

Select Your Character: Individual Needs and Avatar Choice

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Avatars represent the self in virtual spaces, such as videogames, but little is known about how we choose them. Here, we propose that avatars might help to satisfy psychological needs, in addition to serving other functions, with choice influenced by whether an avatar can fulfill these needs. Those higher in Need for Warmth should be drawn to avatars perceived as warm, and the same might be true for those high in Need for Competence and the perceived competence of avatars. We asked 287 university students to rate videogame avatars on a variety of dimensions, including warmth and competence, and to also report on their needs. Using multilevel models, we demonstrated that avatars that were perceived as warmer were more likely to be selected than those that were not, and, as predicted, this relationship was stronger for individuals higher in Need for Warmth. Avatars perceived as more competent were also more likely to be chosen than those that were not, but this was not moderated by Need for Competence. Choice of videogame characters is thus partly based on an alignment with some, but not all, psychological needs.

Public Policy Relevance Statement

We propose that one's choice of digital avatar is based in part on the match between individual needs and the perception of that avatar's propensity to fulfill those needs. We find that those higher in Need for Warmth are more likely to choose avatars they see as warm to represent themselves.

Keywords: digital avatars, psychological needs, personality traits, videogames

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The interactivity of many virtual environments, including videogames, is afforded by the use of an avatar. This interactivity is likely why avatars play an important role in media outcomes such as character

identification (Turkay & Kinzer, 2014), enjoyment (Rogers et al., 2016), and flow, an immersive and pleasurable sense of focus (Soutter & Hitchens, 2016). Many virtual environments offer users either a choice of avatar or the ability to customize avatars, and these choices can signal aspects of our personalities to others (Bélisle & Bodur, 2010; Fong & Mar, 2015). However, the processes that determine avatar choice and customization are not fully understood. One possibility is that using an avatar could help to satisfy psychological needs, in addition to other functions, and so people base their choice of an avatar at least partly on what seems best for fulfilling important needs. For example, an individual high in Need for Competence may choose an avatar in part because she perceives it as being the most competent. In the present study, we evaluate whether avatar choices reflect the psychological needs for warmth and competence. That is, are avatars chosen, in part, based on an alignment between perceptions of the warmth or competence of an avatar and one's own psychological needs for warmth and competence? And could this occur based on the appearance of the avatar alone, with no reference to a character's skills or abilities?

Avatars as Self-Representation in Virtual Environments

Avatars can range from simple static images (e.g., in forums and chats) to visually complex and controllable characters (e.g., in

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All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was conducted with the approval of the York University Ethics Review Board (Approval 2014-328). Informed consent was obtained from all individual participants included in the study.

 The study's materials are available at osf.io/hwp4c

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videogames). Different environments afford varying degrees of control over avatar appearance. Some environments assign users a prefabricated avatar, whereas others allow users to control every aspect of their avatar's appearance, with the latter increasing engagement (Bailey et al., 2009; Cordova & Lepper, 1996; Foshee & Nelson, 2014; Lim & Reeves, 2009). Being able to choose one's avatar might also increase engagement by inducing a feeling of agency. Moreover, our choice of avatar can shape our behavior in virtual environments, with people acting more in line with how they think their avatar should act based on the avatar's appearance (Peña, 2011; Peña et al., 2009; Yee & Bailenson, 2007). Thus, choice of avatar has important consequences for behavior in virtual spaces.

Choice might also serve another objective: reflecting the user's identity. In virtual environments, avatars can communicate rich information about the self to others. This is especially true when there are limited opportunities to communicate using nonverbal cues (Walther, 1993). In addition, avatars can act to affirm one's own identity, as individuals tend to prefer engaging with self-relevant stimuli. For example, individuals pay more attention to avatars that physically resemble themselves relative to those that look similar to strangers or celebrities (Seo et al., 2017). This suggests that individuals may prefer to be represented by avatars that are consistent with their real-world attributes.

Importantly, similarity between avatars and users is not limited to physical resemblance but also encompasses psychological attributes such as trait personality. Although users sometimes explore different identities via their avatar choices (Klimmt et al., 2009), on average, avatars seem to be congruent with users' true personas and part of the extended self (Belk, 2013). As such, on average, avatars are unlikely to be radically different from an individual's true identity or ideal self (Bessière et al., 2007; Ducheneaut et al., 2009; Dunn & Guadagno, 2012; Przybylski et al., 2012). Research has confirmed this idea, with customized avatars being perceived as closely related to the self-concept of users (Chandler et al., 2009). Avatars can also accurately convey a user's individual personality traits (Bélisle & Bodur, 2010), as well as their overall personality profile (Fong & Mar, 2015). Thus, avatars often accurately reflect the interior qualities of users, be it their actual self or their idealized self (Przybylski et al., 2012). For this reason, avatars might also reflect related aspects of the self, such as core psychological needs.

Need Satisfaction and Interactive Media

Media interactivity increases the extent to which engagement satisfies needs (Tamborini et al., 2011). Thus, videogames and avatars are particularly well-suited for this purpose (Przybylski et al., 2010). Indeed, the simple act of choosing an avatar is associated with increased feelings of agency, a core human need (Deci & Ryan, 2000). What is less understood, however, are the motivations behind how individuals choose avatars. Specifically, does avatar selection reflect an individual's psychological needs? And which psychological needs are avatars particularly well-suited to satisfy? We aim to address these questions in the present work.

Past research has found that elements of videogames, such as avatars, may contribute to the satisfaction of the needs identified by self-determination theory (SDT; Przybylski et al., 2010). SDT (Deci & Ryan, 2000) suggests that many behaviors are motivated

by a desire to satisfy basic psychological needs, which then contributes to well-being. The SDT focuses on three needs: (a) autonomy, the need to exert control over one's life and to act in harmony with one's identity (Deci, 1971); (b) relatedness, the need for social connection and warmth (Baumeister & Leary, 1995); and (c) competence, the desire to gain mastery and control outcomes (White, 1959). Videogames are particularly good for satisfying these needs (Przybylski et al., 2010), as they feature myriad elements that relate to need satisfaction, such as achievement signifiers (e.g., badges, leaderboards; Sailer et al., 2017), competition (Kazakova et al., 2014), and narratives (Bormann & Greitemeyer, 2015). Increasing the videogame features that highlight autonomy and competence also increases player engagement (Peng et al., 2012), which in turn predicts game enjoyment (Tamborini et al., 2011). The satisfaction of needs in videogames can also help to create meaningful and fulfilling experiences (Oliver et al., 2016) and is also linked to the motivation to play these games. For example, individuals who have their needs threatened will selectively seek out videogames that promote the satisfaction of these same needs (Reinecke et al., 2012). In addition, those who identify as heavy gamers also score higher on the SDT needs (Neys et al., 2014), and these needs can influence game choice along with in-game behavior (Ryan et al., 2006). Ample research has therefore demonstrated that the SDT needs are a useful framework for understanding videogames and is a strong foundation for investigating why players might select certain avatars.

Although research has shown that videogames satisfy some psychological needs, less is understood about how these needs shape avatar perceptions and engagement. The variety of characters means that certain avatars may be more appealing to certain individuals. For example, a character who is a "healer" may be more appealing to someone high in agreeableness (Park & Henley, 2007). But can the visual cues embedded in avatars, in the absence of explicit information regarding roles or abilities, also influence avatar choice? In this study, we investigate whether an avatar's appearance affects whether a user chooses it based on whether that avatar is perceived as likely to help satisfy the important psychological needs of warmth and competence.

Need Satisfaction and Avatars

Avatars seem particularly well-suited to satisfying the needs for warmth and competence. Warmth and competence play important roles in social categorization and liking, because they give us an idea of an individual's goals and how effectively they will pursue those goals (Fiske et al., 2002). Because we anthropomorphize nonagentic targets such as avatars (Gray et al., 2007; Nass & Moon, 2000), treating them as if they were real social agents, we are likely to evaluate avatars in terms of warmth and competence as well (Fiske et al., 2002). And, just as judgments of competence and warmth are critical in how we perceive others, so too are they likely to impact how we evaluate and select avatars. Indeed, individuals generally prefer avatars high in perceived warmth and competence because they are seen as more believable (Demeure et al., 2011). But these characteristics might also be differentially salient to different users, with users perhaps choosing avatars that might help satisfy their important needs. A friendly avatar, for example, might help an individual satisfy the need for relatedness, as traits ascribed to avatars are often extended to their users

(Nowak & Rauh, 2008). In summary, individuals may select avatars based on their perceived warmth and competence, aligning these with their own needs for warmth and competence. Once chosen, these avatars may become part of the extended self. We should stress, however, that there are undoubtedly other important determinants of avatar choice. However, given evidence that need satisfaction influences aspects of game choice and behavior (Przybylski et al., 2010; Ryan et al., 2006; Tamborini et al., 2011), it is likely that need satisfaction also influences avatar choice.

The Current Study

This study examines whether perceptions of avatars interact with psychological needs to influence evaluations. Are avatars chosen based, in part, on alignment with psychological needs? Because warmth and competence influence evaluations of others (Fiske et al., 2002), we hypothesized that avatars perceived as warmer and more competent would be evaluated more positively. More importantly, we expected that this relationship between avatar traits and desirability would be moderated by psychological needs. Specifically, avatars rated as high in warmth will be more desired by individuals also high in Need for Warmth. Similarly, avatars high in competence will be more desired by individuals also high in Need for Competence. To evaluate this possibility, we asked participants to rate a host of avatars on a variety of metrics, including warmth, competence, and likelihood of choosing this avatar.

We also included a number of relevant control variables, by collecting ratings of other factors not of interest that might also influence avatar choice: (a) avatar attractiveness, which increases the likelihood of receiving help from other players (Waddell & Ivory, 2015); (b) avatar gender and masculinity/femininity, which may lead to the application of gender stereotypes (Cornetto & Nowak, 2006); (c) perceiver gender and whether it matches that of the avatar; (d) avatar anthropomorphization (Banks & Bowman, 2016; Nowak & Biocca, 2003); and (e) avatar familiarity, to control for preexisting opinions or attitudes regarding a target avatar.

Method

Participants

Psychology undergraduates were recruited at a large Canadian university and received partial course credit as remuneration. Our goal was to collect at least 250 participants during the semester, as this is when correlations estimates begin to stabilize (Schönbrodt & Perugini, 2013). The initial sample consisted of 359 participants prior to data cleaning. Seven participants were removed for not consenting, and 65 participants were removed due to incorrect responses on any of the three inattentive responding items we included (Marjanovic et al., 2014).¹ All data cleaning was completed prior to data analysis. The final sample included 287 participants (94 male) between the ages of 16 and 30 ($M_{\text{age}} = 19.30$, $SD_{\text{age}} = 2.42$).

Materials

Avatar Stimuli

Avatars were selected from commercially available videogames to realistically capture the variety of avatars available to users and

increase ecological validity. To maximize the variability in these options, avatars were collected so that differences in age, gender, physique, race, and anthropomorphization were present across the pool. In total, 88 avatars were included: 47 were male, 35 were female, and six were gender neutral (all stimuli publicly available: osf.io/hwp4c).

Avatar Ratings

Participants rated avatars on their perceived warmth and competence using eight items (four items per trait). These items were derived from the perceived warmth and competence scales developed by Fiske and colleagues (2002).² An example item for warmth is, "How likeable is this character?" An example competence item is, "How competent is this character?" All items were rated on a scale ranging from 1 (*not at all*) to 5 (*very*).

To evaluate preference for each avatar, participants were asked, "How likely are you to choose this character to represent yourself in an online context?" Participants responded on a scale ranging from 1 (*not at all likely*) to 5 (*very likely*). We asked participants for their behavior in a generic "online context" to avoid any potential moderating effect of context.

Avatars were also rated on several additional characteristics that may influence their evaluation, to be controlled for during the statistical analysis. These included familiarity with the avatar, perceived masculinity/femininity, attractiveness, and how humanoid the avatar appears to be. Each of these traits was rated on a 5-point scale (e.g., 1 = *not at all humanoid* to 5 = *very humanoid*). A full listing of all items is available on our OSF, along with a table of the average ratings of each avatar (osf.io/hwp4c). This spreadsheet also provides mean ratings for each gender group and identifies the avatars with the lowest and highest ratings in each category.

Need for Warmth

We measured individual differences in needs to explore these as a potential moderator of any effect. Individual differences in Need for Warmth were assessed using the following three measures, all related to a desire for social affiliation: (a) Need to Belong (NTB), (b) the Compassion aspect of the Big Five Aspect Scale (BFAS), and (c) the Connect subscale of the Inventory of Interpersonal Strengths (IIS), each discussed in turn. A composite measure of Need for Warmth was calculated by averaging across all three scales.

Need to Belong. The 10-item NTB scale assesses personal desires for social affiliation and group acceptance (Leary et al., 2013). Higher scores on this scale relate to traits associated with seeking social contact (i.e., extraversion, agreeableness) as well as emotional reactivity in response to rejection. An example item is, "I try hard not to do things that will make other people avoid or reject me." Participants indicated their level of agreement on a scale ranging from 1 (*not at all*) to 5 (*extremely*). Scores on the NTB scale have good construct validity and good internal reliability, with Cronbach's α ranging from .78 to .87 (Leary et al., 2013).

¹ Three inattentive responding items were presented throughout the questionnaire. Each item asked participants to select a particular response (e.g., "For the following question, please choose 'Agree.'").

² Items were altered to refer to the videogame character instead of a social group. Of the four competence items used by Fiske and colleagues (2002), all were used except for the item measuring independence. All four warmth items were used.

Big Five Aspect Scale—Compassion Subscale. The Compassion aspect of the Big Five trait of Agreeableness is characterized by the motivation to pursue and value emotional affiliation with others. The BFAS Compassion subscale consists of 10 items, with an example item being, “Take interest in others’ lives” (DeYoung et al., 2007). Participants indicated the extent to which each statement was self-descriptive using a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores on this scale have good internal reliability, with the authors reporting a Cronbach’s α of .84 and a test–retest correlation of .91 (DeYoung et al., 2007).

Inventory of Interpersonal Strengths—Connect Subscale. The IIS measures two dimensions: submission/dominance and warmth/hostility (Hatcher & Rogers, 2009). These two dimensions make up the interpersonal circumplex, which can be divided into octants that reflect varying combinations of the two dimensions (Wiggins, 1996). The Connect subscale consists of eight items that assess the tendency to be high in warmth (e.g., being friendly) while remaining neutral regarding the submissiveness and dominance. An example item is, “I feel good when I’m with other people.” Participants rated how self-descriptive each item was on a scale ranging from 1 (*very little like me*) to 6 (*almost always like me*). The authors of the IIS report a Cronbach’s α of .93 for scores on the Connect subscale and found that it demonstrated convergent and discriminant validity based on the Big Five traits (Hatcher & Rogers, 2009).

Need for Competence

Individual differences in Need for Competence were assessed using the following four measures related to a desire for mastery: (a) the Lead subscale of the IIS, (b) the Achievement subscale of the Personality Research Form (PRF), (c) the Personal Standards subscale of the Multidimensional Perfectionism Scale (MPS), and (d) five items from the International Personality Item Pool (IPIP) that measure need for achievement, each discussed in turn. A composite measure of Need for Competence was calculated by averaging all four scales.

IIS—Lead Subscale. The Lead subscale of the IIS (Hatcher & Rogers, 2009) consists of eight items that assess behaviors and traits related to dominance but neutral with regard to warmth and hostility. An example item is, “I can take charge in a group.” Participants rated each item on a scale ranging from 1 (*very little like me*) to 6 (*almost always like me*). Scores on the IIS have a Cronbach’s α of .85 for the Lead subscale and demonstrate convergent and discriminant validity with respect to the Big Five traits (Hatcher & Rogers, 2009).

Personality Research Form—Achievement Subscale. The PRF (PRF-E third edition, Jackson, 1984) provides measurement of personality traits based on Murray’s (1938) framework of personality. The Achievement subscale consists of eight statements describing personal characteristics related to aspirations to accomplish difficult tasks and willingness to work hard to achieve one’s goals. An example item is, “I enjoy difficult work,” and we asked participants to indicate the extent to which they agreed with each statement on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Scores on the scale have high reliability and demonstrate good convergent and discriminant validity (Mayes & Ganster, 1983).

Multidimensional Perfectionism Scale—Personal Standards Subscale. The MPS is a comprehensive measure of behaviors and cognitions related to perfectionism (Frost et al., 1990). The

Personal Standards subscale specifically assesses tendencies to hold extremely high standards for personal performance and consists of seven items. An example item is, “It is important for me to be thoroughly competent in everything I do,” and agreement with each statement was rated on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). The authors of the MPS report an α of .83 for scores on the Personal Standards subscale, and the scores exhibit convergent validity (Frost et al., 1990).

International Personality Item Pool—Need for Achievement.

Need for Achievement was measured using five items from the IPIP (Goldberg et al., 2006). This scale assesses the extent to which individuals are intrinsically motivated to perform well or to improve their performance (McClelland, 1987). An example item is, “I plunge into tasks with all my heart,” and agreement with each statement was rated on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). These five items have been previously shown to have good fit in a single-factor model (Loon & Casimir, 2008).

Procedure

This study was administered using online survey software (www.qualtrics.com) that randomly selected a subset of six avatars from the stimulus set to present to each participant, balancing the presentation such that each avatar was presented roughly the same number of times. As a result, after data cleaning, each avatar was rated by between 15 and 23 participants. The mean intraclass correlation indicating agreement between participants who rated a particular avatar was high, ICC (2, k) = .76. For each avatar, participants saw an image of the avatar and were asked to rate their impressions of and preferences for that avatar. Subsequently, participants completed the individual difference measures of Need for Warmth and Need for Competence, as well as a demographics measure.

Results

Descriptives

Descriptives and reliability statistics for the individual differences measures and avatar ratings are found in Table 1.³ A paired *t*-test indicated that, on average, avatars were rated as more competent than warm, $t(87) = -5.04$, $p < .001$, 95% confidence interval (CI) of difference [−.72, −.31]. On average, avatars were rated as feminine, humanoid, unfamiliar, and neither attractive nor unattractive.

Intercorrelations between all measures of warmth and competence, and the avatar ratings, appear in Table 2. The different measures of Need for Warmth (i.e., BFAS—Compassion, NTB, IIS—Connect) were positively associated with one another, as were the measures of Need for Competence (i.e., IIS—Lead, IPIP—Need for Achievement, PRF—Achievement, MPS—Personal Standards). Participants who rated the avatars to be more attractive ($r = .59$), familiar ($r = .16$), humanoid ($r = .29$), or feminine ($r = .28$) also rated them as warmer. Participants who rated the avatars to be more attractive ($r = .44$) or humanoid ($r = .45$) also rated them as more

³ The R syntax for all analyses is on OSF (osf.io/hwp4c). Unfortunately, we lack ethical clearance to share our data publicly, but all data will be happily provided upon request.

Table 1
Descriptive Statistics of Individual Differences and Avatar Ratings

Measure	<i>M</i>	<i>SD</i>	Omega
BFAS: Compassion	3.93	0.52	.81 [.77, .85]
Need to Belong	3.16	0.64	.78 [.73, .81]
IIS: Connect	4.71	0.94	.87 [.82, .89]
IIS: Lead	4.15	0.95	.84 [.80, .87]
IPIP: Need for Achievement	3.70	0.63	.80 [.75, .84]
PRF: Achievement	3.48	0.55	.72 [.66, .77]
MPS: Personal Standards	3.58	0.69	.85 [.82, .88]
Perceived avatar warmth	2.88	1.09	.90 [.89, .91]
Perceived avatar competence	3.40	0.97	.80 [.78, .82]
Perceived avatar attractiveness	2.48	1.29	^a
Perceived avatar familiarity	1.72	0.47	^a
Perceived avatar anthropomorphization	2.99	1.48	^a
Perceived avatar femininity	3.58	1.86	^a

Note. Hierarchical omega was calculated for each measure (95% confidence intervals presented in parentheses). BFAS = Big Five Aspect Scale; IIS = Inventory of Interpersonal Strengths; IPIP = International Personality Item Pool; PRF = Personality Research Form; MPS = Multidimensional Perfectionism Scale.

^aMeasured with a single item and therefore internal reliability cannot be calculated.

competent. Individuals who rated the avatars as warmer also tended to rate the avatars as more competent ($r = .53$).

Does an Avatar's Perceived Warmth and Competence Predict Preference for That Avatar?

To examine the relationship between avatar perceptions and avatar preference, we calculated correlations between avatar preference and avatar characteristics (i.e., perceived avatar warmth, competence, attractiveness, femininity, anthropomorphization, and familiarity). At the avatar level, warmth and competence were negatively related, such that avatars perceived as warmer tended to be perceived as less competent, and vice versa. Perceived avatar warmth was positively correlated with the likelihood of choosing that avatar, $r = .44$, $p < .001$, 95% CI [.30, .60]. Perceived avatar competence was also positively correlated with the likelihood of choosing that avatar, $r = .47$, $p < .001$, 95% CI [.31, .61]. As predicted, the warmer or more competent an avatar was perceived to be, the more likely individuals were to choose this avatar.

Other avatar characteristics were also associated with avatar preference. Specifically, avatar attractiveness ($r = .80$, $p < .001$, 95% CI [.73, .86]), familiarity ($r = .34$, $p < .001$, 95% CI [.16, .49]), and femininity ($r = .34$, $p < .001$, 95% CI [.17, .52]) were all positively correlated with the likelihood of choosing that avatar. This positive relationship between avatar preference and femininity may be due to the high proportion of females in our sample, however. Avatar anthropomorphization was not related to avatar choice, $r = .08$, $p = .48$, 95% CI [−.13, .32].

Is the Relationship Between Avatar Preference and Perceived Warmth/Competence Moderated by Individual Differences?

A series of regression models investigated whether individual differences moderated the effect of avatar perceptions on avatar

choice. Because each participant rated a subset of avatars, avatar ratings were not independent of one another. A multilevel regression model approach was therefore used, with avatars nested within participant. A random slopes model was considered, where the effects of perceived avatar warmth and competence were allowed to vary freely across participants.

We were interested in the interaction between perceived avatar warmth/competence and individual differences on avatar choice, above and beyond the influence of other factors that might influence choice. Thus, we included several control variables in each regression model: perceived avatar attractiveness, familiarity, anthropomorphization, femininity, avatar gender, perceiver gender, and whether the participant's gender matched the avatar's gender. We also included perceptions of both avatar warmth and competence in all regression models: for example, avatar competence was included in models examining the interaction between Need for Warmth and avatar warmth. Given the large number of variables included in each model, we examined possible multicollinearity. The variance inflation factor was < 4 for all variables in all models, which is within the acceptable range (Hair et al., 1995). Level 1 variables (i.e., avatar characteristics) were group mean centered, and Level 2 variables (i.e., rater characteristics) were grand mean centered. The fixed effects of the variables of interest were considered for these models.

Need for Warmth

A composite measure of Need for Warmth was calculated by averaging the scores for BFAS—Compassion, NTB, and IIS—Connect ($M = 3.93$, $SD = .53$). Avatar choice was then regressed on composite Need for Warmth, perceived avatar warmth, as well as the interaction between these two variables. The control variables were also simultaneously entered into the regression model (Table 3).

There was a main effect of individual Need for Warmth, such that Need for Warmth was positively associated with the likelihood of choosing an avatar. In other words, participants higher in Need for Warmth tended to rate avatars as more desirable, regardless of the avatar's perceived warmth or competence. There was also a main effect for perceived avatar warmth, such that avatars perceived as warmer were also more likely to be selected. The interaction between individual Need for Warmth and perceived avatar warmth was also statistically significant, indicating that the relationship between perceived avatar warmth and avatar choice was moderated by individual Need for Warmth.⁴

To decompose this interaction, we reevaluated the regression model at 1 *SD* above and below the mean for Need for Warmth (Aiken & West, 1991). As predicted, for individuals high in Need for Warmth, there was a stronger relationship between perceived avatar warmth and avatar choice ($B = .35$, $p < .001$) relative to those low in Need for Warmth ($B = .23$, $p < .001$; Figure 1).

Need for Competence

A composite measure of Need for Competence was calculated by averaging scores for the IIS—Lead, IPIP—Achievement, PRF—

⁴ Separate regression models were also estimated for each scale used to measure Need for Warmth. There was only a significant interaction for the NTB scale, although all other interactions were in the predicted direction. Details are in our Supplemental Analyses (osf.io/hwp4c).

Table 2
Correlations Among Individual Differences and Perceiver Ratings

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. BFAS: Compassion												
2. Need to Belong	.24* [.12, .35]											
3. IIS: Connect	.50* [.40, .58]	.25* [.13, .36]										
4. IIS: Lead	.13* [.01, .24]	-.06 [-.18, .06]	.58* [.50, .66]									
5. IPIP: Achievement	.14* [.02, .25]	.00 [-.12, .12]	.12* [.00, .24]	.36* [.26, .46]								
6. PRF: Achievement	.08 [-.04, .20]	.04 [-.08, .16]	.09 [-.03, .21]	.24* [.13, .35]	.51* [.42, .60]							
7. MPS: Personal Standards	.01 [-.11, .13]	.05 [-.08, .17]	.12 [-.00, .23]	.37* [.26, .47]	.55* [.47, .63]	.53* [.44, .61]						
8. Avatar warmth	.10 [-.02, .21]	.08 [-.04, .19]	.15* [.03, .26]	.05 [-.07, .16]	-.04 [-.15, .08]	.05 [-.07, .17]	-.04 [-.16, .08]					
9. Avatar competence	.19* [.07, .30]	.03 [-.09, .14]	.21* [.09, .32]	.11 [-.01, .22]	-.07 [-.19, .05]	.05 [-.07, .17]	-.04 [-.15, .08]	.53* [.44, .60]				
10. Avatar attractiveness	.08 [-.04, .19]	.02 [-.10, .14]	.07 [-.05, .18]	.07 [-.05, .18]	-.03 [-.15, .09]	.12 [-.00, .23]	.05 [-.17, .06]	.59* [.51, .66]	.44* [.34, .53]			
11. Avatar familiarity	-.05 [-.17, .07]	-.05 [-.17, .07]	-.05 [-.17, .07]	-.03 [-.15, .09]	.03 [-.08, .15]	-.00 [-.12, .12]	-.04 [-.16, .08]	.16* [.05, .27]	.09 [-.03, .20]	.14* [.03, .26]		
12. Avatar femininity	-.05 [-.16, .07]	-.05 [-.17, .07]	-.00 [-.12, .11]	-.09 [-.20, .03]	-.10 [-.22, .02]	-.01 [-.13, .11]	-.13* [-.24, -.01]	.28* [.17, .38]	.00 [-.11, .12]	.24* [.12, .34]	.08 [-.04, .19]	
13. Avatar anthropomorphization	.12* [.01, .24]	.01 [-.11, .13]	.11 [-.01, .22]	.06 [-.06, .18]	-.07 [-.19, .04]	-.07 [-.18, .05]	-.01 [-.13, .11]	.29* [.18, .40]	.45** [.35, .54]	.33* [.22, .43]	.01 [-.11, .12]	-.12* [-.23, -.00]

Note. 95% confidence intervals reported in brackets. BFAS = Big Five Aspect Scale; IIS = Inventory of Interpersonal Strengths; IPIP = International Personality Item Pool; PRF = Personality Research Form; MPS = Multidimensional Perfectionism Scale.
* $p < .05$.

Achievement, and MPS—Personal Standards scales ($M = 3.72$, $SD = .53$). Avatar choice was then regressed on this aggregate, perceived avatar competence, and the interaction term between these two predictors; control variables were also simultaneously entered (Table 4).

Individual Need for Competence was not a statistically significant predictor of avatar choice. However, perceived avatar competence was a positive predictor of avatar choice. In other words, avatars perceived to be more competent were more likely to be chosen. There was no statistically significant interaction between Need for Competence and perceived avatar competence. Counter to our predictions, the relationship between avatar competence and avatar choice did not vary based on differences in need for competence.⁵

Discussion

In this study, we investigated whether avatar preferences aligned with overarching psychological needs. Specifically, we were interested in whether avatar preferences reflected the needs for warmth and competence. We first found that avatars seen as warmer or more competent were also more likely to be chosen. This association was robust, as avatar warmth and competence both remained unique predictors of preference after accounting for several control variables (i.e., familiarity with the avatar, avatar attractiveness, anthropomorphization, femininity, avatar gender, perceiver gender, and whether the perceiver’s gender matched the avatar’s gender). These results support our hypothesis and are consistent with previous research showing that avatars are evaluated in a similar fashion to humans are evaluated (Nass & Moon, 2000; Wohlrab et al., 2009). The intercorrelations between avatar ratings also indicate that avatars are evaluated in ways similar to how we evaluate other humans (Fiske et al., 2002). For instance, ratings of avatar warmth and competence were inversely related, as is observed for social groups (Fiske et al., 2002).

We also found some evidence that avatars may contribute to the fulfillment of psychological needs, specifically the need for affiliation. Individuals with a higher Need for Warmth tended to prefer avatars that were perceived to be high in warmth. People also preferred avatars that they perceived as more competent. However, preference for these competent avatars did not depend on an individual’s Need for Competence once we controlled for other factors. Thus, our hypothesis was only partially supported: avatar preferences were found to align with some, but not all, personal needs.

High Need for Warmth motivates tendencies toward social affiliation, including behaviors that reduce the likelihood of social exclusion (Leary et al., 2013) and increase the likelihood of social connection (DeWall et al., 2008). Choosing an avatar that is perceived to communicate characteristics of interpersonal warmth may act as a strategy to approach an overarching goal of social connection. Previous research has found that traits ascribed to avatars are often extended to their users (Nowak &

⁵ Separate regression models were also estimated for each scale used to measure Need for Competence. There was no main effect of Need for Competence based on any of the specific competence scales, nor was there any significant interaction between any of the specific competence scales and perceived avatar competence. See our Supplemental Analyses (osf.io/hwp4c).

Table 3
Regressions Predicting Avatar Preference Based on Perceived Warmth

Predictor	B [95% CI]	SE	t	p
Intercept	1.53 [1.38, 1.67]	.08	20.32	<.001
Perceived avatar warmth	0.29 [0.23, 0.35]	.03	9.14	<.001
Need for Warmth	0.15 [0.00, 0.30]	.07	1.99	.047
Perceived Avatar Warmth × Need for Warmth	0.12 [0.02, 0.22]	.05	2.29	.022
Perceived avatar competence	0.28 [0.21, 0.35]	.04	8.04	<.001
Avatar attractiveness	0.12 [0.04, 0.20]	.04	2.95	.003
Avatar familiarity	0.07 [-0.05, 0.18]	.06	1.18	.237
Avatar femininity	-0.02 [-0.07, 0.03]	.03	-0.78	.435
Avatar anthropomorphization	0.01 [-0.03, 0.04]	.02	0.39	.700
Avatar gender	0.03 [-0.14, 0.21]	.09	0.38	.706
Rater gender	0.09 [-0.07, 0.25]	.08	1.07	.286
Avatar-rater gender match	0.59 [0.50, 0.69]	.05	11.88	<.001

Note. CI = confidence intervals.

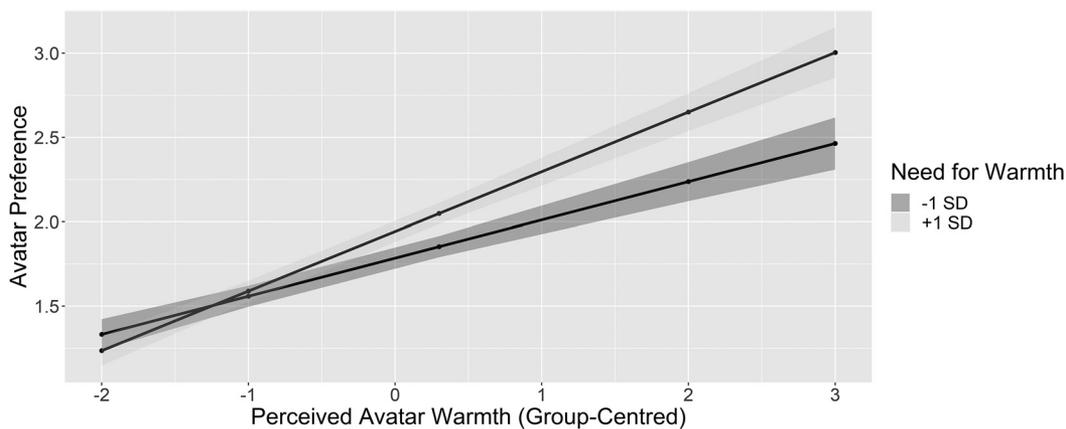
Rauh, 2008). Thus, individuals high in Need for Warmth might be drawn toward avatars that communicate warmth. Choosing a warm avatar may signal to others that the user is also warm, thereby encouraging others to approach or befriend the user. This is consistent with previous research that avatars created by agreeable individuals are more likely to elicit an intent to befriend in others (Fong & Mar, 2015). Because many virtual environments often lack rich cues, users must learn to maximize medium-specific tools to control the impression they make on others (Walther, 1993). If users can leverage avatars to successfully facilitate social interactions online, this can ultimately result in the satisfaction of goals for affiliation. It is important to note that virtual environments are now a common venue for individuals to meet others and foster meaningful social relationships (Steinkuehler & Williams, 2006). Thus, avatars may make constructs and motivations related to self-presentation and social evaluation particularly salient. Users know that avatars are a link between themselves and others within a virtual environment and for this reason it is important for users to create an avatar that communicates socially desirable traits, in addition to personally desirable traits. Crafting a socially attractive avatar can help individuals elicit friendship (Fong & Mar, 2015), which would

support the satisfaction of relatedness needs. Increasing the chances of forming social connection in online contexts is, therefore, a viable strategy to satisfy one's goals for affiliation in the modern era.

Although avatars perceived as more competent were more preferred, personal Need for Competence did not moderate this relationship. This was unexpected, as videogame engagement has primarily been associated with fulfilling the needs for competence and autonomy (Reinecke et al., 2012; Rieger et al., 2014; Ryan et al., 2006). It is possible that fulfilling one's Need for Competence is primarily related to the actions and achievements that occur within a game (Rieger et al., 2014), with issues of competence less influential during avatar selection. There appear to be limits to what traits and characteristics are readily transferred to users based on avatar appearance alone. Users may need to be successful in completing videogame objectives before being conferred any boost to feelings of competence.

An additional explanation for why Need for Warmth influences avatar choice, but not Need for Competence, pertains to the salience of competence needs in videogame contexts. Videogames are generally highly goal-oriented environments, where primary objectives often encompass the mastery of skills to overcome

Figure 1
Interaction Between Need for Warmth and Perceived Avatar Warmth, Predicting Avatar Preference



Note. Bands indicate 95% confidence intervals.

Table 4
Regressions Predicting Avatar Preference Based on Perceived Competence

Predictor	<i>B</i> [95% CI]	<i>SE</i>	<i>t</i>	<i>p</i>
Intercept	1.54 [1.40, 1.69]	.07	20.65	<.001
Perceived avatar competence	0.28 [0.21, 0.35]	.04	7.78	<.001
Need for Competence	0.01 [−0.14, 0.17]	.08	0.19	.849
Perceived Avatar Competence × Need for Competence	0.03 [−0.08, 0.15]	.06	0.56	.573
Perceived avatar warmth	0.31 [0.25, 0.38]	.03	9.50	<.001
Avatar attractiveness	0.12 [0.04, 0.21]	.04	2.95	.003
Avatar familiarity	0.02 [−0.10, 0.14]	.06	0.34	.731
Avatar femininity	−0.03 [−0.08, 0.02]	.03	−1.22	.221
Avatar anthropomorphization	0.00 [−0.03, 0.04]	.02	0.24	.810
Avatar gender	0.02 [−0.15, 0.19]	.09	0.22	.823
Rater gender	0.12 [−0.05, 0.28]	.08	1.41	.160
Avatar–rater gender match	0.55 [0.45, 0.65]	.05	10.99	<.001

Note. CI = confidence intervals.

obstacles, enemies, or game requirements (Oswald et al., 2014; Przybylski et al., 2010; Schmierbach et al., 2014). Thus, exposing participants to videogame content may make the desire for high levels of competence particularly salient. It is possible that the avatars in this study, which were obtained from actual videogames, created a context that elicits uniformly strong motivations for competence, wiping out any possibility of a moderation effect.

Limitations

A possible limitation of these studies pertains to how individuals perceived the value of these avatars. Specifically, individuals were likely aware of the fact that the avatars would not actually be used in the future to represent themselves. As a result, it is possible that participants were not highly invested in their avatar ratings. Although Belk (2013) suggests that avatars are part of the extended self, it is possible that this holds when avatars are used over time or through an intention to do so. Indeed, previous studies on the relationship between the self and avatars examined avatars that have already been in use for long periods of time (Bélisle & Bodur, 2010; Chandler et al., 2009) or avatars that will be used in a subsequent task (Kafai et al., 2010; Vasalou & Joinson, 2009). The context in which these avatars would be used was not specified. Although we believe that this broad-level evidence is valuable in its own right, future work should investigate the potential moderating role of context by exploring a range of specific contexts (e.g., single-player, multiplayer, competitive, cooperative). Different contexts are likely associated with different goals, and so participants may use different strategies for choosing their avatars (Trepte & Reinecke, 2010). For example, it may be that the perception of avatar warmth is less relevant to avatar selection in contexts that are strictly competitive.

In addition, it is worth noting that the need satisfaction framework outlined by SDT is not the only worthwhile framework for studying avatar selection. Other approaches, such as uses and gratifications theory, have been successfully used to study avatar selection and may offer additional insights over and above that of SDT (van Reijmersdal et al., 2013). Other needs, such as the need for power, may also influence avatar preference and selection (McClelland, 1987). Future work should integrate alternative motivational frameworks with that of SDT.

Conclusion

As we use virtual environments with increasing frequency, it becomes more and more important to understand how avatars relate to the self. In this study, we first demonstrate that the perceived warmth and competence of avatars predicts a stronger likelihood of choosing that avatar to represent oneself. We also demonstrate that individual differences in the Need for Warmth influence avatar choice, with those higher in this need more likely to choose an avatar that is perceived as warm. However, there appear to be limitations in how needs moderate avatar choice, with a Need for Competence having no influence in this study on avatar choices. Additional research in this area will help us to better understand how virtual selves can help satisfy our real psychology needs.

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