Ethical Concerns of the Use of Virtual Avatars in Consumer Entertainment

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ABSTRACT

Many questions still remain of the uses both positive and negative of virtual avatars. With virtual avatars primed for consumer entertainment, the effects they can elicit must be further investigated before mainstream adoption. In this paper we present an overview of the potential risks posed by virtual avatars. Followed by a study designed to investigate these risks, and finally ethical research considerations for researchers interested in conducting research with virtual avatars.

Index Terms: virtual avatars, vr ethics, implicit racial bias, social good

1 INTRODUCTION

With the current explosion in virtual reality (VR) content, production and consumption of virtual avatars may soon be commonplace. Embodied virtual avatar are defined as a visual representation of your own body seen through an immersive head-mounted display (HMD) that moves in synchrony with your own body motions and occupy the same space as your actual body. The virtual body does not need to visibly resemble your actual body (i.e race, gender, weight) or even conform precisely to a natural human body. Virtual avatars can be extremely powerful, embodying a first-person virtual avatar in immersive VR can powerfully affect users perceptions, thinking, and behavior. Research suggest, observing an avatar visibly lose weight while exercising, for example, increases the amount of time and effort spent exercising [3] and embodying a superhero leads to stronger prosocial behavior [15]. Research also demonstrates that embodying a child-like avatar promotes those attitudes and associations [2]. These effects show how virtual avatars can change user's perceptions and behaviors. However, virtual avatars may not always affect users in positive ways, other studies have shown that embodying a black avatar in certain situations can increase implicit racial bias [6]. Very little research has explored the potential for negative or unwanted changes caused by virtual avatars. Given that avatars can affect our thinking and behavior, researchers must begin developing a ethical guidelines for the use of virtual avatars in commercial applications. The use of avatars in games and entertainment is especially in need of investigation, as this is where the more unusual avatar experiences will be created. The contributions of this paper are to 1) summarize the various areas where avatars may produce unwanted affects on users, 2) discuss one example of a specific risk in detail, and 3) present considerations on how to conduct this research in an ethical fashion.

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2 POTENTIAL RISKS POSED BY VIRTUAL AVATARS

Virtual avatars can provide significant effects on users. Below we outline potential unwanted effects of virtual avatars.

2.1 Perceptual Manipulation

VR has the ability to change a user's perception of the world, Body parts can seem longer [7], some are not always uniform [20], and laws of physics do not pertain to the virtual world. Body ownership illusion happens when a user perceives that the virtual avatar is actually their own body and behaves in ways that indicate this is true. These body perceptions may elicit slight confusion from users following their experience, such confusion may result in cybersickness, physical discomfort, and/or frustration. Particular affordances of the virtual environment allow users to jump farther, throw harder, and fly for example. Yet if users are not then re-calibrated for the physical world their experience may provide mental and physical discomfort. This could be explained by vergence accommodation and decoupling as stated by Rushton et al. [18]. Perceptual issues relating to size, orientation, and out of body experiences are cause for concern and must be further examined before VR systems are widespread.

2.2 Negative Self Embodied Avatar Experience

Embodiment of a virtual avatar can provide powerful changes to the user's behavior. Rosenberg et al. demonstrate that embodying a superhero leads to stronger prosocial behavior [16] and Yee et al. demonstrated that users embodying taller avatars behaved more confidently [21]. It is possible that if avatars demonstrate potential positive effects it is possible that they can then elicit negative effects on the user. These effects have been demonstrated in non embodied avatars, for example, Pena et al. found that avatars with aggressive connotations can negatively affect users cognition [14] and Peck et al [12]. found that unlike male counterparts women embodying female avatars under stereotype threat in a virtual computer science classroom demonstrated a reduction in cognitive task. In another study Fox et al. found embodying a highly sexualized avatar produced changes in womens behavior online and offline resulting in increased self-objectification [4]. As these studies suggest, embodied avatars are powerful due to their ability to affect the users implicit attitudes and self-objectification.

2.3 Negative Other Avatar Experience

Virtual avatars carry similar effects of a particular outgroup like in the real world. The representation of the avatar can lead to user confirmation of negative stereotypes associated with an avatars experience [22] leading to VR prejudice. One example is Wallace et al. found users are less likely to collaborate with avatars representing various ethnic groups [19]. As virtual avatars become more popular in the virtual world we must design systems to limit negative avatar experiences.

2.4 Risks Presented by Sustained Immersion

The current body of literature regarding VR use has not fully examined the effects of long term immersion due to its recency. Many studies have examined repetitive uses for VR including therapy for

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mental disorders [17] and training simulations for surgery [8] but none involving long term immersion with an embodied avatar. One can imagine a user withholding physical and psychological needs due to the pleasure of an embodied experience. Another fear of sustained immersion is the user developing a lack of self-based on the identity created in the virtual world. With companies such as Oculus and HTC Vive offering more affordable and less cumbersome VR devices, these will soon be in our homes and may have a similar effect of cellphones with children and adolescents. Madary et al. highlight the fact that to better understand the risk a longitudinal study is required [9].

The potential risks mentioned must be further investigated, as virtual avatars are not yet commonly available they pose a great risk toward detriment to users.

3 Focused Consideration of an Example Risk

Of particular relevance to the above mentioned risk posed by virtual avatars we designed an experiment to investigate negative self embodied avatar experiences, specifically the effect of implicit attitudes on implicit racial bias, this study is still on going.

3.1 Implicit Racial Bias

Racial bias can be expressed as explicit and implicit biases. Explicit biases are consciously held beliefs or deliberate actions against a particular social group. In contrast, implicit biases are associations or actions that are unconsciously and automatically activated in the presence of the particular social group an individual is biased against [5]. Explicit and implicit biases can affect behavior in different ways; in particular, explicit attitudes and biases dominate when people have sufficient time or opportunity to consider an action before taking it, while implicit attitudes and biases provide attitudinal and behavioral changes. Implicit biases effect behavior at an automatic level, these associations are made rapidly and instinctively. Explicit biases can be measured by direct self-report, as they exist on a conscious level. As implicit biases exist at a level below conscious awareness, they cannot be measured directly via self-report. Instead, the implicit association test (IAT) has been used to measure implicit racial biases [[6], [13]. The IAT measures association between two concepts or groups (e.g.flowers/insects and pleasant/unpleasant). Participants are presented with a force-choice task where they are asked to press the appropriate key associated with a concept as quickly as possible.

3.2 Implicit Racial Bias and Embodied Virtual Avatars

Regarding the area of implicit racial bias and embodied virtual avatars literature is conflicted. Peck et al [13] found that putting yourself in the skin of a Black avatar reduces implicit racial bias, however Groom et al [6] found that users who embodied Black avatars demonstrated greater implicit bias than those who embodied a White avatar. This influence on bias is potentially linked to the actions exhibited and the avatar representation in the virtual world. Groom also showed that when embodying an avatar, users aware of negative stereotypes express implicit racial bias regardless of their agreement with them. The implicit biases that embodied avatars can provide are dangerous because they can elicit cognitive and behavior changes that the user is unaware of.

3.3 Study Design

3.4 Experiment Design

In our experiment users embody two avatars, one White and one Black, both genders are represented. The objective of this study is to analyze participants implicit biases through behavioral measures among other measures. Participants were tasked with shooting cutouts, and quickly identify which targets were aliens vs humans. A story element was created to reduce participant suspicion of the true purpose of the experiment and to provide a reasonable explanation to shoot human cutouts. In the story participants play as a secret agent whose sole purpose is to identify between aliens and humans. Aliens have invaded the earth and resemble humans. Participants visited the lab on two separate occasions, the first time to take pretest such as IAT, and after at least three days play the VR game and post measures.

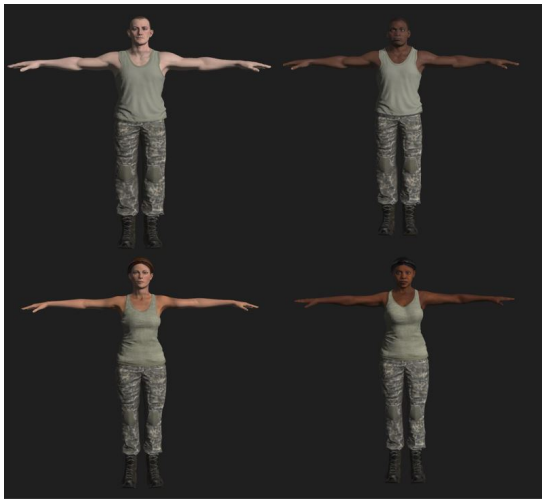

Figure 1: Four embodied Avatars, two genders and two races

3.5 Participants

Participants age ranged from 18-22 and are recruited from the university population and surrounding area. We recruit all races (Black, White, Hispanic/Latinx, Asian etc) and genders for this study.

3.6 Measures

On their first visit participants take a pre IAT, personality questionnaire. Following the VR experience participants take a post IAT, NASA TLX, presence questionnaires, flow questionnaire, and shooting experience questionnaire.

3.7 Lessons Learned about Conducting Research on Virtual Avatars in a Entertainment Context

A previously conducted pilot study using the same apparatus yielded many questions about the experiment and experimental design [10].

3.7.1 Reducing Suspicion

The previous iteration of this study, did not give users an objective. Users were tasked to shoot cutouts of human shaped targets. There was no incentive for users to shoot quickly, other than the experimenter's verbal command.

3.7.2 Study Proctor Race Matters

The experimenter of a study could unintentionally influence participants data. In the previous study having a Black study proctor investigating implicit racial bias on Black avatars could be one of the reasons that led to suspicion. Our previous data shows when another study proctor of a different race (ex White), conducted the experiment little to no suspicion was reported.

3.7.3 Participant Demographics

Another possible reason for suspicion was only White males were recruited for this study. This was explicitly stated on the poster advertising the study.

3.7.4 IAT and Behavioral Measures

During the first visit to the lab participants took a pretest which included only the IAT and demographics. This could have primed participants to the true purpose of the experiment.

3.8 Discussion

When conducting research on the potential risk posed by virtual avatars much thought into experimental design is needed due to the complexity of avatars and avatar experiences. This study is designed to investigate the shifts in implicit racial bias and factors that may contribute to shifts in bias such as flow, cognitive load, and presence. Ethical challenges still remain and many questions about the potential risk are still needed to investigate virtual avatars.

4 Ethical Research Considerations

As avatars can powerfully affect users in unexpected ways, it is important that we understand how avatars may affect users in common gaming and entertainment contexts. This is particularly true for negative, unwanted effects. However, this research also raises significant ethical concerns for participants, as this research may elicit an ethical dilemma. This would appear to directly contradict the principle of beneficence (or non-maleficence), a core right laid out in the Helsinki Declaration stating that the welfare of the research participant should be prioritized in all research [1].

(1) Beneficence: The welfare of the participants should be of upmost importance. No physical, mental, or other harm should come to participants. As stated in the Belmont Report, the objective must be to maximize possible benefits and minimize possible harms [11].

(2) Respect for persons: Participants have autonomy and rights to make their own decisions. Their decisions must be valued without impediment from researchers. Informed consent of risk must be given and if participants are intentionally deceived another informed consent must be given after the experiment acknowledging the deception.

However, as Madary and Metzinger discuss, the current state of VR research makes strictly following the principle non-maleficence infeasible, as we do not yet have enough evidence to make the necessary ethical judgments concerning what is or is not beneficial to the welfare of research participants [9]. Furthermore, such evidence is needed by policy makers and developers to ensure that the public at large has access to beneficent VR experiences. As such, Madary and Metzinger argue that carefully designed VR experiments aimed at understanding the psychological effects of immersion in VR are acceptable. However to limit the risks posed to participants, research studies should consider implementing the following restrictions whenever possible:

1. Mimic consumer entertainment experiences: All experimental scenarios will be designed to closely mimic the types of consumer VR games/entertainment currently available, with the addition of a virtual avatar. This will ensure that participants will not encounter stimuli that differ radically from that which they might encounter in consumer entertainment.

2. Limit extrinsic compensation whenever possible: Incentives (financial or otherwise) will not be provided to participants, so as to reduce the risk that participants may be exposed to VR games/entertainment they would not otherwise have had interest in engaging with. For example, all participants who volunteer for this research would have chosen to engage with similar violent VR games available to consumers.

3. Provide interventions to reduce negative effects after experiments: Whenever possible, after an experiment has been completed and shifts in behavior, perception, and cognition are recorded, participants will have the goals of this research explained to them and will be given the opportunity to experience a literature-based experience known to reduce these negative experiences.

5 Conclusion

As virtual avatars become more available, many questions still remain. Virtual avatars pose the potential to negatively impact users, however to investigate these impacts researchers should adhere to ethical considerations as to not harm participants. The study mentioned above aims at understanding shifts in implicit racial bias with the goal of contributing to the body of literature surrounding negative self embodied experiences. Finally, ethical research considerations are mentioned to assist researchers in investigations of virtual avatars.

References

[1] W. M. Association et al. World medical association declaration of helsinki. ethical principles for medical research involving human subjects. *Bulletin of the World Health Organization*, 79(4):373, 2001.

[2] D. Banakou, R. Groten, and M. Slater. Illusory ownership of a virtual child body causes overestimation of object sizes and implicit attitude changes. *Proceedings of the National Academy of Sciences of the United States of America*, 110(31):12846–51, 2013.

[3] J. Fox and J. N. Bailenson. Virtual Self-Modeling: The Effects of Vicarious Reinforcement and Identification on Exercise Behaviors. *Media Psychology*, 12(1):1–25, feb 2009.

[4] J. Fox, J. N. Bailenson, and L. Tricase. The embodiment of sexualized virtual selves: The proteus effect and experiences of self-objectification via avatars. *Computers in Human Behavior*, 29(3):930–938, 2013.

[5] A. G. Greenwald, D. E. McGhee, and J. L. Schwartz. Measuring individual differences in implicit cognition: the implicit association test. *Journal of personality and social psychology*, 74(6):1464–80, 1998.

[6] V. Groom, J. N. Bailenson, and C. Nass. The influence of racial embodiment on racial bias in immersive virtual environments. *Social Influence*, 4(3):231–248, 2009.

[7] K. Kilteni, J.-M. Normand, M. V. Sanchez-Vives, and M. Slater. Extending body space in immersive virtual reality: a very long arm illusion. *PloS one*, 7(7):e40867, 2012.

[8] T. Lange, D. J. Indelicato, and J. M. Rosen. Virtual reality in surgical training. *Surgical oncology clinics of North America*, 9(1):61–79, 2000.

[9] M. Madary and T. K. Metzinger. Real virtuality: a code of ethical conduct. recommendations for good scientific practice and the consumers of vr-technology. *Frontiers in Robotics and AI*, 3:3, 2016.

[10] D. Maloney. Mitigating negative effects of immersive virtual avatars on racial bias. In *Proceedings of the 2018 Annual Symposium on Computer-Human Interaction in Play Companion Extended Abstracts*, pages 39–43. ACM, 2018.

[11] M. National Commission for the Proptection of Human Subjects of Biomedicaland Behavioral Research, Bethesda. *The Belmont report: Ethical principles and guidelines for the protection of human subjects of research*. Superintendent of Documents, 1978.

[12] T. C. Peck, M. Doan, K. A. Bourne, and J. J. Good. The effect of gender body-swap illusions on working memory and stereotype threat. *IEEE transactions on visualization and computer graphics*, 24(4):1604–1612, 2018.

[13] T. C. Peck, S. Seinfeld, S. M. Aglioti, and M. Slater. Putting yourself in the skin of a black avatar reduces implicit racial bias. *Consciousness and cognition*, 22(3):779–787, 2013.

[14] J. Peña, J. T. Hancock, and N. A. Merola. The priming effects of avatars in virtual settings. *Communication Research*, 36(6):838–856, 2009.

[15] R. S. Rosenberg, S. L. Baughman, and J. N. Bailenson. Virtual Superheroes: Using Superpowers in Virtual Reality to Encourage Prosocial Behavior. *PLoS ONE*, 8(1):1–9, 2013.

[16] R. S. Rosenberg, S. L. Baughman, and J. N. Bailenson. Virtual superheroes: Using superpowers in virtual reality to encourage prosocial behavior. *PloS one*, 8(1):e55003, 2013.

[17] B. O. Rothbaum, L. Hodges, R. Alarcon, D. Ready, F. Shahar, K. Graap, J. Pair, P. Hebert, D. Gotz, B. Wills, et al. Virtual reality exposure therapy for ptsd vietnam veterans: A case study. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, 12(2):263–271, 1999.

[18] S. K. Rushton and P. M. Riddell. Developing visual systems and exposure to virtual reality and stereo displays: some concerns and speculations about the demands on accommodation and vergence. *Applied Ergonomics*, 30(1):69–78, 1999.

[19] P. Wallace and J. Maryott. The impact of avatar self-representation on collaboration in virtual worlds. *Innovate: Journal of Online Education*, 5(5), 2009.

[20] A. S. Won, J. Bailenson, J. Lee, and J. Lanier. Homuncular flexibility in virtual reality. *Journal of Computer-Mediated Communication*, 20(3):241–259, 2015.

[21] N. Yee and J. Bailenson. The proteus effect: The effect of transformed self-representation on behavior. *Human communication research*, 33(3):271–290, 2007.

[22] N. Yee, N. Ducheneaut, M. Yao, and L. Nelson. Do men heal more when in drag?: conflicting identity cues between user and avatar. In *Proceedings of the SIGCHI conference on Human factors in computing systems*, pages 773–776. ACM, 2011.