Impact of Media-based Negative and Positive Age Stereotypes on Older Individuals' Mental Health during the COVID-19 Pandemic

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Abstract

Objectives: During the COVID-19 pandemic, stigmatization of older persons has increased in traditional and social media. It was unknown whether this negative messaging could be detrimental to the mental health of older individuals, and whether the relatively uncommon positive messaging about older individuals could benefit their mental health.

Method: To address these gaps, we designed age-stereotype interventions based on actual news stories that appeared during the pandemic, and divided them into negative and positive versions of what we term personified (i.e., person-based) and enumerative (i.e., number-based) age-stereotype messaging.

The negative versions of the two types of messaging reflected the age stereotype of decline whereas the

positive versions of the two types of messaging reflected the age stereotype of resilience.

Results: As expected, the exposure of older individuals to the negative-age-stereotype-messaging interventions led to significantly worse mental health (more anxiety and less peacefulness), compared to a neutral condition; in contrast, the positive-age-stereotype-messaging interventions led to significantly better mental health (less anxiety and more peacefulness), compared to a neutral condition. The findings were equally strong for the personified and enumerative conditions. Also as expected, the interventions, which were self-irrelevant to the younger participants, did not significantly impact their mental health.

Discussion: This is the first-known study to experimentally demonstrate that institutional ageism, and statistics that reflect stereotypes about older individuals, can impact mental health. The results demonstrate the need for media messaging aimed at empowering older individuals during the pandemic and beyond.

keywords: COVID-19, ageism, age stereotypes, anxiety, media

During the COVID-19 pandemic, stigmatization of older individuals has increased (Ehni & Wahl, 2020; Lichtenstein, 2020). The forms this has taken include the extensive press coverage of government officials devaluing older individuals by suggesting they are unworthy of adequate medical care, as well as popular memes disparaging older individuals on social media (Ayalon et al., 2020; Rudolph & Zacher, 2020). Although the capacity of social media to also devalue older individuals was demonstrated before the pandemic by Facebook (Levy, Chung, Bedford, & Navrazhina, 2014), recent analyses of Twitter data found that the COVID-19 pandemic has sparked a proliferation of negative-age-stereotype-based comments (Jimenez-Sotomayor, Gomez-Moreno, & Soto-Perez-de-Celis, 2020; Xiang, Lu, & Xue, 2020).

The current study seeks to determine whether prevalent negative messaging about aging during the pandemic could have a detrimental impact on older individuals' mental health. It also considered whether the relatively uncommon positive messaging about aging during the pandemic, such as news reports of older health-care workers who came out of retirement to help sectors overwhelmed by COVID-19 (Mansoor, 2020), could benefit older individuals' mental health.

The framework for this study is stereotype embodiment theory (SET), which proposes that age stereotypes are internalized and activated across the lifespan by exposure to a wide-range of societal sources, such as traditional and social media, and that negative age stereotypes can harm the health of older individuals, while positive age stereotypes can benefit their health. According to SET, these health consequences will not occur among younger individuals, for whom age stereotypes are self-irrelevant (Levy, 2009). SET further proposes that the impact of age stereotypes on the health of older individuals occurs along a set of pathways: psychological (e.g., negative age stereotypes can amplify stress and positive age stereotypes can buffer against it (e.g., Levy, Hausdorff, Hencke, & Wei, 2000)); physiological (e.g., older individuals holding negative age stereotypes had higher levels of the inflammation biomarker C-reactive protein (Levy & Bavishi, 2018)); and behavioral (e.g., older individuals holding negative age stereotypes were more likely to

oppose hospitalization of older persons when extremely sick with COVID-19 (Levy, Provolo, Chang, & Slade, 2020)).

The likelihood of a link between age-stereotype messaging and mental health is suggested by a study that found older individuals holding negative age stereotypes were more likely to develop psychiatric conditions than their peers holding positive age stereotypes (Levy, Chung, Slade, Van Ness, & Pietrzak, 2019). That study was not an experiment; it did not look at the societal sources of the age stereotypes nor whether the stereotypes directly impacted the mental health of the participants—overcoming these gaps is the goal of the current study.

In order to pursue this goal, we designed age-stereotype-messaging interventions that were derived from the format and content of actual media reporting about the pandemic (e.g., Begley, 2020; Mansoor, 2020). This reporting fell into negative and positive versions of two categories that we term "personified-age-stereotype messaging," that consisted of stories about older individuals, and "enumerative-age-stereotype messaging," that consisted of statistics about older individuals. In their negative versions, both types of messaging focused on the age-stereotype theme of devitalization; whereas, in their positive versions, both types of messaging focused on the age-stereotype theme of vitalization.

The enumerative-messaging approach corresponded to an experiment that demonstrated, in a hypothetical "outbreak of an unusual Asian disease," the presentation of the same data in terms of number of lives saved or lost resulted in different perceptions of the data (Tversky & Kahneman, 1981, p. 453; Coppock, & McClellan, 2019). This approach of presenting the same data with opposite framing had not been previously applied to age stereotypes or considered as a determinant of health.

To examine mental health in the current study, we selected anxiety because it: has increased during the pandemic and is associated with greater frequency of media exposure (Gao, et al., 2020; Li, Wang, Xue, Zhao, & Zhu, 2020). In addition, to examine a

complementary and positive aspect of mental health, we examined peacefulness as an outcome. Of the two primary types of positive emotions, excitement and peacefulness, the latter tends to be particularly meaningful to older individuals (Mogilner, Sepandar, & Aaker, 2011; Tsai, Knutson, & Fung, 2006).

We predicted that among older individuals, negative-age-stereotype messaging will lead to more anxiety and less peacefulness, compared to neutral messaging; and positive-age-stereotype messaging will lead to less anxiety and more peacefulness. We also predicted that the age-stereotype messaging will not significantly impact the younger individuals. In addition, we explored the relative impact of the enumerative and personified-age-stereotype messaging on anxiety and peacefulness.

Methods

Participants

Our data collection took place between April 23 and May 5, 2020, when stay-at-home orders due to the COVID-19 pandemic were implemented throughout the United States. To accelerate data collection and increase participant diversity, we recruited participants from two online platforms: Lucid and Amazon's Mechanical Turk. Both platforms provide data validity and reliability similar to that collected through traditional in-person settings (e.g., Coppock & McClellan, 2019).

Inclusion criteria were: over 18 years of age, ability to read and write in English, and United States residence. The 1590 participants of the sample were 55% female, 70% white, 19% African-American, 14% Hispanic, and 7% Asian. In order to recruit similar numbers of older and younger participants, we conducted an age-stratified recruitment process that led to 48% of the participants being aged 65 years and older. The age range of the younger sample was 18 to 64, M=39.65, SD=12.23. The age range of the older sample was 65 to 106, M= 70.18, SD=4.72. The two age groups did not significantly differ on racial composition. The younger participants reported more-positive self-rated health (M=2.79, SD=.94) than the older participants (M=2.56, SD=1.01), t=4.69. p<.001.

Also, the younger sample had fewer women (47%) compared to the older group (64%), X^2=46.13, p<.001. All of these variables were included in the models as covariates.

Measures

Predictor: Intervention. We conducted a 3 favorability (negative, neutral, positive) * 2 age-stereotype content (personified vs. enumerative messaging) intervention study in which participants read two paragraphs (each with 51 words) based on actual pandemic news articles. (See Appendix.)

The personified version of the intervention took the form of two vignettes about a 75-year-old man during the pandemic. In these vignettes, he exemplified either negative or positive age stereotypes.

The negative and positive-enumerative-age-stereotype-messaging interventions presented the same data in two ways. The negative version stated that 13.4% of older patients die from COVID-19. The positive version stated that 86.6% of older patients recover from COVID-19. The negative and positive age stereotypes in both the personified and enumerative interventions were evocative of decrepitude and robustness, respectively.

The neutral personified version presented information about scientists studying space wind. The neutral enumerative version presented the percentage of rocks formed from lava.

Participants were randomly assigned to read one of the personified-intervention stories (i.e., negative, neutral, or positive); and one of the enumerative-intervention stories (i.e., negative, neutral, or positive). Because we did not create the two conditions in which these stories had contradictory valences (i.e., positive personified/negative enumerative or negative personified/positive enumerative), this led to seven possible combinations. The intervention order was counterbalanced.

The success of randomizing the participants into the age-stereotype-messaging-intervention groups was indicated by the similar characteristics of the groups. They did not significantly differ by age, self-rated health, sex, or race.

To increase engagement, after reading each news story the participants were asked to write about the most important message of the intervention and how they would describe it to a friend. This was followed by the intervention and, then, the outcome measures.

To check the validity of the age-stereotype messaging interventions, two persons, who were not aware of the intervention-group assignments, rated on a scale ranging from 1-*most negative* to 5-*most positive* the participants' responses to the question about how they would describe the story to a friend. In support of the validity, they rated the negative-age-stereotype messaging interventions as significantly more negative than the positive-age-stereotype messaging interventions, for both the personified, β=3.88, p<.0001, and the enumerative-stereotype versions, β=2.70, p<.0001.

In addition, we found that ratings of the stories closely matched (within half a point) the intended valence. That is, for the personified-stereotype intervention, the negative was *M*=1.09, *SD*=.12, the neutral was *M*=2.98, *SD=.21*, and the positive was *M*=4.55, *SD*=.49; for the enumerative-stereotype intervention, the negative was *M*=1.05, *SD*=.36, the neutral was *M*=3.02, *SD=.26*, and the positive was *M*=4.86, *SD*=.62.

Outcome: Anxiety. We assessed this outcome with the seven-item GAD-7 that is designed to assess generalized anxiety disorder symptoms (e.g., *not being able to stop or control worrying* and *being so restless it is hard to sit still*) (Spitzer, Kroenke, Williams, & Löwe, 2006). The scale has good reliability and validity (Spitzer, et al., 2006; Wild et al., 2014). We asked participants to base their responses on the period "since the pandemic began." Potential responses ranged from 1=*not at all* to 4=*nearly every day*. On average, the participants reported they had experienced two symptoms (*SD*=.96); Cronbach's alpha was .93.

Outcome: Peacefulness. We assessed this outcome by asking participants to indicate how much the word "peaceful" describes "how you are feeling now" on a scale ranging from 1=*very slightly or not at all* to 5=*extremely*. In our sample, the average score was 2.98, *SD*=1.21.

Covariates. In all models, we adjusted for age, sex, race, and self-rated health. Other studies have found these variables are associated with the outcomes (Levy, 2009; Spitzer, et al., 2006; Watson, et al., 1988).

Analytic Plan

To examine the first hypothesis, among the older participants (i.e., 65 years or greater) we created linear regression models, with the personified-age-stereotype-messaging interventions and the enumerative-age-stereotype-messaging interventions as predictors, adjusting for the interaction of the two interventions and all covariates. As considerable research has found that positive, neutral, and negative age stereotypes impact outcomes in valence-consistent ways (e. g. Levy, Slade, Chang, Kannoth, & Wang, 2020), we treated the predictors as continuous variables (Harpe, 2015; Norman, 2010) and assigned a value of "1" to the positive-age-stereotype-messaging condition, "2" to the neutral-messaging condition, and "3" to the negative-age-stereotype-messaging condition. This allowed us to compare both the impact of the negative-age-messaging and the impact of the positive-age-stereotype messaging to the neutral messaging within the personified-age-stereotype-messaging interventions and the enumerative-age-stereotype-messaging interventions, after adjusting for the interaction of the predictors and the covariates (Finney, 1948).

In the models, the outcomes of anxiety and peacefulness were examined as continuous outcomes. Since we predicted a direction of the effects, based on prior age-stereotype studies, the p-values were presented as one-tail tests (Cumming, 2012; Levy, 2009; Levy et al, 2019; Levy, Pilver, Chung, & Slade, 2014; Westerhoff et al., 2014).

To examine the second hypothesis, we repeated all analyses with the younger participants. These analyses were conducted with SAS version 9.4 (SAS Institute Inc., Cary, NC). To compare the

relative impact of the personified-age-stereotype messaging and enumerative-age-stereotype messaging interventions on the outcomes, all measures were z-scored.

Results

In support of our first hypothesis, among older participants, the negative-age-stereotype messaging interventions led to significantly more anxiety than the neutral messaging, in both the personified, $\beta=.24$, $t=1.84$, $p=.03$, $\eta_p^2=.005$, and the enumerative versions, $\beta=.26$, $t=2.07$, $p=.02$, $\eta_p^2=.006$, adjusting for all covariates; and the positive-age-stereotype messaging interventions led to significantly less anxiety than the neutral messaging, in both the personified, $\beta=-.24$, $t=-1.84$, $p=.03$, $\eta_p^2=.005$, and the enumerative versions, $\beta=-.26$, $t=-2.07$, $p=.02$, $\eta_p^2=.006$, adjusting for all covariates (see Table 1 in Supplementary Files and Figure 1.)

Also, in support of our first hypothesis, among older participants the negative-age-stereotype-messaging interventions led to significantly less peacefulness than the neutral messaging, in both the personified, $\beta=-.33$, $t=-1.96$, $p=.03$, $\eta_p^2=.005$, and the enumerative versions, $\beta=.-36$, $t=-2.21$, $p=.01$, $\eta_p^2=.006$, adjusting for all covariates; and the positive-age-stereotype-messaging interventions led to significantly more peacefulness than the neutral messaging, in both the personified, $\beta=.33$, $t=1.96$, $p=.03$, $\eta_p^2=.005$, and the enumerative versions, $\beta=.36$, $t=2.21$, $p=.01$, $\eta_p^2=.006$, adjusting for all covariates (see Table 2 in Supplementary Files and Figure 1.)

Figure 1. Impact of Negative Age-stereotype Messaging on Older Persons' Anxiety and Peacefulness
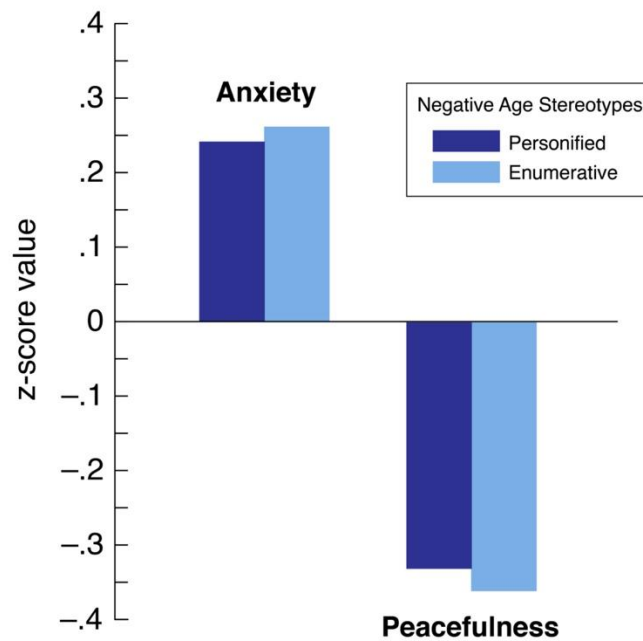
As predicted, among the younger participants, the negative-age-stereotype-messaging interventions did not significantly change anxiety in both the personified, β=.13, t=0.74, p=.23, η_p^2=.001 and the enumerative versions, β=.02, t=0.10 p=.46, η_p^2=.000, adjusting for all covariates. The same pattern was found among the younger participants for peacefulness in both the personified, β=.09, t=0.55, p=.29 η_p^2=.000, and the enumerative versions, β=.06, t=0.33 p=.37, η_p^2=.000, adjusting for all covariates.

The relative impact of the personified and enumerative versions of the age-stereotype interventions did not significantly differ in the models with older participants for anxiety (t=.13, p=.89) or peacefulness (t=.13, p=.89).

Discussion

This is the first study, as far as we know, to experimentally demonstrate that structural ageism, by which societal institutions promote bias against older individuals, can impact their mental health. Specifically, we found that among older individuals, the negative-age-stereotype messaging

led to more anxiety and less peacefulness than among those exposed to neutral messaging. In contrast, among older individuals, the positive-age-stereotype messaging led to less anxiety and more peacefulness than among those exposed to neutral messaging. The interventions in both the negative- and positive-age-stereotype conditions were drawn from actual media reporting about the COVID-19 pandemic.

The brevity of the interventions made the extent of their impact all-the-more noteworthy. The salience of the stories compensated for their brevity because they were framed by the COVID-19 pandemic, which entailed matters of survival or lack of it. We found that participants exposed to the negative-age-stereotype interventions were twice as likely to report moderate or severe levels of anxiety, compared to those exposed to the neutral conditions. In contrast, those exposed to the positive-age-stereotype interventions were twice as likely to report moderate or greater levels of peacefulness, compared to those exposed to the neutral conditions.

There are several indications that the intervention directly led to the significant pattern of outcomes. For in addition to the predicted pattern emerging, the randomization process was found to be successful. Also, we adjusted for covariates in all models. Insofar as there has been a greater prevalence of anxiety during the pandemic (Salari, et al., 2020), there is considerable benefit to understanding the determinants which can be modified, such as messaging.

The mental-health-outcome measures of the current study had different temporal forms: currently for peacefulness, and "since the pandemic" for anxiety. These dissimilar approaches allowed us to assess, respectively, not only whether messaging had an immediate impact, but also whether the anxiety occurred through a cumulative and retrospective perception.

Because anxiety as assessed by the GAD-7 can persist for several months (Spitzer et al., 2006), multiple exposures to similar types of age-stereotype messaging may have long-term mental-

health implications. A previous non-experimental study found that negative age stereotypes predicted older individuals' levels of anxiety up to four years later (Levy et al., 2019).

Further, the magnification of anxiety by negative-age-stereotype messaging that was found may have a far-reaching impact. For prior research has shown that anxiety can compromise immune function (Vogelzangs, et al., 2016). This raises the possibility that the messaging increases the susceptibility of older individuals to COVID-19.

Although, the disadvantageous and advantageous effects of negative- and positive-age-stereotype messaging, respectively, can occur under ordinary circumstances (Levy et al., 2014), these effects may be heightened during the pandemic because people rely more on media coverage in times of crisis (Ball-Rokeach, 2010). Moreover, devitalization, the prominent theme of COVID-19 media messaging about older individuals (as represented in the negative versions of both the personified and enumerative interventions) is also a predominant theme of negative age stereotypes (Ayalon et al., 2020; Levy, 2009). Accordingly, there is a likelihood that this messaging would reinforce these stereotypes among the targets and targeters, with a carry-over effect after the pandemic.

We found that the personified- and enumerative-age-stereotype messaging had similar impacts on the mental health of older participants. Since age-stereotype research, including interventions, has traditionally been limited to personified messaging, our finding that enumerative messaging was equally effective suggests its negative form may be a previously unidentified risk factor and its positive form may be an untapped resource.

Potential structural remedies for the negative-age-stereotype messaging include making the editors and ombuds of traditional media aware of the adverse consequences that it can have for older individuals as well as the importance of positive framing and providing balance in the presentation of stories. Also, a concerted effort is needed to ensure that social-media administrators

begin implementing their stated standards, such as the prohibition by Twitter of messages that

"reinforce negative or harmful stereotypes" (Twitter, 2021).

In short, it is imperative to not only take action against the COVID-19 pathogen, but also

against the negative messaging it has prompted.

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Effect	Level	Estimate	Standard Error	t-value	p-value
Personified-age-stereotype message	per unit	.24	.13	1.84	.03
Enumerative-age-stereotype message	per unit	.26	.13	2.07	.02
Personified-age-stereotype message* Enumerative-age-stereotype message	per unit	–.13	.06	–2.21	.03
Gender	Female	.09	.06	1.58	.11
	Male	0 (ref)	–	–	–
Self-rated health	per unit	.16	.03	5.41	<.01
Race	Asian	–.17	.12	–1.36	.17
	Black	–.18	.07	–2.67	.01
	Other	–.15	.15	–.97	.33
	White	0 (ref)	–	–	–
Age	per year	–.01	.01	–1.13	.26

Table 1. Impact of Negative-Age-Stereotype Messaging on Older Persons' Anxiety.

Effect	Level	Estimate	Standard Error	t-value	p-value
Personified-age-stereotype message	per unit	–.33	.17	–1.96	.03
Enumerative-age-stereotype message	per unit	–.36	.16	–2.21	.01
Personified-age-stereotype message* Enumerative-age-stereotype message	per unit	.16	.08	2.00	.05
Gender	Female	–.10	.07	–1.24	.22
	Male	0 (ref)	–	–	–
Self-rated health	per unit	.01	.04	.25	.80
Race	Asian	.07	.16	.40	.69
	Black	–.08	.09	–.91	.36
	Other	–.31	.20	–1.58	.12
	White	0 (ref)	–	–	–
Age	per year	–.01	.01	.07	.95

Table 2. Impact of Negative-Age-Stereotype Messaging on Older Persons' Peacefulness.