Real Feelings for Virtual People: Emotional Attachments and Interpersonal Attraction in Video Games

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Factors that may affect how people become attracted to virtual characters were explored in an online survey of players of a recent video role-playing game. Seventy-four participants (33 men) completed a series of questionnaires assessing their personalities, motivations for game play, and feelings toward the 10 nonplayer characters (NPCs) with whom they had potentially experienced extensive interactions within the game world. Results suggest that people form real and authentic emotional attachments to virtual characters, and that these arise from a complex blend of the players' personalities and motivations, and the virtual characters' levels of physical attraction, friendliness (or hostility), and general usefulness within the game context. Implications for these findings, and suggestions for future research, are discussed.

Keywords: avatar, video game, attachment, interpersonal attraction, motivation

The desire to create believable virtual characters, whether for commerce, education, or entertainment, faces an interesting paradox. On the one hand, observers are very comfortable ascribing human goals, feelings, and personalities to such simple stimuli as geometric shapes moving around on a screen (Scholl & Tremoulet, 2000), a tendency which may arise from an innate predisposition to see biology in movement (Neri, Morrone, & Burr, 1998). However, as virtual characters move ever closer in appearance and behavior to real ones, the highly developed sensitivities of the same perceptual mechanisms that see agency in behavior, revolt at sophisticated but incomplete realism, as in the well-known Uncanny Valley (Mori, 1970). Put another way, the Uncanny Valley refers to a phenomenon in which humans become repulsed by animated characters who are very realistic but not *quite* human. Just as graphical engines become powerful enough to render lifelike images in real time, so the Uncanny Valley looms large as observers baulk at less than perfect movement, gaze, and expression. Although less research has focused on whether the psychological characteristics of virtual characters suffer from the same awkwardness at high levels of realism as their physical characteristics, an understanding of what makes a character believable and likable (or dislikable) is an important topic for both researchers and designers.

Regardless of whether a virtual character is loved, hated, envied or tolerated, game developers are very interested in establishing what it is about virtual characters that makes people respond to them, like them, and want to make use of their knowledge, advice or help (Donath, 2007). Interpersonal attraction has been conceptualized as consisting of three underlying factors (McCroskey & Richmond, 1996; McCroskey, McCroskey, & Richmond, 2006); we like people because they are physically attractive, socially attractive, and task attractive. That is,

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likable people look good, are friendly, and are useful, and all three contribute to an overall sense of attraction. Previous research on virtual characters has identified a number of other potentially important factors, including personality (Arellano, Verona & Perales, 2008), politeness and impoliteness (Campano & Sabouret, 2009), rapport (Gratch, Wang, Gerten, Fast, & Duffy, 2007), directional attention (Mojzisch et al., 2006), the social dynamics of display (Ochs & Prendinger, 2010), and similarity/homophily (Jones, Pelham, Carvallo, & Mirenberg, 2004).

This latter factor reminds us we should not ignore the role of the observer as well as that of the observed. To the extent that similarity determines liking, the nature of both observer and observed needs to be understood. In trying to understand believability it is therefore important to measure variables describing both the (virtual) person being observed, and the (real) person doing the observing. Understanding the mapping between real and virtual people, and the factors which determine how the former respond to the latter, will assist in the development of more effective, believable, and entertaining virtual characters. The next section considers what we need to know about observers.

Individual Player Factors and Attachment to Virtual Characters

Perhaps the most commonly researched individual player factor is personality, typically conceptualized as the dimensions of the Big Five traits, which are well-validated cross culturally (e.g., McCrae & Costa, 1997). Under this model, an individual's personality is described in terms of where they score on five independent dimensions: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. As the research reported here concerned interpersonal attraction to virtual characters within a video game, it is also important to include some measure of the motivation of game players (Przybylski, Rigby, & Ryan, 2010). People play games for a variety of reasons, and these have been conceptualized as falling into three broad categories (Yee, 2006). *Social* reasons include the desire to chat with other people, make friends, and provide and receive support. *Achievement* motivations reflect a desire to progress through the game, acquiring more powerful items or characteris-

tics, and defeating more powerful opponents. Finally, *immersion* motivation applies to the desire to explore and discover new worlds, create or participate in stories, and avoid real-life stresses and problems.

The relationship between feelings of interpersonal attraction to virtual characters, and individual characteristics of the observer, has received little attention to date, although there is some evidence pointing to relationships between personality and player motivation (e.g., Park, Song, & Teng, 2011). We can, however, ask some tentative questions about how personality, motivation, and attraction might be related. The degree to which a virtual character is liked may be a function of player personality, and whether the character is physically, socially, and task attractive. This may be enhanced or reduced by the degree to which motivations for playing games are primarily social (in which case, social attractiveness may weigh more heavily), achievement oriented (in which case, task attraction may be more important), or immersive (where perhaps a combination of all three might be important). In contrast, the degree to which a character is used (e.g., by choosing to speak with them, spend time with them, or use them in whatever ways the environment offers) may depend on a different combination of the same set of variables. The research reported here tested both of these sets of ideas, within the context of a specific set of interactions with virtual characters.

In order to investigate these phenomena, a suitable set of virtual characters is required with whom real people have extensive and meaningful interactions, preferably interactions that are reasonably similar. *Dragon Age: Origins* (henceforth DAO; BioWare, 2009) is a single player fantasy role-playing game (RPG) in which the player engages in an epic journey through a fantasy world. In common with most games of this ilk, there are multiple foes to vanquish, multiple quests to complete, and a main story line, which ends with a small number of alternative endings. Whereas most RPGs in this genre involve nonplayer characters (NPCs) with whom the player interacts, typically through a series of scripted conversations that may be text or speech based, DAO includes a number of NPCs (henceforth companions) who join the player in his or her adventures, and

make major contributions to the storyline and game play.

Companions are important for a variety of reasons. First, their involvement is essential in completing the game's many, largely combat-based challenges. Party constitution and choice of companion are important decisions, and the mechanics of combat adhere to the KIP model (Barnett & Coulson, 2010) where individual characters are assigned to "kill" (damage enemies), "irritate" (absorb the attention and attacks of enemies), or "preserve" (heal other members of the group). The player can assume control of any of the companions in the current group, and at various points in the game, can return to "camp" and change the group's membership. There is therefore a high degree of flexibility in choosing with whom the player wishes to adventure.

Second, in addition to providing resources essential to the game's completion, the companions come fully equipped with their own histories, likes and dislikes, skeletons in closets, and plans or motivations, which may or may not coincide with those of the player. At key decision points in the game, companions may offer criticism or praise. They may enlist the player's assistance in performing tasks that are important to them, but are not essential for progressing in the game. As the player interacts with a companion, the companion's "approval" rating (measured on a simple scalar system which is transparent to the player) changes, and this can affect further decisions at later points in the game. For instance, at one point in the game a companion will either defend or attempt to kill the player depending on whether his approval rating is above or below a certain threshold. Companions can die permanently, or may of their own accord leave the game. The possibility exists for romantic and sexual interactions between the player and one (or more) companions. Finally, companions initiate interactions, so they are not merely passive respondents, and at various times, have amusing, critical, rude, gossipy, and flirtatious discussions with each other as well as with the player.

A key effect of this level of complexity and richness is that the player experiences emotional reactions to the companions, who are not just resources to use, but fleshed out characters who appear to have lives of their own. Companions develop during the game, and while some of

this change is contingent upon the player's actions and decisions, there is sufficient consistency and limitations that players experience largely similar interactions. As such, the game provides a good virtual laboratory for investigating how emotional links might form, and which factors drive them.

The research reported here investigated psychological characteristics of DAO players, their feelings toward the game's companions, and relationships between the two sets of variables. It sought to explore differences in the degree to which different players liked, and made use of, the companions, and whether the individual variables of player personality and motivation, and the degree to which they found the companions physically, socially, and task attractive predicted their overall feelings of liking and usefulness. We hypothesized that the degree to which players liked characters and made use of them would be a function of both player and character variables.

Method

Participants

Seventy-four participants (33 men) completed the survey. Age ranged from 19–63 (mean, 32 years; *SD,* 10.48). Thirty-eight (93%) of the women participants played the game as female characters, and 24 (72%) of the male participants played the game as male characters on their first play through.

Materials

In addition to demographic variables such as age and sex, and the sex of the player's first character in the game, a number of player characteristics were measured. Personality was assessed using the Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), which measures the Big Five personality dimensions using a 7-point response format from *disagree strongly* to *agree strongly* (example item, "I see myself as critical, quarrelsome"). Scores on the scale evidence only moderate reliability coefficients (0.40–0.73), as might be expected with only two items per dimension, but show good test–retest and validity. Motivation to play games was assessed using Yee's (2006) 10-item Player Motivation Scale, which

measures three aspects of motivation to play (achievement, social and immersion) using a 5-point response format from *not at all important* to *extremely important* (example item, "How important is customizing your character to make them look distinctive, stylish, and unique?"). Test scores have good reliability (all coefficients > 0.70). Participants' feelings of attraction toward companions were assessed using an adapted version of McCroskey and Richmond's (1996) Measure of Interpersonal Attraction (MIA), a 12-item scale using a 5-point response format from *strongly disagree* to *strongly agree*, measuring three components of social, physical and task attraction (example item, "I feel I know him/her personally"). Scores have good reliability (coefficients ranging from 0.66 to 0.95 across studies). In the adapted version used here, two questions assessed each of the three components, and those were reworded to make them relevant to the game environment. The adapted MIA (henceforth aMIA) was completed once for each companion for whom the participant provided data.

An optional section asked participants to provide general observations about each companion. In the main part of the survey, participants could select from all 10 companions, and were free to decide for whom and in which order they answered the more detailed questions. Each companion had a separate section of the survey, in which participants were asked how much they liked each companion, rated on a 7-point scale from *hate* to *adore or love*, and how much time they spent adventuring with each companion, rated on a 6-point scale (0%, 1–25%, 26–50%, 51–75%, 76–99%, and 100%). The latter question was included as an overall indicator of how useful they found each companion.

Procedure

An online survey tool (www.surveymonkey.com) was used to present questionnaires and collect data. Participants were recruited through posts on gaming websites (four online forums devoted to the game), and direct contacts from large online guild web pages (a total of six, large multigame guilds whose web pages included specific sections for DAO). Forum and guild post recruitment messages were identical, and asked potential participants whether they were interested in sharing their experiences of

playing the game. They were informed that the online survey was entirely voluntary and had been assessed by the University's ethics committee, that they could withdraw at any time, and that all information provided was anonymous. They were informed that some of the questions would be about the game and its associated companions, and others would concern the players themselves. It was emphasized that there was no reward for participation, and the researchers had no commercial interest in or links with the game's developers. Participant IP addresses were recorded in order to avoid multiple responses from the same participant.

The survey consisted of initial demographic questions followed by a series of questions asking about the participant's specific experiences of playing the game. Following this, participants completed the TIPI (Gosling, Rentfrow, & Swann, 2003) and the Player Motivation Scales (Yee, 2006), and then provided responses to as many companions as they desired.

Statistical Analyses

Alpha was set to 0.05 in all analyses, with adjustment for multiple comparisons as necessary. Correlational analyses were used to investigate effects of age, and to examine relationships between the different participant measures (a total of 48 correlations, alpha adjusted to 0.005; see Nyholt, 2004). T tests were used to examine sex differences in terms of player personality, motivation, and liking, and for time spent adventuring with the companions (a total of 24 t tests, alpha adjusted to 0.002 using Bonferroni correction). ANOVA was used to investigate differences in the levels of attraction toward the companions. Finally, hierarchical multiple regression was used to investigate whether overall liking, and time spent adventuring for each companion could be predicted from the other measures (two sets of 8 regressions, alpha adjusted to 0.006). For the hierarchical regressions, the first block of variables included participant Big-Five personality scores from the TIPI; Block 2 consisted of player motivation (social, immersion, and achievement); and Block 3 was comprised of aMIA scores (social, physical, and task attractiveness). The decisions about block order were made on theoretical grounds, as we felt it was important to account for the pervasive effects of personality before

the less general effects of motivation, and the companion-specific effects of attraction.

Results

From the set of 10 companions, two received low rates of response (fewer than 20 participants) and were excluded from the analyses reported here. The modal number of companions for whom participants provided data was four (mean, 4.23). The overall mean liking score across all eight companions was 4.7 (measured on a 7-point scale), and the mean liking scores for individual companions ranged from 4.5 to 5.9. The time-spent-adventuring score ranged from 1.7 to 4.0 (measured on a 6-point scale, representing a range from less than 25% to over 50%; as more time spent adventuring with one companion is associated with less time spent with others, overall values for this variable are meaningless).

Women participants scored higher on the personality dimension of neuroticism, $t(72) = 2.68$, $p < .002$; men 2.7, women 3.7, and on immersion motivation, $t(72) = 3.99$, $p < .002$; men 3.4, women 4.1, and lower on achievement motivation, $t(72) = 4.25$, $p < .002$; men 3.4, women 2.6, than men did. No other comparisons of participant measures reached significance. With regard to the companions, women rated all except two as more likable than men did (see Table 1). The two exceptions, where men rated the companions more likable, were the two who were young, female, and attractive (see Table 1 for brief descriptions of companions). Age of participant did not correlate with liking or time spent adventuring for any of the companions (all rs < 0.2, $p > .005$). Other intercorrelations among variables are presented in Table 2. Social and achievement motivation were correlated ($r(72) = 0.32$, $p < .005$), as were immersion motivation and overall liking ($r(72) = 0.39$, $p < .005$), and immersion motivation with neuroticism ($r(72) = 0.33$, $p < .005$). There were moderate associations between some of the personality dimensions (openness with extraversion, and conscientiousness with neuroticism; $r(72) = 0.37$ and 0.39, respectively, $p < .005$).

As the number of women who played the game as men was low, it was not possible to perform analyses treating player sex and character sex as crossed variables (the proportion of men and women who played as the opposite sex was significantly different; $\chi^2(1, N = 74) = 30.99$, $p < .05$, with a greater proportion of men than women choosing to play as opposite sex characters). A t test was performed on male participants, with sex of character as the independent variable and liking as the dependent variable. For one companion (Companion 4 in Table 1, whom women rated as less likable than men did), men playing as men found her less likable than did men playing as women, $t(31) = 2.07$, $p < .002$; men playing as men 5.17, men playing as women 6.22.

With regard to attractiveness of the companions, a repeated measures ANOVA was performed with the three levels of attraction (social, physical, and task) as the three levels of the independent variable. There was a significant effect of type of attraction, $F(2, 146) = 37.09$, $p < .05$, and post hoc pairwise comparisons using Bonferroni-corrected t tests revealed that companions were seen as significantly more task attractive (mean rating = 1.93) than socially or physically attractive (mean ratings 1.62 and 1.63, respectively, a nonsignificant difference).

Separate hierarchical regressions were performed on liking and time spent adventuring for each of the eight companions (the two outcome variables shared 9–61% of their variances across companions, with correlations ranging from 0.29 to 0.68). In all analyses, tolerances were above 0.2, and variance inflation factors were below 5 (highest was 3.9), indicating that there were no issues of multicollinearity (Tabachnik & Fidell, 1996). A summary of the significant predictors from each regression can be seen in Table 1.

Discussion

The data reported here suggest that virtual characters may be genuinely liked, and even loved, by the real people with whom they interact. Participants consistently rated one companion (companion one in Table 1) very highly on the general scale of liking, and 45% used the highest rating of "adore or love," suggesting that real and meaningful emotions were experienced toward him. Other companions received high ratings, and the emotions and attachments formed with virtual people seem strong and

Table 1
Mean Scores for Liking and Time Spent Adventuring by Sex of Participant, With Hierarchical Regression Predictors for All Companions

Companion[1]	Liking[3]			Time spent adventuring[4]		
	Overall (M, W)	Model Rsq	Predictor variables (Beta weights)	Overall (M, W)	Model Rsq	Predictor variables (Beta weights)
1. Male, attractive, "hero," vulnerable, troubled	5.9 (M = 4.9, W = 6.7)	0.52	Immersion motivation (0.42), Task attraction (−0.47)	4.0 (M = 3.3, W = 4.7)	0.64	Openness (0.19), Conscientiousness (0.29), Neuroticism (0.27), Immersion motivation (0.19), Social attraction (−0.16), Task attraction (−0.70)
2. Female, attractive, cynical, dark agenda, young	5.1 (M = 5.5, W = 4.8)	0.54	Physical attraction (0.39), Social attraction (0.40)	2.9	0.58	Conscientiousness (−0.30), Physical attraction (0.45)
3. Male, noble blood, manipulative[2]	2.5			2.0		
4. Female, attractive, otherworldly, young	5.1 (M = 5.5, W = 4.8)	0.63	Physical attraction (0.39)	2.9 (M = 3.4, W = 2.4)		
5. Male (dwarf), funny, drunkard	4.8	0.77	Social attraction (0.50)	1.8	0.79	Openness (−0.61), Physical attraction (0.59)
6. Nonhuman, uncertain sex[2]	5.1			2.1		
7. Male, dogmatic, reticent, complex, troubled	4.5 (M = 4.1, W = 4.9)	0.82	Openness (−0.43), Achievement motivation (0.63), Physical attraction (0.43)	1.7		
8. Female, wise, matronly, judgmental	4.9 (M = 4.3, W = 5.4)			3.4 (M = 3.0, W = 3.7)	0.75	Task attraction (0.69)
9. Male, flirtatious, complex, untrustworthy	5.0 (M = 4.1, W = 5.7)	0.65		2.4 (M = 1.9, W = 2.7)		
10. Dog, unconditionally loving to the player	5.4 (M = 5.1, W = 5.7)	0.74	Conscientiousness (0.56)	1.7		

[1] Descriptions of companions are indicative comments taken from participant responses. Ordering of companions is arbitrary. [2] Companion received a relatively small number of responses from participants, and was not included in statistical analyses. [3] Separate values are provided for men and women (M, W respectively) participants, where the difference was significant (higher scores indicate more liking for companion). Nonsignificant regression models are not listed. [4] Separate values are provided for men and women (M, W respectively), where the difference was significant (higher scores indicate more time spent adventuring with companion). Nonsignificant regression models are not listed.

Table 2
Intercorrelations Between Participant Measures

	C	E	A	N	Ach	Soc	Imm	Overall liking
Openness	.26	.37*	.01	−.09	.01	.00	.14	.19
Conscientiousness		.19	.21	−.39*	.11	.36*	−.11	.27
Extraversion			−.10	−.16	−.03	.19	.13	.02
Agreeableness				−.22	−.04	.16	−.09	.26
Neuroticism					−.13	−.12	.33*	.05
Achievement motivation						.32*	−.18	−.21
Social motivation							−.06	−.02
Immersion motivation								.39*

Note. Ach = achievement motivation; Soc = social motivation; and Imm = immersion motivation.
* $p < .005$.

authentic, as scores for liking were high for a number of the companions. This replicates previous findings in this area (Scholl & Tremoulet, 2000), and supports the legitimacy of carrying out research on relationships in virtual environments.

In line with recent research and data, it is clear that video games are no longer the sole preserve of young men (Entertainment Software Association, 2011). Indeed, women participants formed a majority in the sample reported here, and there was a considerable age range in both sexes. It is interesting to note that while a substantial proportion of men opted to play through the game as female characters, only a very small proportion of women chose to play as men. This may reflect an example of the "Lara phenomenon" (Jansz & Martis, 2007), whereby strong female characters (in particular heroines, along the lines of the eponymous Lara Croft) are seen as attractive, and also as a (welcome) change from the predominantly male protagonists offered by most games. As such, they offer novel and attractive options for both men and women players, resulting in an asymmetry in the likelihood of men and women choosing to play as the opposite sex. The default choice of a same-sex character becomes a slightly less obvious one for men, not so for women.

It is also possible that men and women use gaming media, and RPGs in particular, for slightly different reasons. As Oatley (2004) has persuasively argued, many forms of media offer imaginary environments and situations within which people can explore or "simulate" new emotional responses. Some of the consequent emotions may serve important behavioral and cognitive functions, such as the creation of more novel and creative forms of problem solving (Fredrickson, 2003). The opportunities for emotional exploration in the context of playing as a member of the opposite sex may be more attractive to men than to women, as they provide men with a more novel and unfamiliar set of experiences and possibilities.

Whereas creating appealing virtual characters may once have been a matter of determining what was attractive to adolescent males (a relatively straightforward task, as men tended to like young attractive female companions more than women), the heterogeneity of the gaming population demands a more detailed understanding of virtual interpersonal attraction. The results reported here present a complex and nuanced account of why game players like virtual characters. By adopting an approach that assesses characteristics of both players and companions, it becomes possible to map some of the ways in which real people come to like, and even love, virtual ones. For sure, physical attraction for both female and male virtual characters is an important component, but it is far from ubiquitous, and both social and task attraction also play important roles. On average, companions were rated as more task attractive than socially or physically attractive, and task attraction appears as a predictor of liking (as opposed to time spent adventuring, where its obvious utility might be expected to be manifest) for one companion. It is interesting to note however, that in this case, task attraction was inversely associated with overall liking, that is, the more useful the companion was considered, the less he or she was liked overall. This hints at complex relationships between the individual components of attraction and overall feelings of

liking. Social attraction also plays a role in predicting both liking and time spent adventuring, which is perhaps surprising considering that, although the companions are believable, they are nonetheless automata producing scripted responses to the players' actions. As such, they may not be perceived as social creatures, an observation which may explain why social motivation did not predict any of the outcome measures. Single-player games such as DAO offer no "real" opportunities for social interaction, unlike massively multiplayer online games, for which the Player Motivation Scale (Yee, 2006) was originally designed, and therefore do not satisfy social needs. Both task and immersion motivation predicted both outcome variables for at least one companion.

Player personality is also an important factor, although there were no clear patterns across companions. Of the Big-Five dimensions, conscientiousness, neuroticism, and openness were the only significant predictors; for a limited subset of the companions, all three predicted time spent adventuring, and conscientiousness and openness predicted liking. Again, there was a mixture of positive and negative associations, with conscientiousness and openness both predicting time spent adventuring positively for one companion, and negatively for another.

There were a number of limitations of the current study. Perhaps the most important lies in the lack of a measure of the companion's personality, and the importance of similarity in interpersonal attraction could only be investigated in a limited manner. We also did not explore the nature of the avatar created by the participants. Customization of the character in many RPGs is a complex process, often presenting the player with a bewildering set of options, which allow fine tuning of almost every aspect of the character's appearance. Although some evidence points to the frequent choice of avatars as "ideal" versions of their creators (Bessière, Seay & Kiesler, 2007), there is clearly much work still to be done on the ways in which people choose to present themselves in virtual worlds, and the factors which lead to, or are associated with, the decision to present something radically different (as in the choice of an opposite sex avatar). As this form of social presentation becomes more common and widespread, understanding its nature becomes ever more important.

The nature of the sample was also somewhat limited (the game has sold over three million units), and participants were self-selected from those whose interest in the game lead them to peruse online sites associated with it. The sample could therefore be described as both knowledgeable and enthusiastic about the topic. Notwithstanding, there was considerable variation in age, good balance in terms of sex, and sufficient range in personality and motivation scores to yield a number of significant effects.

In summary, virtual characters evoke strong feelings, and with increasing realism of both graphical and psychological characteristics, designers and researchers need to focus not just on virtual characters' appearance, but on their utility, and how both of these are filtered through the lens of player motivation and personality. Liking, in its varied forms, arises in the psychological space between the virtual and the real, and engineering likable virtual people with whom real people will fully engage means attending to not just physical appearance, but also how they help and hinder, whether they are friendly or hostile, and how all these are perceived through the variety of characteristics and motivations that real people bring with them.

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