA. The study implied that the differences of gamers' personalities and the magnitude of their attitudes and behaviour indicated the increase for VGA. Educational training and VGA awareness are important to reduce the impact of VGA and enhance their mental health.

Keywords: Gacha, Loneliness, Motivation, Personality differences, Video game addiction.

## 1. Introduction

As of recent years, video games have become a popular form of entertainment for many. During the infancy of the video game industry, it was not uncommon to hear of negative stigma being attached to those who enjoy playing video games. However, said stigma is less thought of nowadays and became a rarity. This could be due to factors such as the evolution of the genre. In addition to that, though gaming is still widely popular in terms of home video gaming consoles, such as the PlayStation and Xbox, due to its hardware having been designed for the sole dedication of running video games with high specs; handheld consoles have also become favourable for its portability in exchange for size and memory storage.

With the increasing amount of time spent on video games [1], it was natural to ponder towards the prevalence of video game addiction (VGA). According to the World Health Organisation (WHO), VGA is a pattern of gaming behaviour that is defined by the lack of ability to control in regard to gaming, giving higher priority towards it over other activities to the extent that it interferes with other interests and daily activities along with the continuation or drastic increase in gaming despite the presence of negative consequences [2]. It must also persist for at least a year.

According to Fam [3], one in every twenty adolescents have an addiction towards video games and it is known to have negative effects towards the individual. With smartphone-based video games increasing in both popularity and number, it was natural to wonder about VGA prevalence in relation to it. Mobile social games can be categorised into three types; download purchase model, subscription and a freemium model [4]. The freemium model is the most common as players could enjoy the game for free but are also given the chance to obtain useful in-game items by paying actual currency [5]. An example of a genre that uses this form of play are gacha games.

In brief, gacha is not a new concept. Its roots lie in the appearance of vending machines that dispense children's toys. The word "gacha" is an onomatopoeia that copies the sound of a crank on a toy vending machine [5]. Gacha games share a similar concept as players would spend an amount of in-game currency to gamble their chances of getting their desired characters or items from an allotted pool; chances depending on their rarity. Options of in-game purchases tend to be items, cosmetics and in-game currency. Gacha consists of several elements [4]: 1) it is not the game itself, merely a key game element, 2) it is paid using virtual in-game currency, either by soft or hard currency (actual money), 3) revolves around game-of-chance, 4) (virtual) reward is provided every time, 5) the reward is collectible, non-monetary, available in varying rarities, offers tend to combine with real time events, its value solely lies within the game and it is important in the game's ecosystem, and it is used to increase monetisation for the game company.

There are a multitude of variations of gacha that differs in terms of mechanics. For example, box gacha, discounted gacha, kompu gacha and so on. However, unlike the rest, kompu gacha was banned due to its problem of unknown probability. The most commonly used variations were box gacha and open or close gacha [4].

With the focus of gacha games in mind, this study had three objectives. Firstly, to investigate whether there was a significant correlation between loneliness and VGA. Secondly, to identify the personality differences of individuals with a higher tendency

for VGA. Lastly, to find out whether there was a significant correlation between the factors that motivates a player's in-game spending habits and VGA.

## **2.Literature Review**

### **2.1. The correlation between loneliness and video game addiction**

One of the most defining patterns in VGA is the continuation or drastic increase in gaming despite the presence of negative consequences. Although loneliness was not mentioned explicitly, it is a negative consequence of the behaviour. Various studies were done on the topic and more often than not, positive correlations were found [6-8], especially in that of male players. This could be due to the larger interest in technology [9]. Based on the displacement hypothesis within the context of internet usage, those who spend more time in online settings tend to result in having negative effects towards their existing relationships [10]. Further support was found from the insufficient social skills theory, those with insufficient social relations were more likely to form an addiction [11]. Though this may be the case, there were a few studies that depicted contradicting results [12].

### **2.2. Personality differences for the video game addiction**

Portard et al. [13] stated that personality traits may have an impact towards the amount of time spent on video games whereas specific traits of one's personality could explain their preferences to not only genre but also habits. For example, in creativity-driven games that involves activities such as building and exploring, there was an association with high levels of conscientiousness [14] and high openness scores in relation to roleplaying games (RPG) and low neuroticism for action games [15]. Past literature showed reoccurring theme of high neuroticism in those with VGA [15, 16]. This was supported by a study [13] which determined that heavy video game players scored higher neuroticism scores than casual players alongside higher levels of extraversion and conscientiousness. High neuroticism scores could be credited towards being easier to influence in terms of feeling anxious and furious when confronted with hardships and thus, being more likely to participate in virtual spaces to escape. From a cognitive aspect, they were easier to arouse and had difficulty in emotional regulation in specific situations [16].

In comparison, the remaining personality traits may not have an effect towards VGA with the reason being that compared to other internet-related activities, some gameplays may require active engagement in regard to their role and in-game missions. Therefore, flexibility is required and may lead to difference effects towards one's personality traits [16]. Further support for this was found in other studies [15, 17].

### **2.3. Motivation for Gacha**

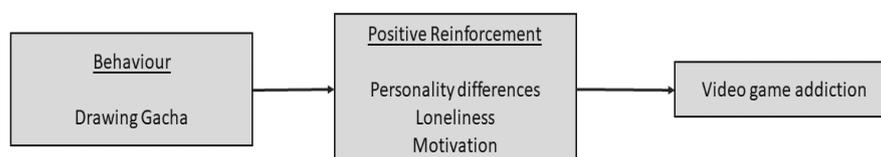
In gacha games, players are given the opportunity to attain randomly allotted items and thus, players would have different reasons for drawing gacha. Consequently, to maintain the player base, limited-time events come in various forms; the most common being limited-time gacha, followed by limited-time discounts and limited-time ranking [5]. These events provide them opportunities to obtain rare and valuable characters that are said to be easier to obtain due to increased rates of attainment for a specified period of time. Regardless of whether actual money was invested into the game, every player shares the desire to collect characters but with

slight differences. Paying players, after taking into account of high rarity and limited-edition items alongside collectability, would have their purchasing behaviour be impacted [18]. For free-to-play (F2P) players, a determining factor would be whether they liked the character, but it does not ensure that they would definitely draw gacha. Rather, the degree of being able to obtain higher rarity items as far as possible without paying. Furthermore, they are also affected by the effect of probability notation [19].

To emphasise the importance of the characters in terms of drawing gacha would be through a previously conducted survey [19]. In the same survey, but in 2019, results differed slightly but was ranked of higher importance compared to social connections. In this context, it showed that even low probabilities may be less likely to deter the players. This was evident as F2P players found further appeal in gacha by means of testing one's luck [20]. Unfortunate luck may result in them either continuing to draw gacha until they are no longer able to or simply cut their losses. However, the opposite reaction may occur in paying players, otherwise known as pay-to-win (P2W) [21]. Based on a lacking in research having been conducted on this, this study aimed to further explore the significant correlation between motivational factors that motivates a player's in-game spending habits and VGA.

## 2.4. Theoretical framework

In this study, operant conditioning by Skinner [22] was used to explain the reasonings for drawing gacha. According to Madigan [23], there appeared to be a psychological reaction that is triggered. With the presence of positive reinforcers, in this case, the personality differences of players alongside the factor of loneliness; it could act as a catalyst to further enforce the behaviour. Furthermore, the randomness aspect of the reward would then trigger a much stronger conditioning alongside stronger brain reactions by means of releasing a rush of dopamine. This would then result in the ongoing repetition of the behaviour of drawing gacha. The accompaniment of audible and visual stimuli could also aid in the reinforcement of this behaviour [23]. The theoretical framework is as illustrated in Fig. 1.



**Fig. 1. Theoretical framework of drawing Gacha via operant conditioning.**

## 3. Methodology

### 3.1. Participants and procedure

This study collected its data from 377 university students via sub forums of three gacha games on Reddit. The gacha games in question were Fate/Grand Order (F/GO), Fire Emblem Heroes (FEH) and Granblue Fantasy (GBF). They were chosen using purposive sampling on the prerequisite of being a university student. The participants were given a consent form and asked about their gender, age,

country of origin and favourite video game genre via Google Forms. The data obtained after collection was then analysed using SPSS version 26.

### **3.2. Measures**

In this study, four questionnaires were used. Firstly, to determine the intensity of loneliness, the UCLA-Loneliness Scale (UCLA-LS) with a 4-point scale ( $\alpha = 0.96$ , test-retest correlation over a two-month period of  $\alpha = 0.73$ ; 20 items) was used [24]. Aside from that, a short version of the Big Five Personality Test (BFI-S) containing questions in reference to openness ( $\alpha = 0.63$ ), conscientiousness ( $\alpha = 0.60$ ), extraversion ( $\alpha = 0.66$ ), agreeableness ( $\alpha = 0.50$ ) and neuroticism ( $\alpha = 0.60$ ) using a 7-point likert scale to determine personality differences [25]. Thirdly, the Video Game Addiction Scale for Adolescents (GAS) ( $\alpha = 0.92 - 0.94$ ; 21 items) [26]. In the context of GAS, a polythemic format implied that for a participant to be considered as having VG, at least half of the criteria needs to be endorsed. An item was considered met when they answered 3 (sometimes) on the 5-point likert scale. Lastly, a motivation for gacha questionnaire was also used [18]. It consisted of 9 items and used a 6-point likert scale. Based on the structural equation modelling (SEM), the questionnaire was deemed a good fit despite having never been used in other students as the topic of gacha is niche and still fairly new in the context of research.

### **3.3. Pilot test**

A pilot test was conducted using 30 participants and the results were analysed to compare the internal validity with that of its original sources. It was determined that the UCLA-LS had  $\alpha = 0.94$ , BFI-S had resulted in  $\alpha = 0.45$  and  $\alpha = 0.53$  for neuroticism and extraversion respectively whereas GAS had  $\alpha = 0.89$ . The participants were selected via purposive sampling.

### **3.4. Analyses**

The hypotheses previously mentioned placed a focus on the correlation between the variables of loneliness, personality differences and possible motivational factors for pulling gacha in relation to VGA. As such, Pearson's correlational analysis was used. This was used to determine whether the correlations were positive, negative or simply non-linear.

## **4. Results**

### **4.1. Sample characteristics**

The results showed that a large majority of the sample was male (81.2%) followed by female (15.1%) and a small minority identifying themselves as being of neither gender (3.7%). Based on the prerequisite of the participants being a university student, it was expected that most were either within the 17 to 20 and 21 to 24 age brackets, 41.3% and 41.9% respectively, with the percentage decreasing with each increase in age group. In terms of the participants' country of origin, the data was simplified by means of sorting it based on continents. The highest frequency of participants hailed from North America (46.2%), followed by Asia (21.5%), Europe (20.2%), South America (6.4%), Oceania (5.0%) and lastly, Africa (0.8%). In terms of video game genre preference, a few suggestions of popular genres were suggested alongside an option to state other genres. It was determined that most

had a preference for RPGs. However, 3 participants were not accounted for in terms of favourite video game genre due to indications of being indecisive. The data is summarised as shown in Table 1.

**Table 1. Demographic profile of participants.**

Measure	Data		
	Items	n	%
Gender	Male	306	81.2
	Female	57	15.1
	Other	14	3.7
Age Group	17 – 20	156	41.3
	21 – 24	158	41.9
	25 – 28	50	13.2
	29 – 33	13	3.5
	34 and above	4	1.0
Country of Origin Sorted by Continent	Africa	3	0.8
	Asia	81	21.5
	Europe	76	20.2
	North America	174	46.2
Favourite Video Game Genre	South America	24	6.4
	Oceania	19	5.0
	Action-Adventure	41	10.9
	First Person Shooter (FPS)	25	6.6
	Roleplaying Games (RPG)	254	67.4
	Puzzle	12	3.2
	Open World	20	5.3
Other	66	17.5	

#### 4.2. Research hypothesis 1

The first hypothesis that was put forth was that there would be a significant correlation between loneliness and VGA. An internal consistency analysis was conducted on the UCLA-LS and GAS questionnaires and reported  $\alpha = 0.76$  and  $\alpha = 0.90$  respectively. Based on the scores obtained between loneliness ( $M = 21.8$ ,  $SD = 11.8$ ) and VGA ( $M = 66.1$ ,  $SD = 17.3$ ), it was found to have a significant positive correlation. Therefore, the hypothesis was supported.

#### 4.3. Research hypothesis 2

A focus was placed upon only two aspects of personality, neuroticism and extraversion. As such, it was determined that the hypothesis was only partially supported. Alpha values were found to be 0.70 and 0.74 respectively. Based on the correlational analysis of the total scores for neuroticism ( $M = 12.8$ ,  $SD = 4.0$ ) and VGA, it was determined that there was a significant positive correlation between the variables. However, in the case of extraversion ( $M = 9.1$ ,  $SD = 3.8$ ), it resulted in an insignificant negative correlation. This implied that the higher the individual's neuroticism score, the more likely they are to have VGA. In the case of the latter, insignificance aside, the more extroverted the individual, the more likely they would have VGA.

### 4.4. Research hypothesis 3

The final predicted result of this study would be the significant correlation between motivational factors that motivates a player’s in-gam spending habits and VGA. Pearson’s correlation as conducted on each of the nine possible motivational factors for drawing gacha against GAS scores. The total frequencies of agreed responses (scoring 4-6 on the likert scale) and the results are depicted in Tables 2 and 3. It was determined that the highest agreed upon statements were those involving characters, with the exception of one (“I think some rare characters (items) will hit someday”) and based on the correlational analysis conducted, the hypothesis was mostly supported with the exception of getting the target characters (items) and in the occasion of an increased probability event.

**Table 2. Motivational factors for Gacha.**

Statements	Data			
	M	SD	p	r
I want new characters (items)	4.33	1.60	0.12	0.016
To get the target characters (items)	4.90	1.43	0.09	0.078
To clear games	3.17	1.88	0.13	0.010
To advance the game	3.36	1.88	0.14	0.005
To rank up	3.00	1.83	0.14	0.006
If there is a probability UP event	3.86	1.70	0.05	0.36
If limited-time characters (items) are provided	4.39	1.62	0.11	0.02
If there are sale events, such as price reduction	3.31	1.80	0.14	0.006
I think some rare characters (items) will hit someday	3.38	1.82	0.15	0.004

**Table 3. Total frequency of agreed responses on the motivational factors for gacha.**

Statements	Data	
	n	%
I want new characters (items)	282	74.8
To get the target characters (items)	324	86.0
To clear games	170	45.0
To advance the game	189	50.1
To rank up	153	40.6
If there is a probability UP event	238	63.1
If limited-time characters (items) are provided	279	74.0
If there are sale events, such as price reduction	187	49.6
I think some rare characters (items) will hit someday	190	50.4

## 5. Discussion

### 5.1. Loneliness and VGA

As predicted based on the findings of past literature [7-10] in addition to the data analysis, it was determined that there was a significant positive correlation between loneliness and VGA. It was reported that the majority of participants were found to be male. As stated by Van Rooij et al. [27], males generally spend longer periods of time and with higher frequency on video games. In the same study, male participants in the high problematic gamer group had lower psychosocial wellbeing scores, especially in regard to depressive mood followed by loneliness, social anxiety and low self-esteem. This may explain the gender imbalance and low self-esteem.

Aside from that, the findings also aligned with the previously mentioned social displacement theory as loneliness is a form of negative effect of having spent more time in online settings in contrast to offline. This may result in players experiencing a decline in interest towards offline socialisation with the increased need to play video games. Further explanation is that video game playing may help in terms of seeking temporary solace from negative feelings associated with social deficiencies despite having little effect on facilitating the development or maintenance of relationships in real life [28]. Instead, this form of substitution may only worsen the deterioration of pre-existing social relationships and lead to further increase in loneliness [29].

## **5.2. Personality differences and VGA**

The findings on neuroticism could be explained by highly neurotic individuals being easier to influence in terms of negative emotions [16]. The difficulty in video games tend to scale with progression and with the added factor of gacha mechanics, it may either result in satisfaction or frustration within the player. As a result, it was predicted that neurotic players would gravitate towards gacha games due to the challenge aspect, be it something within or beyond one's control.

In contrast, the findings of extraversion did not align with the typical findings for this topic. However, there may be possible explanations for this. In reference to a previous study, heavy gamers enjoy talking about video games with other likeminded individuals in contrast to being involved in social activities with others [30]. Thus, it could be implied that such preferences in combination with VGA may negatively affect one's self-efficacy.

## **5.3. Motivation and VGA**

The results of this study showed that 25.2% of the participants had VGA whereas the latter 74.8% did not. This case is an example of the Pareto Principle, otherwise known as the 80/20 rule, which states that in most systems involving inputs and outputs, there exists an imbalance. The ratio is not to be taken literally but is indicative that most results were the result of a minority of outputs [31]. A derivative of this principle is the 80/20/5 rule, which states that 80% of players do not engage beyond the surface level of the game, 20% would search up and read more about the game and 5% would be so heavily engaged that they would post and communicate with other players about it. Therefore, the responses obtained only represents those in the 20% and 5% category. In order to explain the findings, one may consider the idea of parasocial relations.

Similar to various other gacha games, the ones in this study consisted of having an anime art style. In anime culture, a handful of fans have a waifu, a female character one is attracted to, similar to a wife; or a husbando, the male equivalent. According to Reysen et al. [32] study, 28.3% of anime fans have a waifu or husbando and reported having a stronger emotional connection with the character. It was concluded that the associations observed in terms of one's favourite character was similar to that of found in real life relationships. Further support was found in a study dubbed "the waifu effect," as it was determined that extroverts had a slightly higher tendency to fall in love with fictional characters in contrast to introverts. Although it was concluded to not be significant enough to provide a clear explanation, it still served to be a possible explanation with the finding on extroversion in the previous hypothesis.

In an interview from a previous study, one of the participants reported that their main motivation for gacha purchase was to obtain limited-edition outfits for the in-game characters [18]. This observation may be tied with the idea of collectability. Based on the researcher's own personal observations of gacha players on Reddit, it was a common trend for players to show off their accomplishments in terms of character collection. In some games, such as FEH, building characters with skills obtained from other characters is part of the core strategy of the game. As such, this feature allows even easily obtainable characters to increase in rarity due to the investment being done. When the collecting that belongs to a collector is deemed rare and of value, simply possessing just one object is sufficient in motivating the individual to start collecting objects related to it [33].

This implies that once a player has obtained a character that is considered rare or valuable, they would be more likely to continue collecting as to further build their collection of rarities. On the topic of rarity, a possible explanation for the lower frequency of agreed responses on characters that may be useful someday, it could have been due to the factor of uncertainty on whether these characters may actually be useful further down the line. With the factor of limited in-game currency, especially for F2P players, the management of resources is very important. The evidence for collectability stems from the researcher's own knowledge and is implied to be a possibility as no studies have been conducted on the connection between collectability and gacha games. Despite that, it opens up opportunities for future exploration on this topic.

## **6. Limitations and Future Directions**

Despite the notable findings obtained in this study, it came with several limitations. Firstly, this study had the sole focus towards university students, which included both younger and older adults. It is important to emphasise that the results obtained from this age group may not necessarily represent how younger players, such as teenagers, would opt to answer—especially in terms of decision-making abilities. Secondly, the players were generalised in terms of playing style rather than being differentiated between F2P and P2W. This may have led to a lack of clarity on the differences in motivational factors for drawing gacha when comparing the two groups. Next, based on the feedback given by some of the participants after the completion of the survey, it was reported that the word choice in some statements may have been unclear or confusing to less fluent English-speaking participants. Lastly, the study had only focused on three gacha games and all three games shared the same core genre of being strategy games. Therefore, the results may not necessarily be representative of every gacha game fanbase.

For future studies on gacha games, to obtain a better and clearer understanding, it would be strongly recommended that the study not be restricted to only a specific age group. This is to obtain a more varied response from the participants. Furthermore, it may also be more meaningful to differentiate the types of players based on whether they had invested actual money into the game. Next, an exploration on gacha games of varying core genres would also aid in better identification of shared responses. In terms of variables related to the social life of players, it should be clearly defined by whether friendships are restricted by only offline settings. In the occasion of both offline and online settings being considered, it should also be clearly stated. Another recommendation to take into account, as inspired by Loton's study [34], is to clearly

distinguish the difference between players who are either considered to be highly engaged or addicted to the game as to avoid overgeneralising.

## 7. Conclusion

In conclusion, the findings of this study were able to fill the gaps of previous literature on the topic of gacha games and VGA. In reference to the findings, it was determined that there was a significant positive correlation between loneliness and VGA. Furthermore, those with high levels of neuroticism had a higher tendency for VGA, however, the same could not be said for the aspect of extraversion as those with low levels of extraversion had similar tendencies, albeit deemed insignificant. Lastly, it was determined that there was a significant correlation between the motivational factors that motivates a player to partake in in-game spending in relation to VGA; with a strong emphasis on character-related factors having higher priority. The current study serves to not only be an extension to prior studies but also as an opportunity for other possible avenues to be explored for a better understanding on VGA.

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