The Effects of Transparency on Dehumanization of Black Avatars in Virtual Reality

Isaac Bynum, Jessica Good, Tabitha Peck, Austin Erickson, & Gerd Bruder

INTRO

Because of the current optical limitations of OST-HMDs, under some lighting conditions virtual humans representing Black individuals will appear to the user as semi-transparent, whereas lighter skinned virtual humans will be seen as more opaque.

METHOD

- 160 participants, recruited through CloudResearch
- 2 (human, avatar) x 4 (race: White, Black, Asian, Zombie) x 4 (transperency level) mixed experimental design
- Participants evaluated the extent to which each figure seemed human, animal-like, robotic, competent, friendly, dangerous, angry, happy, creepy, unearthly on a scale of 0-100

RESULTS

- Ratings of humanness increased with increased opacity, particularly for humans (compared to avatars)
- Humanness was positively associated with competence and friendliness, negatively associated with dangerousness

Semi-transparent rendering of **dark-skinned avatars** in augmented reality is associated with **decreased perceptions of humanness.**

Fig. 1. (a) Avatars representing(from top to bottom) White, Black, East Asian, and Zombie categories,(b) Humans representing (from top to bottom) White, Black, East Asian, and Zombie categories. For both (a) and (b), columns represent (from left to right) 35% opacity, 68% opacity, 100% opacity, and 100% opacity with color correction

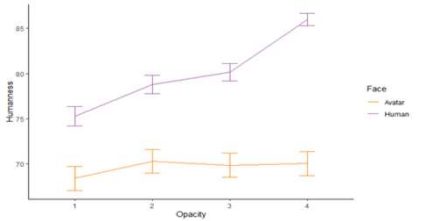

Fig. 2. Effect of opacity on humanness, separately for avatars and humans.

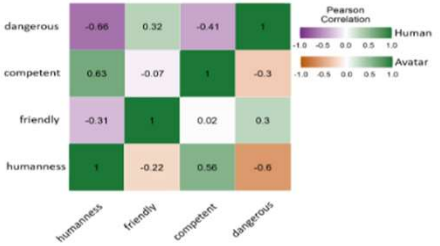

Fig. 3. Pearson correlation coefficient matrix between humanness, competent, friendly, and dangerous. The avatar face correlations are in the top left triangle and the human faces are in the bottom right.

DISCUSSION

Regular interaction with semi-transparent dark-skinned avatars may contribute to ongoing racial bias in fields that frequently use AR for training and work (military, medicine, education, etc.). Future research must test these implications.

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