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Older Adults Are Healthier Than Many People Expect: Reducing Anti-old Attitudes

Abstract

There are widespread anti-old attitudes held by younger people. Older adults are generally perceived as closely associated with illnesses. Thus, younger people with a higher degree of germ aversion (i.e., aversion to disease transmission) are thought to view the older population more negatively. In Study 1, we conducted an online survey ($N = 981$) and found that, even after controlling for the related variables such as fear of death, those with higher germ aversion had more anti-old attitudes. In Study 2, we conducted an online experiment ($N = 689$). Participants in the experimental group read an explanatory text which showed that older adults in general are healthier than people perceive and those in the control group read an irrelevant explanatory text. Results showed that anti-old attitudes were weaker in the experimental group than in the control group; this effect lasted at least one week. In Study 3, we conducted an online experiment similar to Study 2 ($N = 997$). In the experimental group, anti-old attitudes toward both the young-old (aged 65–74 years) and old-old (aged 75 years and over) were reduced. Further, advocates for policies to support older adults increased in the experimental group. The experimental manipulation in this study has the advantage that it can be conducted with a large number of participants in a simple procedure. Our findings would be useful in gerontological research aimed at improving anti-old attitudes and creating a society, in which older adults can live comfortably.

Keywords: older adults, attitudes, germ aversion, the young-old, the old-old

Introduction

The rapidly aging is most pronounced in Japan, with 28.7% of the population aged ≥ 65 years in 2020 (Japan Ministry of Internal Affairs and Communications, 2020). With increasing life expectancy, the age at which one is considered an “older adult” may differ. Thus, in studies examining negative and discriminatory attitudes toward older adults (i.e., anti-old attitudes), we must clarify its definition. In this study, following the World Health Organization, older adults are defined as people aged ≥ 65 years.

Despite the rapidly growing proportion of older adults, younger people’s anti-old attitudes have been observed in varied spaces, including the workplace, care settings, and social networking services (Lytle, Apriceno, Macdonald, Monahan, & Levy, 2020; Skipper & Rose, 2021). Such attitudes have a variety of undesirable effects on older adults, including reduced well-being (Avidor, Ayalon, Palgi, & Bodner, 2017) and increased depressive tendencies (Bai, Lai, & Guo, 2016). A large Israeli survey of 300 older adults and 300 people of other generations showed that anti-old attitudes contributed to a lower degree of social participation in the neighborhood among older adults (Vitman, Iecovich, & Alfasi, 2014). In a survey conducted during the COVID-19 pandemic, younger people with stronger anti-old attitudes were more likely to favor legal and unilateral restrictions on the freedom of movement of older adults (Spaccatini, Giovannelli, & Pacilli, 2022). Therefore, decreasing anti-old attitudes is an urgent issue. Although East Asians emphasize respect for older adults (Cuddy, Norton, & Fiske, 2005), recent meta-analyses have shown that they have more anti-old attitudes than their Western counterparts (North, 2022; North & Fiske, 2015). Thus, anti-old attitudes in contemporary Japan are stronger than international standards.

Older adults are more likely to be associated with illnesses due to superficial cues, such as weakened immunity and aged skin (Duncan & Schaller, 2009; Murray & Schaller, 2016). In this study, we regard “illness” as a broadly morbid condition in general, regardless of whether it is associated with pathogens. We also consider diverse stereotypes about older adults,

including sickly, physically weak, and incompetent (Hummert, Garstka, Shaner, & Strahm, 1994). It is reported that older adults are generally portrayed as sickly in social networking services as well (Ng, Indran, & Liu, 2022). In addition, anti-old attitudes can be increased because people avoid objects associated with illnesses (Curtis, Aunger, & Rabie, 2004; Oaten, Stevenson, & Case, 2009) and possibilities of disease transmission (i.e., germ aversion) (Shimizu, Hashimoto, & Karasawa, 2022a). Therefore, in Study 1, we examine the association between germ aversion and anti-old attitudes.

If people with higher germ aversion have more anti-old attitudes, decreasing people's germ aversion could lead to less anti-old attitudes. However, cognitions, emotions, and behaviors that avert disease transmission are reported to be adaptive for survival and procreation (Fukukawa, Oda, Usami, & Kawahito, 2014) and deeply rooted in most human beings (Shook, Sevi, Lee, Oosterhoff, & Fitzgerald, 2020); therefore, reducing people's germ aversion is undesirable. Thus, in Study 2, instead of reducing germ aversion, we decrease anti-old attitudes by weakening the cognitive link between the idea of the old and illnesses by presenting participants with an explanatory text showing older adults as being healthier than generally perceived. Educational interventions presenting correct information about common misunderstandings about older adults are effective (e.g., Lytle & Levy, 2019; Wurtele & Maruyama, 2013) and could reduce anti-old attitudes.

In Study 3, we measure not only anti-old attitudes, but also measure how important participants rate policies that support older adults and examine whether the similar experimental manipulation as in Study 2 is effective. Most previous studies categorize all older people into one large age group. With the rapid increase in life expectancy in Japan, it is possible that younger people hold different impressions toward different age groups among older adults. In particular, relatively old older adults would be more easily perceived and associated with illnesses than relatively young older adults. Therefore, we distinguish a rating target of two age groups: the young-old (aged 65 to 74 years) and the old-old (aged ≥ 75 years).

In Japan, the classification of older adults by age is generally into the young-old/old-old. In Study 3, we decrease anti-old attitudes toward the young-old/old-old and increase advocates for policies to support for older adults by weakening the cognitive link between the old and illnesses. Our research question is whether weakening the cognitive link between the idea of the old and illnesses (i.e., reminding younger participants that older adults are healthier than they expect) can decrease anti-old attitudes.

Study 1

We examine the association between germ aversion and anti-old attitudes. There are several variables that should be controlled for (Shimizu et al., 2022a); variables related to illnesses, attitudes toward others, contact experience with older adults, and social desirability. Regarding illness variables, death is an outcome of many illnesses, and older adults and death are often cognitively linked by other generations (Marques et al., 2020). Further, COVID-19 pandemic manifested as older people at high risk of serious illnesses vs. younger people forced to refrain (Skipper & Rose, 2021). Thus, the recent pandemic may have increased fear of death and the association between germ aversion and anti-old attitudes. Individuals with higher germ aversion tend to evade others to avoid disease transmission (Schaller & Park, 2011). For example, people with higher germ aversion have lower extroversion (Duncan, Schaller, & Park, 2009) and lower trust in others (i.e., general trust; Aarøe et al. 2016). Thus, we control for people's negative attitudes toward younger people relative to older adults (i.e., anti-young attitudes), extroversion (Oshio, Abe, & Cutrone, 2012), and general trust (Yamagishi & Komiyama, 1995). Those with more experience with older adults have weaker anti-old attitudes (Shimizu et al., 2022a), and we distinguish between the quantitative and qualitative aspects of contact experience. Many prejudices, including anti-old attitudes, are socially taboo to express (Cherry, Allen, Denver, & Holland, 2015). In such cases, participants with higher social desirability (i.e., the tendency to express socially desirable attitudes; Tani, 2008) may give responses that differ from true attitudes. Therefore, in Study 1, we examine if those with

higher germ aversion have more anti-old attitudes, even after controlling for the aforementioned variables (Hypothesis 1).

Methods

Participants

Participants were recruited using the crowdsourcing service CrowdWorks in July 2022. A power analysis was performed ($\alpha = .05$, $\beta = .80$, $N_{\text{parameter}} = 12$, $f^2 = .02$) and the required sample size was $N = 888$. Participants were 981 Japanese (aged 18–39 years; 354 males and 627 females). Participants who answered incorrectly to the item “For this item, please choose the second to the right option (i.e., agree)” in the survey ($N = 20$) were excluded from the analysis as they did not read the instructions carefully. The data used for the analysis consisted of $N = 961$ (352 males and 609 females) with a mean age of 31.96 years ($SD = 5.42$). The reward per participant was 100 yen.

Procedure and analysis

Participants agreed to participate after receiving an online explanation of this study. They then responded to the items of anti-old attitudes, germ aversion, fear of death, fear of COVID-19, anti-young attitudes, extroversion, general trust, contact experience, social desirability, and demographics. Statistical software R (ver. 4.1.0) was used for the analysis. The data, R scripts, and questionnaire items are available on the Open Science Framework (OSF) repository (https://osf.io/3yt95/?view_only=871853f366f846d99a37814f163c8121).

Measurements

Anti-old attitudes were measured using an adapted, shorter, Japanese version of the Fraboni Scale of Ageism (Harada, Sugisawa, Sugihara, Yamada, & Shibata, 2004) consisting of 14 items (five-point Likert scale). The mean was calculated ($\alpha = .87$), with higher scores indicating more anti-old attitudes.

Germ aversion was measured using the subscale “germ aversion” of the Japanese Perceived Vulnerability to Disease Scale (Fukukawa et al., 2014) consisting of eight items

(seven-point Likert scale). The mean was calculated ($\alpha = .77$), with higher scores indicating more germ aversion.

Fear of death was measured using the subscale “fear of death” of the Scale of Attitudes toward Life and Death for Adulthood (Tanaka & Saito, 2016) consisting of eight items (five-point Likert scale). The mean was calculated ($\alpha = .89$), with higher scores indicating more fear of death.

Fear of COVID-19 was measured using seven items (five-point Likert scale) of Ahorsu et al. (2022). The mean was calculated ($\alpha = .86$), with higher scores indicating more fear of COVID-19.

Anti-young attitudes were measured using the five semantic differential scales (seven-point Likert scale), such as “friendly–unfriendly” (Meshel & McGlynn, 2004). We explicitly stated to the participants that “younger people” refers to those between the ages of 18 and 39. The mean was calculated ($\alpha = .85$), with higher scores indicating more anti-young attitudes. As for the definition of “younger people,” the Paper on Children and Youth in 2021 (Japan Cabinet Office, 2021) provides many statistics for people between the ages of 15 and 39. In addition, based on the decade-based delimitation of “20s” and “30s,” it would be appropriate to set the upper age limit for younger people at 39 years old. On the contrary, the lower limit should be 18, given that the age of adulthood was lowered to 18 in Japan in April 2022. Thus, in this study, younger people are defined as those between the ages of 18 and 39. All participants in this study meet this criterion.

Extroversion was measured using two items (seven-point Likert scale) of the Japanese version of the Ten-Item Personality Inventory (Oshio et al., 2012). The mean was calculated ($r = .56$, 95%CI = [.52, .61], $p < .001$), with higher scores indicating more extroversion.

General trust was measured using six items (seven-point Likert scale) of Yamagishi and Komiyama (1995). The mean was calculated ($\alpha = .88$), with higher scores indicating more general trust.

The quantitative aspect of contact experience was measured using the single item (seven-point Likert scale): “Do you think you have a lot of contact with older adults on a daily basis?” Qualitative aspects of contact experience were measured using two items (seven-point Likert scale) of Shimizu et al. (2022a). The mean was calculated ($r = .76$, 95%CI = $[.73, .78]$, $p < .001$), with higher scores indicating higher quality of contact experience.

Social desirability was measured using the Japanese version of Balanced Inventory of Desirable Responding (Tani, 2008) consisting of “self-deception (twelve items, seven-point Likert scale)” and “impression management (twelve items, seven-point Likert scale).” The mean was calculated (in order, $\alpha = .80, .75$), with higher scores indicating more social desirability. As for the demographic, participants’ age and gender were recorded.

Results

Summary statistics for each variable were posted on the OSF. Multiple regression analysis was conducted with anti-old attitudes as the dependent variable, and germ aversion, fear of death, fear of COVID-19, anti-young attitudes, extroversion, general trust, contact experience (quantitative/qualitative aspects), social desirability (self-deception/impression management), age, and gender as independent variables (Table 1). As a result, Hypothesis 1 was supported as those with higher germ aversion had more anti-old attitudes ($\beta = .10$, 95%CI = $[.05, .16]$, $p < .001$).

Discussion

In Study 1, participants with higher germ aversion had more anti-old attitudes. This association was still pronounced after controlling for fear of death and COVID-19, anti-young attitudes, extroversion, general trust, contact experience, social desirability, age, and gender. In this study, fear of death was not associated with anti-old attitudes (Table 1). This is at odds with the findings of previous research (Martens et al., 2004) that anti-old attitudes increase when the fear of death is stronger. This could be because death was not strongly associated with common illnesses for many young people. Although we assumed that death was perceived as

an outcome of many illnesses, the concept of death might be a distant prospect for most younger people, and the cognitive link between illnesses and death would be weak. Future studies should examine in detail whether this interpretation is correct.

Study 2

In Study 2, we aimed to examine anti-old attitudes by weakening the cognitive link between older adults and illnesses. Participants were split into an experimental group (EG) presented with text indicating that older adults in general are healthier than people expect, and a control group (CG) presented with an irrelevant text. We examined whether anti-old attitudes became weaker in the EG, compared to the CG (Hypothesis 2). Meanwhile, to examine the effect of the experimental manipulation, we control for the participants' aging anxiety, which is defined as "worries brought up by imagining the negative consequences and losses associated with old age" (Ayalon, 2018, p. 1) given that people with higher aging anxiety have more anti-old attitudes (e.g., Allan & Johnson, 2008; Ha & Kim, 2021; Harris & Dollinger, 2001).

Methods

Pre-registration

Pre-registration of the research plan and analysis for this study was submitted to the OSF on September 9th, 2022 (<https://doi.org/10.17605/OSF.IO/KD7NB>).

Participants

Participants were recruited using the crowdsourcing service CrowdWorks in September 2022. Participants were 689 Japanese (18–39 years; 261 males; 428 females). We collected data at three time points (times 1, 2, and 3; see below); however, 265 participants left the study during the times. Those who answered incorrectly to the item "For this item, please choose the second to the right option (i.e., agree)" in the first data collection ($N = 6$) were excluded from the analysis. Thus, there 418 participants (167 males, 251 females) with a mean age of 32.66 years ($SD = 5.16$). The reward per participant was 130 yen.

Procedure and analysis

Participants consented to participate after receiving an online explanation. They responded to items about anti-old attitudes, germ aversion, fear of death, fear of COVID-19, and aging anxiety (time 1). They were then randomly assigned to either the EG ($N = 206$) or the CG ($N = 212$). The sample sizes for each group were above the criteria indicated in the pre-registration. After reading the provided text, participants responded to items about anti-old attitudes and demographics (time 2). A week later, they responded to items on anti-old attitudes, contact experience, and social desirability (time 3). Data correspondence between the different times was performed using the last four digits of participants' cell phone numbers and zip codes. Statistical software R (ver. 4.1.0) was used for the analysis. The data, R scripts, and questionnaire items are available on the OSF.

Experimental manipulation

The text presented in the EG corrected the common misconception that older adults were unhealthy (physically and mentally) (Shimizu, Hashimoto, & Karasawa, 2022b). The text used in the CG was based on Ikeda's (2010) description of media and the Internet, which was the same as that used in Shimizu et al. (2022b). Each full text was posted on the OSF.

Measurements

The items used were similar to those in Study 1; anti-old attitudes (time 1: $\alpha = .88$, time 2: $\alpha = .90$, time 3: $\alpha = .90$), germ aversion ($\alpha = .77$), fear of death ($\alpha = .91$), fear of COVID-19 ($\alpha = .87$), contact experience with older adults (qualitative aspect: $r = .74$, 95%CI = [.69, .78], $p < .001$), social desirability (self-deception: $\alpha = .82$, impression management: $\alpha = .79$), and demographics. Aging anxiety was measured using six items (four-point Likert scale) from Yan, Silverstein, and Wilber (2011). The mean was calculated ($\alpha = .73$), with higher scores indicating more aging anxiety.

Results

Summary statistics for each variable were posted on the OSF. A generalized linear mixed model (GLMM) was used to examine the effects of the groups on anti-old attitudes. The

dependent variable was anti-old attitudes; fixed effects were groups (EG/CG), measurement timings (times 1, 2, and 3), germ aversion, fear of death, fear of COVID-19, aging anxiety, contact experience (quantitative/qualitative aspects), social desirability (self-deception/impression management), gender, and age; random effects were participants. Results showed that a significant interaction between groups and measurement timings ($t(834) = 4.75$, $p < .001$). Multiple comparisons showed that anti-old attitudes in time 1 did not significantly differ between the CG ($M = 2.71$) and the EG ($M = 2.71$; $t(468) = 0.77$, $p = .44$). Results also showed that anti-old attitudes were weaker in times 2 and 3 than in time 1 in the EG (in order, $t(832) = 7.30$, $p < .001$; $t(832) = 5.39$, $p < .001$). Accordingly, Hypothesis 2 was supported.

Variables such as anti-old attitudes and germ aversion were measured prior to the presentation of each text, allowing us to re-examine Hypothesis 1. Accordingly, multiple regression analysis was conducted with anti-old attitudes (time 1) as the dependent variable, and germ aversion, fear of death, fear of COVID-19, aging anxiety, contact experience (quantitative/qualitative aspects), social desirability (self-deception/impression management), age, and gender as independent variables (Table 2). Results showed that those with higher germ aversion had more anti-old attitudes ($\beta = .14$, 95%CI = [.05, .22], $p = .002$); Hypothesis 1 was supported again.

Discussion

In Study 2, anti-old attitudes were weaker in the EG than in the CG, and the effect lasted at least one week. Thus, the results suggest that weakening the cognitive link between the old and illnesses may decrease anti-old attitudes. The results of Study 1 were also replicated; those with higher germ aversion had more anti-old attitudes. We conducted an experimental manipulation, where the text was presented showing that older adults are healthier than people expect. However, it was unclear if the manipulation really weakened the cognitive link between the idea of old and illnesses. Therefore, in Study 3, we conducted manipulation check after the experimental manipulation to measure whether the cognitive link between the old and illnesses

is weaker in the EG than in the CG.

Study 3

We must emphasize policies to support older adults to counteract the discriminatory treatment against them. Furthermore, we distinguished between two age groups—the young-old (65–74 years) and the old-old (≥ 75 years)—as a rating target. By resolving common assumptions/stereotypes that older adults are unproductive, stubborn, and lead boring lives (Breyspraak & Badura, 2015; Palmore, 1980; Shimizu et al., 2022b), anti-old attitudes could be more effectively decreased. Therefore, in the EG of Study 3, additional sentences with the aim of clearing up such common misconceptions are added to the experimental manipulation of Study 2. We examined whether attitudes toward the young-old and old-old respectively become weaker in the EG than in the CG (Hypothesis 3-1) and advocates for on policies to support older adults becomes higher in the EG than in the CG (Hypothesis 3-2).

Methods

Pre-registration

Pre-registration of the research plan and analysis for this study was submitted to the OSF on October 15th, 2022 (<https://doi.org/10.17605/OSF.IO/94V3F>).

Participants

Participants were recruited using CrowdWorks in October 2022 ($N = 997$; 18–39 years; 337 males and 660 females). Participants who answered incorrectly to the item “For this item, please choose the second to the right option (i.e., agree)” in the experiment ($N = 22$) were excluded from analysis. The analysis data consisted of 975 participants (329 males and 646 females) with a mean age of 32.01 years ($SD = 5.45$). The reward per participant was 70 yen.

Procedure and analysis

Participants consented to participate after receiving an online explanation. They were randomly assigned to the EG ($N = 491$) or the CG ($N = 484$). Sample sizes for each group were above the criteria indicated in the pre-registration. After reading one of the texts, participants

responded to items on manipulation check, anti-old attitudes toward either the young-old or the old-old (a rating target was randomly assigned, in order $N = 489, 486$). They then answered items about advocates for policies to support older adults. Next, they responded to items on germ aversion, contact experience, social desirability, and the demographics. Statistical software R (ver. 4.1.0) was used for the analysis. The data, R scripts, and questionnaire items are available on the OSF.

Experimental manipulation

The same texts were used for both the EG and the CG as in study 2, however statements correcting common stereotypes were added to the EG (Brejtspraak & Badura, 2015; Shimizu et al., 2022b). Each full text was posted on the OSF.

Measurements

For anti-old attitudes, we used the same items as in Studies 1 and 2, but changed the target of each item to “the young-old” ($\alpha = .89$) or “the old-old” ($\alpha = .88$). The participants were told that the term “young-old” refers to those aged 65–74, while the term “old-old” refers to those aged 75 and older. Advocates for policies supporting older adults was measured using four items (six-point Likert scale) after the leading sentence “How important do you think each of the following policies currently being implemented to address the aging society in Japan are?” Participants responded to the items, including “To ensure a variety of opportunities for older adults to work according to their motivation and ability” (Japan Cabinet Office, 2018). The mean was calculated ($\alpha = .73$), with higher scores indicating more advocating for policies to support older adults. The following items were similar to those in Studies 1 and 2; germ aversion ($\alpha = .77$), contact experience with older adults (qualitative aspect: $r = .79$, 95%CI = [.76, .81], $p < .001$), social desirability (self-deception: $\alpha = .81$, impression management: $\alpha = .75$), and the demographics.

The manipulation check was conducted using two items (six-point Likert scale) including “Older adults are susceptible to illnesses” and “Older adults are generally in poor

health.” The mean was calculated ($r = .68$, $95\%CI = [.64, .71]$, $p < .001$), with higher scores indicating a stronger cognitive link between the old and illnesses. It is assumed that the cognitive link between the old and illnesses would be weaker in the EG than in the CG.

Results

Means of the two items in the manipulation check were calculated for each group, and an independent t -test was performed. Results showed that the EG ($M = 3.11$, $SD = 1.01$) had a weaker cognitive link between the old and illnesses ($t(942) = 16.72$, $p < .001$, $d = 1.07$) than the CG ($M = 4.09$, $SD = 0.82$). Therefore, we believe that the experimental manipulation functioned as expected.

Summary statistics for each variable were posted on the OSF. The data for all participants showed that those with weaker anti-old attitudes were more likely to advocate for policies to support older adults ($r = -.26$, $95\%CI = [-.32, -.21]$, $p < .001$). An analysis of covariance was conducted to examine the effects of groups and rating targets (1) on anti-old attitudes and (2) on advocates for policies to support older adults (Table 3). Anti-old attitudes and advocates for policies to support older adults were the dependent variables, and the independent variables were groups, rating targets, the interaction between groups and rating targets, germ aversion, contact experience, social desirability, age, and gender. (1) There was a main effect of groups on anti-old attitudes, which was weaker in the EG than in the CG ($\beta = -.05$, $95\%CI = [-.10, .00]$, $p = .04$). There was also a main effect of rating targets on anti-old attitudes, which was weaker toward the young-old than toward the old-old ($\beta = -.07$, $95\%CI = [-.12, -.02]$, $p = .006$). Meanwhile, there was no interaction between groups and rating targets ($\beta = .00$, $95\%CI = [-.04, .05]$, $p = .85$). (2) There was a main effect of groups on advocates for policies to support older adults, which was stronger in the EG than in the CG ($\beta = .08$, $95\%CI = [.02, .14]$, $p = .008$). Meanwhile, there was no main effect of rating targets and interaction effects (in order, $\beta = .05$, $95\%CI = [-.01, .11]$, $p = .10$; $\beta = .03$, $95\%CI = [-.03, .08]$, $p = .39$). Therefore, Hypotheses 3-1 and 3-2 were supported.

Discussion

In Study 3, anti-old attitudes were weaker in the EG than in the CG. In the EG, advocates for policies to support older adults was higher than in the CG. Results suggest that weakening the cognitive link between the old and illnesses could decrease anti-old attitudes held by younger people and increase advocates for policies to support older adults. The experimental manipulation showing that older adults in general are healthier than people expect functioned as expected. This could guarantee the validity of Study 2, where a similar experimental manipulation was performed.

General Discussion

We conducted three studies with the aim of reducing anti-old attitudes held by younger people. In Study 1, even after controlling for the effects of related variables, those with higher germ aversion had more anti-old attitudes. In Study 2, we conducted an experimental manipulation to reduce the cognitive link between the old and illnesses. Results showed that anti-old attitudes were weakened by demonstrating that older adults are healthier than people assume. A similar experimental manipulation was conducted in Study 3, and both anti-old attitudes toward the young-old and the old-old were reduced. Moreover, participants in the EG advocated more for policies supporting older adults.

In all three studies, participants with more positive quality of contact experience with older adults had weaker anti-old attitudes (Tables 1, 2, and 3). Many previous studies have shown that intergenerational contact is effective in improving anti-old attitudes (e.g., Allan & Johnson, 2008; Christian, Turner, Holt, Larkin, & Cotler, 2014; Meshel & McGlynn, 2004), and our results were consistent with these findings. However, direct contact between the old and other generations is becoming more difficult, especially with the COVID-19 pandemic, and it is difficult to implement intergenerational exchange programs for a large number of people simultaneously, and the interventions often take a long time. Therefore, our findings (i.e., experimental manipulations that can be conducted online with a large number of

participants are effective in reducing anti-old attitudes) have great practical significance in educational and welfare settings.

Implications

In Study 3, instead of a single rating target of “older adults,” we distinguished between two groups: the young-old and the old-old. Results showed that anti-old attitudes were directed more toward the old-old, than toward the young-old. As older adults are more likely to be ill, the old-old could be more easily perceived and associated with illnesses than the young-old, leading to more anti-old attitudes. Meanwhile, the distinction between the two groups is based on age, and there are many old-old people who live as healthy lives as the young-old. Consequently, labeling people as “old-old” could contribute to more anti-old attitudes, and the extent to which the labeling effects exist in news coverage should be examined in the future.

Despite these findings, there are three major limitations. First, the explanatory text used in the CG was possibly associated with old-age stereotypes. This text included the contents related to media and the Internet, which might be linked to the stereotype of older adults as “unfamiliar with new technology.” However, in time 1 of Study 2, there was no significant difference in anti-old attitudes between the CG and the EG. Also, in Shimizu et al. (2022b), which used the same explanatory text, no significant difference in time 1 was observed. Therefore, it would be unlikely that the contents of the explanatory text in the CG had any effect on anti-old attitudes. On the contrary, we should conduct similar experiments employing the topics less associated with old-age stereotypes. Second, in Study 3, we did not examine if the experimental manipulation had a lasting effect. In Study 2, effects on attitude change lasted at least one week, while in Study 3, the effect was measured only immediately after the experimental manipulation. Thus, it would have been advantageous to measure the effect of the experimental manipulation one week after the experiment. Third, we did not examine whether the experimental manipulation causes behavioral change toward older adults. In Study 3, we measured advocates for policies to support older adults, which is thought to be related to

people's voting behavior, but it is unclear whether our experimental manipulation increases helping behavior toward older adults. Therefore, we should examine the effects on behavioral change in detail using laboratory experiments.

Conclusions

We found that showing people that older adults are healthier than they perceive reduces anti-old attitudes. Our study is advantageous because it can be conducted with a large number of participants with ease. All three studies showed a significant effect that those with higher germ aversion had more anti-old attitudes. Moreover, showing that older adults in general are healthier than people expect was effective in the two datasets (Studies 2 and 3). This suggests that our results are sufficiently reproducible. Although it is difficult to dramatically decrease anti-old attitudes held by younger people, our findings have great potential for development in gerontological research. We should conduct practical and educational interventions to reduce anti-old attitudes and create a society in which people of all ages can live comfortably.

Disclosure statement: The authors report there are no competing interests to declare. Supplemental material can be accessed at the Open Science Framework (OSF) repository (https://osf.io/3yt95/?view_only=871853f366f846d99a37814f163c8121).

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Tables

Table 1

Multiple regression analysis on anti-old attitudes (Study 1)

	β		95%CI	VIF
Germ aversion	.10 **		[.05, .16]	1.20
Fear of death	.05		[.00, .11]	1.32
Fear of COVID-19	.04		[-.02, .10]	1.38
Anti-young attitudes	.02		[-.04, .07]	1.22
Extroversion	-.08 **		[-.13, -.02]	1.22
General trust	.01		[-.05, .06]	1.29
Contact experience (quantity)	-.04		[-.10, .01]	1.19
Contact experience (quality)	-.50 **		[-.55, -.44]	1.26
Self-deception	.12 **		[.06, .17]	1.24
Impression management	-.20 **		[-.26, -.15]	1.15
Age	.00		[-.06, .05]	1.06
Gender (1= male, 0 = female)	.02		[-.03, .07]	1.11
Adjusted R^2	.36 **		[.31, .41]	—

Note. Regression coefficients are standardized. * $p < .05$, ** $p < .01$.

Table 2

Multiple regression analysis on anti-old attitudes in Time 1 (Study 2)

	β	95%CI	VIF
Germ aversion	.14 **	[.05, .22]	1.16
Fear of death	-.02	[-.11, .07]	1.26
Fear of COVID-19	-.06	[-.15, .03]	1.35
Aging anxiety	.06	[-.03, .15]	1.39
Contact experience (quantity)	.12 **	[.04, .21]	1.17
Contact experience (quality)	-.53 **	[-.62, -.44]	1.23
Self-deception	.08	[-.01, .16]	1.19
Impression management	-.16 **	[-.24, -.08]	1.09
Age	.03	[-.05, .12]	1.08
Gender (1= male, 0 = female)	.02	[-.06, .10]	1.07
Adjusted R^2	.34 **	[.27, .41]	—

Note. Regression coefficients are standardized. ** $p < .01$.

Table 3

Analysis of covariance results on anti-old attitudes and advocates for policies to support older adults (Study 3)

	Anti-old attitudes		Advocates for policies		VIF
	β	95%CI	β	95%CI	
Groups	-.05 *	[-.10, .00]	.08 **	[.02, .14]	1.01
Rating targets	-.07 **	[-.12, -.02]	.05	[-.01, .11]	1.01
Groups $\times$ targets (interaction)	.00	[-.04, .05]	.03	[-.03, .08]	1.00
Germ aversion	.17 **	[.12, .22]	.06 *	[.00, .13]	1.08
Contact (quantity)	.01	[-.04, .06]	.03	[-.03, .09]	1.15
Contact (quality)	-.54 **	[-.59, -.48]	.26 **	[.20, .33]	1.20
Self-deception	.06 *	[.01, .11]	-.11 **	[-.17, -.05]	1.08
Impression management	-.14 **	[-.19, -.09]	-.01	[-.07, .05]	1.06
Age	-.01	[-.06, .04]	.07 *	[.01, .13]	1.07
Gender (male = 1, female = 0)	.06 *	[.01, .12]	-.16 **	[-.22, -.10]	1.09
adjusted R^2	.40 **	[.35, .45]	.13 **	[.09, .17]	—

Note. Groups: Experimental group =1, control group = 0; Rating targets: The young-old =1, the old-old = 0. Regression coefficients are standardized. * $p < .05$, ** $p < .01$.