Avatar Idealization in Video Games

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1 Introduction

Video games have become ubiquitous as both entertainment and computer-mediated social interaction, and due to their interactivity may be more influential than films, television, and other electronic media. Games have even become part of children's development and therefore may have heavy influence on skill and character development of the future generation. Since developers have complete control over the virtual worlds they create and have the power to change them, it is important that we understand and control the effects games have on their players. A deep study of video games can provide insights into what makes games enjoyable and why people play them, which could aid developers in making new games and possibly even creating games that can help develop social skills. Understanding the motivations people have for playing games can also researchers determine the effects video games have on the mind, such as their effects on violent behavior.

Games have been the subject of many studies recently; however, the majority of these focus on violent content in games and the possible effects on youth [16] [14] [20]. The studies show correlations between violent video game play and increased aggressive behavior and desensitization to violent actions. While this is an important factor to study, there are many other interesting questions that can offer insight into how virtual environments affect our behavior and how designers can create games to be more inclusive, educational, and enjoyable. One of these questions is "Why do we choose to play particular characters in a game?" It is meaningful to understand the choices we make in games, but more importantly, the identities that we take on.

A recent article in *Communications of the ACM* revealed the prevalence of alternate identities and deception in online social media sites, showing that individuals use computer-mediated communication to be someone they are not

[28]. Video games offer the same anonymity and freedom of expression, not for deception of people, but to allow people to further act out an adopted new identity through actions they can perform within the digital world. Therefore, we will explore the idea that video games can be means for people to experiment with various identities, some of which may not be possible in the real world. For example, this could be changing genders or being a character more physically capable than oneself. Furthermore, we claim that people choose virtual identities that are idealized versions of themselves. A person's *ideal self* is the person they would like to be, who has all the traits they desire in themselves. This is different from their *actual self*, which is the version of themselves that they present to the world and therefore has all the traits and qualities the person really owns.

By studying how and why players choose their virtual identity, or *avatar*, and how "close" their relationship is with said avatar, game designers can become better informed about why people play their games and what they look for in characters. Games can evolve to include a more diverse range of characters. From this information, we may even find reasons for why women do not play certain genres of games, such as first-person shooters, as often as men play [12]. Alterations in character designs and personalities may be able to widen game audiences.

Video games essentially give players the freedom of choice over what they look like and how they act in a world completely disconnected from reality. Results of this study could therefore also inform the field of psychology, showing researchers what people would like to be, when given the choice to completely start anew.

A possible computer science application of this understanding would be a more complex and complete video game character creator for users. Many video games offer the ability for players to customize the physical appearance of their in-game character, however these only allow physical changes and not behavioral or personality alterations. Characters in these games are often just the bland "hero" character, not allowing players to fully experience another identity or personality besides through their own actions in-game. Giving deeper control of their characters to the players would allow players to better utilize these games for identity exploration purposes.

Understanding how people interact and identify with various digital personalities is a large step toward many other computer science applications. One such application is the creation of personalities and emotions in artificial agents, such as conversation partners, virtual humans and life-like characters [5, 6]. Having artificial agents with personality increases the enjoyability of human-computer interaction and is more inclusive for various human communication styles. Integrating human personality into artificial agents could increase usability and enjoyability of technology.

2 Related work

Identity and avatar selection has been the focus of several studies in the HCI community. Many of these focus on the role-playing game (RPG) and massively multiplayer online role-playing game (MMORPG) genres due to the highly-customizable nature of their in-game avatars. However, there are very few, if any, studies focusing on the very popular genre of first-person shooter (FPS) games. It is important to study this genre for many reasons. First, it is interesting to discover how and why avatars are chosen in FPS games, as the perspective is indeed first-person and therefore the player never sees their chosen virtual self but only presents themselves to others just as is done in the physical world. Second, FPS games are particularly lacking in female players, far more so than MMOs and RPGs. Since one of the goals of my work is to remove the divide in genders in virtual worlds, investigating the reasons behind the low female population in FPS games is critical. From the results of this study, we hope to ascertain some knowledge about ways to alter FPS games to be more welcoming to both genders.

A study by Ducheneaut *et al.* explored the motivations for gamers' customization of their avatar's physical appearance [15]. This study focused on RPG games in which customization was a focus, including World of Warcraft, Maplestory, and Second Life. However, the study did not examine the emotional and personality factors involved in character selection. In games with pre-made characters where physical customization is not possible in the game mechanics, character personality and characteristics may have a large impact on selection.

The ideal self and its relation to chosen in-game representations has also been studied previously by Bessiere *et al.*[9]. In this work, the authors focused on the role-playing game World of Warcraft in which players create and personalize the appearance of their character. The authors surveyed participants about their avatar's personality using a modified Big Five Personality Inventory. Similar to the results of Duchenaeut *et al.*, the authors found that players typically gave their avatars more favorable traits than they reported having themselves, though the traits in this work were non-physical. This trend was found to be higher for individuals who had lower psychological well-being, which included higher levels of depression and lower self-esteem. Again, this work focuses on a RPG title, and we are most interested in the FPS genre.

Similar studies by Yee *et al.* have investigated the Proteus Effect in the behaviors of gamers playing an avatar of the opposite gender, or *gender-bending*, in RPG games [31]. The Proteus Effect is a phenomenon in which a person adopts behaviors different from their own in response to the visual characteristics of their digital representation in a

virtual world. The study showed that players, regardless of gender, conformed to the expected gender roles of their avatars in the digital world. For example, people playing female avatars typically spent more time healing, and people playing male avatars acted more aggressively and participated more in player-vs-player (PvP) combat. This informs our research, as we can see that players do have a tendency to act as expected of the character that they choose, thus allowing them the freedom to jettison their own behaviors and take on another identity in virtual worlds.

Gender has been a focus of many game-related studies. A survey study by Lucas *et al.* focusing on interpersonal needs and social stereotypes of video game play asked participants about their motivations for playing video games, favored game genres, and frequency of play. Their results showed that female gamers tended to play less frequently and play fewer games that had competition as a focus. Our survey includes similar aspects, such as gameplay frequency and reasons for playing; however, we focus on the subset of gamers who already play competition-centric first-person shooter (FPS) games. Females in our sample will have at least some experience with competitive games and we can investigate this subset of gamers to gauge their motivations. Gender and gameplay motivations were also investigated in an observational study conducted by Yee *et al.* [30]. This study used data collected about a community of MMORPG players and found correlations between gender and reasons for playing. The authors categorized the motivations in their analysis as achievement, relationship, immersion, manipulation, and escapism, which are similarly defined in our study. They found males being driven most by achievement and manipulation, while females were most driven by the relationship factors. A similar work by Hartmann and Klimmt found comparable results of women not favoring competitive elements in games [21]. Their results also demonstrated that women dislike games in which social interactions are not meaningful. Our study wishes to obtain similar correlations; however we focus on FPS games which have a highly male-dominated player base. By also including women in our FPS study, we hope to ascertain whether or not gender does have a significant influence on motivations for playing stereotypically "masculine" games.

Investigating the altered expressions of the self in digital environments has been the focus of several studies, including the widely-known and well-accepted publication by Bargh *et al.* [8]. This work states that the Internet is used by many as a laboratory for trying out new identities in a way that would not otherwise be possible in a face-to-face "real world" environment. This study focuses on generalized Internet social applications, such as chat rooms. Since such support was shown that computer-mediated interactions facilitating expression of one's true self, it will be interesting to investigate how much of the self is communicated when players embody a completely different digital

being in a video game.

A study performed by Marriott and Buchanan in 2014 [26] attempts to challenge the results from Bargh *et al.*. They claim that the opposite is true, that online self-representations are not necessarily more authentic. However, this work focused more on the more highly-connected and ubiquitous social networks, ignoring more isolated computer-mediated interaction platforms that allow for more freedom, such as video games and online forums. Therefore the online environment in focus this case was an online network that included many real-life connections, which inhibited the medium from being disconnected entirely from the real world. Additionally, the authors' methodology was not experimental and did not allow for any claims of causation. Therefore much support for the claims of Bargh *et al.* still exists and it it widely accepted that computer-mediated interactions are often used as means of identity experimentation. We use this fact as the basis of our study, where we claim video games and similar virtual worlds in which people are embodied by an entirely different being are major outlets for people to experiment with alternate identities.

3 Overview

Our main focus of this study is to understand the motivations behind why players choose different avatars in games. One aspect of this is how players conceptualize their self as both how they actually are, and how they want to ideally be. We believe that video games allow a safe environment in which to experiment with various alternate identities and believe that a large portion of players do play for this purpose. Since video games are very much a fantasy environment in which users can connect with and act out different parts of themselves, we hypothesize that video game players choose avatars that are most like their idealized selves.

Self-esteem is a second factor which we believe will have a large effect on players' motivations for playing games. Specifically, we feel that players with low self-esteem will be more likely than those with high self-esteem to play games to escape real life and to do things they cannot do in real life. We also believe that self-esteem will affect the type of characters players choose to represent them in the digital world, with players having low self-esteem choosing characters they feel to be different from their real selves, while high self-esteem players will be more likely to choose a character they find similar to themselves.

Gender as an aspect of self-identity may also have an effect on players, especially since FPS games have an

overwhelmingly male player base. We believe that men and women will have significantly different motivations for playing video games and enjoy different aspects of games. Because FPS games have mostly male characters, we also believe that men and women will choose significantly different characters to play. Answering these questions about gender may shed some light on the reasons many women do not engage in playing FPS titles. Discovering the reason for the gender disparity will aid in improving games to be more inclusive and appealing to wider audiences.

3.1 What is identity?

This study focuses on identities adopted within virtual worlds, but we must be clear on which definition we mean in relation to this work. There are many definitions of "identity"; however many seem to reduce to two general meanings: social and personal. James Fearon defines social identity as a "social category, or a group of people designated by a label that is commonly used by either the people designated, others, or both" [17]. An alternate definition is "a person's knowledge that he or she belongs to a social category or group" [4]. Examples of both such uses include terms such as "Canadian," "mother," and "Muslim."

Personal identity has a strong influence on behaviors, and is described by Fearon as being almost a substitute for words like "pride," dignity" and "honor." His exact definition is "a set of attributes, beliefs, desires, or principles of action that a person thinks distinguish her in socially relevant ways and that (a) the person takes a special pride in; (b) the person takes no special pride in, but which so orient her behavior that she would be at a loss about how to act and what to do without them; or (c) the person feels she could not change even if she wanted to [17]."

For our purposes in this study, both definitions come into play, though personal identity may be a stronger influence. More simply, alternate definitions of identity may be sufficient, such as "relatively stable, role-specifc understandings and expectations about the self" [29].

How does personality relate to identity?

Our survey for self-other overlap not only taps into users identities, but also asks them to describe their personality as well. The Encyclopedia of Psychology defines personality to be "individual differences in characteristic patterns of thinking, feeling and behaving [24]." Personalities are different from identities, as personalities are characteristics possessed by the individual, rather than the essence of the person themselves. Still, personality can have an influence

on a person's identity. For example, introverted people may not desire to become more outgoing, as they may feel their introversion is part of who they are.

There are two broad conceptualizations of personality: idiographic and nomothetic. The idiographic view states that personality is completely unique to each individual and therefore the number of different personalities is the same as the number of people in the world. The nomothetic perspective is more practical for scientific studies, as it creates models of personality and categorizes personalities based on certain patterns [19]. For this work, we will consider the nomothetic view, as it will be easier to define personality metrics for future studies.

3.2 What does it mean to "idealize?"

Our hypothesis deals with the idealized self, which we have defined to be the person one wishes to be. Here we further explore the concept of idealization.

When one idealizes something, one purposely ignores attributes that undermine perceived perfection of the object. Idealization is illogical, and often the very existence of an object with the idealized attributes is impossible. Idealizing oneself is to pretend to be someone one is not, but specifically in a more positive direction. Again, the idealized self is imagined to be without flaws, or things one perceives to be imperfect. It is also likened to a mask, which one wears to hide flaws from others and from oneself. For example, the mask self may be of a different personality type, as perhaps we imagine that other personalities can better deal with conflict and things that give us unhappiness.

Idealization has been described as being a defense mechanism, as a means to avoid unhappiness [10]. People constantly fear unhappiness, and believe that by being different –and in their opinion better– than they are, they can avoid it. The creation of an idealized form could also be an attempt to gain self-esteem and confidence, which in truth are significant ingredients for happiness and satisfaction. When one has genuine self-confidence, one develops one's skills and is able to contribute to society, thus granting the person true happiness and self-worth. A lack of acceptance in our faults results in dissatisfaction and many find it easier to idealize rather than to introspect and accept.

Constraints in the real world often make it difficult to act out our idealized identities in face-to-face interactions, such as a fear of rejection within existing social circles, social rules and constructs, and limitations of one's physical body. Computer-mediated communication inherently comes with a certain anonymity for its users, providing a "clean slate" upon which to craft a new image of ourselves. Many people are also aware of the separation of the virtual world

and the real one. As a result, we find it easy and liberating to explore alternate forms of ourselves within this digital "safe space" that we disconnect with the real world. Virtual worlds are so disconnected from the real one that one does not fear the drastic difference between one's behavior in each.

Digital communication allows us to consciously self-censor everything we do and everything we share with others. This is very apparent in social media, where we can, for example, choose which photographs are posted and therefore which versions of ourselves are displayed to both the general public and our friends. We generate a separate online persona in this way, and this persona is often more idealized than how we see ourselves. We hide everything we find distasteful.

Video games and virtual worlds allow us to act out idealized identities even further. We can change appearance and even gender. By hiding our true appearance and having in place a virtual substitute of our choosing, we can see how people react to our idealized appearance. With regards to gender, we can completely hide our biological sex or gender identity from others and enter into another form entirely.

The Proteus Effect is the phenomenon wherein people conform to the behaviors of their digital representation. A study focusing on the game World of Warcraft (WoW) has shown that the Proteus Effect strongly influences players of video games [31]. The aim of their study is to determine if players conform to the stereotypes associated with their avatar's appearance when the player's gender conflicts with that of their avatar.

Surveying a subset of the game's players, Yee *et al.* determined that player-vs-player (PvP) combat was considered the most "male" in-game activity, and that healing was considered the most "female." These two categories of data were used as metrics to measure a player's behavior. Participants were asked questions about the gender and role of their in-game avatars, and then data from the publisher's database was scraped to determine the amount of healing and PvP combat in which a player participated while playing as each of their characters. The analysis of the data showed that players tended to participate in more PvP combat when playing a male avatar, and healed more when playing a female avatar, regardless of the player's real gender association. It was found that players who "gender-bended," which is playing as an avatar whose gender is opposite of their own, still adapted to their digital form. This adaptation to the digital form is what drives our hypotheses that video game players use the medium to engage in exploration of alternate selves.

4 Methodology

To determine the closeness of a player's personality to that of their chosen avatar, we will use the concept of "self-other overlap" via a questionnaire analysis. The concept of "self-other" describes close relationships in terms of including another in the self [7]. Self-other overlap is a commonly-used measure in psychology and related disciplines and has been used to ascertain the closeness of people to other entities in many studies [27, 22]. We will ask players to describe their ideal selves, their actual selves, and their avatar using a set list of adjectives. Using descriptions of a player's ideal self will allow us to make inferences about the reasons behind a player's avatar choice. More overlap with their ideal self implies players wish to explore an avatar identity they strongly desire in the real world.

Because avatars are not living beings and the perception of "closeness" cannot be obtained from the avatar's point of view, we will be using the *overlapping representations* dimension of self-other overlap. This involves a person selecting adjectives that they feel describe themselves from a predetermined list of words. They next pick words from the same list to describe the "other" entity, in this case their avatar and their ideal. The number of shared adjectives used to describe the entities are used to determine the overlap.

There is another measure of self-other overlap, called *perceived closeness*, in which participants are asked to describe their closeness to another entity using a visual representation of two overlapping circles, with a larger overlap of the circles representing a closer relationship [27]. We chose not to employ this method for two reasons. Firstly, an avatar is not a living being, and therefore it is difficult for humans to gauge the closeness of their relationship with it. Avatars cannot reciprocate feelings with humans, so the test would be one-sided at best. Secondly, such a visual representation may elicit biased responses due to a knowledge of what is being judged and from the societal pressures. Therefore, we feel an adjective list can draw forth overlaps that perceived closeness cannot capture with a non-human entity. Furthermore, we are more interested in overlapping representations that would show how similar a player is to his or her avatar, not necessarily the closeness of the player and the avatar.

There have been several investigations into player and avatar personalities [13, 32, 9] using the Big Five Personality Inventory [18]. We have chosen not to use this measure because we feel that it would be simpler for our participants to describe their avatars using a list of adjectives, rather than attempting to answer questions about aspects that would very likely be unknown in a digital representation. It may be difficult to know where a video game character would stand on all 5 measures. We believe that using self-other overlap will not only be easier for participants, but will also

reveal different information that may not have been collected by the direct questions of the Big Five. The self-other overlap is far better suited for our needs and we believe will be a far different approach from past works.

4.1 The Experimental Medium: Team Fortress 2

For this study, we have chosen to focus on the multiplayer team-based first-person shooter (FPS) titled Team Fortress 2 (TF2). The game allows players to join one of two teams and compete in various game modes such as capture the flag, deathmatch, and king of the hill. We have chosen TF2 because it is a free game and is widely available. The community for this game is very large, diverse, global, and active despite the game's age (the game launched in 2007), which shows strong user loyalty and an overall high likability of the game. The author also has significant first-hand experience playing the game and has numerous observations of players in action.

4.1.1 TF2 Characters

Players of TF2 are represented as avatars selected from nine different characters, called classes. Unlike in many other popular FPS titles, the nine available classes in TF2 are more than just bland representations of the game roles. Each class is very much a character in their own right, and each has its own personality and backstory within the lore of the game universe. The TF2 developers often release comics, videos, and in-character blog posts on their website, which give avid players and fans a deeper insight into the characters they play [2].

TF2 Class Category Breakdown	
Category	Class Name
Offense	Scout Soldier Pyro
Defense	Demoman Heavy Engineer
Support	Medic Sniper Spy

Table 1: The TF2 classes and their categories.

The classes are divided into three categories: Offense, Defense, and Support. Table 1 shows the nine classes and the category of which each is a member. In the character selection screen, the characters are displayed separated by their category (Figure 2). Eight of the nine classes are instantly perceivable as being male; however, the Pyro (the second character in Figure 1) is ambiguous due to its baggy clothing, full gas mask, and lack of a clear voice (it speaks with muffled grunts through the mask). The gender of this character is hotly debated within the community, not only due to the ambiguity, but due to confusing hints given by the game developers.

4.2 Self-Other Adjective Descriptions

A self-other overlap done with the overlapping representations measure requires a list of adjectives from which participants choose words. We established a list of 65 adjectives starting with 45 words selected from a list that has been developed for use in the self-overlap studies by Mark Davis [11]. The original list contains a set of adjectives that have already been categorized as positive, negative, or neutral by a set of six non-participant coders. We have selected 15 positive, 15 negative, and 15 neutral adjectives from the list by eliminating synonyms and words not likely to be selected to describe the self or the avatars.

Figure 1: A height comparison of the classes of Team Fortress 2 with default headwear removed. **From left to right:** Engineer, Pyro, Scout, Soldier, Spy, Medic, Demoman, Sniper, Heavy

Figure 2: In-game class selection screen, with classes separated by category. **From left to right:** *Offense* - Scout, Soldier, Pyro *Defense* - Demoman, Heavy, Engineer *Support* - Medic, Sniper, Spy

Because the avatars in TF2 likely have qualities not included in Davis' human subject study, we supplemented the list with words scraped from official descriptions of the characters [2]. We further supplemented the list with adjectives that current players use to describe the characters. We accomplished this by asking five non-participant TF2 players with over 500 hours of gameplay to informally describe or list adjectives they feel describe each of the nine characters. Choosing players with over 500 hours of gameplay ensures that our adjectives come from people who have a significant familiarity and dedication to the game and its characters. These players were recruited through the authors' connections on the Steam gaming network.

From these two methods, we gained 32 frequently-used adjectives describing the nine classes in TF2. We recruited four non-participant individuals to "code" the valence of the TF2-specific adjectives, voting each to be either positive,

negative, or neutral. Out of the 32 adjectives presented to the coders, we chose the 20 adjectives which had a 100% inter-rater agreement on the adjective valence. Of these 20, 12 were rated positive, 4 were negative, and 4 were neutral. This valence distribution is equivalent to that of the original 32 adjectives and therefore we did not introduce any additional bias. For the complete list of adjectives used in our study, please refer to Table 10 in Appendix A.

4.3 Participants

This study required that we survey participants who are fairly avid players of TF2. Since such specificity in participants would be difficult to obtain in the campus setting, we chose to recruit suitable participants online. Obtaining participants in cyberspace eliminates issues with the logistics of testing in a lab, and therefore allowed us to get a significant number of participants with no issue. Our study was targeted to users on official and popular fan-made forums for the TF2 game, including the TF2 Subreddit [1] and the official game forums [3]. We polled multiple communities to ensure a diverse participant sample. On each site, we posted a message briefly describing the purpose of the study, as well as what participation entailed for interested parties. A link to our online survey was provided. Users were encouraged to ask any questions regarding the study or make any comments on the thread in which the recruitment message was posted. After a period of a week, we closed the survey. Initially we received over 1,700 responses, but due to the nature of using online participants many responses were unfinished or otherwise unusable. Unfinished surveys, as well as those deemed to contain unrealistic responses such as those with recognizable answer patterns or ages over a certain threshold, were eliminated, leaving 520 valid responses.

Unsurprisingly, our gamer sample was strongly male-dominated; however, this is not uncommon for video game studies, especially those focusing on FPS titles [23]. Out of 570 participants, 518 (90.9%) were male, 45 (7.9%) were female, 4 (0.7%) selected "Other," and 3 (0.5%) declined to respond. Due to the low numbers of "Other" and "decline to respond" responses, we have eliminated these from any analysis using gender as a factor. This prevents them from affecting our numbers. We had a large enough female sample to do sound analysis between males and females.

Our participants were comprised of mostly younger individuals from 18-20, with a mean age of 21.02 and a median of 20. The minimum age was 18, and the maximum was 53. As part of our consent form, we required participants to be at least 18, hence the hard lower bound of ages. It may be possible that individuals under 18 participated in the survey and claimed to be 18, which may account for the large volume of 18-year-old participants (38% of total

Region	Frequency	Percentage
North America	362	63.5%
Northern Europe	102	17.9%
Western Europe	35	6.1%
Australia/Oceania	27	4.7%
Eastern Europe	11	1.9%
South-East Asia	11	1.9%
Southern Europe	8	1.4%
South America	6	1%
Middle East	4	0.7%
Northern Asia	2	0.3%
Eastern Asia	1	0.01%
South-Central Asia	1	0.01%

Table 2: Participant nationalities broken down by region.

participants).

Participants in our survey were from diverse nationalities, most coming from English-speaking countries. Since our survey relied heavily on participants understanding the meanings of English adjectives, we required participants to be fluent in English. Only 56% of participants were from the USA, 13% from the United Kingdom, 7% from Canada, 4% from Australia, 2% from Germany, 2% from Finland. See Table 2 for the percentages broken down by region. Having a diverse sample will aid in ensuring that results may be generalized beyond one culture.

4.3.1 Participant Gaming Experience

One question in our survey asked participants to rate their experience level in TF2, other FPS games, and three popular non-FPS games. They rated themselves on a 4-point Likert scale with "Not experienced at all," internally coded as 1, "Somewhat experienced," coded as 2, "Very experienced," coded as 3, and "Expert," coded as a 4. Unsurprisingly, the game in which participants had the most experience was TF2 with a mean experience value of 3.44 ($SD = 0.6$), which

means our sample was highly experienced with the game. Players were also experienced with Portal ($mean = 2.73$, $SD = 0.89$), unspecified "Other FPS games" ($mean = 2.32$, $SD = 0.82$), Half-Life ($mean = 2.17$, $SD = 0.93$), and Borderlands ($mean = 2.06$, $SD = 0.97$).

4.3.2 Participant Gameplay Frequency

We wanted to gauge how frequently our participants actually play TF2 and the other titles included in the question about gaming experience. We asked participants to rate their time playing each game on a 4-point Likert scale with "Never," internally coded as 1, "Rarely" coded as 2, "Occasionally," coded as 3, and "Frequently," coded as a 4. Again as was expected, the game participants played most frequently was TF2 with a mean experience value of 3.83 ($SD = 0.42$). Players also more frequently played unspecified "Other FPS Games" ($mean = 2.44$, $SD = 0.94$), Portal ($mean = 2.22$, $SD = 0.77$), Counter-Strike ($mean = 2.03$, $SD = 1.02$). The least-frequently played titles were Starcraft ($mean = 1.16$, $SD = 0.45$), Warcraft ($mean = 1.21$, $SD = 0.58$), and Dota ($mean = 1.37$, $SD = 0.76$). From the data gathered about game experience, it follows that the three non-FPS games would also be the least-frequently played.

4.4 Procedure

4.4.1 Survey

The survey (see Appendix A) was developed and presented via Qualtrics, an online survey software. The first part of the survey had four questions that collected information about demographics, including age, nationality, and gender, and language fluency. A second section containing six questions focused on game experience, asking about the participant's experience playing TF2 and other similar FPS games, as well as asking which of the nine TF2 classes was the participant's favorite. This favorite class is the "avatar" which the participant is later asked to describe.

The third survey section (see Appendix A) was the adjective survey. It was made up of three blocks, each focusing on one of the three entities: the actual self, the ideal self, and the avatar. The block describing the self was presented first, then order in which the last two blocks were presented was randomized. At the beginning of each block, the participant was informed which entity they would be describing. The remainder of the block was populated with 65 questions of the form "Describes *[entity]*? *[adjective]*" where *[entity]* was the entity being described and *[adjective]*

was one of the 65 adjectives from our list. The order in which the adjective questions was presented was randomized for each participant. From these questions, we solicited a "yes" or "no" response. Using binary responses made analysis easier than a Likert scale format, and encouraged participants to answer more quickly with their first reaction instead of taking a long time to consider a scaled response. See Appendix A for the survey questions and a sample of the adjective survey.

4.4.2 Analysis

We completed a frequency analysis for the questions on the first and second parts of the survey, which resulted in information about the participants' demographics and some measures of gamer experience and preferences. The third section of the survey provided an assessment of the traits possessed by the participants, their ideals, and their avatars. We used this information to calculate the self-other overlap, as well as a few extra variables which we later use in the statistical analysis.

For calculating overlap, we used the methods outlined in the work done by Hodges and colleagues [22]. Specifically, we determined measure of self-other overlap from the adjective data based on methods developed and used by Davis et al.[11]. This method involves computing the percentage of adjectives used to describe the self that were also used to describe the avatar.

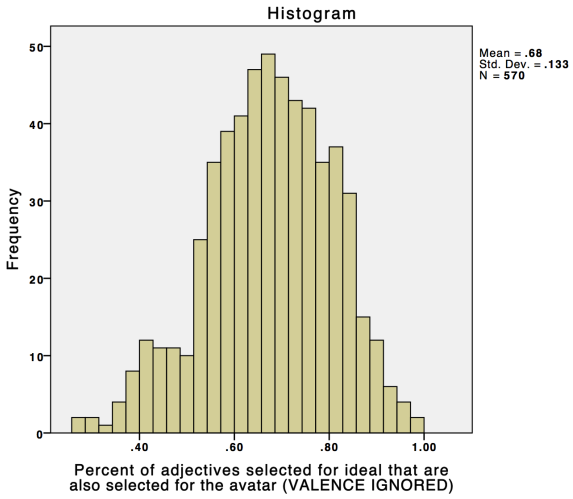

Figure 3: The frequency distribution of the avatar/ideal overlaps.

We calculated three different types of overlap: avatar/ideal, avatar/actual, and ideal/actual. These represent the

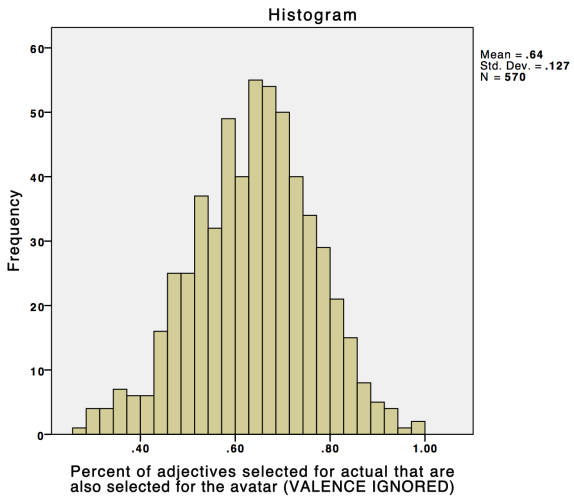

Figure 4: The frequency distribution of the avatar/actual overlaps.

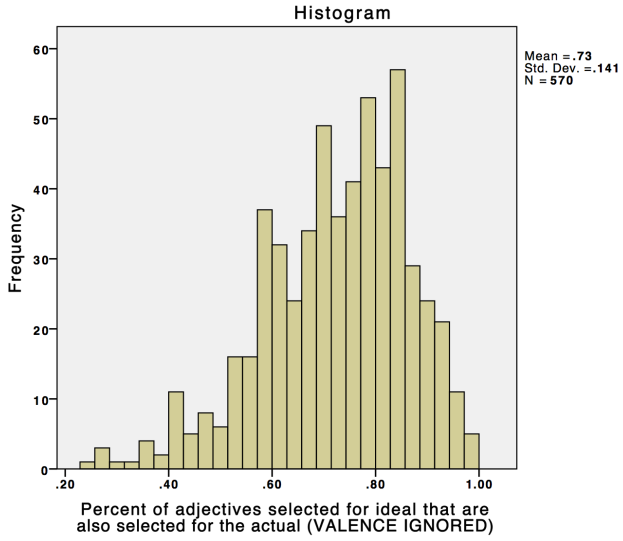

Figure 5: The frequency distribution of the ideal/actual overlaps.

percentage of adjectives endorsed (adjectives to which participants answered "yes") for the ideal that were also endorsed for the avatar, the percentage of adjectives endorsed for the actual that were also endorsed for the avatar, and the percentage of adjectives selected for the ideal that were also shared with the actual, respectively. To calculate these, we first counted the total number of adjectives endorsed for each target entity, namely the actual self, ideal self, and avatar. For our initial analysis, we retained the valence of the adjectives and calculated the total number of positive, negative, and neutral endorsed adjectives for each entity. A statistical analysis of the overlap percentages grouped

by valence revealed distributions that were not normally distributed. However, combining all three valences yielded data that is normally distributed. See Figure 3, Figure 4 and Figure 5 for the distribution of the overlaps with valence ignored. For this reason, all future analysis ignored valence to retain the normal distribution of values.

To calculate the overlap, we used the following algorithm. For each entity pair, we found the percentage of adjectives endorsed for the second entity that were also endorsed for the first. We took this count of shared adjectives and calculated a percentage by dividing it by the total number endorsed for the second entity. For example, when calculating avatar/ideal overlap, we looked at all endorsed adjectives for the ideal, and counted how many of those were also endorsed for the avatar. If the participant endorsed "Efficient", "Curious," "Persistent," and "Outgoing" for their ideal and endorsed "Brash," "Strong," "Fierce," "Efficient," and "Persistent" for their avatar, then of the 4 adjectives endorsed for the ideal, 2 were shared by the avatar. We then divided this shared count (2) by the total endorsed for the ideal (4). Therefore the avatar/ideal overlap is 50%. The full pseudocode algorithm can be found in Appendix B. Note that the second adjective in the pair is treated as the denominator in the calculation, and we chose our variable labels to reflect that. For example, the avatar/ideal overlap uses the endorsed adjectives of the ideal as the denominator of the calculation.

For our calculations, we did not use the avatar as the denominator in any calculation, as we feel that participants would have a stronger image of their actual and ideal selves and therefore the adjectives endorsed for those entities would be more reliable. For the actual/ideal overlap, we used the ideal as the denominator because the ideal is most likely to contain adjectives not endorsed for the actual, whereas the actual's positive qualities almost always appear in the ideal as well.

Another factor we wished to explore was the concept of self-esteem and how this affected gamers' choices. We did not ask participants explicitly about their self-esteem, but we calculated an implicit measure by finding the difference between the adjectives endorsed for the ideal and those selected for the actual. We make the assumption that all adjectives endorsed for the ideal are seen by the participant as being positive. If they were not perceived as positive, then it would violate the very definition of an ideal. Note that this concept of "positive" is not the same as the coded valence of the adjectives chosen.

Once we calculated the raw self-esteem measure from the differences between the adjectives endorsed for the ideal and the actual, we categorized the differences into "Low," "Normal," and "High" esteem categories. The cat-

egory thresholds we based on the distribution of the differences and we strove to make the categories symmetrical. Differences between 15 and 28 were in the "Low" category, those between 5 and 14 were in the "Normal" category, and 4 and lower were considered "High." This results in 11.8% of the sample in the "Low" category, 13% in the "High" category, and 75.2% in the "Normal" esteem category. This is a fairly normal distribution and having 75% of the sample be in the "Normal" category is just over 2 standard deviations. See Table 11 in Appendix B for full distribution of difference scores.

After calculating the overlap and self-esteem variables, we used several statistical measures to learn about our data and test hypotheses. To compare overlap distributions, we use t-tests, Chi-square, and non-parametric t-tests in the SPSS statistics software. Various correlations were calculated using the SPSS correlation functions as well.

5 Results

After our initial survey of player demographics, our study was essentially comprised of two major surveys, one asking questions about game experience, and the other being the self-other overlap adjective survey. We separated the analysis by the two sections, as they each will tell us very different information. We report the results of the self-other overlap analysis first, as these results inform those of the remaining section.

5.1 Self-Other Overlap

5.1.1 Avatar/Ideal vs Avatar/Actual Overlap

Our main hypothesis is that gamers will have greater avatar/ideal overlap than avatar/actual overlap and that avatar/ideal overlap is greater than avatar/actual. We feel this will be true because games will allow for identity exploration and gamers will be likely to desire exploring their idealized qualities.

Simply inspecting the means of the two types of overlap, we found the mean avatar/actual overlap was 64.06% and the mean percentage of avatar/ideal overlap was 67.66% (see Table 3). While the difference between these values is small, a paired t-test revealed that the difference was statistically significant $t = -9.087$, $p < 0.001$. The difference in means shows the avatar/ideal overlap is larger, and therefore we can reject the null hypothesis and can support that people's avatar/ideal overlap is significantly larger than the avatar/actual overlap. This means that players are generally

		All participants ($n = 570$)
avatar/ideal		
	Mean	67.66%
	SD	13.265%
avatar/actual		
	Mean	64.06%
	SD	12.726%

Table 3: Descriptives of the overlap types of all participants.

Overlap type	**Mean**	**SD**
ideal/actual	75.77%	12.11%
actual/ideal	72.52%	14.09%
avatar/ideal	67.66%	13.27%
avatar/actual	64.06%	12.73%

Table 4: Descriptive statistics of each overlap type.

choosing avatars that they feel are more similar to their idealized selves than to their actual self, and we can draw the conclusion that people may be using games to act out their idealized traits.

The mean percentage of adjectives chosen for the actual that were also chosen for the ideal is very high, at 75.7%, making the ideal/actual overlap the largest of any entity pair in our study (see Table 4). This likely represents the positive qualities that people currently possess being included in the characteristics of their ideal. The ideal/actual overlap is also similar to the ideal/actual overlap, meaning that many people feel they do already possess many of their idealized qualities. We used the difference between the actual adjectives and the ideal adjectives to create the self-esteem measure, as described in section 4.4.2 and from this we see that our participant sample, in general, possessed fairly high self-esteem ratings.

We examined gender to see if it had an effect on the overlaps of a participant and their avatar. Table 5 shows the

		Men ($n = 518$)	Women($n = 45$)
avatar/ideal			
	Mean	67.42%	69.84%
	SD	13.22%	14.23%
avatar/actual			
	Mean	64.00%	64.83%
	SD	12.57%	14.43%

Table 5: Descriptives of the overlap types of men and of women ("Other" and "Decline to Respond" answers for gender omitted.).

means and standard deviations for each overlap type of each gender group. A two-way repeated measures ANOVA comparing the avatar/ideal and avatar/actual overlaps of men and women yielded no effect between gender and overlap type $F(1, 561) = 3.095$, $p < 0.60$, $\eta^2 = 0.001917$. Therefore we must accept our null hypothesis that there is no difference between the overlaps of men and women. With the gender disparity being so significant in FPS games, it would be assumed that there is some reason women are not playing, but our result suggests that women are not choosing avatars for different reasons than men.

5.1.2 Self-Esteem

We believe gamers' self-esteem influences the type of characters they select to play and the relationship between the type of character and the gamer themselves. We hypothesized that players with low self-esteem will be more likely to choose a character they view to be different from themselves than will players with high esteem. Participants' character choice for this hypothesis was determined by their answer to survey question 12.3, "In video games, I usually choose to be a character I find very different from myself." A Spearman's Rho correlation yielded a significant positive correlation between the raw self-esteem values (the difference between the endorsed ideal self adjectives and the endorsed actual self adjectives) and the answer to question 12.3 ($r = 0.135$, $p < 0.001$), which lends support to our hypothesis that people with low self-esteem choose characters that are different from themselves significantly more than people with high esteem do.

A similar hypothesis stated that people with high self-esteem would be more likely to choose a character most similar to their actual selves. We found a significant negative correlation of the self-esteem score and choosing to play as a character players found similar to themselves (question 12.2, "In video games, I usually choose to be a character I find similar to myself"). The Spearman's Rho yielded a correlation coefficient of $r = -0.71$ ($p < 0.044$). High esteem players had a mean response of 3.24 ($SD = 1.12$) and the mean of low self-esteem players was 2.89 ($SD = 1.197$). This result lends further support to our ideas that self-esteem is an influential factor in players' selection of characters.

Because we feel self-esteem influences the types of character people choose to play, we further hypothesized that players with low self-esteem would have a larger avatar/ideal overlap than high-esteem players have. This follows from the previous test that shows low-esteem players tend to choose characters far different from their actual self. Again using a Spearman's Rho correlation, we found a significant negative correlation between self-esteem and the avatar/ideal overlap ($r = -0.213$, $p < 0.001$). This suggests that the higher difference of the ideal self and the actual self, the lower the likelihood of the player selecting a character more similar to their ideal. Similarly, the mean avatar/ideal overlap for low-esteem players was 63.01% ($SD = 14.152\%$) and the mean for high-esteem players was 69.11% ($SD = 15.09\%$). Therefore, our hypothesis was incorrect and the data shows high-esteem players actually pick avatars that overlap with their ideal more. This may be because high-esteem players believe they share a significant number of traits with their ideal, making their ideal self and actual self quite similar. Therefore, if a character they chose to play was based on their actual self, it would, in turn, also be very similar to their ideal self. Further, our above result shows that players with low self-esteem are more likely to play as a character they see as different from their actual self, but "different" from self does not necessarily mean that it is their ideal. This result showing smaller overlap with the ideal hints that perhaps players with low self-esteem are choosing characters that are neither their ideal nor their actual self, but a ludic self that is something different from anything they currently are.

Self-esteem may also influence gamers' reasons and motivations for playing. We performed Spearman's Rho correlation calculations between endorsement of certain reasons for playing games, and the raw self-esteem calculation, namely the difference between the ideal and the actual. From a Spearman's Rho test, we found a significant positive correlation between raw self-esteem differences and playing games to escape real life ($r = 0.217$, $p < 0.001$). This means that the higher the difference in ideal and actual (the lower the self esteem), the more people play to escape real life. Similarly, we found a significant positive correlation between the raw self-esteem differences and playing games

to do things one can't do in real life ($r = 0.181$, $p < 0.001$), showing the higher the difference of ideal and actual (the lower the self esteem), the more likely it is the person will play games to do things they cannot in the real world.

From these results examining self-esteem and player preferences, it appears that individuals with low self-esteem may be more likely to play video games for escapist purposes. This may either be playing to distract themselves from real life, or playing to try out alternate identities in the digital realm. While players with high self-esteem may play for escapist purposes as well, our data supports the fact that low-esteem players are more likely to do so.

5.2 Gender

Our question about elements that players enjoy in games (question 11, "Please rate how much you like the following aspects in games.") allows us to examine if different subgroups of the participant sample have significantly different opinions about what is enjoyable in video games. Because FPS games have a largely male-dominated audience, gender is an interesting grouping variable to consider.

One element of FPS that may be differently enjoyed by the genders is violence. With gender roles and stereotypes glorifying aggression for males, we hypothesized that men would rate their enjoyability of violence higher than women do. Participants used a 5-point Likert scale to rate their enjoyability of various aspects of video games in question 11 of our survey, and sub-question 11.1 specifically asked about violence ("Please rate how much you like the following aspects in games - Violence"). We use participants' answers to question 11.1 as our dependent variable and grouped by gender. A significant difference ($U = 9110.5$, $p < 0.006$) was found between the two groups, using a Mann-Whitney test. The mean enjoyment rating of violence from men was 3.53 ($SD = 0.69$) and the mean for women was 3.22 ($SD = 0.52$). With this result, we can reject the null hypothesis and claim that men rate their enjoyment of violence higher than women do.

For similar reasons, we also hypothesized that men enjoy competition in games (question 11.5) more than women do. The Mann-Whitney test resulted in a significant difference between the groups ($U = 8108.5$, $p < 0.001$). The mean enjoyment rating for men was 4.02 ($SD = 0.83$) and the mean for women was 3.56 ($SD = 0.84$). Therefore we reject the null hypothesis and can have support that men enjoy competition significantly more than women do.

We next inspect an aspect we expect to be more "feminine" in nature, which is avatar customization. This data stems from question 11.7, which asks about the enjoyability of avatar customization ("Please rate how much you

like the following elements in video games - Avatar Customization"). Both men and women found customization aspects of video games enjoyable, with the mean rating of women at 4.31 ($SD = 0.76$), and the men's mean rating at 4.01 ($SD = 0.93$); However, we see a significant difference between men and women in a Mann-Whitney test ($U = 9647.0$, $p < 0.04$), giving support to our hypothesis that women enjoy avatar customization significantly more than men enjoy it.

The author had noticed, from her own experience, that the female audience for games such as the otherwise hyper-masculine Borderlands series was generally larger than for other typical player-vs-player or team-based FPS games like TF2. Exploration is a very large aspect of the Borderlands series, and therefore we hypothesize that women enjoy elements of exploration more than men do. Again grouping by gender, we compared the answers to question 11.3 ("Please rate how much you like the following elements in video games - Exploration") with a Mann-Whitney test and found a significant difference between the groups ($U =$, $p < 0.014$). Examining the means, we see women rated exploration on average 4.62 ($SD = 0.58$) and men rated on average 4.36 ($SD = 0.73$). These values show that in our sample, the women rated exploration higher than men did.

We had made no predictions about the enjoyability of gore or story, and we found no significant difference between genders on these measures. We had hypothesized that women would enjoy social interaction more than men would, but this was not supported by our data.

Our results of men enjoying competition and violence and women preferring avatar customization is consistent with previous studies of online gamers [30, 25, 21].We have been unable to find another study that examines exploration being favored by women, and this result does offer insights as to what draws women to certain FPS titles and not to others where violence and competition are central to gameplay. With this information, we can draw some interesting conclusions about the popularity of FPS games with men. The very essence of FPS is violence and aggression using projectile weapons. Most FPS titles are multiplayer and the main objective is to emerge victorious over another team or another player in some manner, thus making competition another central theme. In general, avatar customization is not as prevalent in FPS titles as it is in RPG or more casual genres. This is partially because one cannot view one's own avatar in a first-person perspective. The most common elements we see in FPS games are, on average, considered much more enjoyable by men than by women.

Class	Frequency	Percent
Scout	66	11.6%
Soldier	118	20.7%
Pyro	90	15.8%
Demoman	57	10.0%
Heavy	20	3.5%
Engineer	45	7.9%
Medic	78	13.7%
Sniper	38	6.7%
Spy	58	10.2%

Table 6: Overall frequencies of class selection

5.2.1 Favorite Class By Gender

To establish the avatar which the participant would be describing in the adjective survey, we needed to determine which class they enjoyed playing as the most. Obtaining favorite classes also allowed us to answer interesting questions about the TF2 audience and which classes are most popular with various subgroups of the sample.

Overall, ignoring gender, the favorite class was Soldier with 20.7% of the sample selecting him. Pyro was the second most chosen class at 15.8% of the sample. Medic was the third most popular with 13.7% of the population. The remaining classes were ranked as follows: Scout 11.6%, Spy 10.2%, Demoman 10.0%, Engineer 7.9%, and Sniper 6.7%. The least-frequently chosen class was Heavy at 3.5%. See Table 6 for the complete breakdown of classes.

One of our hypotheses investigates class choice by gender. Specifically, we hypothesized that men and women would typically choose different types of classes when playing, and that men would choose more offense classes than women do, and women will choose more support and defense classes than men do. We first examined the top 3 classes chosen by men and women. We found that Soldier was the most frequently chosen class of males, with 22% of the male sample selecting Soldier. Further, 15.1% of the males chose Pyro, and 11.8% chose Medic. For women, Medic was by far the favorite class, with 31.1% of all females selecting that class. Pyro was the second most chosen class of females at 24.4%, and Engineer made up 15.6% of the female votes. See Table 7 for the full percentage breakdowns

of class choice by gender.

		Scout	**Soldier**	**Pyro**	**Demoman**	**Heavy**	**Engineer**	**Medic**	**Sniper**	**Spy**
Male	Count	60	114	78	56	20	37	61	34	58
	% within gender	11.6%	22.0%	15.1%	10.8%	3.9%	7.1%	11.8%	6.6%	11.2%
	% within favorite TF2 class	92.3%	96.6%	87.6%	100.0%	100.0%	84.1%	81.3%	89.5%	100.0%
Female	Count	5	4	11	0	0	7	14	4	0
	% within gender	11.1%	8.9%	24.4%	0.0%	0.0%	15.6%	31.1%	8.9%	0.0%
	% within Favorite TF2 class	7.7%	3.4%	12.4%	0.0%	0.0%	15.9%	18.7%	10.5%	0.0%
Total	Count	65	118	89	56	20	44	75	38	58
	%within gender	11.5%	21.0%	15.8%	9.9%	3.6%	7.8%	13.3%	6.7%	10.3%
	% within favorite TF2 classes	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 7: Percentage breakdown of classes chosen by men and women.

This frequency analysis shows that the top class for men and women is dissimilar. Further comparing the individual class choice of men and women with a chi-squared test reveals a significant difference between the two distributions ($\chi^2 = 33.056$, $p < 0.001$), giving support to our hypothesis that men and women select different classes of characters when playing TF2.

We further examined class choice by gender by inspecting the general category of the class chosen, that is if the class was offense, defense, or support. Surprisingly, the results of a Chi-squared test yielded no significant difference between the groups ($\chi^2 = 2.405$, $p < 0.300$), despite the fact that the percentage of men and women playing support roles differed by over 10% (see Table 8). This result may be due to the fact that many women choose to play Pyro, an offense role, and only men play Spy, a support role. This fact may balance the distribution of genders within the three general categories, even though the data shows significant frequency discrepancies within each individual class.

		Offense	Defense	Support	Total
Male	Count	252	113	153	518
	% within gender	48.6%	21.8%	29.5%	100%
	% within class category	92.6%	94.2%	89.5%	92.0%
Female	Count	20	7	18	45
	% within gender	44.4%	15.6%	40.0%	100%
	% within class category	7.4%	5.8%	10.5%	8.0%
Total	Count	272	120	171	563
	%within gender	48.3%	21.3%	30.4%	100.0%
	%within class category	100.0%	100.0%	100.0%	100.0%

Table 8: Percentage breakdown of categories chosen by men and women.

5.3 Survey Section 2 Results

The second portion of the survey gathered information about the experience and preferences of the gamers in our sample. First we completed a frequency analysis of these responses to gauge the overall preferences of the TF2 community. We also wanted to correlate the responses to this section with other variables we collected, such as gender and self-esteem.

5.3.1 Likability of Game Elements

Part of our intent with this survey was to understand the reasons why people play video games and which parts of FPS games attract their audience. We asked participants to rate how much they like various aspects of games. The 5-point Likert scale included "Dislike Extremely" (1), "Dislike" (2), "Neither Like nor Dislike" (3), "Like" (4), and "Like Extremely" (5). This question was not specific to FPS games; However, since we have established that our sample are heavy FPS gamers, it seems probable that their answers would apply to FPS games.

By far the most-desired element of video games was "story" with a mean of 4.51 ($SD = 0.69$). "Exploration" was a close second, with a mean of 4.38 ($SD = 0.72$). Players also enjoyed elements of "avatar customization"

($mean = 4.04$, $SD = 0.92$), "competition" ($mean = 3.98$, $SD = 0.85$), and "social interaction" ($mean = 3.89$, $SD = 0.87$). "Violence "($mean = 3.50$, $SD = 0.68$) and "gore" ($mean = 3.10$, $SD = 0.86$) were by far the lowest-scoring elements. With the means for violence and gore being close to 3 ("Neither Like no Dislike"), we can conclude that players will deal with violence and gore in games, but they do not particularly favor those elements. This runs counter to the common belief that gamers enjoy violence and gore.

There is a possibility that participants were hesitant to answer truthfully about the violence and gore elements, as studies about the negative effects of violent games are prevalent, and these studies often condemn gamers for perceived lack of moral fibre. Still, almost every participant would have had to have answered dishonestly about disliking violence and gore to give result in the numbers we have gathered.

5.3.2 Reasons for Playing

Another method to examine the reasons why people play video games was to ask participants to mark their level of agreement with several statements regarding proposed reasons for playing and methods of play, such as "I play video games to escape real life," and "I prefer to play games with other people." Responses were on a 5-point Likert scale that included "Strongly Disagree" (1), "Disagree" (2), "Neither Agree nor Disagree" (3), "Agree" (4), and "Strongly Agree" (5). The means and standard deviations of responses to these questions can be found in Table 9.

Q#	Question Text	Mean	Std Dev
12.9	I prefer to play games with other people.	3.87	0.95
12.10	I prefer to play games by myself.	3.21	0.95
12.4	I play video games so I can do things I can't do in real life.	3.74	1.13
12.8	I play video games to escape real life.	3.64	1.22
12.1	I play video games so I can be in control.	3.19	1.02
12.2	In video games, I usually choose to be a character I find similar to myself.	3.10	1.15
12.3	In video games, I usually choose to be a character I find very different from myself.	2.83	1.06
12.7	I play video games so I can be submissive.	1.97	0.87
12.6	I play video games so I can be dominant.	2.51	1.18
12.5	I play video games so I can express aggression and be violent	2.16	1.14

Table 9: The means for each question asking about reasons for playing video games. Answers were given in 5-point Likert scale. See Appendix A for full survey.

The statement with the most agreement was "I prefer to play games with other people," with a mean of 3.87 ($SD = 0.95$). This suggests that gamers have a desire to be social with others, contrary to the "shy loner" gamer stereotype. The responses to the opposite question, "I prefer to play games by myself," had a mean of 3.21 ($SD = 0.95$). Performing a Wilcoxon Signed Rank Test of the responses to these two questions yielded a significance value of $p < 0.001$ ($Z = -9.451$), suggesting that the two are significantly different and that gamers prefer to play games with others rather than by themselves.

The statement with the second-highest agreement was "I play video games so I can do things I can't do in real life," with a mean of 3.74 ($SD = 1.13$). Similarly, "I play video games to escape real life" had a mean of 3.64 ($SD = 1.22$). With both means high on the "agree" end of the scale, it suggests that players use video games for escapist purposes and for exploring things that may be impossible or otherwise unacceptable in real life.

People also tend to play games to feel that they are in control ("I play video games so I can be in control."), with the mean response to this question being above the midpoint at 3.19 ($SD = 1.02$). This again feeds into the idea of games being used for escapism. It may be that people are attracted to this aspect of video games to escape chaotic or

overwhelming aspects of their own lives and find it gratifying to escape to another place where one can be completely in control of everything.

Questions about the characters players chose were included in this section as well, which directly asked if players chose characters they perceived to be similar to themselves ("In video games, I usually choose to be a character I find similar to myself.") or characters they felt were different from themselves ("In video games, I usually choose to be a character I find very different from myself."). From this question only, we found players claim to choose characters similar to themselves (mean 3.10, $SD = 1.15$), but this mean was fairly close to the responses to choosing a different character (mean 2.83, $SD = 1.06$). The main goal of this study was to ascertain the types of characters people choose to play, but we wished to obtain this information using a method other than simply asking participants explicitly. Our use of the self-overlap method will allow us to draw conclusions about player avatar choices in a less direct way.

Players generally disagreed with the statement "I play video games so I can be submissive" (mean 1.97, $SD = 0.87$). Conversely, they were fairly neutral about playing to be dominant ("I play video games so I can be dominant") (mean 2.51, $SD = 1.18$). Similar to earlier statistics showing a lack of desire for violence in games, there was general disagreement with the statement "I play video games so I can express aggression and be violent," with a mean of 2.16 ($SD = 1.13$). This further suggests that FPS gamers do not generally follow the stereotype of being aggressive, violence-loving individuals.

6 Discussion

Our main goal of this study was to determine if, in general, players chose characters that were similar to their ideal selves or their actual selves using a self-other analysis. Support was shown for our main hypothesis that players will choose characters closer to their ideal selves. These results are comparable to those found by Bessiere *et al.* [9]; however, our use of adjective descriptors to describe gamers' ideal and actual selves, as well as their avatars, and using the concept of self-other overlap is a methodology that is different from previous studies investigating similar issues.

We have found support of our hypotheses regarding self-esteem influencing players of video games. Self-esteem appeared to have an effect on the type of characters players choose to play, with players of low self-esteem tending to prefer characters that they find different from their actual selves and players with high self-esteem being more likely to choose a character similar to their actual selves. We found self-esteem to also influence the self-other overlap

between a player and his or her avatar, though our findings were contrary to our hypothesis and contrary to the findings Bessiere's study. Instead we found that it is actually players with high self-esteem that tend to have more avatar/ideal overlap. This may be due to the fact that players with high self-esteem by definition have more shared traits with their ideal self and a character that is close to their ideal self would also be similar to their ideal self. These results further support that players with low self-esteem players choose characters different from themselves – both their actual and ideal selves. This hints that perhaps players with low self-esteem are choosing characters wildly different from any part of themselves, a sort of "ludic self."

Self esteem was found to strongly correlate with the motivations players have for playing video games. We found a significant positive correlation between the difference between a player's actual self and ideal self, and choosing to play to escape reality or to do things they cannot do in real life. This suggests that escapism is a highly influential motivation for engaging in video game play for those with low self-esteem. As far as we can tell, our investigations into the influence of self-esteem on motivations and character choice in video games is an original contribution to the field. Bessiere *et al.* also investigated self-esteem; however, they did not relate it to player motivations as we have done in our study. They also determined self-esteem scores by explicitly asking participants using a Positive Affect Negative Affect Scale, whereas we have calculated self-esteem implicitly using the difference in endorsed adjectives for the ideal self and the actual self.

Our hypotheses regarding gender influencing TF2 class choice has been supported by our sample data. Specifically, we found a significant influence of gender in the choice of individual classes; however, we found no significance of gender's influence on the category of the class chosen (offense, defense, support). The main effect of gender was found instead in participants' gaming preferences. Our hypotheses stating that male players have a greater enjoyability of violence and competition than women do was supported by our study, and this result is in agreement with those of similar studies [30, 25, 21]. Contrary to the work by Hartmann and Klimmt, we did not find a significant difference in the enjoyability of social interaction between male and female participants. However, we did find support for our hypothesis that women enjoy avatar customization and exploration elements more than men do. From our searches, we believe we are the first to investigate gender influence on the enjoyability of exploration in games.

6.1 Limitations and Future Work

Our survey produced an abundant amount of data and we have many more hypotheses which we would like to explore. For the purposes of this paper, we focused on a comparatively small amount of our data and hypotheses. In future work we will be further analyzing our results and examining more deeply matters of gender, gamer experience, and character selection and how these relate to self-other overlap and correlate with the likability of various elements in games. Similarly, we would like to explore the personality profiles of each of the TF2 classes as given by our participants. Profiling these characters would offer insights into correlations between the character and the type of person who typically plays as that character.

We made self-esteem a focus of our current study. While we are fairly confident in our implicit measure of self-esteem, we would like to include a direct measure of self-esteem for future surveys. For any future surveys, we would like to obtain a more gender-balanced sample. While we did have a large enough female sample to make solid analysis, we would like to better investigate the female population of TF2 and FPS games in general. Especially since the percentages of women playing support roles was nearly 10% larger than the percentage of men playing support classes but was still not significantly different, we feel that re-examining this hypothesis with a larger female sample would yield stronger results.

Our results regarding players of low self-esteem choosing characters vastly different from themselves brings up the question about the "ludic self." Ludic recombination and its presence in virtual worlds is something the author would like to further explore in future work. Using this data as a base, the author believes that future exploration of the "ludic self" may be possible.

7 Conclusion

This study has provided critical data about FPS gamers' preferences, including reasons and motivations for choosing a particular avatar. We have found that players generally choose avatars that are slightly (but significantly) more similar to their idealized selves than their actual selves.

We have also drawn interesting conclusions about gender self-identification and its effect on in-game choices. We have found a significant difference between the types of characters men and women play in FPS games, which leads us

to believe that this may be one reason women do not often play this genre. The content of FPS games may be another reason, as we found that men rate their enjoyability of violence and competition significantly higher than women do, and women rate avatar customization and exploration higher than men do. Since the central theme and mechanics of FPS games are violence and competition between players, this could be a large reason why women do not typically play them.

Our further correlations using our created self-esteem measure revealed that people with low self-esteem typically play games for escapist purposes, much more so than people with high self-esteem. Further, low self-esteem players tend to play as characters they feel are unlike themselves, and high self-esteem players typically choose characters they feel to be similar to themselves. These findings show that self-esteem can have a large influence on a player's choices and motivations for playing.

There is still a lot more to be learned from our data and in this area in general. Many of our results agree with those in previous studies, but some findings also conflict. Our study has supported several hypotheses regarding the factors influencing avatar selection in games and has done so in a different manner.

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Appendices

A Appendix A - Survey

Q1.

You are invited to participate in a research study conducted by a PhD student and Dr. Sarah Douglas from the University of Oregon Computer and Information Science Department. We hope to learn more about how gamers choose their avatars or characters in virtual worlds.

To participate, you must be 18 years of age or older and you must be fluent in English.

If you decide to participate, you will complete a digital survey online. The survey will ask about your game experience with TF2 and similar games. Then it will ask you to describe yourself and two other entities using a given set of adjectives.

This study will take approximately 30 minutes to complete. You may choose to discontinue participation at any point in the study with no consequences. If you do not complete the survey, your data will be discarded and not included in the study.

All the information that is obtained via questionnaire in connection with this study and that can be identified with you will remain confidential and will not be disclosed.

Your participation is *voluntary*. Your decision whether or not to participate will not affect your relationship with the University of Oregon Computer and Information Science Department. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty.

Clicking the "I accept" button below indicates that you are 18 years of age or older, that you have read and understand the information provided above, that you willingly agree to participate, that you may withdraw your consent at any time and discontinue participation without penalty, and that you are not waiving any legal claims, rights, or remedies.

Clicking the "I accept" button below also indicates that you have received an adequate description of the purpose and procedures for the proposed research study. You understand that all information will be kept confidential and will be reported in a fashion that does not explicitly identify you. Again, you may withdraw consent at any time.

Q2.

Please select the response below regarding your willingness to participate in the study.

- ○ I agree to participate in the study, and I am 18 years or older.
- ○ I do not agree to taking this survey

Q3. About You

Q4. What is your gender?

- ○ Male
- ○ Female
- ○ Other
- ○ Decline to respond

Q5. What is your age?

Q6. In which country do you reside?

Please select below...

Q7. Do you consider yourself to be fluent in English?

- ○ Yes
- ○ No

Q8. Game Experience

Q9. How experienced would you say you are with the following game series? Mark answers if you have played ANY game in the given series.

	Not experienced at all	Somewhat experienced	Very experienced	Expert
1 Team Fortress	○	○	○	○
2 Call of Duty	○	○	○	○
3 Half-Life	○	○	○	○
4 Borderlands	○	○	○	○
5 Portal	○	○	○	○
6 Fallout	○	○	○	○
7 Counter-Strike	○	○	○	○
8 Other FPS games	○	○	○	○
9 Dota	○	○	○	○
10 Warcraft	○	○	○	○
11 Starcraft	○	○	○	○

Q10. How often do you play ANY games in the following video game series?

		Never	Rarely	Occasionally	Frequently
1	Team Fortress	○	○	○	○
2	Call of Duty	○	○	○	○
3	Half-Life	○	○	○	○
4	Borderlands	○	○	○	○
5	Portal	○	○	○	○
6	Fallout	○	○	○	○
7	Counter-Strike	○	○	○	○
8	Other FPS games	○	○	○	○
9	Dota	○	○	○	○
10	Warcraft	○	○	○	○
11	Starcraft	○	○	○	○

Q11. Please rate how much you like the following elements in video games.

		Dislike Extremely	Dislike	Neither Like nor Dislike	Like	Like Extremely
1	Violence	○	○	○	○	○
2	Story	○	○	○	○	○
3	Exploration	○	○	○	○	○
4	Gore	○	○	○	○	○
5	Competition	○	○	○	○	○
6	Social interaction	○	○	○	○	○
7	Avatar customization	○	○	○	○	○

Q12. How much do you agree with the following statements?

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1	I play video games so I can be in control.				
2	In video games, I usually choose to be a character I find similar to myself.				
3	In video games, I usually choose to be a character I find very different from myself.				
4	I play video games so I can do things I can't do in real life.				
5	I play video games so I can express aggression and be violent.				
6	I play video games so I can be dominant.				
7	I play video games so I can be submissive.				
8	I play video games to escape real life.				
9	I prefer to play games with other people.				
10	I prefer to play games by myself.				

Q13. Favorite Team Fortress 2 Classes

Q14. What is your favorite TF2 class to play?

- Scout
- Soldier
- Pyro
- Demoman
- Heavy
- Engineer
- Medic
- Sniper
- Spy

Q15. Select how much you play as each class.

	Never	Rarely	Sometimes	Often	All of the Time
(1)Scout	○	○	○	○	○
(2)Soldier	○	○	○	○	○
(3)Pyro	○	○	○	○	○
(4)Demoman	○	○	○	○	○
(5)Heavy	○	○	○	○	○
(6)Engineer	○	○	○	○	○
(7)Medic	○	○	○	○	○
(8)Sniper	○	○	○	○	○
(9)Spy	○	○	○	○	○

Q16. In this section, you will be presented with 65 different adjectives and asked if each describes **yourself**. Please answer truthfully and openly. Please respond to each question as quickly as possible.

Q62. Describes yourself?

Outgoing

- ○ Yes
- ○ No

This section continues with similar questions, randomizing the order of the adjectives from the list. There are 65 questions in total in this section. The next two sections ask the same adjective questions, only ask about the ideal self and the avatar chosen in an earlier question. The following are the prompts for these two sections.

Q82. Bring to mind **your ideal self**, that is the person you wish you could be, and take a minute to think about their characteristics. In this section, you will be presented with 65 different adjectives and asked if each describes **your ideal self**. Please answer truthfully and openly. Please respond to each question as quickly as possible.

Q148. Bring to mind **your favorite class, Pyro,** and take a moment to think about their characteristics. In this section, you will be presented with 65 different adjectives and asked if each describes **Pyro**. Please answer truthfully and openly. Please respond to each question as quickly as possible.

Q150. Describes the Pyro?

Aggressive

- ○ Yes
- ○ No

Adjective Lists

Positive	Neutral	Negative
Alert	Aggressive	Absent-minded
Efficient	Anxious	Aloof
Intelligent	Emotional	Boastful
Mature	Masculine	Irresponsible
Self-confident	Serious	Irritable
Calm	Carefree	Lazy
Conscientious	Cautious	Rude
Friendly	Feminine	Self-centered
Helpful	Impulsive	Careless
Humorous	Mild	Hostile
Outgoing	Opinionated	Immature
Practical	Timid	Impatient
Sophisticated	Unconventional	Moody
Curious	Uninhibited	Stubborn
Persistent	Inhibited	Critical of others
Coordinated	Stealthy	Inscrutable
Professional	***Mysterious***	***Brash***
Independent	***Fierce***	***Obnoxious***
Playful	***Loud***	***Hot-tempered***
Strong		
Versatile		
Powerful		
Determined		
Enthusiastic		
Skillful		
Dependable		
Supportive		

Table 10: Valences of the survey adjectives. Words in standard font are from Davis [11]. Words in bold italic are TF2-specific adjectives unique to our study.

B Appendix B

Difference between ideal and actual-shared. Total number endorsed adj for ideal minus the shared number endorsed with actual

		Frequency	Percent
Valid	.00	4	.7
	1.00	7	1.2
High 13%	2.00	16	2.8
	3.00	20	3.5
	4.00	27	4.7
	5.00	44	7.7
	6.00	49	8.6
	7.00	45	7.9
	8.00	39	6.8
Normal 75.2%	9.00	53	9.3
	10.00	41	7.2
	11.00	42	7.4
	12.00	31	5.4
	13.00	31	5.4
	14.00	30	5.3
	15.00	21	3.7
	16.00	10	1.8
	17.00	19	3.3
	18.00	10	1.8
	19.00	6	1.1
Low 11.8%	20.00	2	.4
	21.00	7	1.2
	22.00	5	.9
	23.00	5	.9
	24.00	1	.2
	25.00	2	.4
	27.00	2	.4
	28.00	1	.2
	Total	570	100.0

Table 11: Frequency of raw self esteem scores, that is the difference of the adjectives chosen for the ideal and those chosen for the actual.

```
for each adjective in the current entity do
    if isPositiveAdj then
        posCount++;
    end
    else if isNegativeAjd then
        negCount++;
    end
    else
        neuMatch++;
    end
    for each other entity do
        if current adjective also endorsed for other entity then
            match++;
        end
        if isPositiveAdj then
            posMatch++;
        end
        else if isNegativeAdj then
            negMatch++;
        end
        else
            neuMatch++;
        end
        percentOverlap = match/(posCount+negCount+neuCount);
    end
end
```

Algorithm 1: Algorithm for calculating percentage overlap.