Aging Biases Among Medical Students and Self-Aged Image Intervention

Abstract

The purpose of this study was to assess whether medical students have age biases by using the Age Implicit Association Test (IAT). An intervention of a photo of each selected participant was aged using age-progression software, April ®. The photos of each participant were aged to the image of an older adult of approximately 72 years old. Each participant was tested again using the Age IAT to see if the intervention had any effect on his or her aging biases. Overall, there was no significant difference detected between the intervention and control group based on the repeat Age IAT scores when compared to the initial Age IAT scores. Many possible explanations could account for lack of significance including small sample size and fluid changes in an individual's biases.

Background and Significance

Bias is a phenomenon that does not escape the medical profession, specifically aging biases. Recognition and attempts to mitigate such deficiency have already been initiated as seen in the 1980's when the geriatric fellowship programs increase to 103 from 36 and with current integration of geriatrics into medical school curriculum (Brooks, 1993). Even with the slight efforts to change medical students' attitudes toward aging, the outlook has been poor (Arber, 2004). The attitude of the medical student is the crux which born and potentiate biases. Furthermore, the problem of aging biases also lies within the culture of medicine due to its inherent focus on the diseases and disabilities of aging when providing care or conducting research (Ferrario et. al., 2008). The atmosphere and social perceptions of aging become "well-learned and so fundamental" that they become "primitive or automatic" (Nelson, 2005). This is no better exemplified by when health professionals use "baby talk," a simplified speech using high pitch and stressed intonations with older adults or when over-accommodating with simple sentences and being overly courteous (Nelson, 2005). This "automaticity" is so striking and malignant that evidence of such biases is reflected even in the medical decisions and practices early on in medical students. When asked to decide on a treatment plan for female patient who hypothetically had same-stage breast cancer stratified by age group, 31 years or younger and 59 or older, second-year medical students tended to assign breast conservation therapy for the younger patients (86% versus 66%; $p<.001$) and modified radical mastectomy for the older patients (95% verses 65%; $p<.001$) (Madan, 2001). For these procedures, it may have not been shown that age is factor in the outcome of the procedure; the differential treatment can be attributed to "physician preference" or physicians' age biases (Madan, 2001).

In a study examining the factors that influences career choice showed that those who did not choose internal medicine, a specialty in which care for the older population is prominent, they reported that their experiences with "the elderly and chronically ill patients" discouraged them from considering internal medicine (Hauer et. al, 2008). These subtle yet significant finding is also apparent in the pattern and choices of practicing doctors. In a study conducted by Arber, doctors selected from Massachusetts encountered patients with congestive heart disease in a simulated interview to see if there was differential treatment (2004). Measuring different variables like sex, smoking habits, alcohol consumptions, and age, Arber found that doctors' "information seeking and advice giving do not match know patient risk factors" (2004). Specifically, older patient tended to receive less advice and inquiry about their smoking habits and alcohol consumption even when they might be at a greater risk (Arber, 2004).

Ferrario et al. has demonstrated that with more active shifts in framework, clinical experiences and coursework, change can be instituted, like that of the successful aging model (2008). They showed that students were able to express more positive views about aging because of the focus of humanism in clinical practice (Ferrario et. al, 2008; Nelson, 1993). But medicine as a whole has not experienced such a paradigm shifts yet as demonstrated by the choices that medical students and doctors are making.

These findings and trends are disturbing in light of the statistics that the people are living longer and that the older population is the fastest growing cohort. It is expected that the older population will double from 2005 to 2030 to well-over 50 million (Brooks, 1993; Hauer et. al., 2008). It is pertinent to note that, even those who do not choice to care for the elder by title as geriatricians do, a great proportion, 42%, of all practicing doctors will work with the elderly especially when considering that up to 50% of hospital visits, 50% of cardiologists' patients, 20% of general surgeons' patients, 20% of neurologists' patients 20% of urologists' patients, and 20% of ophthalmologists' patients are older adults (Brooks, 1993).

Perhaps a fruitful solution to the disintegration of aging biases is realizing that "aging is no disease, but a normal part of living, just like childhood" (Spiro, 2009). Altering the aging perceptions and deeply root biases within in the medical culture can only help to improve and meet the "geriatric imperative" (Brooks, 1993). If we keep with the mindset that aging is a disease process, then we will be doing a great disservice and be ignorant of the fact that the elderly "are, and will be, healthier, better educated, and more demanding, vigorous, aggressive, independent, organized, and self-reliant" (Brooks, 1993). We can then start to think of aging in terms of caring, rather than curing (Spiro, 2009).

The aging phenomenon and all of it implications has been greatly appreciated by the financial industry. Go to a certain Bank of America website. One can upload or a take a digital photo of one-self. Click a button and one can observe one's phenotypic aging process. What will one look like at 49, 69, or even 109 years old? The instillation of this program hopes to stimulate thoughts about savings and future financial concerns by making an individual visually confront the aging process. An ideal outcome would be that the individual is encouraged to start saving money, with the bank of course. If such effectiveness can be observed in the financial respect, it can be creative application in the medical realm, which is the hope with this study. This study aims to investigate whether medical students, who potentially may have aging biases, are affected by a visual phenotypic self-aged photo intervention. The ultimate goal of this study is to generate a possible avenue or tool in which the medical society can teach and make aware about the aging process.

Methods

Participants

The sample population of the study was medical students from the University of California, San Diego from all levels of year in medical school. Participants were not restricted by age, sex, or race.

Materials

Courteous of April ®, an aging software program was used to digitally age the selected participant's photo in a progressive manner to the maximum age of 72. The software was accessed through the company's website (https://www.aprilage.com/). The photos of the selected participants were taken from the school's website. The participants' school photos were chosen as

the photo to be age because of ease of access and standardized photo quality (i.e. similar subject position, lighting, and size). The Age IAT was available and accessed through a website (https://implicit.harvard.edu/implicit/selectatest.html). Interactions between the researcher and participants were conducted via electronic mail. Five-dollar Target gift cards were available to the first 100 participants, which was funded by the Ruth Covell Grant; these gift cards were mailed to the eligible participants.

Procedures

The following procedures were conducted in the study:

1. Participants were recruited by posting an inquiry on the school of medicine web portal, word-of-mouth, and referral from participants. Participants were asked to respond by email. The posting clearly outlined that the participation is voluntary and that all information will be kept confidential. An electronic version of the informed consent and participant's Bill of Rights were attached to the posting and email for review.
2. The participant's response to the inquiry was considered as informed consent to participants and they provided personal information of age, sex, race, mailing address and permission to use their posted school photo on the school of medicine web portal.
3. The investigator responded to the participant and provided a link to a website where the participant can complete the Age IAT (https://implicit.harvard.edu/implicit/selectatest.html). Participants were instructed to follow the directions of the website.
4. The participant completed the Age IAT and sent the results to the investigator via email in the form of a screenshot or a written response in the email.
5. The participant was randomized to the intervention group or the control group.
6. If the participant was selected to be in the control group, the participant was sent the same link to the Age IAT test approximately one week later.
7. If the participant was selected to be in the intervention group, the investigator obtained the participant's school photo off of the school's web portal website.
8. The participant's photo was then aged using the April ® aging software.
9. The aged photo of the participant was sent to the participant immediately after the participant's results were sent and were to be viewed.
10. Approximately one week later, the participants in the intervention group were sent the same link to the Age IAT to be completed a second time.
11. Participants sent the results of the repeated Age IAT test to the investigator via email.
12. Data was analyzed.

Analysis

This study is a randomized, interventional study. The randomly selected participants were divided into one of two groups of the study, interventional or control group. The results of the Age IAT data were classified as the following:

Number	Race
1	slight young
2	moderate young
3	strong young
4	little to no preference
5	slight old
6	moderate old
7	strong old

Table 1. Classification of preferences into a seven-digit scale.

Race was also classified into a digit scale as described below.

Number	Race
1	White, White/Asian, or White/ South Asian
3	Hispanic or Mexican
4	Asian or Asian/White
5	Bangladeshi, East Indian, Indian, South Asian, Middle East

Table 2. Classification of race into a numeric scale.

The difference between the repeat Age IAT and initial Age IAT were analyzed using the two-sample paired t-test.

Results

A total of 63 participants were recruited into the study, 32 of which were randomized into the intervention group. Of the 32 participants in the intervention group, 28 participants completed the study; 26 of the 31 participants completed the study in the control group. Data was collected over a span of 21 days with an average duration of 5.02 days (SD +/- 2.74) for a participant to complete the study. The age range of the participants was from 21 to 33 years old with the average age of 25.87 years old (SD +/- 2.16). 38.10% and 61.90% of the interventional and control groups respectively were females. The largest response race was Asians at 46.77% followed by Whites at 37.10%; the remainder was made up of Hispanics and South Asians.

Overall, no significant difference was detected between the intervention and control group with regards to baseline Age IAT, follow-up, race, medical school year and when comparing repeat Age IAT and initial Age IAT. When comparing the initial Age IAT scores between the intervention and control group, the mean scores were both 2.46 (SD +/- 1.07 and 1.24) respectively. Examining the repeat Age IAT at follow up, the means for the intervention and control group were 2.65 and 2.56 (SD +/- 1.23 and 1.27) respectively. Within the intervention group, the means of the initial Age IAT and repeat Age IAT were 2.48 and 2.65 (SD +/- 1.08 and 1.23) respectively with a difference of -0.17 (SD +/- 1.37). Within the control group, the means of the initial Age IAT and repeat Age IAT were 2.52 and 2.57 (SD +/- 1.27 and 1.27) respectively with a difference of 0.04 (SD +/- 1.77).

Using regression analysis and controlling for age, sex, race, medical school year and initial Age IAT, the initial Age IAT was the only variable that showed a significant p-value of 0.00 in the intervention and control group. Focusing on the interventional group, those

individuals with an initial Age IAT score of 3 (strong preference for young) and 5 (slight preference for older), demonstrated a p-value of 0.04 and 0.03 respectively, the only variables that showed significance. For the control group, only individuals with initial Age IAT of 5 showed significant, p-value of 0.00.

Discussion and Future Directions

Although no significant difference between the control and intervention groups were detected when comparing the initial Age IAT and repeat Age IAT, several possible factors can be influencing the outcome. When examining the intra-group comparison of the initial and repeat Age IAT of the control group, scores change; specifically with those who scored higher on the initial Age IAT demonstrated a trend towards lower scores on the repeat Age IAT. This indicates that the Age IAT can serve as an intervention itself. It is interesting in itself that those who did score higher, specifically those scoring 5 (slight preference toward older) on the Age IAT initially trended towards a lower score on the repeat; this could suggest that those who initially had a slight preference towards older changed their preference for younger on repeat. Because of the small sample size, total of 54 participants who completed the study, such generalizations cannot be made confidentially.

Changes in scores from initial to repeat for an individual can be revealing the fluid nature of biases and not necessarily the influence of the IAT itself. The IAT has been study extensively for its validity, and variation of the results of this study are less likely to be due to the IAT itself. Greenwald et al. has noted that the IAT "measures are not influenced by wide variation in subject's familiarity with IAT stimuli" and that the IAT "measures are relatively insensitive to procedural variations such as the number of trials, the number of exemplars per concept, and the time interval between trials" (2007). Carney et al. has demonstrated that the IAT has shown stability across time, making the IAT less likely an influential factor (2007); the medical students' biases could be changing over the few days from initial to repeat testing.

The difference between the means of the initial Age IAT and repeat Age IAT was -0.17 (SD +/- 1.37) for the intervention group. Another possible explanation for such a trend could be that the data captured was a just snapshot of the scores regressing towards the mean. With a small difference, it is difficult to accurately assess the trend, as the sample size may not be sufficient as well.

The results of this study are not discouraging, but serves as motivation to further continue the study. Perhaps continuing this study to include other medical students at different schools would increase the sample size. Additionally, adding co-variates like school location could help further identify significant factors. It would also be interesting to repeat the Age IAT a second time to further trend changes.

Many of the medical students involved in the study had commented on their surprise with the Age IAT; some of them surprised that they had a preference toward young when they thought themselves as having preference for older. This study achieved some level of impact in helping reveal aging biases among medical students and hopefully will serve as a buttress for future advancements.

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