3D Avatars and Body Image Perception of Young Adults: An Exploratory Study

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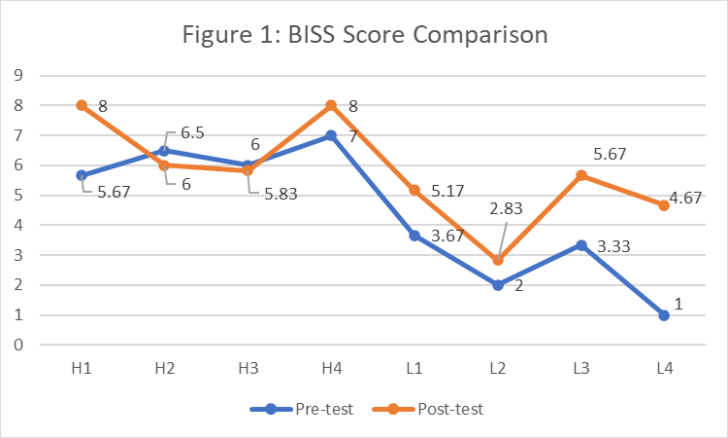
Introduction and Background: Users interact in virtual worlds through digital avatars, which can mimic their voices and actions in a virtual environment. The metaverse is a virtual world (replicating our physical one) where users can use avatars to learn, socialize, shop, work, and take part in any leisure activity (Preston, 2021). It is essentially an ecosystem of industries all working cohesively together to replicate our physical world. By using 3D body scanning technology, consumers can see their physical bodies represented in accurate measurements on their screens (Grogen et al., 2016). However, some consumers may choose not to use this technology as 3D body image scanning exposes their actual body shape to themselves. Despite this, creating a digital twin to represent oneself in a virtual space sounds appealing. Customizing an avatar to present oneself involves several decisions for the user about their identity. As the body image (BI) of an individual plays a major role in the selection process for their digital avatar, will users create an avatar that accurately represents their physical features, or will they design it to be a figure of what they wish to look like in the real world remains unknown. The purpose of this study is to identify how individuals with positive or negative body image perceptions interact with their own digital avatars and consider their usage in the virtual world. We used the Body-Image States Scale (BISS) (Cash et al., 2002) to measure participants' body image perceptions. The BISS was adopted to measure a participant's evaluation of their physical self at that moment in time (Cash, 2012). The proposed research questions are: RQ1: Will one's body image perception change after interacting with their own 3D avatars? RQ2: How will young women's body image perception play a role in how they play/interact with their digital avatars?

Data and Analysis: The present study utilized a convenient sampling method to collect data. Data collection took place in two phases in a southwest university. During the first phase, college students were invited to complete a body image questionnaire via Qualtrics, an online survey platform, in exchange for extra credits. Upon completion, a subset of 8 female subjects (4 with positive body image and 4 with negative body image) were selected to participate in the second phase, which involved 3D body scanning. The Vitus Anthroscan scanner was employed to capture highly accurate and detailed body measurements of the participants. After the 3D scanning process, the participants proceeded to interact with their respective 3D avatars, following which they were requested to complete a second survey that comprised the same set of body image questionnaires, as well as a few open-ended questions for qualitative feedback. IBM SPSS was used to conduct descriptive statistical analysis.

Results: Figure 1 depicts the mean scores of the Body-Image States Scale (BISS) for the eight participants who were selected for phase 2 of the study. Before the participants interacted with their avatars, the BISS scores ranged from 5.6 to 7 for Group 1 (Positive group: participants H1 to H4) and from 2 to 3.67 for Group 2 (Negative group: participants L1 to L4). Following their interaction with the avatars, the participants' BISS scores ranged from 5.83 to 8 for Group 1 and 2.83 to 5.67 for Group 2. It is of significance to observe that the average score of the negative cohort exhibited a notable rise from 2.5 to 4.58.

To answer the RQ2, we interviewed participants after they interacted with their 3D body avatars (see examples in Figures 2 & 3). Upon being queried regarding their initial impressions of their 3D avatars, they seem comfortable seeing their own body in the 3D forms. Generally, positive BI participants were more confident in stating the accuracy of their avatars and naming features that surprised them. For example, participant H2 stated, *"I think it's pretty accurate… I know that's how it is, and I'm aware of that. So yeah, I'd say I'm pretty realistic of what I look like and what I'm insecure about."* However, there was no consistent opinion among negative BI participants. Some negative BI participants said it was accurate and some stated it was accurate but shocked them. Participant L2 stated, *"I think it does pretty well. I do feel like I've kind of perceived myself like in a different way. This is a whole new way of seeing myself because I'll be honest, like I thought I was a bit smaller, but I look bigger in this."* When participants were asked if they would let their avatars represent themselves in a virtual space, there were no consistent findings in each of the positive and negative groups Both cohorts made reference to their utilization or non-utilization of their avatar in the virtual platform, resulting in an amalgam of emotions that varied in nature.



Conclusions: The positive BI group was more confident to admit the features of their body they would like to modify without showing aversive behavior. However, half of the negative group displayed aversive behavior in talking about their avatar and the other half chose to keep the avatar as it was. To our surprise, we found a mean score increase on participants' BISS after they interacted with their avatars. Specifically, the negative BI group showed a notable increase in their BI satisfaction perception than the positive BI group.

Figure 2: Example of Positive BI Subject 3D Avatar

Figure 3: Example of Negative BI Subject 3D Avatar

Implications and limitations: Users of 3D Body Image Scanning can understand how this technology helps them with things such as virtual try-ons, virtual meetings, and more. Consumer behavior research with attitude toward avatars can benefit tech companies such as Microsoft, Google, and Apple, which are following the footsteps of Meta and developing new products that captivate the virtual world of the Metaverse (Leswing, 2022). The limitation of this research is the small sample size of participants that were selected for the second phase of the study. Another limitation is the self-select effect; participants might not answer truthfully about how they honestly feel about their body image perception.

References:

Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: The development and validation of the Body Image States Scale. *Eating Disorders*, *10*(2), 103-113.

Cash, T. F. (2012). *Biographical information*. Thomas F. Cash: Biographical Information. http://www.body-images.com/bio/

Grogan, S., Gill, S., Brownbridge, K., Warnock, D., & Armitage, C. J. (2016). Women's long-term reactions to whole-body scanning: A mixed methods approach. *Clothing and Textiles Research Journal*, *34*(1), 61–73. https://doi.org/10.1177/0887302X15603117

Leswing, K. (2022). *2022 will be the biggest year for the metaverse so far.* CNBC. https://www.cnbc.com/2022/01/01/meta-apple-google-microsoft-gear-up-for-big-augmented-reality-year.html

Preston, J. (2021). *Facebook, the metaverse and the monetisation of higher education.* The Conversation. https://theconversation.com/facebook-the-metaverse-and-the-monetisation-of-higher-education-171036