**Inside out: Avatars as an indirect measure of ideal body self-presentation in females**

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**Abstract**

*Prior research has shown that individuals engage in impression management online, both in a social networking context and when using avatars. However, avatar creation research often directly asks participants about their creation motivations or primes a specific social context. Such direct methodologies potentially lead to biases which may give a distorted picture of how ideal characteristics are reflected in avatars. Our research used a less explicit measure to test for the expression of ideal body image during avatar creation. Female participants created two avatars in the virtual world of Second Life. For the first, participants were instructed to design an avatar that looked like themselves. For the second, participants were given no design restrictions and could design any avatar they wanted to. This first avatar acted as a baseline, to identify which attributes were the focus of change in the second. Avatar creation order was counterbalanced across participants. When given no design restrictions, participants who showed a desire to be thinner created avatars which had a lower body mass. This desire was measured after avatar creation using a standard body image scale. The generalizability of the results is discussed in the context of suggestions for future research utilising this paradigm.*

Keywords: avatars, body image, self-presentation, impression management, virtual reality

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**Introduction**

When communicating with others, it is not surprising that people often engage in self-presentation or impression management as a means of enhancing their personal qualities (Leary & Kowalski, 1990; Schlenker, 1980). The motivation for impression management can vary from wanting to succeed in a job interview, to getting a date, to being thought of favourably by strangers (Lajunen & Summala, 2003; Rowatt et al., 1999; Tice, Butler, Muraven, & Stillwell, 1995; Weiss & Feldman, 2006). Individuals may not always be aware of this motivation yet may still attempt to influence the way others perceive them by enhancing their qualities or controlling the presentation of information about themselves, particularly in contexts where misrepresentation is unlikely to be detected.

A growing body of literature connects social behaviour in the virtual world to the real world (e.g. Kozlov & Johansen, 2010), and online impression management is a particularly important aspect of this. In chat rooms, users have been found to ‘tweak’ desirable characteristics about themselves including age, physical appearance, social status, intelligence, income and marital status (Caspi & Gorsky, 2006; Cornwell & Lundgren, 2001; Whitty, 2002). Likewise, on social networking sites (SNS), users have been shown to report their weight and age closer to their ideal, and filter their profile content to reflect their positive points, e.g. only showing attractive photos and only writing about exciting experiences (Ellison, Heino, & Gibbs, 2006; Manago et al., 2008; Strano, 2008). Note however that some research also suggests SNS users are more likely to express their *real* personality in their profiles rather than their ideal ones (Back et al., 2010). This may be due to the profile's exposure to existing real life contacts, which limits the opportunity for self-presentation enhancement because of the risk of being caught in a blatant fabrication.

Some online environments allow users to represent themselves using an avatar they design. These avatars usually allow a substantial amount of design flexibility based on user input. Some avatar creation systems even allow sophisticated fine-tuning of hundreds of characteristics from eyelash length to amount of chest hair. In real life people can communicate both actively, through mediums of speech or gesturing, and passively, through general appearance and the subtlety of body language. Both can convey messages and both can be subject to impression management. If chat rooms and SNS profiles are akin to active, direct communication, then avatars are akin to passive or indirect communication allowing users to present themselves as they see fit. One such place where avatars feature prominently is Second Life (Linden Research Inc., 2012) – a 3D virtual world emulating real life where users socialise through the medium of avatars online. While Second Life does contain some video game elements (i.e. specific goals and challenges), it is also a large open environment with relatively unrestricted social interaction. As such, it encourages users to interact with each other as they please.

While online virtual worlds undoubtedly allow people to simply exercise their creative ability, most avatar-rich online environments (Second Life, World of Warcraft, etc.) have a substantial social element to them. It is not surprising that the drive for enhanced self-presentation can lead some users to create an improved version of themselves within these virtual worlds because they can do so with little risk of detection. Indeed, Ducheneaut, Wen, Yee, and Wadley (2009) found that 60% of Second Life users reported designing an avatar based on their own characteristics, with a large number putting forward idealised versions of their true selves. When generating an avatar for a blogging site, Vasalous and Joinson (2009) showed that participants tended to create avatars that enhanced their attributes towards their reported aspirations, such as the lifestyle they wished to live or possessions they someday wished to own. Likewise, Bessière, Seay, and Kiesler (2007) showed that World of Warcraft users report choosing avatars with more favourable characteristics than their own self-rated attributes.

One possible critique of many of the aforementioned studies is that they directly asked their participants about the motivation behind their avatar creation. Such leading questions could cause results to be distorted by demand characteristics and social desirability bias (Fisher, 1993; Orne, 1962). For example, users who did not give much thought to their selection of a particular avatar attribute may believe that they did so when prompted by a leading question, or they may simply give the answer they think the researcher expects to hear. Likewise, asking about the enhancement of sensitive attributes (e.g. breast size) may lead participants to conceal their true motivations. Similarly, restricting avatar creation to a specific and narrowly defined social context can alter behaviour. For example, when Vasalous and Joinson (2009) asked participants to create an avatar for a dating context, they created avatars with attributes emphasizing attractiveness and romanticism. In contrast, when put into a gaming context attributes related to ‘coolness’ or fantasy were stressed. These results make sense; however, this type of investigative set-up may again lead participants to select avatar attributes in line with what they think the experimenter’s expectations are.

While we don’t dispute that context dependent impression management occurs during avatar creation, the extent to which ‘ideal’ attributes are infused into avatars has the potential to be obscured by the task demand and social desirability aspects of experiments emphasizing a specific, narrow context. So assessment in a more general social context is also likely to be informative. As such the goal of this experiment was to test for impression management in avatars using a paradigm designed to reduce these potential reactance effects by using a less explicit measure. We did this using a novel method whereby we asked participants to create two avatars for use in a general social context in Second Life. The first avatar (‘Self’) was designed to actually look like the participant and acted as a baseline for comparison. The second avatar (‘Any’) had no design restrictions. (The order of creation was counterbalanced across participants.) We then looked to see if the virtual attributes modified in the 'Any' avatar matched the real world attributes that participants desired to change about themselves (measured separately at the end of the experiment). This allowed us to test if the participants’ ideal characteristics were reflected in their avatars without directly asking them why they generated the avatars as they did.

For the purpose of this research, we focused on the attribute of body image in young women. Thin individuals are often stereotyped as being more attractive, healthy, and self-confident (Tiggemann & Rothblum, 1988), so it comes as no surprise that body image can be a preoccupation for many in this demographic. Between 79% and 94% of female undergraduates report being unhappy with their weight (Neighbors & Sobal, 2007; UWE, 2011) and a recent online survey by *Glamour* magazine found that 97% of the females scolded themselves over their body at least once per day; 13 times on average. Strikingly, 30% of women admitted they would sacrifice one year of their life in order to reach their ideal weight, and 10% up to five years (UWE, 2011). Given the importance of body image to young women we considered this a good attribute for assessing self-presentation, especially in a relatively unstructured online context with little implied risk of being caught exaggerating self-presentation.

We hypothesized that the real life difference between actual and ideal body image would be reflected in the difference between ‘Self’ and ‘Any’ avatars created for use in the general social context of an online virtual environment. For this study we used a standard body image scale (The Figure Rating Scale; Stunkard, Sorensen, & Schulsinger, 1983) to measure actual and ideal body image after participants had created both avatars.

**Method**

**Participants**

Forty-two female undergraduate students were recruited from a psychology department participant panel and received partial course credit for their participation in the experiment. Note, all members of the sample were female. Participants had an average age of 19.23 (*SD*= 1.23) and a BMI of 21.2 (*SD*= 2.87). On average the participants spent 18.98 (*SD*= 11.44) hours using computers and 1.04 (*SD*= 1.77) hours playing video games per week. Of the 42 participants 45.2% (*n*= 19) had heard of Massively Multiplayer Online Role Playing Games (MMORPG) and 26.2% (*n*= 11) played them on a regular basis.

**Materials**

***Avatar creation system****.* Avatars were designed using the creation tool included in Second Life. This is an online system only accessible in game. As such, avatars were created in an area of low inhabitancy to minimize the chance of interactions with other users during the design process.

For each avatar, 147 attributes were available for manipulation on a scale between 0 and 100. Eight of these were directly related to avatar body mass such as ‘body fat’, ‘thighs’ and ‘stomach’. A default avatar was created as a starting point in both conditions with all attributes set to a 50/100 starting pointwith the exception of skin tone, hair length and make-up. The midpoint for these attributes looked abnormal (i.e. almost bald with purple skin), and so the avatar was given medium length blonde hair, pink skin and no makeup. Participants were allowed to manipulate all variables on the avatar (except height, see below) so as to mask the variable of interest.

***Manipulation****.* In one condition participants were given the instruction ‘Your task is to design an avatar *which resembles yourself as closely as possible* [italics added] for you to use in a social situation in Second Life’ before creating an avatar. We refer to this as the ‘Self' avatar condition. In the other condition, participants were given the instruction ‘Your task is to design an avatar *of any human form you wish* [italics added] for you to use in a social situation in Second Life’ before creating an avatar. This was the ‘Any' avatar condition. All participants completed both conditions, and the condition order was counterbalanced across participants. The purpose of the 'Self' avatar was to obtain a baseline measure of virtual mass which could be compared to that assigned to the ‘Any’ avatar. Both sets of instructions asked participants not to manipulate the attribute ‘height’ as this had a warping effect on other attributes.

***Measures***. There were two variables used in analysis. The first was obtained by calculating the difference in virtual body mass between the ‘Self’ and ‘Any’ avatars. Each avatar's mass was calculated by combining the values of all avatar weight-related variables. The second was another difference score obtained using the Figure Rating Scale (FRS; Stunkard, Sorensen, & Schulsinger, 1983). The FRS is a widely used body image tool (Fallon & Rozin, 1985; Thompson & Altabe, 1991) consisting of nine silhouettes of women with varying body mass, spaced out horizontally, and ordered from one to nine with silhouettes increasing in body mass by number. Participants were asked to use the FRS to select which silhouette best represented the participant’s current body type (FRS*Self*), and which represented their ideal body type (FRS*Ideal*). Differences between these measures allowed participants to be separated into ‘image change desire’ groups during analysis (see below).

***Additional Measures****.* A final questionnaire assessed age, weekly computer and video game usage, as well as MMORPG knowledge. These were obtained for use in analysis as control variables.

**Procedure**

Participants were given an introduction to Second Life and a brief tutorial showing them how to use the avatar creation system. When the participant indicated confidence in using the avatar interface, they were given a condition-appropriate instruction form asking them to create either an ‘Any’ or ‘Self’ avatar as described above. Participants completed both types of avatars in a counterbalanced order, and started from the same default avatar both times. They were given 20 minutes to complete each avatar in private. At the end of the experiment, participants also completed a questionnaire containing the FRS and additional measures. This was also completed in private. All participants received a full verbal debrief.

**Results**

Of the 42 participants, 20 created the ‘Self’ avatar followed by the 'Any' avatar. The order was reversed for the other 22 participants. The Second Life creation system contained 8 variables related to body mass: body thickness, body fat, breast size, love handles, stomach, hip width, thighs and bottom which could all be manipulated from 0-100. These values were summed for each avatar. The average body mass for the ‘Any’ avatar was 220.4 (*SD*= 50.7) and 241.7 (*SD*= 60.3) for the ‘Self’ avatar. The average FRS*Self* rating was 4.17 (*SD*= 1.28) and FRS*Ideal* was 3.25 (*SD*= 0.72).

Our participants were divided into two groups: those whose ideal body image (based on the FRS scale) matched their current body image or was larger (*n*= 14) and those whose ideal body image was thinner (*n*= 28). The former group was not split down into ‘matched’ and ‘thinner’ groups as this would have produced samples too small for meaningful analysis. The difference in assigned virtual weight between the 'Self' and 'Any' avatars was significantly different between the groups (*F*(1,40) = 5.637, *p*= 0.02, *ηp2*= 0.124; or *t*(40) = 2.374, *p =*0.02): Participants who wished to stay the same or become larger in real life, created an 'Any' avatar with a small change in weight compared to their 'Self' avatar (*M*= 7.14, *SD*= 40.00). In contrast, participants who wished to become thinner, created an 'Any' avatar with a lot less weight compared to their 'Self' avatar (*M*= -35.71, *SD*= 61.10). When age, computer usage and video game play were entered into the analysis as covariates, no qualitative change to the results occurred (*F*(1,37) = 4.653, *p*= 0.04, *ηp2*= 0.112). There was no effect of avatar creation order. Lastly, and most importantly, the difference in virtual mass between the two avatars was strongly correlated with the difference between FRS*Self*and FRS*Ideal* (*r*(40) = .655, *p*< 0.01, *R*2 = 0.429). That is, small differences between the ‘Self’ and ‘Any’ avatars tended to correspond to small differences between FRS*Self*and FRS*Ideal* and large differences between the avatars, to large differences on the FRS.

**Discussion**

The purpose of this research was to test for impression management in avatars using a paradigm designed to reduce the effects of social desirability and demand characteristics by making the key measurements more implicit than directly questioning participants about their avatar design motivations. We had participants create two avatars to use in a general 'social interaction' context in Second Life, a ‘Self’ avatar intended to look like the participant and an ‘Any’ avatar without imposed design restrictions. Using the 'Self' avatar as a baseline we then looked at how it differed from the 'Any' avatar based on the hypothesis that this would be affected by the real life difference between the participants' actual and ideal body mass as subsequently measured with the Figure Rating Scale (FRS; Stunkard, Sorensen, & Schulsinger, 1983).

The results showed that participants who indicated their current body image was larger than their ideal were more likely to create thinner ‘Any’ avatars compared to those whose actual body image was thinner than or matched their ideal. Furthermore, the difference between current and ideal body image was strongly correlated with the difference between the two avatars. Image change group accounted for a large proportion of the variance in the change to avatar body mass and it is worth noting that the variance in the virtual mass of the ‘Any’ avatars was comparable to that of the ‘Self’ avatars – something that would not be expected if our participants had simply designed characters that resembled a standard ‘social ideal’ rather than their own ideal.

Unlike the methodologies in most other avatar research (Ducheneaut, Wen, Yee, & Wadley, 2009; Vasalous & Joinson, 2009) we did not ask participants retrospectively or directly how they selected the attributes of their avatar. Instead it was not until at least completion of the avatar design portion of the experiment, and probably the whole experiment, that the nature of the study became apparent to the participants. Likewise, the characteristics related to avatar mass were only a small subset of the characteristics that participants were allowed to manipulate. As such, we were able to test whether ideal body mass was mirrored in avatars in way that minimised experimental reactance (Fisher, 1993; Orne, 1962). The results support a growing body of literature indicating that individuals tend to infuse desired qualities in their virtual-world avatars (Bessière, Seay, & Kiesler, 2007; Ducheneaut, Wen, Yee, & Wadley, 2009; Vasalous & Joinson, 2009). In doing so, they are engaging in a form of impression management (Leary & Kowalski, 1990; Schlenker, 1980) by favourably changing the type of attributes their avatar communicates to others.

It is worth noting that our use of the well-established FRS (Stunkard, Sorensen, & Schulsinger, 1983) as a way of measuring actual and ideal body-image was not an indirect measure of the kind we are advocating as a benefit of the avatar generation methodology. However, importantly this measure was used *after* the avatar generation tasks and no participants were able to guess the true nature of the study during the debriefing at the end of the experiment. Further, this measurement tool was necessary in order to be able to connect our virtual, indirect methodology back to a well-established measure in reality.

**Results Generalizability and Future Research Directions**

As a place to start, this study used only young females because there are a variety of reasons to think that body mass is an important visible attribute for members of this demographic which, in particular, can be easily manipulated in the avatar generation paradigm. However, in terms of other populations, there are known sex differences in body image importance between male and female undergraduates (Frederick, Forbes, Grigorian, & Jarcho, 2007). Specifically, whereas females show a general tendency to want to lose weight, males show a desire to simultaneously lose weight in terms of fat and gain weight in terms of muscle mass (Drewnowski & Yee, 1987; McElhone et al., 2007). There are also qualitative and quantitative differences between the male and female avatar creation system in Second Life which would have made the two groups somewhat difficult to compare directly. For example, a value of ‘50’ for body thickness on a male avatar looks markedly different from that of a female avatar. Representative design (Hammond, 1998) could be improved in a larger study incorporating participants of both sexes and from a diverse demographic background. This would need to utilise a creation system with attributes which are more standardised between male and female models.

One potentially interesting way to probe the generalizability of the avatar generation paradigm might be to evaluate avatar hair attributions in the context of pattern baldness in a male demographic. A plausible hypothesis might be that younger males who are balding would be more likely to generate unconstrained avatars with large amounts of hair than males who are not going bald. But this might be different for older men.

One possible way to extend the present methodology beyond the implied social interaction context of the present research would be to allow an interactive process whereby participants initially generate an avatar, then engage in social interaction, subsequently refine their avatar, engage in further social interaction, etc., in an iterative manner. This has the potential to not only see how the anticipation of social interaction influences self-presentation but more importantly how self-presentation changes as a result of actual social interaction. However one potential cost of this methodology is that, unlike the present experiment, it makes the within subject assessment of ‘Any’ versus ‘Self’ avatars more difficult.

There is research to show that individuals react differently depending on the type of avatars they are issued by the experimenter (Yee & Bailenson, 2007). It would be interesting to see how, when the participant has more control over the avatar creation, whether self-efficacy, confidence and self-esteem are affected during communication. That is, would asking participants to create 'Self' avatars lead to more true-to-life self-efficacy compared to when an 'Any' avatar is used?

In the context of further generalization, there are almost 150 variables which can be modified in Second Life's avatar creation system. As such, the current paradigm could be used to assess avatar creation choices across a whole array of attributes, especially those often associated with attractiveness (e.g. musculature, height, symmetry and hip to waist ratio; see Buss, 1994) which participants may not be aware of or would not want to admit to changing. The number of variables involved can also mask the key variables of interest. This could be particularly useful in the implicit assessment of clinical disorders related to body perception. A recent study has shown the benefit of using self-figure drawing in participants diagnosed with eating disorders (Guez, Lev-Wiesel, Valetsky, Sztul, & Pener, 2010) and avatars could be an alternative medium. This would have the specific advantage of being even more indirect, as avatar creation is intended for the specific purpose of online social interaction. As such, it does not directly invoke issues of body image at all. So freely creating avatars could reveal atypical body perceptions in those with eating disorders such as anorexia nervosa (Tovée, Benson, Emery, Mason, & Cohen-Tovée, 2003).

In conclusion, our research adds further support to the growing body of evidence that people tend to present ideal personal attributes in online contexts where the risk of being caught out is low. Specifically, young females tend to represent their ideal body type in the avatars they create as shown using an indirect methodology designed to reduce experimental reactance. When presented with a blank canvas with which to represent themselves, people have a tendency let the ideal characteristics they hold inside, out.

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