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Behavior Correlation between Games in First-Person Shooter Genre based on Personality Traits

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Abstract

Recently, video games became an increasingly popular pastime. Nevertheless, there is little research conducted to see the relationship between personality and preferences for first-person shooter (FPS) video games. We would like to know what this kind of games is can drive a violent behavior. On the other hand, in the field of personality psychology, there is consistent research that personality traits can clustered into 5 high-level factors, called as the Big Five Personality Factors. This study would like to examine whether personality traits affect preference in FPS games. We conducted the research by asking participants to fill out a questionnaire containing personality traits test based on Big Five Personality and a questionnaire about FPS games played to identified player's game preference. From the data, we investigated the behavior correlation between FPS games based on personality traits. There were 62 participants who like to play video games on this research. Only 29 participants like and play FPS games. It showed that participants already have different preference for games based on their personality traits. On FPS players who like Counter Strike Global Offensive (CSGO) have interesting patterns, that is very low Extraversion, Agreeableness, Conscientious, Openness, but higher neuroticism when compared to other players.

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1. Introduction

Video games are a big part of the 21st century, not only is it part a majority of people's amusement but video games also have a large market [1]. Video games are now available on various devices, such as personal computers, smartphones, handheld devices and console systems. Throughout this research, the term of video games is used for any game that is played, without considering the devices. The most of video game research are concerned with children and adolescents. But today gamers are more mature audiences and the average video gamer is 34 years old [2]. Therefore, our study did not consider age issues.

Game preferences has a correlation with personality traits [3]. Therefore, the choice of video game genres is based on player's preferences. Game has many genres, such as sports, action, puzzle, first-person shooter, and many others. First-person shooter (FPS) is one of video game genres, which focused on gun and other weapon-based combat in a first-person point of view. The gamer usually acts as the protagonist during the game. There is study which has found that personality has correlation to their preferred difficulty in first-person shoot games [4]. The other researches found the traits have relations to gameplay time and the genre of the game [5, 6].

Generally, video games are played for seeking pleasure. But the pleasure differs from one person to another. Some players search for pleasure in the violent actions. We are concerned with the impacts of playing violent video games. The popularity of video games depends on their features. Game with good features will increase player's gameplay time [7]. Furthermore, there are many factors that influence player's satisfaction when playing a game, such as system connection, graphics and game story [7]. These factors become the key of successful game in this day. However, there is renown controversy while a violent video game has become very popular such as Doom [8]. Doom is included as the first-person shooter genre, which has unintelligent and very violent scene. It has become controversy, while some adolescent criminals had a history of playing it. On the other hand, Doom became so popular that its multi-player features caused problems for companies whose networks were used to play games. In FPS video games, player's gameplay will adapt its difficulty level based on player's experience. Moreover, the players will be generally interacted with others player in same match. It is designed in order to keep the players playing the game continuously. We cannot imagine what if the players continuously played a violent game like Doom. Based on this concern, we would like to know the relationships between FPS video games with player's personalities. We also consider the idea for giving rating of violent video games based on the above relationships. Therefore, we formulate the purposes of this research are (1) to evaluate the correlation between personalities of the FPS players and the FPS video games by using Big Five Inventory and Questionnaires, and (2) to determine the attributes between FPS games which attract certain personality traits. The first-person shooter (FPS) games are represented by four games that is: Counterstrike, Rainbow-Six, Overwatch, and Left 4 Dead 2, The results of this study will help FPS game developers to gain insight into player behavior and help them develop more interesting and responsible games.

The remainder of the paper is composed as follows: first we discuss the related works in section 2, and then is followed by our research methodology, in section 3. In section 4, we descript our results and discuss the consequences. In the end, we concluded our work with limitation of our study and suggestions for the future research in section 5.

2. Related Works

2.1. Player experience in-game

Video game is very popular and a part of entertainment for nowadays. While playing a video game, players will adapt with the game environment as well as the other players who have better skill. Players pay attention on game attributes and expecting positive consequences, such as improve interactivity, cultivate logic and reflex, gain authentic experience, enhance pleasure of senses, utilize imagination, accomplishment sense, and warm relationship with other players [6]. Furthermore, there are some factors associated with game addiction that is individual traits, cognitive levels, psychopathological, and social interaction [7]. One main factor of game addiction is loneliness [9] which is caused by lack of social interaction. It also happens with violent behavior of game players [8].

On the other hand, the players generally express their personality traits while playing the game. Therefore, we can actually predict the behavior problems, faced by players. One method to predict the behavior is Big Five personality concept, which related to enjoyment and gameplay duration in the face of the difficulty of game adaptation [4]. Based on this concept, a research found that personality traits of temperament and character, associated with gaming preference, and problematic internet gaming, was strongly correlated with psychological status [10].

2.2 Big Five Personality

Big Five Personality [11] usually used by researcher for knowing people personality traits. The research methodology is usually done by asking some questions to determine the respondent personalities. Big Five Personality also known Five Factor Model and employed by using OCEAN [12] model for the personality classification. OCEAN (see in Figure 1.) is abbreviation of Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism. Next is some description of this model. Openness is a general appreciation for broad variety of experience. The open personality will like to learn new things. Conscientiousness is personality about organized, methodic person. It is related to the way of people to control their impulses. Extraversion is personality about interacting with others. This trait is marked by real involvement with the outside world. Agreeableness is personality about being sympathetic person, cooperative, and friendly. Agreeable persons appreciate getting along with others. Neuroticism is personality about being moody or tense person. This trait can be also called as emotional stability.
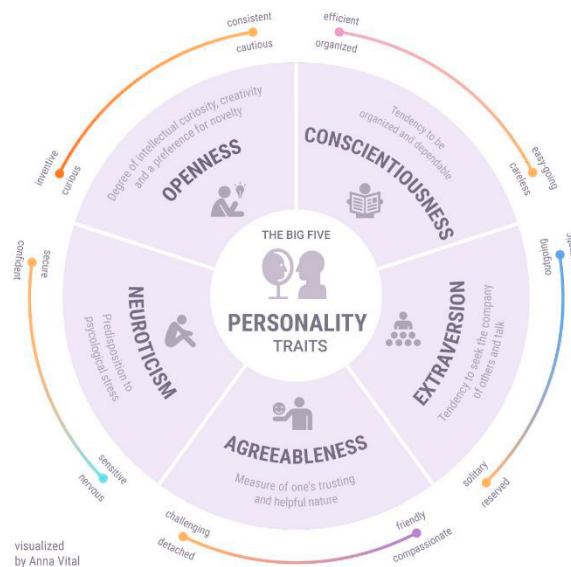

Fig. 1. The Big Five O.C.E.A.N. model
(source: https://counselingrx.files.wordpress.com/2019/07/personality.jpg)

2.3 Characterizing player

Personality traits reflect people's characteristic patterns of thoughts, feelings, and behaviors. Personality traits have been investigated as important predictor of human personality traits. To predict the personality traits of game players, we can employ Big Five Personality paradigm and using OCEAN [12] model. Previous researches which focused on gaming addiction [7], have found the relationship between age and genres and relationship of traits and genres. According to some researches, game with adventure or action has higher relation to extraversion and neuroticism [13]. Beside the agreeableness and openness is found related to frequency and number game played [5]. The characteristics can be considered as consistent predictor. Another discovery is that higher age can be predicted with lower gaming time [14]. It is also found that depression is one of the main factors that causes players to be addicted to

the game [7]. This addiction drives the players to spend their money in the game for leveling up their character and ability as soon as possible [15].

2.4 First-Person Shooter Games

First-person shooter (FPS) [16] is a video game genre in which the player combats with weapons in first-person perspective. This genre has been played by many people nowadays. Most of FPS games involve a character with weapon to fight enemies. Many popular games like Counterstrike, Rainbow-Six, Overwatch, Left 4 Dead 2 are included into this FPS genre. FPS games on computer are basically controlled with mouse for moving character vison, shoot, and scope and keyboard for walk, reload, jump, crouch, etc. FPS games on console systems are basically controlled with analog device for moving character vision and walk and others key for reload, jump, etc.

3. Research Methodology

In this study, the main research question is how to develop ratings [17] for First-person shooter (FPS) games by considering the player's personality traits. We analyze the participants personality by using Big Five personality test, on the FPS games that they played, that is: Counterstrike: Global Offensive, Tom Clancy's Rainbow Six Siege, Overwatch, and Left 4 Dead 2. The chosen games were picked based on fame within the research region and different characteristics between each game.

3.1 Selected method

There are two main research methodologies that is aimed: quantitative and qualitative methods. For this study, the selected research method is the quantitative method [18]. The quantitative method can be defined as a measuring option of how many participants that is having a certain trait and relate it into the following method. The research questions require a large number of participants in order to gain the data and to present accurate results that is involved in personality analysis. We decided to use the multiple-choice questions in order to test the personality of the participants

3.2 Big Five personality

The big Five personality test is used in most previous research done in similar topic. [19] The big Five personality traits consist of: Agreeableness, Openness, Conscientiousness, Neuroticism, Extraversion [11]. By factoring these personality traits in our research correlation between in-game behavior in separate games can be found.

3.3 The games

In here, we choose FPS games based on their popularity and have different characteristics between each game. All FPS games are multiplayer to put an emphasis on social aspects of the game. The chosen games (see Figure 2) represent a different demographic in the first-person shooter (FPS) genre, that is:
- Counterstrike: Global Offensive (CSGO): this game represents a classic first-person shooter experience. This game can be seen as the base line of the FPS genre by presentation the game is what symbolizes FPS.
- Tom Clancy's Rainbow Six Siege(R6S): this game is more strategic, in-depth, slow paced and methodical. The game is similar to CSGO in presentation, theme, and core gameplay despite R6S having more mechanics.
- Overwatch (OW): this game appeals more to the casual crowd, colorful design, and fast paced. By design the game should draw in different crowds from the other games. It's presentation and aesthetics should draw in more people with high openness.
- Left 4 Dead 2 (L4D2): this game shines mostly on cooperation and not Player versus Player (PVP) this game should draw in people with higher Extraversion and Agreeableness.
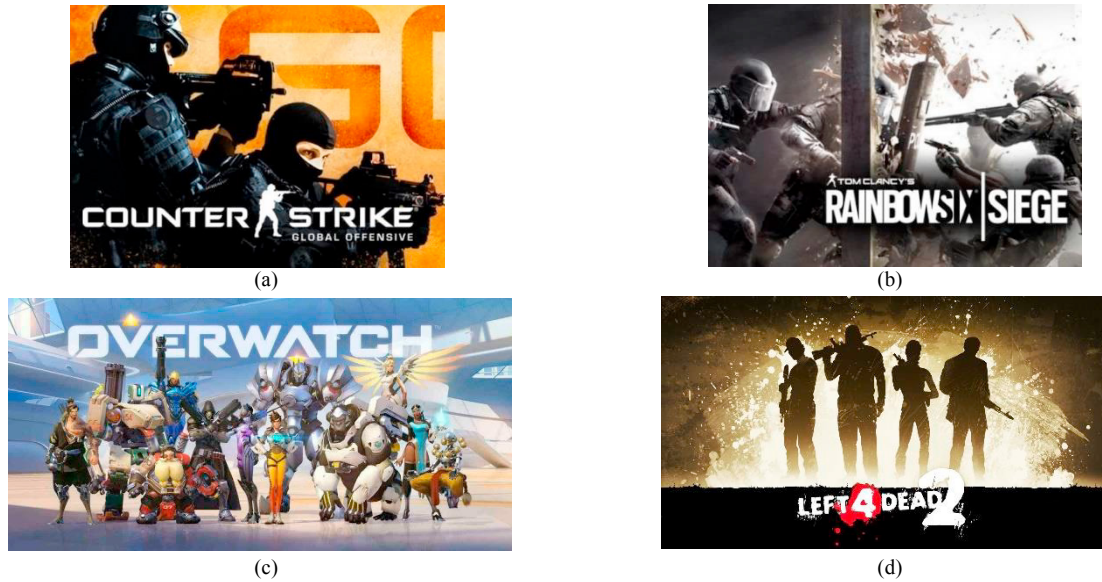
Fig. 2. Representation of FPS games: (a) CSGO, (b) R6S, (3) OW, (4) L4D2

3.4 The questionnaire

The research method, which is designed for this study, is using an online questionnaire. In this survey, we are using Google Form because it is easier to use. The questionnaire contains 4 main sections: The General Questions, The Big Five Questions, The General Game Questions, and Game Specific Questions. For the general questions, we asked a question based on their individual data as in age, gender, and any physical trait that the participants have. For the Big Five Question, we asked questions based on how they managed to emphasize their personality based on the scenario given, participants were asked to select the response (from 1 to 5) which best represent their current state in the following scenario; 1 being strongly disagree and 5 being strongly agree. For the General Game Question, we asked about what kind of game that they play in general and then decide which game that they play based on the later list. For the game specific question, it will ask questions that can align with other games about gameplay or interaction around the game. The data taken doesn't require data that are related to the person's identity except for some that require a person's in game name which is used solely to get their in-game stats data.

3.5 The participants

As previously mentioned, this research was designed specifically to target individuals who are recognized as online gamers who regularly play video games. Individuals that are not interested in or have not played Counter Strike: Global Offensive, Rainbow Six Siege, Overwatch, and Left 4 Dead 2 Can still take part in it, their data is used in comparison to the others. To make participants to reach this questionnaire, we shared the Google Form to our friends and games communities. We also handed out the questionnaires using our social media platforms including Line, WhatsApp, Twitter, and Instagram. Taking part in this survey was voluntary and there is no coercion used.

4. Result & Discussion

In this section we will explore the data taken from the survey to answer our hypothesis. From the 62 participants 41 are male and 21 are female and everyone is between the age of 19-22. The majority of participants are students in Indonesia except for a few of outliers that are working or living abroad.

Table 1. Big five inventory test score by FPS games played

Average BFI Score	Plays FPS	Doesn't Play FPS	All Participants
Extraversion	2.68	2.52	2.61
Agreeableness	2.87	2.93	2.90
Conscientious	2.49	2.72	2.60
Neuroticism	**3.01**	2.85	2.94
Openness	**3.32**	3.20	3.26

The score test was first calculated by following the BFI score calculation [11]. Afterwards the average of the score is taken by filtering if the participant has played a First-person shooter game or not (see Table 1.). For the entire dataset the standard deviations are Extraversion 0.60, Agreeableness 0.52, Conscientious 0.47, Neuroticism 0.67, Openness 0.51. Participants that plays FPS games has higher Extraversion, Neuroticism, and Openness. However not by a large margin.

Table 2. Big five inventory test score by games

Average BFI Score	CSGO	R6S	L4D2	OW
Extraversion	2.43	2.30	2.26	1.88
Agreeableness	2.80	2.66	2.95	2.47
Conscientious	2.68	2.61	2.56	2.22
Neuroticism	3.01	2.88	2.85	3.18
Openness	**3.18**	**3.16**	**3.12**	**3.16**

The average of each game (see Table 2.) cannot be taken by face value because of the amount of participant who played the game. CSGO (Counter Strike Global Offensive) 16 people, R6S (Rainbow Six Siege) 10 people, L4D2 (Left 4 Dead 2) 12 people, OW (Overwatch) 5 people. with the uneven distribution of participants of each segment the average scores might be skewed towards these specific individuals. One data that stands out is that Left 4 Dead 2 players does have a higher agreeableness than other games as it is a game that is more cooperative rather than the others.

The average of both CSGO and R6S scores when compared with its own scores such as:

$$CSGO = Extraversion: Agreeableness: Conscietiousness: Neuroticism: Openness \qquad (1)$$

this formula when ran has similar ratio with R6S. with that Table 3 research will be delving into both player base seeing if both game's player base has similarity and difference with other participants.

Table 3. Big five inventory test score for participants that played CSGO and R6S

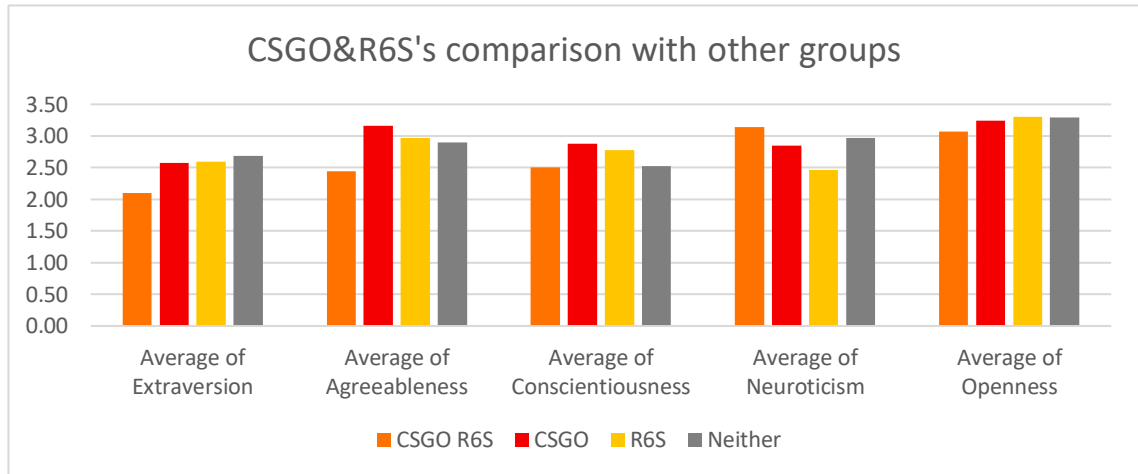| Average BFI Score	Extraversion	Agreeableness	Conscientious	Neuroticism	Openness
CSGO & R6S	2.10	2.44	2.50	3.15	**3.07**
CSGO without R6S	2.58	3.17	2.88	2.85	**3.24**
R6S without CSGO	2.59	2.97	2.78	2.47	**3.30**
Neither CSGO or R6S	2.69	2.90	2.53	2.97	**3.29**

Fig. 3. Average BFI score test for CSGO&R6S

The graph shows Average BFI scores depending on if the participant plays Both CSGO and R6S, only 1 of the two games, and neither of the two games. Participants that plays only CSGO or R6S has have similar data except for agreeableness where CSGO players have higher average and Neuroticism where CSGO players have higher Score. And Participants that plays both games have significantly different score from everyone else. Showing very low Extraversion, Agreeableness, Conscientious, Openness and higher neuroticism when compared to everyone else.

Table 4. BFI score test of participants that plays specific games

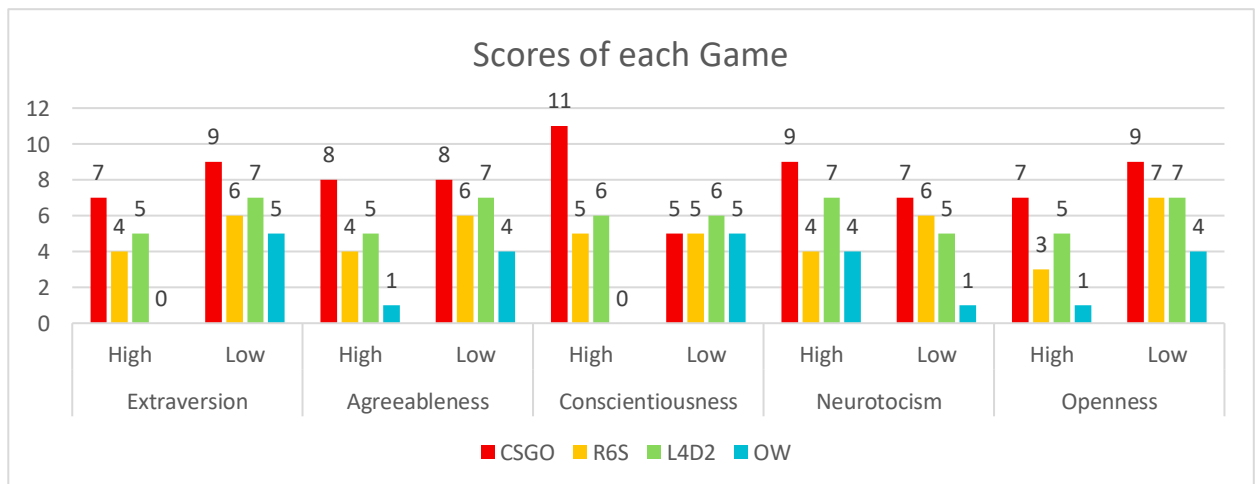| Average BFI Score	Extraversion		Agreeableness		Conscientious		Neuroticism		Openness	
	High	Low	High	Low	High	Low	High	Low	High	Low
CSGO	7	9	8	8	11	5	9	7	7	9
R6S	4	6	4	6	5	5	4	6	3	7
L4D2	5	7	5	7	6	6	7	5	5	7
OW	0	5	1	4	0	5	4	1	1	4

Fig. 4. BFI Score of Specific games

High and low scores are determined by being higher or lower than the average of all participants, if the score is equal it will be categorized as lower. Fig. 4 shows most games have even split between both high and low BFI score test except for outliers like higher amount of conscientious participant on CSGO and higher amount of low openness participant in R6S while Overwatch players are always aligned in either being higher and lower in all categories. It seems to be a problem that there are few participants that plays overwatch making their data harder to distribute and read into.

Table 5. Overlapping participants game interests

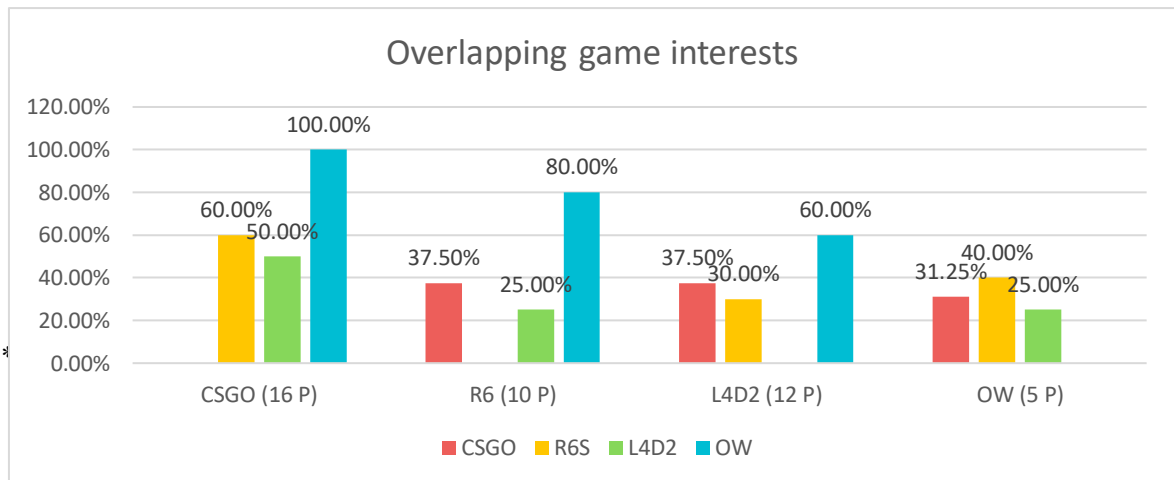| Overlapping Game Interests	CSGO	R6S	L4D2	OW
CSGO		37.50%	37.50%	31.25%
R6S	60.00%		30.00%	40.00%
L4D2	50.00%	25.00%		25.00%
OW	100.00%	80.00%	60.00%	

Fig. 5. Overlapping Games interests

Graph Shows Participants who plays 2 games and how much a player base of a certain game plays another. Fig. 5. Amplifies how the small amount of participant that plays overwatch also plays the other games, the amount of player that plays CSGO and R6S creates a nice split between participants that played both or only one. Aside from the general average BFI scores other questions had differing variety and none of the data stands out with overwhelming unity. Some questions made based on BFI had answers mostly align with their personality.

5. Conclusion & Limitation

5.1 Conclusion

Only small sample size of participants, who really like and play FPS games. It showed that participants already have different preference for games based on their personality traits. Based on our survey, there is a pattern that person's personality differ in the type of FPS games which they played. The games with similar characteristics like Counter Strike Global Offensive (CSGO) and Rainbow Six Siege (R6S) have similar personality demographic. While the games with different characteristics, such as Overwatch (OW) and Life 4 Dead 2 (L4D2) have different

player's personality in their demographic. Therefore, we should consider the tendency of player personality traits who are attracted to a FPS game, when developing ratings for FPS games.

For future research on this subject for the same genre the research should have a larger scope of participants for better generalization of the subject and expand to other genres of videogames as well as finding the bridge between different characteristics in FPS games.

5.2 Limitation

There were 62 participants who like to play video games on this research. Only 29 participants like and play FPS games. This is really small sample to study such broad FPS games. Furthermore, the localization of the questionnaire makes the generalization of the data limited and the bias of the data higher. The questionnaire is in English and spread online using Google forms this could deter and change the participants answer by either not understanding fully the question and being in a casual environment when answering rather than a controlled environment. Some games are harder to access than others such as Overwatch. This game is in a different download client from the rest and has a higher price to access the game making harder to get participants who has played the game.

Appendix
https://docs.google.com/forms/d/1Lhighf3UX5DUk5dOzA9DqDySIOIhimH1vlImsTv54PM/copy

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