The Stereotype-Matching Effect: Greater Influence on Functioning When Age Stereotypes Correspond to Outcomes

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Abstract

Older individuals assimilate, and are targeted by, contradictory positive and negative age stereotypes. It was unknown whether the influence of stereotype valence is stronger when the stereotype content corresponds to the outcome domain. We randomly assigned older individuals to either positive-cognitive, negative-cognitive, positive-physical, or negative-physical subliminal-age-stereotype groups and assessed cognitive and physical outcomes. As predicted, when the age stereotypes corresponded to the outcome domains, their valence had a significantly greater impact on cognitive and physical performance. This suggests that if a match occurs, it is more likely to generate expectations that become self-fulfilling prophecies.

Keywords

age stereotype; self-stereotype; memory; physical functioning; health

In *The Nature of Prejudice*, Allport (1954) wrote that there tends to be agreement within cultures about the stereotypes ascribed to stigmatized groups, although "closer analysis reveals a curious situation. Some of the stereotypes are inherently contradictory" (p. 190). Members of stigmatized groups tend to assimilate the contradictory stereotypes, that is, positive and negative stereotypes that refer to the same domain (Levy, 2003). However, the operation of these self-stereotypes is only partially understood. In the present study, we explored one aspect that has not been previously considered: whether contradictory positive and negative stereotypes have greater influence on the behavior of their targets when there is a match between the content of the stereotypes and the performance domain, in contrast to when there is not a match.

The domains of contradictory stereotypes that we examine in the present study are cognitive and physical functioning, as found among older individuals. These participants are well suited for our research because older individuals are targeted by, and tend to hold, a broad range of contradictory age stereotypes (Levy & Banaji, 2002; O'Brien & Hummert, 2006). For example, there are stereotypes about older individuals having bad cognitive function (e.g., they are senile) and good cognitive function (e.g., they are wise), as well as having bad physical function (e.g., they are decrepit) and good physical function (e.g., they are spry; Butler, 2008; Levy & Langer, 1994).

A series of experiments with older individuals demonstrated that subliminally presented positive and negative age stereotypes tended to have a beneficial or adverse effect, respectively,

on a variety of outcomes, including memory performance and cardiovascular response to stress (Levy, 1996, 2003; Levy, Hausdorff, Hencke, & Wei, 2000). Yet, since the positive and negative age stereotypes used for priming referred to both cognitive and physical domains, it was not possible to assess the relative influence of stereotypes that matched the outcome domains, compared with those that were unmatched.

It appears that the expectations generated by self-stereotypes act as self-fulfilling prophecies (Levy, Slade, Kunkel, & Kasl, 2002). If so, correspondence between the content and the outcomes of these stereotypes should facilitate their influence, because the prophecies would be more focused and, therefore, potentially provide clearer directives. In order to examine this idea, we assigned older participants to one of four contradictoryage-stereotype groups. We predicted that the influence of stereotype valence on cognitive and physical functioning will be stronger when the stereotype content matches the performance outcome domains.

Method

Participants

Our cohort consisted of 114 participants aged 60 years or older (M = 74.6, SD = 6.3 years), recruited from senior centers in greater New Haven, Connecticut. Having fluency in English and being age 60 years or older were required for inclusion in the study. Participants were primarily female (79.6%) and White (96.3%). Self-rated health was rated as *good* or better for 92.6% of the participants. They had an average score of 1.5 (SD = 2.0) on the 15-item Geriatric Depression Scale (GDS–SF; Sheikh & Yesavage, 1986) and an average score of 5.6 (SD = 0.6) on a six-item cognitive screener (Callahan, Unverzagt, Hui, Perkins, & Hendrie, 2002) derived from the Mini-Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975).

In the experiment, we randomly assigned participants to four age-stereotype groups: positive-cognitive, negative-cognitive, positive-physical, and negative-physical. Members of the four age-stereotype groups did not significantly differ at baseline by age, gender, self-rated health, depression, and responses to the shortened version of the MMSE (Callahan et al., 2002).

Study Design

To create two pairs of contradictory age-stereotype groups, we followed the procedure used in previous age-stereotype priming studies (Levy, 1996). An intergenerational group (n = 21) generated a list of 77 cognitive-health descriptors and 72 physical-health descriptors. A new intergenerational group (n = 20) then rated each word on four dimensions: characteristic of cognitive health, characteristic of physical health, characteristic of old age, and valence. The first three dimensions were rated on scales ranging from 1 (*not characteristic at all*) to 7 (*extremely characteristic*). Valence was measured on a scale ranging from 1 (*extremely positive*) to 7 (*extremely negative*).

The age-stereotype prime words in this study met the following criteria: ratings for characteristic of cognitive health, ratings for characteristic of physical health, and ratings for characteristic of old age were greater than 4 on their respective scales; positive primes had a rating of 3 or below; and negative primes had a rating of 5 or above on the valence scale. There were no significant differences between the positive and negative groups in the frequency of the prime word in the English language (Carroll, Davies, & Richman, 1971) or in word length. Examples of the 48 age-stereotype words are: for positive-cognitive functioning, *sage* and *alert*; for negative-cognitive functioning, *dementia* and *confused*; for positive-physical functioning, *fit* and *hardy*; and for negative-physical functioning, *feeble* and *shaky*.

To activate the age stereotypes, we presented the words on a computer screen at a speed allowing perception but not awareness (speed based on each participant's predetermined

visual-processing capabilities), using the software SuperLab Pro (Version 4.0, Cedrus, San Pedro, CA; see Levy, 1996, for a full description of the method used to present the subliminal-age-stereotype primes). All of the participants had an error rate below chance in identifying the location of the age-stereotype primes on the computer screen.

Procedure

Participants were assessed in quiet rooms at senior centers. They were told that this was a study of older individuals' health patterns. After responding to background questions, participants were exposed to the age-stereotype intervention. The cognitive outcome, memory performance, was measured by a photo-recall task in which participants were shown eight photographs of older adults, together with a statement about each one, and then asked to repeat the statement that applied to each photograph when it was shown a second time (Levy & Langer, 1994). The physical outcome, balance performance, was measured by a timed chair-stand task, in which participants were asked to sit down on and rise up from a chair five times with their hands folded across their chest, as fast as it felt comfortable and safe to do (Jones, Rikli, & Beam, 1999). Both sets of outcome measures were administered by a person who was unaware of the participants' stereotype groups. After completing the study protocol, participants were debriefed and given a gift certificate.

In order to make the direction of both outcomes consistent, so that a higher score indicated better performance, we reverse-scored the chair-stand scores by subtracting the number of seconds it took each participant to complete the five chair stands from the maximum time taken by any of the participants.

To examine our hypothesis, we conducted a 2 (valence: positive vs. negative) × 2 (age stereotype domain: cognitive vs. physical) × 2 (outcome domain: cognitive vs. physical) multivariate analysis of covariance (MANCOVA), We included age, the shortened MMSE, and GDS–SF in the model as covariates, because others have found that they impact one or both of the outcome variables (e.g., Maruff & Darby, 2006). In the multivariate analysis, we standardized the outcome measures.

Results

As predicted, we found that the influence of stereotype valence was stronger when the stereotype content matched the outcome domain: the interaction of stereotype valance and stereotype domain was significant, $F(2, 99) = 4.54$, $p = .01$, $\eta^2 = .09$, in the $2 \times 2 \times 2$ model. In addition, a significant main effect emerged, with those exposed to the positive-age stereotypes having higher scores than those exposed to the negative-age stereotypes, regardless of domain, $F(2, 99) = 4.55$, $p = .01$, $\eta^2 = .09$.

As can be observed in Figure 1, the order of the means is consistent with a stereotype-matching effect. For the memory-performance mean scores, those exposed to the positive-cognitive age stereotypes performed the best, followed in descending order by those exposed to the positive-physical age stereotypes, those exposed to the negative-physical age stereotypes, and those exposed to the negative-cognitive age stereotypes, who performed the worst. The planned linear contrast representing the expected order of matched positive, unmatched positive, unmatched negative, and matched negative age-stereotype group means reached significance for the memory performance outcome, $F(1, 114) = 9.44$, $p = .003$.

For the balance-performance mean scores, those exposed to the positive-physical age stereotypes performed the best, followed in descending order by those exposed to the positive-cognitive age stereotypes, those exposed to the negative-cognitive age stereotypes, and those exposed to the negative-physical age stereotypes, who performed the worst. The planned linear

contrast representing the expected order of matched positive, unmatched positive, unmatched negative, and matched negative age-stereotype group means reached significance for the balance-performance outcome, $F(1, 114) = 4.12$, $p = .02$.

To better understand the interaction of valence and domain observed in the $2 \times 2 \times 2$ model, we conducted planned-contrast analyses within each of the outcome variables. Consistent with the hypothesis, the difference between the memory scores of those exposed to the positive-cognitive age stereotypes and those exposed to the negative-cognitive age stereotypes was significantly greater than the difference between those exposed to the positive-physical age stereotypes and those exposed to the negative-physical age stereotypes, $t(55) = 8.04$, $p < .0001$, $d = 2.16$.

Also consistent with the hypothesis, the difference between the balance scores of those exposed to the positive-physical age stereotypes and those exposed to the negative-physical age stereotypes was significantly greater than the difference between those exposed to the positive-cognitive age stereotypes and those exposed to the negative-cognitive age stereotypes, $t(55) = 3.96$, $p = .0001$, $d = 1.09$.

To understand the pattern of the age-stereotype group-means, we examined whether positive age stereotypes matched to the outcome domain had a stronger impact than the other three age-stereotype groups. We did this by conducting a post hoc contrast analysis with weights representing this pattern. Support for this effect was found in both the memory outcome, $F(1, 113) = 8.09$, $p = .005$, $\eta^2 = .07$, and the balance outcome, $F(1, 109) = 4.31$, $p = .04$, $\eta^2 = .04$.

Discussion

Our study found support for an age-stereotype matching effect. The impact of the positive and negative age stereotypes on cognitive and physical functioning was greatest when the content of the stereotypes corresponded to the outcomes.

The strength of the matching effect is suggested by our finding that it applied to the physical outcome (in addition to the cognitive outcome), even though the cognitive task was measured before the physical task. That is, more time elapsed between the physicalage-stereotype priming and the physical measurement than occurred between the cognitive-age-stereotype priming and the cognitive measurement. Yet, the physical-outcome scores of the positive and negative physical-age-stereotype groups were, respectively, above and below those of the positive and negative cognitive-age-stereotype groups.

Although stereotype matching was measured experimentally, our findings are likely to have relevance outside the laboratory. This is because the implicit level at which the primes were presented is also the level at which stimuli in everyday life are often received (Bargh & Williams, 2006).

The matching effect of positive age stereotypes appeared to be stronger than the matching effect of negative age stereotypes. This result suggests that negative age stereotypes have a greater tendency to operate without borders. In turn, this tendency can be explained by the higher level of salience attached to negative age stereotypes. Specifically, the cognitively and physically debilitated conditions to which they refer may be perceived as precursors to death (Levy & Banaji, 2002).

The generalizability of our findings to other types of stereotypes will have to be determined in future research. Nevertheless, the possibility that matching effects may be found in additional targeted groups is raised by a pair of studies that considered Asian-American women's ethnic and gender identities, rather than contradictory stereotypes within a single identity as in the

present study. These identities, which were alternatively made salient, thereby improved or impaired mathematical and verbal performance (Shih, Pittinsky, & Ambady, 1999; Shih, Pittinsky, & Trahan, 2006). The authors speculated that the findings were due to the social-identity intervention activating stereotypes that matched the outcomes (e.g., Asians excel on quantitative tests). But it was not possible to confirm the linkage between stereotypes and outcomes, because the social identities were activated by indirect questions (e.g., the family's country of origin) rather than by stereotypes.

Consistent with previous age-stereotype research (e.g., Hess, Hinson, & Stratham, 2004; Levy, 2003), we found that those exposed to the positive age stereotypes tended to perform significantly better than those exposed to the negative age stereotypes on both the cognitive and physical measures. However, we were unable to measure the extent to which positive and negative age stereotypes raised or lowered performance, respectively, because this experiment did not have a comparison group without stereotypes.

The findings of this study support our assumption that self-stereotypes generate expectations that, in turn, are more likely to be self-fulfilling prophecies when there is a correspondence between the stereotypes and the outcomes. Accordingly, it suggests an approach for interventions that are aimed at mitigating the injurious effects of stigma. This would entail enhancing positive stereotypes as well as ameliorating negative stereotypes—all of which would be matched to the outcomes of concern.

Acknowledgments

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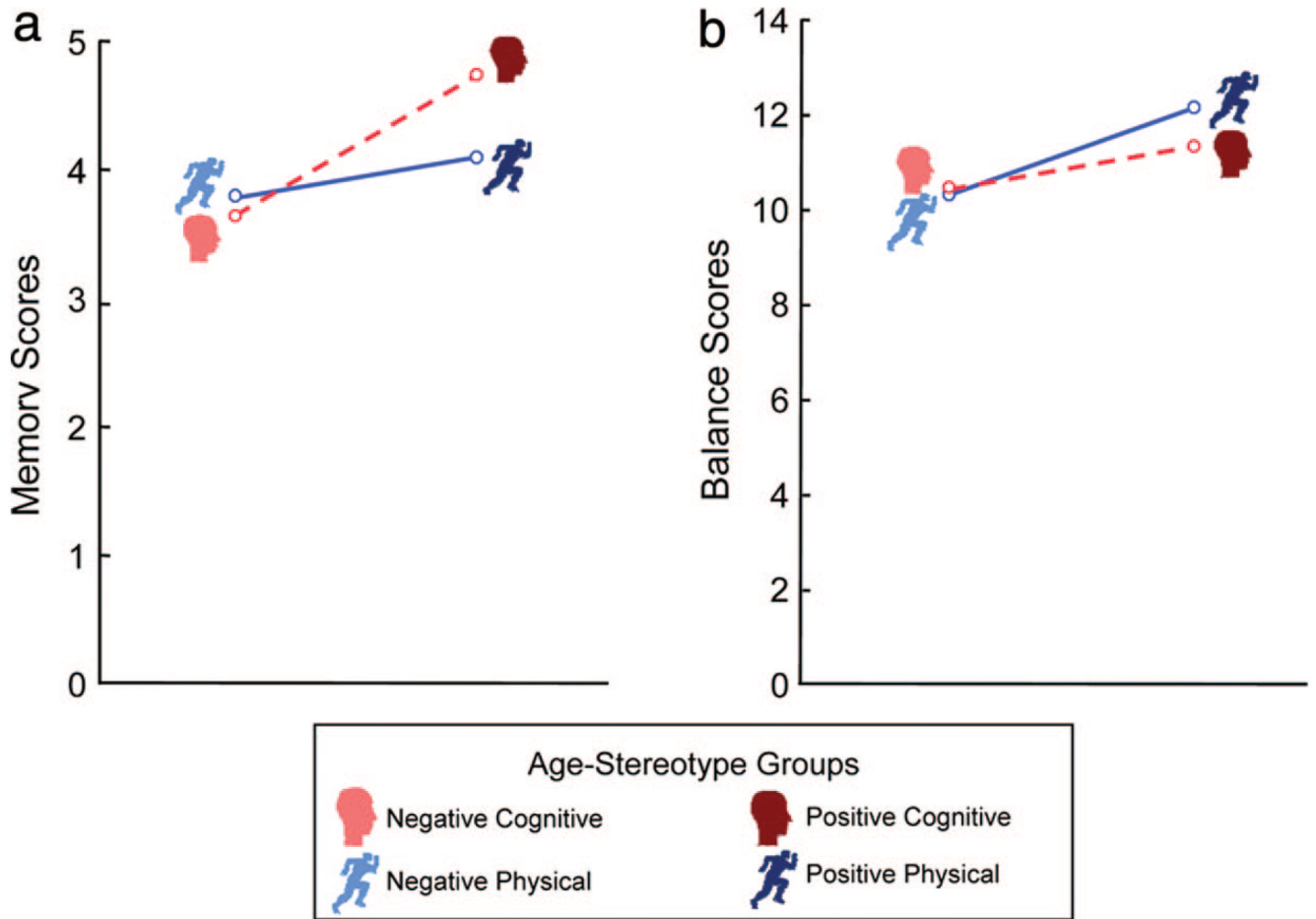
Figure 1.
Influence of age-stereotype matching effect on older individuals' (a) cognitive performance
and (b) physical performance.