The effect of manipulated body image on self-confidence, self-disclosure, service dissatisfaction

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Abstract:
This study investigates the impact of manipulated body image on self-concept and the tolerance towards service failures. Specifically, it explores how the body shape of avatars can influence users’ self-confidence, self-disclosure and, and subsequent consumer behavior when confronted with service failures. This study employed a between-subject experiment involving 124 participants, utilizing a 2 (avatar ownership: self-avatar vs. other-avatar) x 2 (avatar’s body size: fat vs. normal). The manipulation of body image was conducted within a web environment, and participants’ self-concept and responses to service failures were examined in two scenarios: a cyber dating scenario and service failure scenario at a restaurant. This study found that in cyber dating scenarios, participants assigned to avatars with a fat body shape reported a less degree of self-confidence compared to participants assigned to avatars with a normal shape. In addition, participants assigned to avatars with fat body shape expressed higher levels of dissatisfaction with the service failures. This dissatisfaction was more pronounced when the service failure involved social service failures (e.g., an unfriendly waiter) compared to the non-social service failures (e.g., menu unavailability). Theoretical and practical implications are discussed.

Keywords: Body image, Avatar, Self-confidence, Self-disclosure, Service failure

Introduction

Body image is a highly subjective self-perception that reflects an individual’s perception of their own body or appearance (Cash, 2000). It is fundamentally rooted in one’s (dis)satisfaction with their own physical body, irrespective of others’ perceptions. Negative body image can cause depression, leading to negative health behaviors, such as eating disorders, substance use, and negative lifestyle choices, including unhealthy diets and lack of exercise (Littleton & Ollendick, 2003). It is worth noting that body image is strongly associated with self-esteem or self-efficacy, influencing one’s overall quality of life (Molloy & Herzberger, 1998; Olivardia et al., 2004; Williams & Currie, 2000). These factors play a pivotal role in shaping how individuals perceive and interact with the world around them.

In the realm of consumer behavior research, aspects of self-concept, such as self-esteem or self-confidence, have been explored in the context of complaint behaviors. For example, Consiglio and Van Osselaer (2019) discovered that customers with low self-esteem are less likely to switch their providers when faced with service failure, despite reporting dissatisfaction with the service. Conversely, Bearden and Teel (1980) found that individuals with higher self-confidence are more likely to voice their complaints.
Service failures, particularly those involving social interactions (e.g., dealing with unfriendly waiters), can threaten consumers’ self-concept (Iglesias, 2009). This threat may be heightened among individuals with negative body image or low self-confidence, as their self-esteem and self-efficacy are more vulnerable.

Despite the importance of body image, there is a noticeable gap in the literature examining the relationship between negative body image and complaint behavior. The current study aims to explore the impact of body image on consumer behavior. Furthermore, we seek to investigate whether body image can be manipulated within the web environment.

In a series of experiments, Yee and Bailenson (2007) illustrated how an avatar’s appearance could exert a significant influence on the avatar user’s self-concept. They introduced this phenomenon as the “the Proteus effect,” derived from a Greek god, Proteus, who had ability to alter his appearances based on the circumstances. In their study, participants assigned to attractive avatars exhibited increased self-confidence and greater self-disclosure. They were more likely to approach the confederate closely and disclosed personal information. Furthermore, when tasked with proposing splits to the confederate, those assigned attractive avatars frequently suggested unfair splits.

This study explores the manipulation of avatar body image in a web-based environment. Specifically, the primary objective is to shed light on how an avatar’s body image can influence the self-confidence, self-disclosure, and consumer behavior of the avatar user, particularly in scenarios involving service failures.

**Literature Review**

**Body Image, Self-Confidence, and Self-Disclosure**

Body image refers to an individual’s subjective perception and evaluation of their own body, encompassing feelings of satisfaction or dissatisfaction with one’s appearance (Tylka & Wood-Barcalow, 2015). Body image is influenced by numerous factors, including societal standards of beauty, media portrayal, family, and peer influences. Negative body image can lead to a range of psychological and physical health issues. Cash (2004) highlighted the importance of understanding body image not only as a static construct but also as a dynamic and multifaceted one. People’s body image can fluctuate, depending on sociocultural factors such as ethnicity or gender (Cafri et al., 2005), situational factors such as chronic disease (Pinquart, 2013) or sexual satisfaction (Pujols et al., 2010), or feedback from peers (Dohnt & Tiggemann, 2006). The impact of a negative body image can be detrimental, leading to low self-esteem and a lack of self-confidence (e.g., Huebscher, 2010; Stapleton & Nikalje, 2013).

Self-confidence is a crucial psychological factor influencing one’s overall well-being and ability to interact with others. It is the belief in one’s own abilities, competence, and worth (Bayat et al., 2019). Individuals with high self-confidence are more likely to engage in proactive behaviors, set and achieve goals, and exhibit resilience in the face of challenges. Conversely, individuals with low self-confidence may struggle with self-doubt and may be less likely to express themselves, both verbally and non-verbally (Pilegge & Holtz, 1997). Body image is also highly associated with the individuals’ behavior in relating to others.

Self-disclosure refers to the process of revealing personal information, thoughts, feelings, or experiences to others (Greene et al., 2006). It plays a crucial role in the development of interpersonal relationships and is often linked to increased intimacy and trust between individuals (Laurenceau et al., 2004). According to the social penetration theory proposed by Altman and Taylor (1973), self-disclosure occurs gradually and reciprocally as the relationships develop. However, in the initial interaction stage, self-disclosure is highly associated with self-confidence. Low self-confidence can inhibit self-disclosure, as individuals may fear judgment or rejection from others. Additionally, negative body image can make individuals reluctant to disclose personal information, as they may perceive themselves as unattractive or undesirable.

**The Avatar as a Priming Cue on Self-Concepts**

The exposure to specific cues can trigger particular behaviors automatically (Bargh, 1994). Much like the principles of classical conditioning (Olson & Fazio, 2002), priming occurs when the stimuli associated with stereotypes or specific perception are presented. The stimuli activate those associations and subsequently shape an individual’s response. An illustrative example is the priming effect of a specific color (e.g., black) on an individual’s stereotypical
behavior. For example, Frank and Gilovich (1988) found that individuals wearing black uniforms showed more aggressive behavior compared to those wearing white uniforms. This effect has been replicated in virtual environments, demonstrating a similar finding. Peña et al. (2009) observed that participants employing black-cloaked avatars tended to display more aggressive and antisocial behavior, in contrast to those employing white-cloaked avatars.

Avatars, which serve as self-representatives in virtual environment, play a pivotal role in users’ interactions and experiences. Yee and Bailenson (2007) the Proteus effect, which specifically examines how an avatar’s appearance influences the self-perceptions of users. In a series of experiments conducted in immersive virtual environments (IVE), they found that users assigned to attractive avatars approached their virtual partners closely and shared personal information more than those assigned to unattractive avatars.

A fundamental aspect of the priming effect involves exposure to cues associated with stereotypes. Stereotypes often function as mental shortcuts, leading to biased perceptions that subsequently impact social interactions (Allport, 1954). The influence of stereotype becomes pronounced when physical cues that signify the identity of a particular group are present. For example, black skin color might be associated with Black ethnicity, a pink jacket might signify a member of the LGBTQ+ community, an attractive appearance might be linked to confident individuals, and a fat body shape might be stereotypically connected to laziness (Pratto & Bargh, 1991). Stereotypes can trigger cognitive and behavioral responses in perceivers swiftly and automatically when a target exhibits stereotypical physical cues, often occurring without conscious thought, as explained by the automaticity model (Bargh, 1994; Bargh et al., 1996).

Stereotypical physical cues have the power to influence not only attitudes and behaviors toward a specific target but also the self-concepts and subsequent behaviors of the perceiver when they observe such cues in themselves. For example, the experiment conducted by Frank and Gilovich (1988) found that individuals who wore black uniforms exhibited aggressive thoughts or behaviors. Similarly, Peña and her colleagues (2009) found that individuals using avatars in black clothes displayed aggressive tendencies. In a related context, Yee and Bailenson (2007) demonstrated that the physical appearance of avatars could significantly influence the behaviors of the avatar users. Participants who assigned the attractive and tall avatars exhibited higher levels of self-confidence.

Notably, body image serves as one of the most important physical appearance cues capable of triggering stereotypes. Similar to facial appearance, obese people are often perceived as physically unattractive and are described as lazy, incompetent, and lacking in willpower (DeJong, 1980; Staffieri, 1967). In reality, obese people have reported experiencing mistreatment due to their body weight in various settings, including the workplace and social environments (Cossrow et al., 2001). Studies have also shown that they receive less service, assistance, and advice compared to their non-obese counterparts (Karris, 1977).

Given, the current study attempts to examine whether the assigned avatar body image can function as a priming cue, activating associated stereotypes and influencing participants’ self-concepts. Another key aspect of this study is the concept of self-connection. In Yee and Bailenson (2007)’s experiment, users were provided with avatars, which exhibited a high level of behavioral resemblance to the users. In the experiment, as participants raised their arms, they observed their avatars mimicking the same actions through a virtual mirror within an immersive virtual environment. This heightened the avatar users’ sense of ownership over their avatars, facilitating the self-perception process. Since the current study explores this Proteus effect in a web-based experiment, it becomes essential for participants to strongly believe that the avatars are extensions of themselves. Therefore, as a manipulation check, we propose the following hypothesis:

Hypothesis 1 (H1): Participants in the self-avatar condition will perceive their avatars as more self-resembling themselves than participants in the other-avatar condition.

Subsequently, we endeavor to investigate how the avatar’s body image cue influences an individual’s self-confidence and self-disclosure and the service complaint behavior when confronted with service dissatisfaction. This exploration is particularly focused on situations involving service failures, that may involve the service provider’s personal factors, such as unfriendly attitude.
Hypothesis 2 (H2): Participants assigned to avatars with a fat body image will exhibit lower levels of self-confidence (H2a) and less self-disclosure (H2b) than participants assigned to avatars with a normal body image.

Hypothesis 3 (H3): Participants assigned to avatars with a fat body image will exhibit a higher degree of dissatisfaction in response to service failures compared to participants assigned to avatars with a normal body image (H3a). Furthermore, this effect will be more pronounced in cases of social service failures than non-service failures (H3b).

Methods

Overview of the Experiment Design

In contrast to a 3-D digital environment, where avatar users can easily experience and observe a high degree of behavioral similarity with their avatars, the web environment poses challenges in achieving such a sense of ownership. Consequently, the key focus of this study’s design was to create the perception that the participants’ avatars truly represented themselves. Based on prior literature, we found that individuals often tend to accept personality feedback as accurate, a phenomenon known as the “Barnum effect” (Meehl, 1956). This tendency arises because the feedback is derived from personality assessment procedures (Furnham & Schofield, 1987). Therefore, to investigate the hypotheses proposed in this study, we employed a personality test website. The test results, followed personality assessment procedures would make the participant believe the results accurate and reflect themselves, eliciting the “Barnum effect.”

A between-subjects experiment employing a 2 (avatar ownership; self-avatar vs. other-avatar) x 2 (avatar’s body size; fat vs. normal) design was conducted to test the hypotheses. To facilitate this study, a website for a personality test was developed. A total of 124 participants were randomly assigned to one of four conditions: Group 1, where participants took a web-based personality test for themselves and received an avatar with a fat body image as a result; Group 2, where participants took a web-based personality test for themselves and received an avatar with a normal body size as a result; Group 3, where they took a web-based personality test designed for an acquaintance and received an avatar with a fat body image as a result; Group 4, where participants took a web-based personality test designed for an acquaintance and received an avatar with a normal body size as a result. After taking the test and receiving the avatar as a result, participants were asked to answer a series of follow-up questions pertaining to their perceptions of the assigned avatar and the test result, their self-confidence, and their service satisfaction with a service experience.

Stimulus

Website and Picture-Based Personality Test

Using Wixx.com, a website featuring a personality test was created. Inspired from an existing picture-based personality test (http://www.96pix.com), the website contains four stages: welcoming, testing, waiting/analyzing, and displaying results. Each state is carefully structured to create a seamless and engaging user experience. The welcoming stage greets participants and provides essential instructions for the personality test. The testing stage is the core component of the website, comprising ten pages. Each page presents a pair of images to the participants. These images serve as choices to represent either their own personality and preferences (self-avatar condition) or those of an acquaintance (other-avatar condition) (see Figure 1).

Figure 1
A snapshot of a psychology test

These images were selected from 96pix.com, originally obtained from Flickr members with their consent. The image choices encompass a wide array of backgrounds and activities, providing diverse preferences. After participants have made their image selections, the website leads them to the next stage of the analyzing stage.
Like other web-based personality assessments, this state features an animated processing icon that runs for 10 seconds. Percipients are instructed to wait patiently while the test is analyzed. This waiting period is an essential part of the personality test, enhancing the perceived accuracy by creating an illusion that the system is actively evaluating their choices, a technique supported by research (Snyder et al., 1977a).

Following the 10 second analysis, participants are directed to the results page, where they are given an avatar (i.e., a black body silhouette). Peña and her colleagues (2009) underscored that when testing the priming effect, it is important not to use an obvious manipulation/stimulus for participants to recognize the purpose of the study. To increase the external validity, a written description of the Myers-Briggs Test Indicator (MBTI) personality type is added. While the avatar is randomly assigned to participants, it is crucial to note that the MBTI result remains identical across all conditions (see Figure 2).

**Figure 2**
* A snapshot of a result page (Left: self-avatar condition /fat avatar Right: other-avatar condition/ normal avatar)*

The MBTI, originally developed based on Carl Jung’s theory of psychological types (Jung, 1971), is a widely employed tool for assessing personality types. Given the vague and ambiguous nature of MBTI results (e.g., “You have slight preference of Extroversion over Introversion” or “Judging over Perceiving”), this study recognizes that this MBTI description is very effective for participants to pay attention to the avatar rather than relying solely on the accompanying written description. This approach encourages a more nuanced and engaging evaluation of the character’s alignment with their personality type.

**Avatar**

In their study on the Proteus effect, Yee and Bailenson (2007) manipulated the facial attractiveness of avatars. To rule out the facial appearance and focus on the body size, the current study employed a side view of silhouettes of both female and male avatars, depicting the full body in a standing pose (Dibiase & Hjelle, 1968). Out of the seven female and male silhouettes representing a range from size 1 (“very skinny”) to size 7 (“very obese”), size 6 was selected to represent the fat avatar, and size 4 was selected as the normal avatar.

**Participants**

This study recruited participants from Amazon’s Mechanical Turk (MTurk; http://www.mturk.com), a growing and widely utilized crowdsourcing platform for research (Kittur et al., 2008). Mturk offers numerous advantages, including the ability to integrate with external survey tools (e.g., SurveyMonkey) and access to a large and diverse participant pool comprising over half a million users. A total of 124 MTurk participants (88 females, 37 males) participated in this online experiment. The participants’ ages ranged from 19 to 77 years ($M = 41.97$, $SD = 14.79$). In addition, 74% of the participants identified as White/Caucasian, while the remaining participants included African American (11%), Hispanic/Latino (3%), Asians (3%), and American Indian or Alaskan Native (2%).

**Procedure**

For the online self-administered experiment, a link to the website, which contained the logic for the random assignment of participants into one of four experimental conditions, and a link to SurveyMonkey were posted on Amazon MTurk. Once participants clicked on the survey link, they were greeted and presented with an implied consent form prior to their participation. By clicking the “agree” button, they were directed to the welcome page of the personality test.

On the welcome page, participants were asked to select a gender, whose button contained the logic of random assignment for each gender. This means that female participants were randomly assigned to one of four female-specific conditions, which included self-avatar condition
with a fat female avatar, other-avatar condition with a fat female avatar, self-avatar condition with a normal female avatar, other-avatar condition with a normal avatar. Similarly, male participants were assigned to one of four male-specific conditions following the same approach.

For participants in the self-avatar condition, they were instructed to think about themselves and then select the image within each pair that best reflected their personality and preferences. Conversely, participants in the other-avatar condition were instructed to think about a same-gender acquaintance and choose the image within each pair that represented that acquaintance’s personality and preferences. A number of studies on the Barnum effect have used the acquaintance to compare the self and the other (Johnson et al., 1985; Ulrich et al., 1963). The acquaintance in this experiment was defined as “someone whom you know, occasionally interact with, and sometimes engage in conversations, but not well enough to be considered a close friend” (Johnson et al., 1985, p. 1380).

After making their image selections, all participants were directed to the waiting/analyzing page. This page featured an animated processing icon displayed for 10 seconds, with the instruction, “Please wait! We are analyzing.” After 10 seconds, a button became available, allowing participants to process to the results page. The results page presented the avatar and the MBIT description. Subsequently, participants were guided to the survey page, where they were asked to respond to a series of questions.

Index Construction

Manipulation Checks for Independent Variables

To check the manipulation of self-avatar (vs. other-avatar) condition, participants were asked to indicate their agreement with the following statements on a scale of 1 (“not at all”) to 7 (“very much”): “To what extent do you believe this result accurately represents your actual self?” and “To what extent do you believe this result accurately represents your acquaintance?” For the manipulation check of body size, two questions on a scale of 1 (“strongly disagree”) to 7 (“strongly agree”) were used: “The avatar looks fat” and “the avatar looks attractive.”

Dependent Variables

Perceived Similarity. To measure participants’ perceived similarity of the avatar to their actual self, 6 items were adopted from Kim (2010) and were assessed on a scale of 1 (“strongly disagree”) to 7 (“strongly agree”) (e.g., “the avatar resembled me,” “the avatar reminded me of myself,” and “the avatar was an extension of me.”). The ratings were averaged to yield the index for perceived similarity to the self ($\alpha = .96$).

Self-Confidence And Self-Disclosure. Traditionally, self-confidence has often been assessed using self-reported items such as “I am capable of handling myself in most social situations.” (Bearden et al., 2001). However, such self-report measurement has faced criticism due to the ‘self-other bias’, the tendency for individuals to evaluate themselves in more favorable terms (Brown, 1986).

Yee and Bailenson (2007) employed an indirect approach to measure self-confidence. They assessed self-confidence through (1) the actual distance between the avatar user and their virtual counterpart when avatar users walked to approached to the counterpart (i.e., interpersonal distance) (Experiment 1) and (2) the money-split offer to the confederate (Experiment 2) and (3) self-disclosure, measured by counting the number of information pieces shared with the counterpart. To replicate this measurement in a web-based environment, this study utilized a scenario involving online dating and the money split.

Self-Confidence. Participants were asked to envision their engagement in online dating scenarios and then describe how closely they would approach and interact with their partner’s avatar during these dating interactions, essentially assessing virtual interpersonal distance. There responses were provided on a 6-point scale ranging from 3 meters to 0.5 meters in 0.5-meter increments.

Self-Disclosure. Then, participants were questioned about how much of their personal information they would be willing to reveal to their dating partner. Responses were recorded on a 6-point scale, ranging from 0% to 100% in 20% increments.

Money Split. Participants were asked to imagine participating in a simple online game with their virtual partner as a part of team. The game offered a cash prize of $100, and participants were inquired about the portion of this prize money they would claim when splitting it with their partner. Their responses were recorded on a 6-point
scale, ranging from $0 to $100, in $20 increments.

Service Satisfaction. To measure consumer tolerance for service failure, a scenario set in a restaurant context (see Appendix) depicting a social/nonsocial failure was adopted from Smith et al. (1999). Participants, in their role as consumers, were asked to imagine encountering either a waiter’s poor attitude (e.g., no smile, no beverage, and no apology) (social failure condition) or a service failure by the restaurant (e.g., unavailability of their first and second food choices) (nonsocial failure condition). To measure the participants’ level of service satisfaction (Chan et al., 2009) were employed on a scale ranging from 1 (= strongly disagree) to 7 (= strongly agree). (“As a whole, I am satisfied with the restaurant”, and “I am happy about my overall experience with the restaurant.”). The ratings were then averaged to yield the index for service satisfaction (α = .93, M = 2.79, SD = 1.26). Therefore, the low score indicates a high level of dissatisfaction.

Control variable. To rule out the potential influence of pre-existing body dissatisfaction, we included a control variable by assessing participants’ fear of appearance evaluation (FAE) (Lundgren et al., 2004) using 6 items ranging from 1 (= strongly disagree) to 7 (= strongly agree). Example items include “I am concerned about what other people think of my appearance,” “It bothers me if I know someone is judging my physical shape,” and “I worry that people will find fault with the way I look.” The responses to these items were then averaged to yield the index for fear of appearance (α = .94, M = 3.62 SD = 1.67).

Results

Manipulation Check

For the manipulation check, a series of simple t-tests was employed. The results showed that participants in the self-avatar condition reported the test results significantly more reflected their actual self (M = 3.41, SD = 1.85) compared to participants in the other-avatar condition (M = 2.58, SD = 1.68; t (122) = 2.59, p < .01). Conversely, participants in the other-avatar condition reported the test results significantly more reflected their acquaintance (M = 4.06, SD = 1.75) compared to participants in the self-avatar condition (M =3.22, SD = 1.67; t (122) = -2.73, p < .01).

Furthermore, the results demonstrated that participants assigned to the fat avatars reported that the avatar looked significantly fatter (M = 6.33, SD = 1.22) and less attractive (M = 1.61, SD = 1.08) (t (121) = -8.15, p < .001) compared to participants assigned to the normal avatars (M = 4.05, SD = 1.82; M =3.32, SD = 1.54, respectively) (t (122) = 7.12, p < .001). Overall, these results affirm the successful manipulation of the independent variables, especially the self-avatar vs. other-avatar and fat vs. normal avatar conditions.

Hypotheses Tests

To examine H1, which predicted that participants in the self-avatar condition would perceive their avatars as more similar to themselves than those in the other-avatar condition, an analysis of variance (ANOVA) was conducted. Results showed that participants in the self-avatar condition reported a higher level of perceived avatar’s similarity to themselves (M = 2.88, SD = 1.67) compared to those in the other-avatar condition (M = 2.33, SD = 1.41; F (1, 122) = 3.95, p < .05). Therefore, H1 was supported (see Table 1).

H2 predicted the influence of the avatar’s body size on the participant’s self-confidence (H2a) and self-disclosure (H2b). Specifically, it was hypothesized that the fat avatar would lower the fat avatar user’s self-confidence and self-disclosure. For H2a (self-confidence), two factor analysis of covariance (ANCOVA) controlling for fear of appearance demonstrated a significant main effect of the avatar’s body size on interpersonal distance (F (2, 119) = 5.59, p < .05).

Table 1

The means (with standard deviations in parentheses) and F values for the perceived character’s similarity to the self

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Avatar body size</th>
<th>F</th>
<th>Self-connected</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fat (N=61)</td>
<td>Normal (N = 63)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived similarity</td>
<td>2.29±(1.56)</td>
<td>2.88±(1.51)</td>
<td>4.43*</td>
<td>2.88* (1.67)</td>
</tr>
<tr>
<td></td>
<td>Other (acquaintance)</td>
<td></td>
<td></td>
<td>2.33± (1.41)</td>
</tr>
<tr>
<td></td>
<td>(N = 65)</td>
<td></td>
<td></td>
<td>3.96*</td>
</tr>
</tbody>
</table>

Note: Higher scores indicate a greater level of responses. Comparisons between means are specified by lowercase superscripts and cell means that do not share
However, there were no significant main effects for the self-avatar condition and no interaction effects between avatar’s body size and self-avatar condition. Another two-factor ANCOVA for the money split showed no main effects for the avatar’s body size, self-avatar condition, or their interactions (see Figure 3). Therefore, H2a was partially supported.

**Figure 3**
Means and standard error for self-confidence (interpersonal distance and money split) and self-disclosure by avatar’s body size.

For H2b (self-disclosure), a two-way ANCOVA controlling for the fear of appearance was performed. The results showed no main effects for the avatar’s body size and self-avatar condition. However, there was a significant interaction effect between the avatar’s body size and self-avatar condition \((F(4, 117) = 4.67, p < .05)\) (see Figure 4). Therefore, H2 was not supported.

**Figure 4**
Two-way interaction between avatar body size and self-avatar (vs. other-avatar) condition for self-disclosure.

H3 predicted an influence of the avatar’s body size on consumers’ dissatisfaction when there was a (social vs. nonsocial) service failure. The hypothesis stated that the fat would increase dissatisfaction, especially in the context of a social service failure. A two-way ANCOVA was employed, showing a significant main effect of the avatar’s body size \((F(8,113) = 13.03, p < .01)\). However, there were no main effects of self-condition, type of service failure, or any interaction effects. Therefore, H3a was supported.

To test H3b, we performed separate ANCOVAs for the social and non-social failure conditions. For the social failure condition, there was a significant main effect of the avatar’s body size \((F(4, 60) = 10.61, p < .01)\), but no main effects for self-avatar condition or interaction effects. In the nonsocial service failure condition, there were no main effects for the avatar’s body size, self-avatar condition, or interaction effects (see Figure 5). Therefore, H3b was supported.

**Figure 5**
Two-way interaction among avatar body size, self-avatar (vs. other-avatar) condition, and the type of service failure for service satisfaction.

**Discussion**

This study aimed to reexamine the Proteus effect within a web-based environment. Specially, we examined whether the presence of a fat avatar, conventionally considered unattractive, would impact participants’ self-concepts and consumer behavior. In our study, the most important part of our study was to confirm the web-based personality could convince participants the test results were accurate, and
their given avatar reflect their self. The finding demonstrated that participants who completed the test for themselves perceived the test results as more reflective of their own selves and believed that their randomly assigned avatars resembled them more than those who completed the test for their acquaintances. This result aligns with the idea argued by self-perception researchers (e.g., Bem, 1972; M. Snyder & Cunningham, 1975), suggesting that individuals learn about themselves through external validation, such as personality assessment. People possess various aspects of self-concepts that can be influenced and altered in various situations (Baumeister, 2010), including self-presentation and impression management (Fazio et al., 1981). Therefore, people tend to believe and accept the personality interpretations driven from the results of assessment procedures. This phenomenon is referred to as the Barnum effect (Dmitruk et al., 1973; Snyder et al., 1977). This study’s findings confirmed the Barnum effect, particularly among participants who received vague personality interpretations and avatars as a test result for themselves.

However, when examining the impact of a fat avatar on self-concepts, this study did not find the main effects of self-avatar condition (i.e., the group that took the test for themselves and reported their avatar as self-resenting). However, we identified a main effect of the fat avatar concerning interpersonal distance. Participants with fat avatars reported that they would maintain a greater distance from their virtual partners compared to participants with normal body-sized avatars. Regarding self-disclosure, an interaction effect between the self-avatar condition and the fat avatar was observed. Participants in the self-avatar condition with a fat avatar reported that they would disclose their self-information less than those in the self-avatar condition with a normal avatar. Conversely, the opposite pattern was found among participants in the other-avatar condition. Participants who took the test for their acquaintances and received fat avatars disclosed their self-information more than those in the other-avatar condition with normal avatars. These seemingly paradoxical finding can be explained by the assumption that self-disclosure demands a higher degree of self-focus and introspection (Davis & Franzoi, 1987). Consequently, participants in the other-avatar condition tend to disassociate themselves from their avatars, and this tendency becomes more pronounced when they are assigned fat avatars.

One of the key findings of this study pertains to the influence of a fat avatar on consumer behavior. This study predicted that the presence of a fat avatar would increase the fat avatar user’s service dissatisfaction, particularly in the context of a social service failure, which involves a waiter displaying an unfriendly attitude. This, in turn, was expected to increase service dissatisfaction among users with fat avatars. The results supported the hypothesis by demonstrating a significant main effect of the fat avatar. Participants with fat avatars expressed greater service dissatisfaction compared to participants with normal avatars. Furthermore, this study found that when participants with fat avatars experienced a social service failure, they expressed even higher levels of service dissatisfaction than participants with normal avatars. However, in the case of non-social service failures, there was no significant relationship between the avatar’s body size and the level of service dissatisfaction. These findings suggest that social service failures increased service dissatisfaction significantly among users with fat avatars. It is assumed that individuals with fat avatars experienced negative emotions, attributing the cause of a waiter’s negative attitude to the consumers’ body size. According to cognitive appraisal theory (Lazarus, 1991), the type of emotion experienced plays an integral role in consumers’ decisions to voice or not when faced with service failures (Stephens & Gwinner, 1998). This study's findings and underlying argument point to an opportunity for future research to delve deeper into the role of emotions as a psychological mechanism behind service dissatisfaction and complaint behavior. This area of investigation could shed more light on the intricate dynamics of consumer behavior in the context of service failures and customer complaints.

This study has several limitations. Firstly, the study primarily relied on participants from Amazon's Mechanical Turk, which may not fully represent the diversity of the population. This limits the generalizability of the findings. Additionally, this study employed scenarios such as online dating and money-split task, which may not fully replicate real-life situations or interpersonal interactions. Furthermore, this study focused on the manipulation of avatar body size and did not explore other potential factors, such as avatar facial features, that could affect self-perception and behavior. Finally, certain aspects of body image and emotions were not deeply explored but could
provide valuable insights into understanding consumer behavior in the context of avatars.

Despite these limitations, this study holds practical significance. While recognizing the potential of the Proteus effect in developing marketing or health intervention programs that leverage avatars, it is very expensive and cumbersome to establish the virtual environment and one-on-one intervention programs. Given, this study, which confirmed the Proteus effect in the web environment, is notable in terms of helping to pave the way for more cost-efficient and easily manageable intervention programs. Furthermore, this study’s findings regarding the relationship between the avatar’s body size and the consumer behavior contribute to an understanding of the role of body image in consumer behavior. This study also underscores the need for future research to delve into the role of emotions as a psychological mechanism connecting body image and consumer online/offline complaint behavior.

In conclusion, this study illustrates how a mere explore to a fat avatar can influence users’ self-concepts (i.e., self-confidence and self-disclosure) and consumer dissatisfaction. These findings provide valuable insights for developers of intervention programs or marketers who wish to employ avatars in either promoting or prohibiting certain behaviors.

Conflict of interest

The author(s) declare that no competing interests exist.

Reference


Appendix

A restaurant scenario

You visit an upscale American-style restaurant for lunch. It is a nice restaurant in a good neighborhood. You are seated at your table. The waiter comes to take your order. You place your order.

[Social failure: The waiter does not smile while taking your order. The waiter brings your food but not your beverage. You ask the waiter about it. The waiter then brings your beverage but does not offer an apology or explanation.]

[Nonsocial service failure: The waiter informs you that the restaurant is out of the food you selected. You make another selection. The waiter informs you that the restaurant is also out of your second choice of food.]