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The relationship between video game character preferences and aggressive and pro-social personality traits

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Abstract

Previous research on video games showed that violent and pro-social content influences the player's behavior and is associated with their personality. However, it has often been criticized that the video games are poorly matched (i.e., relative to neutral video games, they may differ not only in their violent and pro-social content but on a variety of dimensions), so it is unclear what video game property exactly accounts for the video game's impact. This criticism can be addressed when different in-game roles, varying in terms of aggression/prosocial behavior, among a single game are investigated. The present research focused on the class-based First-Person Shooter "Overwatch". Using a large sample of actual gamers (N = 2323), we assessed the relation between players' in-game role preference and a range of personality traits. Preference for aggressive (relative to prosocial) roles was linked to a more aggressive and less pro-social type of personality. Self-perceived aggressive in-game behavior also correlated positively with aggressive traits and negatively with empathic traits. However, this was only observed using self-report measure and not in a smaller sample with objective playtime measures. Overall, it appears that one's favored role in a video game relates to certain personality traits. Future perspectives on video games, in-game role, personality, and social behavior are discussed.

Word count abstract: 209

Key Words: video game; aggression; empathy; in-game role; personality

Public Policy Relevance Statements

In a study using a large sample (N = 2323), we assessed the relation between Overwatch players' in-game role preference and their personality. Self-perceived in-game aggressive behavior correlated positively with aggression and dark personality and negatively with

empathy and agreeableness. Furthermore, participants preferring Attack (more aggressive) characters showed a more aggressive and less prosocial type of personality in comparison to those who preferred Support (more pro-social) characters. Taken together, these results suggest that future studies on the relation between video game play/preferences and personality should take into consideration the discrepancies not only between different games but also within a single one.

Introduction

Video gaming is an ever-growing industry, generating more than $100 billion in revenue in 2016 and with an expected 7.8% increase for 2017 (newzoo, 2017). These numbers are even more impressive when compared to the film industry, which reached a total of $38.6 billion in box office worldwide during the same year (MPAA, 2017). It is no surprise, therefore, that the impact of video game play attracts a lot of interest among the academic world and the public alike.

In particular, there has been a focus on the impact of violent video games (VVGs). The most-often used model explaining the link between video game violence and aggression is the General Aggression Model (GAM, Anderson & Bushman, 2002). In this model, persons and situations influence one's internal state in different ways (i.e., in terms of affects, cognition, and arousal). This internal state in turns affects the perception and decision-making of people. Exposure to violent content, therefore, is assumed to lead to short-term increases in aggression and, through learning processes, repetitive exposure reinforces hostile structures, favoring an aggressive personality. For example, Bushman and Anderson (2002) found that people who played VVGs expected story characters to behave, think, and feel more aggressively than those who played a non-violent game. Increased accessibility of aggressive thoughts, in turn, evokes aggressive behavior (e.g., Anderson & Dill, 2000).

The debate on the link between VVGs and aggression is still ongoing (e.g., Ferguson & Konijn, 2015), with some studies finding no effect of violent content (e.g., Adachi & Willoughby, 2011) or even diminished aggression after playing games with violent content (e.g,. Unsworth, Devilly, & Ward, 2007). In his meta-analysis, Ferguson (2015) found the effect of VVG to be minimal, and some recent studies keep finding null results (e.g., Kühn et al., 2018; McCarthy, Coley, Wagner, Zengel, & Basham, 2016). On the other hand, recent meta-analyses supported the idea that exposure to violent content in video games does increase aggression (Anderson et al., 2010; Greitemeyer & Mügge, 2014). It should be noted,

however, that this effect could have been overestimated because of publication bias (Hilgard, Engelhardt, & Rouder, 2017; but see Kepes, Bushman, & Anderson, 2017 for a rebuttal).

Nevertheless, our understanding of the pertinent literature is that most studies have found exposure to VVGs to be linked to aggression in correlational (e.g., Greitemeyer, 2018), longitudinal (e.g., Anderson et al., 2008), and experimental settings (e.g., Gabbiadini & Riva, 2018). Conversely, prosocial video games appear to have a positive effect on prosocial behaviors (Gentile et al., 2009; Greitemeyer & Osswald, 2010), reducing aggressive cognition (Greitemeyer & Osswald, 2009) and aggressive behavior (Greitemeyer, Agthe, Turner, & Gschwendtner, 2012), as well as increasing empathy (Greitemeyer, Osswald, & Brauer, 2010; Prot et al., 2014).

There is, however, a question that, to the best of our knowledge, has never been the focus of video game studies, namely the impact of one's in-game role. Indeed, some of the largest games in the industry have some sort of a class system, allowing for different roles and gameplay. This is the case, for instance, for League of Legends (over 100 million monthly active subscribers in 2016; Statista, 2017a), Dota 2 (over 13 million monthly active subscribers as of June 2016; Statista, 2017b), or World of Warcraft (whose last expansion, "Legion", sold more than 3.3 million copies on launch day, August 30, 2016; Activision).

There is not one single classification system used among all video games, and sometimes players even use their own system instead of the official in-game class separation (e.g., World of Warcraft offers 12 different classes to choose from, but players will also distinguish three main type of playstyle, being Tank, Heal, and DPS). Importantly, however, one's choice of a role has an impact on one's approach of the game. For instance, in League of Legends, a player choosing the champion "Soraka", a character who has access to healing spells, will likely focus on keeping his allies safe. In contrast, another player choosing the champion "Veigar", whose ability deals a great amount of damage, will probably focus on killing his enemies.

Because of this, players of the same game can have varying levels of prosocial and aggressive in-game behavior when playing, based on the role they are filling. Therefore, we developed the hypothesis that players of games offering different types of role characters will show different patterns of personality traits in relation to their in-game choices. Namely, we expected that players who choose more pro-social roles would be more empathic/less aggressive than other players of the same game whose preference goes towards roles that are more aggressive.

It is important to state that, although some research has been conducted relating personality with in-game behavior (e.g., Worth & Book, 2015) or character preference (e.g., Park & Henley, 2007), these studies focused on general personality evaluation, such as the Big Five Inventory (e.g., Bean, Ferro, Vissoci, Rivero, & Groth-Marnat, 2016; Ewell, Guadagno, Jones, & Dunn, 2016) or the HEXACO model (e.g., Worth & Book, 2014, 2015), which divides personality in six factors, being honesty-humility, emotionality, extraversion, agreeability, conscientiousness, and openness to experience, all composed of four facets (Lee & Ashton, 2004). Interestingly, these studies showed that one's in-game choice mirrored one's personality. However, we are still lacking evidence in regard to traits that are more closely related to the content of the video game (i.e., prosocial traits and traits related to the dark side of human personality). This dark side of personality can be conceptualized in light of Paulhus and Williams' (2002) Dark Triad. As suggested by its name, the Dark Triad includes three related, yet distinct, constructs: Machiavellianism (i.e., a manipulative personality), subclinical narcissism, and subclinical psychopathy. Recently, personality psychologists have suggested that the triad should be extended by the addition of a fourth construct, everyday sadism (e.g., Chabrol, Van Leeuwen, Rodgers, & Séjourné, 2009), effectively forming a Dark Tetrad. However, others believe that the benefits of adding a fourth dimension to the measure of dark personality is limited (e.g., Jonason, Zeigler-Hill, & Okan, 2017). Hence, and because of space considerations, we report an overall mean index of

the Dark Tetrad in our analyses. All analyses for the subdimensions can be obtained from the first author.

Please note that our design enables us to circumvent one important criticism of previous video game research, namely that violent (or prosocial) video games often differ from neutral video games on dimensions other than violent (or prosocial) content. For example, in an experimental study, the VVG could not only be more violent than the neutral video game, but also more difficult and frustrating, which in turn may account for increased aggression in the VVG condition. In contrast, because players of the exact same video game are compared, we can be relatively certain that the different video game roles indeed account for the relationship between type of role and pro-social and antisocial personality traits.

The present study

To test our hypotheses, we focused on in-game roles within a single video game: Overwatch (OW). OW is a popular online class-based First-Person Shooter developed by Activision-Blizzard, launched on May 24 2016. As of April 2017, the game had been sold over 30 million times (Statista, 2017c). It is available for PC as well as for PlayStation 4 and Xbox One.

Each of the 24 heroes from OW (i.e., character from the game) is part of one out of four classes: the offense heroes are focused on dealing damage and taking down the enemy; the defense heroes stop the enemies from advancing; the tanks are highly resistant and are expected to take damages themselves to prevent harm to their teammates; the supports are equipped to heal or improve allies, providing utility. Importantly, the extent to which a role is aggressive is inversely associated with the extent to which the role is prosocial. That is, the most aggressive role is the least prosocial role, whereas the least aggressive role is the most prosocial role. Every hero has a unique weapon that can be used to attack the enemy team's characters, but they also have access to skills to help them in their role (e.g., a secondary weapon, a shield, a healing capacity). In OW, two teams of six players, each controlling their

own hero, battle each other in a variety of maps with different types of objectives. Players can choose to play in the competitive mode where they are ranked based on the results of their games. They also have the possibility to play against AI-controlled enemies. A fourth option allows people to enter varying game modes, with rules different from the main game[1].

Based on our theoretical analysis, we developed the following hypothesis specific to OW: Players favoring more aggressive (relative to prosocial) roles will show a more aggressive and less prosocial personality. Based on their characteristic, it is assumed that Offense characters will be the most aggressive followed in order by Defense, Tank, and Support. With regard to prosocial roles, the order is assumed to be reversed.

Concretely, it was predicted that empathy would correlate negatively with the preference for aggressive roles. With regard to the Big Five Inventory, significant relationships to video game aggression/prosocial content were only expected for the agreeableness subscale (i.e., higher aggression relating to lower agreeableness scores). This is in line with several studies showing that agreeableness correlated with helping behaviors (Worth & Book, 2014, 2015), and with preferences for helping game-profession (Park & Henley, 2007), and that it indirectly predicted moral alignment (this relation being mediated by moral disengagement, Ewell et al., 2016). Conversely, it was expected that participants who prefer aggressive roles would score higher on trait aggression. Likewise, Dark Tetrad's traits were expected to be higher for participants favoring more aggressive roles.

Method

Participants.

Two thousand, four hundred and eleven volunteers were recruited online to participate in our survey. Of those, 86 failed to respond correctly to an item attention check (i.e., "*This is an item check. Please indicate four on the scale if you read this item*") and two more reported playing OW for over 150 hours a week. They were excluded from the analysis, leaving us with a sample of 2323 participants (90% male, mean age = 22.88, *SD* = 5.81). Participants'

in-game statistics were also obtained online with the help of their in-game ID. Failure to access the profile of 449 participants meant that this data was accessible for only 1874 participants. Three more persons were excluded from the subsample as their total playtime were deemed too low (respectively 0, 10 and 15 minutes), leaving a sub-sample of 1871 participants (90% male, mean age = 22.76, *SD* = 5.74). Recruitment was held on OW's official forums as well as on two subreddits dedicated to OW (i.e., www.reddit.com/r/OverwatchUniversity & www.reddit.com/r/OWconsoles). Participation entitled subjects to enter a lottery to win one of ten 40€/40$ prizes (in the form of pre-paid cards dedicated to Blizzard games).

Measures

At the beginning, participants were asked to answer demographic questions (i.e., age, sex, and mother tongue) as well as to indicate their "*BattleTag*". The *BattleTag* corresponds to the players' ID in the game. Participants were informed that this information would not be used to identify them but only as a way to link their in-game statistics to the questionnaire (see below).

In-game Habits

Participants were then asked to give information regarding their in-game habits. First, they had to give an estimate of the amount of time they usually spend on OW per week, in hours. Then, they were asked to select their "main character" in a list of all 24 OW characters. A main character was defined as "… *a character you specialize in and that you will pick in priority.*" Participants could also choose to pick a 25th option, stating that they do not have a main character. They were then asked to indicate their perceived role in the game by answering the following item: "In an average game with this character, what percentage of your time do you spend attacking the enemy and helping your teammates?" To answer this, participants were presented with two sliders (i.e., "*Attacking the enemy team*" & "*Helping my teammates*"), ranging from 0 to 100%, that had to amount to a total of 100% together (i.e., if

one rated “attacking” as 63% of his time spent with a character, “helping” would be set to 37%). Finally, participants were asked to indicate their three most played characters and to rate their perceived role with the same scale as they used for the main character assessment.

Empathy

The Interpersonal Reactivity Index (IRI, α = .82; Davis, 1983) was used to measure empathy. This scale is composed of 28 items and all items are answered using a 5-point Likert scale ranging from “*Does not describe me well*” to “*Describes me very well*”. A sample item is: “I often have tender, concerned feelings for people less fortunate than me.”.

Trait aggression

To measure trait aggression, participants had to fill the Buss and Perry Aggression Questionnaire (BPAQ, α = .86; Buss & Perry, 1992). It contains 29 items, such as “Given enough provocation, I may hit another person.”, which are answered using a 7-point Likert scale ranging from “*Extremely uncharacteristic of me*” to “*Extremely characteristic of me*”.

Big Five

The five-factor model was employed, measured with the Big Five Inventory (BFI, α = .72; John & Srivastava, 1999). This 44 items scale assesses the following dimensions of personality: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness. These items (e.g., “I see myself as someone who likes to cooperate with others.”) are answered using a 5-point Likert scale ranging from “*Disagree strongly*” to “*Agree strongly*”.

Dark Tetrad

Finally, the Dirty Dozen (DD, α = .81; Jonason & Webster, 2010) was used to measure Narcissism, Machiavellianism, and Psychopathy. These three subscales, each containing 4 items (e.g., “I tend to want others to pay attention to me.”), form what is known as the Dark Triad of personality (Paulus & Williams, 2002). The 19-items Comprehensive Assessment of Sadistic Tendencies (CAST; Buckels & Paulhus, 2014) was also assessed. This addition follows Chabrol et al.’s (2009) recommendation that sadistic traits should also be accounted

for in what the authors called the Dark Tetrad (D4, α = .86). Both the DD and the CAST used a 5-point Likert scale, ranging from "*Strongly disagree*" to "*Strongly agree*".

In-game Statistics

At the end of the data collection phase, in-game statistics for our participants were extracted using the website Overbuff.com. This included total playtime for each hero as well as the mean per game per hero of the following information: medals obtained, damage done, damage blocked, healing done, kills, death, and objective time. This information was taken only for the "quickmatch" mode, excluding competitive and special game modes.

Results

Correlational analysis

Descriptive statistics, scale internal consistency, and intercorrelations of weekly playtime (PT), in-game aggressive behavior (i.e., mean of the self-rated aggression for the 3 most played heroes), and the different subscales are presented in Table 1. These results support our hypothesis, in that more aggressive (less prosocial) in-game roles were positively associated with trait aggression, the D4, and negatively associated with empathy and agreeableness. Significant Pearson's correlations size was relatively small.

It is worth noting that weekly playtime also correlated positively with the BPAQ as well as the D4, and negatively with agreeableness, with effect size again being small. These results are consistent with the GAM (Anderson & Bushman, 2002), as, irrespective of the player's in-game role, OW remains a First-Person Shooter, with a focus on killing your opponents. Therefore, the more someone plays OW, the more exposed she/he is to violent content, which, according to the GAM, should reinforce an aggressive personality[2].

Role and self-perceived aggressive in-game behavior

Next, we tested our assumptions regarding the order of role categories based on their aggression. To do so, we conducted an ANOVA comparing the self-perceived aggressive in-game behavior of the different roles. The analysis showed statistical differences between

Main Hero type, $F(3, 1944) = 698.82$, $p < .001$, $\eta_p^2 = .52$ (participants who indicated that they had no main hero were excluded from this analysis). Tukey Post-hoc comparisons are displayed in Table 2. As shown, Offense and Defense heroes did not differ on self-perceived aggressive in-game behavior, and were both scoring significantly higher than Tank and Support heroes. Furthermore, Tank heroes also scored significantly higher than Support. Similar patterns were found when replicating this analysis for participants' three most played heroes, supporting our assumptions (with the exception that Defense heroes did not differ from Offense heroes).

Role and personality

We then conducted several ANOVAs in order to compare the scores on the different variables of interest between the different categories of main heroes based on the game's class system. Table 3 presents the mean and standard deviations of each group for every measure, as well as the exact Fisher's Test and associated *p*-value resulting from the ANOVAs. The IRI, the BPAQ, the D4, and both the extraversion and agreeableness subscales of the BFI showed significant differences between groups, with all $F(4, 2318) > 2.78$, $p < .05$. As expected, BFI's conscientiousness, neuroticism, and openness subscales did not show any statistically significant difference between groups. However, extraversion unexpectedly did.

In order to better understand the results from the ANOVAs, we conducted Tukey Post-hoc comparisons on every scale that appeared to show statistically significant differences in the different ANOVAs. For each dependent variable, the Offense Main group always differed from the Support Main group (respectively the groups rated as the most and the least aggressive). Detailed results of this analysis are displayed in Table 4. Taken together, these results mainly support our hypotheses. A few other statistically significant differences also emerged that were less relevant to our study[3].

Overbuff data

Unexpectedly, in-game data extracted from Overbuff for our subsample did not provide any statistically relevant results. Therefore, we will not present these results here, nor will we discuss them in the following section[4].

Discussion

The present research suggests that one's favored role in a video game relates to certain personality traits. When comparing OW players based on their favorite hero's class, we found that participants who preferred a less aggressive Support hero were more empathic and agreeable and less aggressive, with a less dark personality, than those who favored a more aggressive Offense hero. Self-perceived aggressive in-game behavior also correlated positively with trait aggression, and the Dark Tetrad, and negatively with empathy and agreeableness. Although these effects were small in terms of their effect size, it is worth noting that they emerged from variation among a single game. Furthermore, they are consistent with our hypotheses across all the dimensions of interest in this study.

These results are in line with what would be expected from the literature. In fact, according to the GAM, more aggressive choices should be linked to a more aggressive personality. Hence, they support the idea that VVG exposure could be linked to aggression. Moreover, we can observe a parallel with previous studies which highlighted a relation between players' general personality and in-game behaviors or character selection. Although we found that general playtime correlated positively with a more aggressive personality, this relationship proved to be small (r = .07). This is smaller than what would be expected based on recent meta-analyses (around r = .19; Anderson et al., 2010; Greitemeyer & Mügge, 2014). This could be interpreted as being in line with studies which found the effect of VVG to be overestimated (Hilgard et al., 2017). However, this could also be a sign that within regular players, the amount of time spent playing has little effect. In order to test this, our sample would need to include non-players for comparison.

This relation has the potential to work in three different ways. On one hand, as would be expected based on existing literature on VVG and on the GAM, behaving more aggressively/more prosocially in the game could lead to a change in personality. Despite the observed effect size being small, this could still be relevant. In fact, it is well-known that personality affects behavior. Studies have shown that trait aggression (Bettencourt, Talley, Benjamin, & Valentine, 2006) and everyday sadism (Buckels, Jones, & Paulhus, 2013) predict aggressive behavior, whereas agreeableness (Graziano, Habashi, Sheese, & Tobin, 2007) and empathy (Stout, 2016) predict prosocial behavior. On the other hand, the relationship could work in the opposite direction, with players having a preference for a role that better fits their own personality. For example, Ewell and colleagues (2016) found that existing personality predicted participants' choices in creating a character in a game. Likewise, OW players could be inclined to pick a character that is similar to them. Finally, both accounts could be taking place simultaneously, with a bidirectional effect. That is, players would play a character that corresponds to their personality, and their in-game behavior would then reinforce certain personality traits. However, because of the cross-sectional approach we used, we cannot draw any conclusions with regard to the direction of the relationship we observed.

To the best of our knowledge, this study is the first to examine the link between pro-social and aggressive personality traits and specific roles in video games. We believe that our findings could be used in the future to improve on existing designs, by taking into account specificity of players' approach in games offering different types of gameplay. An important step to consolidate our findings in the future stands in replications. It is important to look for similar patterns of effect in a variety of games to ensure that our effects do not stand from a characteristic specific to OW but rather are a reflection of in-game choices in general.

Another promising direction for future efforts in this field would be the concept of avatar identification. For instance, Yoon and Vargas (2014) found that playing the same game

as a villainous character yielded more antisocial behaviors when compared to playing a heroic character. Although we based our evaluation on changes in in-game behaviors, we should point out that the different heroes in OW could be perceived as villains and heroes, based on the game lore as well as on character design. These heroes being mixed among the different classes, it is unlikely that this had an influence on our results.

Furthermore, unlike OW where players choose between a set of fixed characters, some games offer the possibility to personalize one's avatar, not only in regards to his role but also his appearance and personality. Mancini and Sibilla (2016) found that participants based their avatar on their own personality with different types of profiles (i.e., actualized, idealized, alter ego, or negative hero), influencing player's identification to their character. It would be interesting to assess the interactions between character role, player's identification, and personality in future research.

As any, our study is not without flaws. There might be a bias in participants' selection: 36% of respondents indicated that their main character was a Support. This is in slight contradiction with Overbuff (2017) statistics, which shows the following distribution for role selection in quick play for computer players (as of June 19, 2017): 32.2% Offense heroes, 25.1% Support, 21.54% Tank, and 21.16% Defense. We compared expected N for each category with the actual distribution, and found them to be statistically different for participants' main character, excluding those without a main, ($\chi^2(3, N = 1948) = 820{,}68$, $p < .001$) and for participants most played character ($\chi^2(3, N = 2323) = 813{,}75$, $p < .001$). Therefore, there might be some sort of a selection bias. It is possible that the forums we recruited on are mostly used by certain type of players, or simply that Support players are more likely to participate in such a questionnaire, which could be a sign that nicer people play nicer characters. It could also be due to a form of social desirability, should certain characters appear as more desirable. Furthermore, our sample consisted mostly of male participants. With only 10% of our sample being female, the external validity of the study could be limited.

However, no reliable sources are available at the moment about the distribution of male and female OW players. Hence, our sample could simply reflect the actual population of the game. Nonetheless, when taking into account studies showing that role selection and gaming experience is different between gender (Ratan, Taylor, Hogan, Kennedy, & Williams, 2015), it appears that a balanced sample allowing for controlling the effect of sex could be preferable.

Moreover, we made some design choices based on inherent advantages, but they also come up with downsides. As previously stated, the use of a cross-sectional design does not allow for any conclusion regarding the direction of the effect. Future research on the relationship between in-game role and personality should try to include longitudinal and experimental studies in their design, in order to evaluate the direction of the effects. This direction of the effect could also be different depending on the dependent variable. For instance, Greitemeyer and Sagioglou (2017) showed in a longitudinal study a bidirectional relationship between everyday sadism and VVG exposure, whereas Krahé and Möller (2010) found that VVG exposure increases aggression and decreases empathy, but their data could not support the reverse direction.

Our design was also limited in its ability to distinguish the unique effects of aggressive and pro-social behavior. Indeed, we observed differences between participants who reported more in-game aggressive behavior (and therefore less pro-social behavior because of the dichotomic nature of our approach) and those reporting less aggression (and more pro-sociality), as well as between those favoring aggressive roles and those preferring pro-social roles. However, it is unknown whether it is the aggressive content, the pro-social content, or both that created these discrepancies. Future research is needed that allows differentiating specific influences of both aggressive and pro-social aspects of player's role on their personality.

A further limitation of our study stems from the use of self-report measures. Indeed, these types of measures are subject to a social desirability bias (Arnold & Feldman, 1981). Therefore, it is possible that participants overestimated socially desirable traits and underestimated the undesirable ones. Nevertheless, we believe it unlikely that the relationship between video game role and personality is affected by such a social desirability bias. That being said, one could imagine that perception of one's favorite character could affect self-presentation, creating a spurious correlation. For instance, playing mostly in a supportive role could lead people to think they should present themselves as more empathetic. Likewise, someone who wishes to appear as more agreeable may want to indicate that he plays mostly agreeable characters.

Conclusion

To conclude, in this study, we found that different in-game roles inside a single game are linked to varying personality traits among the players. That is, participants who preferred more aggressive in-game roles were also the one's showing a more aggressive personality. We believe that this is but a first step towards a better understanding of the relationship between video games exposure and the player's personality and an open gate to new designs, taking into account the entire range of the actual gameplay when studying video game effects.

Notes

[1]These varying game modes are different from week to week and players also have the possibility to create games with personalized rules. It should, however, be pointed out that players in the "regular" game mode cannot pick a character if one of their teammates has already picked the hero they wanted (although this is not the case in one of the "special" modes). One of two players with the same "main" playing together in a match would therefore have to pick a different character. Furthermore, and especially in competitive matches and/or with experienced players, one could choose to assume a different role than their favored one in order to balance the team or because they are more skilled with it. This can lead players to make their choice based not only on their preference, but also on the current team, on availability of certain characters, and on their skill. Nonetheless, over a number of games, player should be able to express their choices and to develop a preference for certain characters.

[2] These findings also held when running partial correlations controlling for age and sex of the participants. Similar patterns were found when only considering self-reported aggressive behavior of participants' main hero (excluding participants who indicated they do not have a main hero). The correlation coefficients for this measure with our dependent variables are presented in Table 1. Once again, these results held when controlling for sex, age, and weekly playtime.

[3]Participants in the No Main group scored lower than those in the Offense main and Tank main groups on extraversion (mean difference (*MD*) = -0.26, $p < .001$ and *MD* = -0.25, $p < .001$). They also scored lower than the Offense main group on the D4 (*MD* = -0.10, $p = .03$) and higher on the IRI (*MD* = 0.10, $p = .02$) and on agreeableness (*MD* = 0.13, $p = .03$). Participants who favored a Defense character only differed from those who preferred a Support character in that they scored lower on agreeableness (*MD* = -0.18, $p = .03$). The Tank

main group scored higher than the Support main group on the D4 (MD = -0.13, $p < .001$)and extraversion (MD = 0.14, $p = .02$),. It also scored higher than the Offense main group on the IRI (MD = 0.09, $p = .03$) agreeableness (MD = 0.12, $p = .02$). Finally, the Support main participants scored higher on the IRI than the Defense (MD = 0.13, $p = .04$), Tank (MD = 0.10, $p < .01$) and No Main (MD = 0.08, $p = .046$) participants.

[4]We conducted two different correlational analyses. First, we computed the total time played as each of the four different classes for every participant: within each class, playtime for all heroes were added together. Total playtime for offense, defense, tank, and support characters were correlated with personality traits. Of all these correlations, only one reached significance: total playtime as a support character was positively related to the IRI ($r = .058$, $p = .012$). These analyses were repeated using percentage of time played as each type of character instead of total playtime. Only one correlation between these percentages and personality reached significance: the percentage of time played as a tank character was negatively related to openness ($r = -.05$, $p = .038$). All other correlations were non-significant. We also computed a damage done ratio. For each character, total time played was multiplied by the average damage done per game. Each of those were added together and then divided by total playtime to obtain a measure of average damage done across all characters. This was repeated for damage blocked and healing done whenever possible (whereas all heroes can do damage, not all can block or heal). These three ratios were then correlated with personality traits. None of the correlations between ratio and personality reached significance.

Unfortunately, this lack of results in analyzing the data extracted from Overbuff.com cannot be interpreted. Nonetheless, we believe that these data were inherently flawed in different regards. First, the measure of playtime is only an estimate, as the website only compiles the highest metrics possible (minutes, hours, days, weeks). For example, someone who plays 1h59 would still be considered as a 1-hour player (i.e., 60 minutes in our data

files), whereas someone who plays 2h01 would register as a 2-hour player (i.e., 120 minutes). This problem growing as the time goes higher (e.g., going from 2880 minutes, as a 2-days player, to 4320 minutes as a 3-days player). Second, the mean damage/heal done are not a good measure of actual behavior as they are affected by an important confounding variable: skill. Indeed, a higher mean damage does not necessarily reflect that one is more aggressive than another, as it can simply be, for instance, stemming from a higher competence in aiming. Therefore, it would be interesting to evaluate this kind of data whilst controlling for participant's skill. Finally, as of healing done and damaged blocked, our data cannot distinguish self-help (e.g., healing oneself) from other-help (e.g., healing an ally).

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Table 1. Means, standard deviation and bivariate correlations.

Variable	M	SD	α	1	2	3 [a]	4	5	6	7	8	9	10	11
1. Playtime	13.41	9.00	/	--										
2. TAB	54.99	16.98	/	.00	--									
3. MAB[a]	50.7	26.99	/	.01	.48***	--								
4. IRI	3.27	0.48	.83	-.03	-.13***	-.16***	--							
5. BPAQ	3.15	0.80	.86	.07**	.05*	.08**	-.06**	--						
6. D4	2.15	0.50	.86	.07**	.11***	.14***	-.26***	.58***	--					
7. Extraversion	2.67	0.87	.87	-.01	.07**	.07**	-.05*	-.03	.10***	--				
8. Agreeableness	3.63	0.63	.77	-.07**	-.12***	-.13***	.37***	-.54***	-.48***	.10***	--			
9. Conscientiousness	3.12	0.69	.80	-.03	.00	.01	-.08***	-.23***	-.17**	.15***	.22***	--		
10. Neuroticism	2.91	0.87	.85	-.05*	-.05*	-.07**	.32***	.42***	.10***	-.28***	-.27***	-.35***	--	
11. Openness	3.68	0.61	.75	-.00	.01	.03	.24***	-.00	.01	.23***	.13***	.09***	-.06**	--

* $p < .05$, ** $p < .01$

IRI = Interpersonal Reactivity Index

BPAQ = Buss-Perry Agression Questionnaire

D4 = Dark Tetrad

TAB = Three most played heroes self-perceived in-game aggressive behavior. A higher score indicates that one is more aggressive than prosocial when playing their most played character

MAB = Main hero self-perceived in-game aggressive behavior. A higher score indicates that one is more aggressive than prosocial when playing their main character.

[a]: excluding participants who indicated “No main”

Table 2. Tukey Post-hoc comparisons of self-perceived in-game aggressive behaviour across main hero's category

Main Hero's Category		Mean Difference (Standard Error)	Interval	
			Lower Bound	Upper Bound
Offense	Defense	2.25 (1.92)	-2.82	7.32
	Tank	18.80 (1.20)***	15.63	21.97
	Support	46.53 (1.12)***	43.58	49.48
Defense	Offense	-2.25 (1.92)	-7.32	2.82
	Tank	16.55 (1.86)***	11.63	21.47
	Support	44.28 (1.81)***	39.50	49.06
Tank	Offense	-18.80 (1.20)***	-21.97	-15.63
	Defense	-16.55 (1.86)***	-21.47	-11.63
	Support	27.73 (1.02)***	25.04	30.42
Support	Offense	-46.53 (1.12)***	-49.48	-43.58
	Defense	-44.28 (1.81)***	-49.06	-39.50
	Tank	-27.73 (1.02)***	-30.42	-25.04

*** $p < .001$

Table 3. Means (and standard deviation) of IRI, BPAQ, DD, and CAST subscales scores across main hero's categories, with Fisher's Test and η^2 of the ANOVAs.

Dependent measure	Main Hero's Category					*F* (4, 2318)	η^2
	No Main *M* (*SD*)	**Offense** *M* (*SD*)	**Defense** *M* (*SD*)	**Tank** *M* (*SD*)	**Support** *M* (*SD*)		
Interpersonal Reactivity Index	3.27 (0.47)	3.17 (0.47)	3.22 (0.49)	3.25 (0.49)	3.35 (0.46)	11.43***	0.019
Aggression Questionnaire	3.1 (0.77)	3.23 (0.82)	3.25 (0.85)	3.16 (0.78)	3.09 (0.79)	2.78*	0.004
Dark Tetrad	2.13 (0.47)	2.23 (0.53)	2.21 (0.56)	2.19 (0.49)	2.09 (0.50)	6.78***	0.012
Big Five Inventory							
Extraversion	2.51 (0.86)	2.78 (0.84)	2.66 (0.82)	2.77 (0.92)	2.62 (0.84)	7.15***	0.012
Agreeableness	3.63 (0.61)	3.50 (0.64)	3.53 (0.63)	3.62 (0.63)	3.71 (0.62)	8.55***	0.014
Conscientiousness	3.11 (0.69)	3.10 (0.72)	3.08 (0.65)	3.16 (0.70)	3.12 (0.69)	0.64	0.001
Neuroticism	2.92 (0.89)	2.86 (0.87)	2.87 (0.91)	2.88 (0.87)	2.96 (0.86)	1.18	0.002
Openness	3.63 (0.60)	3.69 (0.60)	3.69 (0.68)	3.72 (0.60)	3.66 (0.61)	1.43	0.002

* $p < .05$, *** $p < .001$

Table 4. Tukey Post-hoc comparisons of personality traits subscales scores between "Offense main" and "Support main" participants.

	Offense main		**Support main**		
Dependent measure	M	SD	M	SD	Mean difference
Interpersonal Reactivity Index	3.17	0.47	3.35	0.46	-0.18***
Aggression Questionnaire	3.23	0.82	3.09	0.79	0.14*
Dark Tetrad	2.23	0.53	2.09	0.50	0.13***
Big Five Inventory					
Extraversion	2.78	0.84	2.62	0.84	0.16*
Agreeableness	3.50	0.66	3.71	0.62	-0.21***

* $p < .05$, *** $p < .001$,