Walk A Mile in Digital Shoes: The Impact of Embodied Perspective-Taking on The Reduction of Negative Stereotyping in Immersive Virtual Environments

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Abstract

In social psychology, perspective-taking has been shown to be a reliable method in reducing negative social stereotyping. These exercises have until now only relied on asking a person to imagine themselves in the mindset of another person. We argue that immersive virtual environments provide the unique opportunity to allow individuals to directly take the perspective of another person and thus may lead to a greater reduction in negative stereotypes. In the current work, we report on an initial experimental investigation into the benefits of embodied perspective-taking in immersive virtual environments. It was found that negative stereotyping of the elderly was significantly reduced when participants were placed in avatars of old people compared with those participants placed in avatars of young people. We discuss the implications of these results on theories of social interaction and on copresence.

1. Introduction

A great deal of research in social psychology has focused on the nature of stereotypes and prejudice. For example, since Allport's classic work developing a theoretical framework of social categories [1], it has become apparent that strong beliefs about inter-group differences can be created with minimal and oftentimes arbitrary decisions [2, 3]. For example, individuals randomly assigned to one of two different groups will have more positive expectations of members in their own group and more negative expectations of members of the other group despite the fact that there is no rational reason to differentiate members of one group over another.

Researchers have also demonstrated that stereotype activation oftentimes occurs with an automaticity that is beyond conscious control [4] and that the presence of these stereotypes leads to prejudicial interactions unless conscious intervention is applied [5]. These stereotypes not only impact minority groups in social interactions due to the prejudicial treatment they receive from others, but also create cognitive burdens for these minorities themselves as well. For example, negative stereotypes can lead to systematic underperformance via a mechanism known as stereotype threat [6-8]. In a landmark study of stereotype threat, when black students were given a verbal test that they were told was a direct measure of their intellectual ability, they performed worse than another group of black students who were told the test was about understanding different problem-solving strategies [8]. The authors of that study argued that the extra pressure caused by the fear of reinforcing a negative stereotype causes systematic underperforma
nce in ability tests.

These findings all point to the explicit and implicit hold that stereotypes and prejudice have on our society, and the difficulty in preventing tensions and conflicts due to the existence of stereotypes. In the current work, we explore potential interventions for decreasing the application of stereotypes, and in particular, we present empirical data from an experimental design that implemented an intervention method in immersive virtual reality (VR) with beneficial results.

1.1 Decreasing impact of stereotypes

The line of research into the nature of prejudice has led other researchers to explore ways to decrease the accessibility and application of stereotypes. The earliest method of intervention suggested was by Allport himself in his early work [1]. The *Contact Hypothesis* was the suggestion that social interaction between two groups of individuals would decrease the existing conflicts and tensions between them as mutual understanding occurred. The success of this form of intervention, however, depended on several factors, which Allport noted. For example, 1) the two groups must have equal status, 2) and share resources or power in such a way as to create a mutual interdependence, and 3) the context for interaction must be conducive to positive and friendly interactions. While these factors may be introduced in some artificially-created groups [2] to decrease inter-group tension, these factors may be hard to introduce in groups where power imbalances are deeply entrenched (such as with racial or gender stereotypes). Thus, the Contact Hypothesis offers one potential solution that is unfortunately highly situational.

Another intuitive intervention method is *thought suppression*. For example, individuals who try to avoid treating minorities prejudicially may attempt to suppress stereotypical references before the interaction. It has been shown, however, that deliberate thought suppression often backfires [9, 10]. Because a representation of the target stereotype must be articulated in order to suppress it, deliberate thought suppression has the effect of making stereotypical concepts and traits hyper-accessible. This search also functions as a form of repetitive priming. In other words, suppressed stereotypes

often become more, rather than less, accessible and salient after the intervention.

1.2 Perspective Taking

One intervention method that has yielded positive results derives from the concept of *perspective-taking*. In social interactions, the fundamental attribution error affects how we think about and evaluate ourselves and others [11]. When we judge ourselves, we tend to rely on situational factors (i.e., "I did poorly on the test because I didn't sleep well the night before."). On the other hand, when we judge others, we tend to rely on dispositional factors (i.e., "He did poorly on the test because he's not that bright."). Thus, when people are forced to observe their own actions (via a video tape), they tend to make more dispositional rather than situational attributions [12]. The reverse is also true. When participants are asked to take the perspective of the person they are observing, participants tend to make situational rather than dispositional attributions [13].

More importantly, it has been found that perspective-taking leads to an increased overlap between the self and other. In one study, participants rated themselves and another person more similarly on a set of trait words in the perspective-taking condition in which they asked to take the point of view of another person than in a control condition [14]. It was also found that participants felt the target was more similar to themselves than control participants and liked the other person more after the perspective-taking exercise. Thus, on an individual level, perspective-taking had been shown to generate positive interpersonal effects.

Galinsky and Moskowitz [15] extended this work on perspective-taking into the domain of stereotypes and prejudice. They hypothesized that the benefits of perspective-taking may extend to inter-group evaluations and interactions. In other words, by encouraging people to focus on situational rather than dispositional factors via perspective-taking, they may rely less on stereotypes in evaluating and interacting with members of minority groups. In their work, they worked with stereotypes about the elderly because it has been shown that college-age students automatically associate negative traits with the elderly [16]. Participants were shown a photograph of an elderly man and were asked to write a short narrative essay about a typical day in the life of this individual. Participants also performed an implicit association task involving recognition of words related to old age. In a lexical decision task [17], words are flashed briefly on a computer screen and participants are asked to categorize the flashes as words or non-words. It has been shown that concepts and associations that are more accessible in a person's mind will be recognized faster than concepts that are less accessible. Thus, if an individual has a strong negative association with the elderly, then they are more likely to recognize words with negative connotations quicker (i.e., frail, wrinkled, sick) than neutral words or worlds with a positive connotation. It was found that perspective-taking decreased the amount of implicit and explicit stereotyping while increasing the amount of self-other overlap. The significant contribution of their work was in showing that the positive effects of perspective-taking can extend to the group level (i.e., improving evaluations of all elderly people after taking the perspective of one elderly man) rather than simply on the individual level (i.e., improving the evaluation of Tom after taking the perspective of Tom).

1.3 Collaborative Virtual Environments

If it were possible to convincingly place an individual into the body of an elderly person, rather than simply asking them to imagine this, we may expect this perspective-taking exercise to have an even stronger effect. Collaborative Virtual Environments [CVEs, see 18, 19, 20] make this manipulation possible. CVEs are communication systems in which multiple interactants share the same three-dimensional digital space despite occupying remote physical locations. In a CVE, immersive virtual environment technology monitors the movements and behaviors of individual interactants and renders those behaviors within the CVE via avatars (digital representations of people). These digital representations are tracked naturalistically by optical sensors, mechanical devices, and cameras. Thus, CVEs offer unique opportunities for social science research [21, 22].

1.4. Transformed Social Interactions

Unlike telephone conversations and videoconferences, the physical appearance and behavioral actions of avatars can be systematically filtered in immersive CVEs idiosyncratically for other interactants, amplifying or suppressing features and nonverbal signals in real-time for strategic purposes. Theoretically, these transformations should impact interactants' persuasive and instructional abilities. Previously, we outlined a theoretical framework for such strategic filtering of communicative behaviors called Transformed Social Interaction [23]. In a CVE, every user perceives their own digital rendering of the world and each other and these renderings need not be congruent. In other words, the target may perceive his or her own avatar as being attractive while the perceiver sees the target as being unattractive.

Previous work on transformed social interaction has demonstrated quite resoundingly that changing one's representation has large implications on other's in terms of social influence. In other words, transforming Avatar A strategically causes Avatar B to behave consistently with the representation of Avatar A (as opposed to the actual representation of Avatar A). A recent review [24] summarizes a number of studies that show social influence resulting from transformations in facial similarity, mimicry, and eye gaze.

Other research has also shown that alterations in digital self-representation can have a large impact on how a person

behaves in virtual environments - a phenomenon termed The Proteus Effect [25]. For example, participants given attractive avatars are willing to walk closer and share more personal information to a stranger in a virtual environment than participants given unattractive avatars. Also, participants in taller avatars are significantly more willing to make unfair offers to their own advantage than participants in shorter avatars in a negotiation task. In other words, previous work has shown that alterations in self-representation can lead to significant changes in behavior.

In the current study, we were interested in altering self-representation for a different goal. Specifically, we wanted to explore whether changing a person's self-representation may help in reducing the negative stereotypes against particular social groups. For example, we could place college-age users into an elderly avatar to test whether embodied perspective-taking increases the positive evaluations of the elderly.

Presence is the concept of "being there", a measure of how immersive an environment is [26-31]. We argue that the beneficial effects of perspective-taking would be evident in a high presence situation such as the one proposed. Instead of asking people to imagine the world from the perspective of another person, immersive virtual reality allows us to place a person directly into the body of another person. Thus, in our study, we immersed participants into a virtual reality environment and presented them with an avatar via a virtual mirror. Following the work by Levy [32] and Galinsky and Moskowitz [15], we worked with stereotypes of the elderly in the study. Thus, participants were either given an avatar of a young or an elderly person and were forced to interact with another person while wearing the old or young avatar. We predicted that participants given avatars of elderly people would come to have fewer negative stereotypes of the elderly.

2. Method

2.1. Design

In a between-subjects design, participants were randomly assigned to have an avatar of an elderly person or an avatar of a young adult of the same gender. Participants then interacted with a confederate of the same gender who was blind to condition. Finally, participants completed a survey measure of their attitudes towards the elderly.

2.2. Participants

Forty-eight undergraduate students (24 men and 24 women) participated in the study for course credit.

2.3. Materials

2.3.1 Face Pretest. We selected faces of old and young people based on the results of a pretest. First, we found 12 digital photographs of individuals in each of the gender and age conditions needed in the study (thus 48 images altogether). These digital photographs were frontal photographs of individuals in well-lit conditions consisting of at least 400 by 400 pixels. To reduce variation, we selected only photographs of Caucasians who had no facial hair and were not wearing glasses.

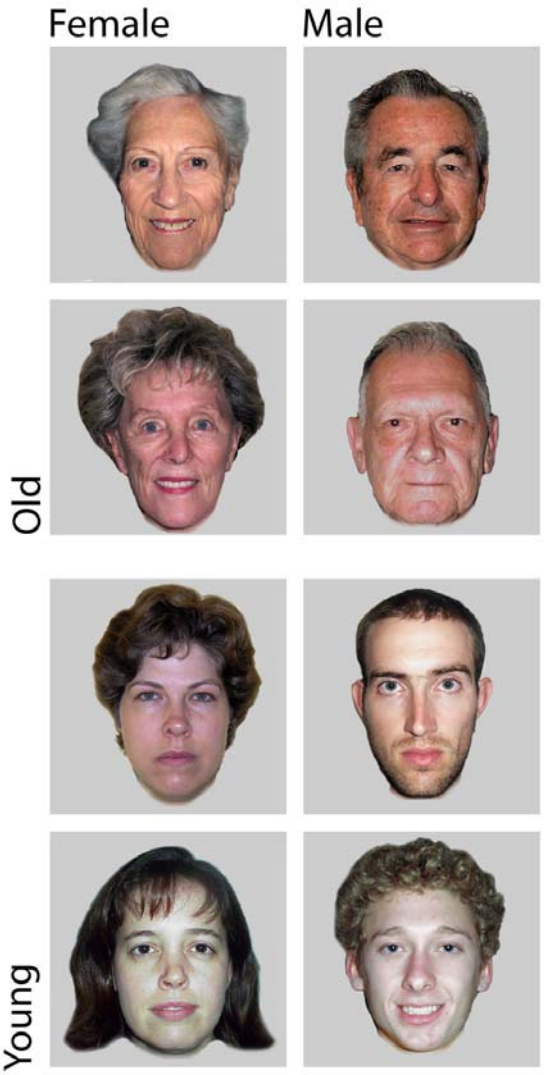

Figure 17 - Avatar faces selected from the pretest for the old and young conditions

Thirty-three undergraduate students who did not participate in the study were presented with each photograph sequentially in a randomized order. They were asked to estimate the age of the individual in the photo on a 6-point

Figure 18 - Equipment setup: A) head-mounted display, B) tracking camera, C) rendering machine.

scale (labeled as 16-25, 26-35, 36-45, 46-55, 56-65, 66-75) as well as rate the attractiveness of the individual on a 7-point fully-labeled scale (from "Extremely Attractive" to "Extremely Unattractive").

Our goal was to select photographs of individuals for both genders that had significantly different age ratings but non-significantly different attractiveness ratings near the mid-point of the attractiveness scale (labeled as "Average"). We selected the two faces for each gender and age condition (thus eight faces altogether) that were closest to the mid-point of the attractiveness scale. A repeated-measures analysis of these eight faces using face trial as the independent variable and attractiveness as the dependent variable was not significant ($F[7, 224] = 1.32$, $p = .24$). A repeated-measures analysis of these eight faces using age group and face trial as the independent variables and age estimate as the dependent variable showed that the effect of age group was significant ($F[1, 32] = 2693.60$, $p < .001$). In particular, the photographed individuals selected for the old condition were rated as significantly older ($M = 5.14$, $SE = .06$, thus between the labels of 55-65 and 66-75) than those in the young condition ($M = 1.67$, $SE = .04$, thus between the labels of 16-25 and 26-35). See Figure 17.

2.3.2. The Physical Lab Setting. The lab consisted of two rooms with an open doorway. In the room where the study took place, a black curtain divided the room. To ensure that confederates and participants were not biased by the attractiveness each other's real faces, confederates stayed behind this black curtain until the VR interaction began and thus never saw the participant's real face and vice versa.

2.3.3. The Virtual Setting. The virtual setting was a white room that had the same exact dimensions as the physical room participants were in. Two meters behind the participant was a virtual mirror that reflected the z-rotation (roll) of the head and body translation (translation on X,Y, and Z) of the participant with the designated face (See Figure 19). Thus, the mirror image tracked and reflected four degrees of freedom such that when the participant moved in physical space, his or her avatar moved in synchrony in the mirror. The confederate's avatar was located 5 meters in front of the participant, facing the participant, and remained invisible until the conversational portion of the experiment began. The confederate's avatar always had a young face of average attractiveness and also had an automated blink animation based on human blinking behavior.

2.4. Apparatus

Perspectively-correct stereoscopic images were rendered by a 1700 MHz Pentium IV computer with an NVIDIA 5950 graphics card, and were updated at an average frame rate of 60 Hz. The simulated viewpoint was continually updated as a function of the participants' head movements, which were tracked by a three-axis orientation sensing system (Intersense IS250, update rate of 150 Hz). The position of the participant along the x, y, and z planes were tracked via an optical tracking system (WorldViz PPT, update rate of 60 Hz). The system latency, or delay between a participant's movement and the resulting concomitant update in the head-mounted display (HMD) was 45 ms maximum. The software used to assimilate the rendering and tracking was Vizard 2.17. Participants wore an nVisor SX HMD that featured dual 1280 horizontal by 1024 vertical pixel resolution panels that refreshed at 60 Hz. The display optics presented a visual field subtending approximately 50 degrees horizontally by 38 degrees vertically. See Figure 18.

2.5. Procedure

Two research assistants - one male and one female - were present for each trial. Because the confederate was always the same gender as the participant, one research assistant would greet the participant and guide the study while the other would be the confederate based on the gender of the participant.

After informed consent, participants were told that the goal of the experiment was to study social interaction in virtual environments and that they would be having a conversation with another person in a virtual environment. Participants were then led into the room with the black curtain and shown how to wear and adjust the HMD. Once the virtual world was loaded, participants saw themselves in a room that was exactly the same dimensions as the physical lab room, as depicted in Figure 19. The research assistant drew open the curtains at this point.

Figure 19 - Screenshot of participant's point of

view in the virtual room with the mirror when he is embodied in an elderly avatar.

Participants were then asked by the lead research assistant to turn around 180 degrees and asked to verify that they saw a mirror in front of them. After verbal affirmation, participants were then told that this is how they appeared to others in the virtual room. Several procedures were used to make sure participants had enough time to observe their avatars' faces. First, they were asked to tilt or nod their head and verbally affirm whether the reflection was following them. Then they were asked to walk up closer to the mirror to get a good look at the face and verbally affirm that the mirror image responded correctly. They were then asked to tilt or nod their head again and verbally affirm that their mirror image followed them. And finally, they were asked to bend down at the knee and come back up and verbally affirm that the mirror image was following them. Every participant was thus exposed to the designated face for between 60 to 75 seconds.

Participants were then asked to turn back around to face the front (i.e., their original orientation). Slightly ahead of time, the research assistant had triggered the program to make the confederate's avatar visible to the participant in the virtual world. Participants were then reminded that others in the virtual room saw them as they had just seen themselves in the mirror. The lead research assistant then told the participants that the other person in the room would initiate the next portion of the experiment.

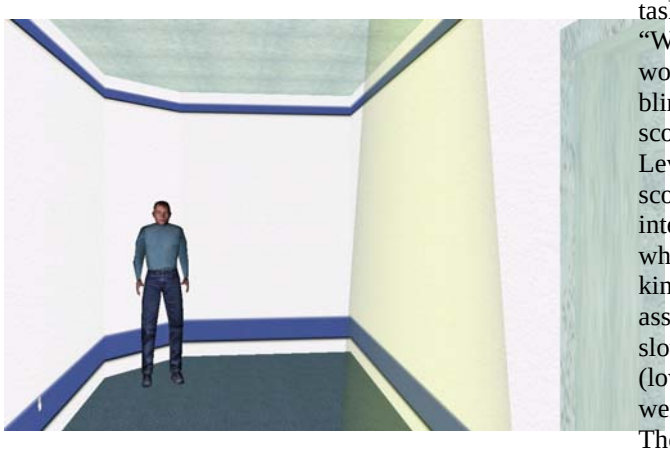

Figure 20 - Screenshot of participant's point of view with confederate across the room and beam of light for the movement task.

The confederate followed a strict script that was displayed in their HMD so they could follow the specific verbal and nonverbal procedures while interacting with the participant inside the CVE. In order to provide the subjects with the time and maximal opportunity to feel self-presence [26] from the designated avatar, subjects were asked to perform a variety of social interactions. First, the confederate asked the participant to walk to several locations in the room under the guise of getting used to moving in a virtual environment. These locations were shown to the participant as cones of light within the virtual environment. There were three such locations that the participants walked to sequentially (see Figure 20). Then participants - now back at the starting location, facing the confederate again - were asked to answer several questions: 1) "Tell me a little about yourself.", 2) "What makes you happy in life?", and 3) "What do you think are the most important things to have in life?". Participants also performed a brief memory exercise of trying to repeat a list of fifteen words. The purpose of the memory exercise was to reinforce the fact they were wearing an elderly avatar. Finally, the confederate asked participants to approach him or her to make the interaction more social. Participants were then taken out of the virtual environment and completed a questionnaire.

2.6. Measures

The questionnaire included three attitudinal measures towards the elderly. This collection of attitudinal measures were taken from Levy's [32] study on the effect of self-stereotyping on attitudinal differences towards the elderly.

2.6.1. Word Association. In the word association task, participants were asked the open-ended question "When you think of somebody old, what are the first five words that come to mind?" Two individuals who were blind to condition rated the responses according to the scoring criteria first developed in an earlier study by Levy and Langer [6]. In brief, each of the five words was scored on three dimensions: 1) whether it described an internal or external trait (i.e., wise vs. wrinkled), 2) whether it had a positive or negative connotation (i.e., kind vs. agitated), and 3) whether the word was associated with activity or inactivity (i.e., gardening vs. slow). Finally, the scores for each of the three ratings (low was always negative; high was always positive) were averaged across the five words for each participant. The inter-coder reliability was .66.

2.6.2. Indirect Attitudes. The second measure of participant's views on aging was derived from Palmore's [33] Fact on Aging Quiz - a true or false quiz that could be used to measure underlying biases towards the elderly. Again, the scoring was based on the earlier Levy and Langer [6] study. We used both positive and negative bias items in this measure. In a positive bias

question, a true negative statement about the elderly is made (i.e., "Old people usually take longer to learn something new."). If participants choose "false" as the response, then it means they have a positive bias towards the elderly. Conversely, in a negative bias item, a false negative statement about the elderly is made (i.e., "The majority of people over the age of 65 reside in nursing homes."). If participants choose "true" as the response, then it means they have a negative bias towards the elderly. In this measure, we had a total of 6 positive bias items and 6 negative bias items (see Appendix A). We calculated a bias score for each individual by subtracting their negative bias score from their positive bias score.

2.6.3. Ambiguous Story. Finally, we included an ambiguous story - the Margaret story - drawn from Levy's [32] study (see Appendix B). The story described a 73-year-old woman named Margaret who moves in with her adult daughter and attends a college reunion. The story consisted of 21 sentences and presented information that could be judged in both positive, neutral, or negative ways. For example, Margaret's inability to concentrate during the long reunion speech could be attributed to her age (negative dispositional attribution), her lack of sleep the night before (neutral situational attribution), or the tedium everyone experiences in listening to a long speech (a neutral dispositional attribution).

Participants were asked to summarize the story in their own words as well as to describe Margaret. Two coders blind to condition read through and scored each participant's responses on four dimensions: 1) was Margaret dependent or independent in her relationship with her daughter?, 2) is Margaret described as being imaginative or losing touch with reality (becoming senile)?, 3) is Margaret forgetful because she is getting old or because of situational factors?, and 4) is Margaret described overall positively or negatively? The inter-coder reliability was .68. These four scores were then combined to form an aggregate rating.

3. Results

3.1. Word Association

We ran a t-test on the word association scores from the two Age Conditions (old and young). We found a significant difference (t[44] = 2.60, p = .01) where participants in the old condition (M = 7.67, SD = 1.72) associated traits that were significantly more positive to the elderly than participants in the young condition (M = 6.42, SD = 1.54).

3.2. Indirect Attitudes

We ran a t-test on the overall bias score from the two Age Conditions. The effect was not significant (t[45] = .30, p = .77).

3.3. Ambiguous Story

We ran a t-test on the aggregate rating from the two Age Conditions. The effect was not significant (t[31] = .77, p = .45). See Table 1 for the detailed results of all our significance tests.

Table 1. Means and standard deviations for all our dependent measures.

	Young *M* (*SD*)	Old *M* (*SD*)	*t*	*p*
Word Association	6.42 (1.54)	7.67 (1.72)	2.60	.01
Indirect Attitudes	-1.13 (1.61)	-1.17 (2.06)	.30	.77
Ambiguous Story	10.10 (2.52)	9.47 (2.12)	.77	.45

4. Discussion

While our results did not show a consistent effect across all three dependent measures, it was extremely encouraging to find that such a short virtual interaction can change a person's negative stereotypes at all. We found a significant effect in the word association task, but not in the indirect attitudes or ambiguous story tasks. On the other hand, similar inconsistencies were found in Levy's [32] original study, which only demonstrated significant differences on one of several dependent measures. Thus, perhaps these other dependent measures were not particularly sensitive to the manipulations we chose. Nevertheless, it is encouraging that a brief immersion into the avatar of an elderly person has a significant effect on attitudes towards the elderly in general.

There were several limitations to the current study. First of all, the dependence on explicit attitudinal measures made it impossible to assess whether the manipulation had an effect on implicit stereotype activation. For example, the use of a lexical decision task (with words associated with the elderly) may be used in

future studies to explore the effect of embodied perspective-taking on implicit stereotype activation. And secondly, it is difficult to minimize demand characteristics in the current experimental paradigm. During debriefing, we demonstrated that many participants in the old condition guessed the goal of the study. On the other hand, intervention methods (such as the contact hypothesis or thought suppression) are typically explicit as well. So while there are demand characteristics in both the narrative and embodied perspective-taking tasks, it may be the case that the increased amount of presence from the latter type of simulation is a more effective tool in reducing stereotypes. Furthermore, it is not clear how one might conceal the nature of the intervention in practice. After all, diversity training in school or business settings are never covert interventions.

Future work can expand on the current findings in several ways. First of all, as mentioned before, implicit measures should be included. The inclusion of implicit measures may also yield more consistent results, as lexical decision tasks are less susceptible to social desirability bias among other demand characteristics. Thus, these implicit measures may improve upon the inconsistent results apparent in both Levy's study and the current study. Secondly, it would be interesting to compare the effects of embodied perspective-taking with the effects of narrative perspective-taking. In other words, an estimation of the added benefit of using this intervention in immersive virtual reality. And finally, future work might explore how embodied perspective-taking impacts other stereotypes, such as race or gender. Previous work has demonstrated that VR is an effective tool for treating many types of psychological disorders (such as phobias or post-traumatic stress syndrome) [34-37]. In future work, we hope to add prejudice to this list.

Social inequality caused by stereotypes and prejudice is a problem that has no simple solutions. Perspective-taking has been shown to be a practical intervention method that decreases both implicit and explicit stereotyping. While the current study found inconsistent results for the use of embodied perspective-taking, the findings do suggest that this intervention in immersive virtual reality can have a positive effect on reducing negative stereotypes.

5. Appendix A

The following items were drawn from Palmore's original work [33] on the stereotypes people have of the elderly.

5.1. Positive bias items

1. Physical strength tends to decline in old age.
2. The five senses (sight, hearing, taste, touch, and smell) all tend to weaken in old age.
3. Old people usually take longer to learn something new.
4. Older people tend to react slower than younger people.
5. Lung vital capacity tends to decline in old age.
6. A person's height tends to decline in old age.

5.2. Negative bias items

1. About half of the people over the age of 65 in the US have Alzheimer's Disease.
2. The majority of people over the age of 65 reside in nursing homes.
3. The majority of old people lose interest in and capacity for sex.
4. About half of old people live below the poverty line.
5. Drivers over the age of 65 are more likely to get into car accidents than drivers under the age of 65.
6. Old people are more likely to victims of theft, murder, and burglary than people under the age of 65.

6. Appendix B

Because the "Margaret story" was not reproduced in Levy's earlier paper [32], we requested a copy from her and she kindly shared her original stimulus. Since the story has not been reproduced in full before, we include it here for reference.

6.1. The Margaret story

Margaret had just moved in with her daughter, son-in-law and grandchildren (aged 7, 5, and 1). Margaret's daughter, Anne had been worried about her mother. Margaret had been living alone since her husband died soon after her 70 th birthday, which was three years ago. Anne convinced her mother to move into her nearby home where she could ask her mother to baby-sit for her grandchildren and where she could better help her mother with meals and household chores.

The week Margaret moved in with her daughter happened to be the week of Margaret's 50 th college reunion. During Margaret's first night in her daughter's home, she woke up many times because her one year old grandson had an earache and cried throughout the night. The next day, Margaret was supposed to attend the dinner to honor the reunion of her college class. Margaret's college roommate Essie had convinced Margaret to attend the reunion which was to be held at the nearby Hyatt Hotel. Margaret tried to walk to the hotel but could not recognize the local streets and got lost. She finally wandered back to her daughter's house. When she walked in, her grandchildren started to giggle at their disheveled grandmother. Margaret's daughter decided to give her mother a ride to the reunion dinner

and go as her escort.

When they arrived, Margaret introduced her daughter to some of her college acquaintances but could not recall many of their names. During the salmon dinner, Margaret found it difficult to concentrate on the speeches by the long-winded members of her class. She noticed that one of the speakers resembled a poodle. Margaret's attention shifted downward. She saw a napkin that had fallen under the table and thought how it looked very much like a squirrel. She then looked over at her daughter and started to think about how she used to take her to a playground with lots of swings and a big green sandbox. She smiled at her daughter and commented half out loud, "That sandbox - how you loved it." Anne looked at her mother with a concerned look and whispered, "Shhh! Be quiet mom!" After dinner, Anne drove her mother home.

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