

## Short Report

# Age Stereotypes Held Earlier in Life Predict Cardiovascular Events in Later Life

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When older individuals apply negative age stereotypes to themselves, they can adversely influence a wide range of outcomes (Levy, Slade, Kunkel, & Kasl, 2002). These outcomes include a greater cardiovascular response to stress and worse health behaviors, such as higher tobacco use (Levy, Hausdorff, Hencke, & Wei, 2000; Levy & Myers, 2004), both of which have been linked to the risk of cardiovascular events (Jiang et al., 1996).

We consider here for the first time whether negative stereotypes held earlier in life have consequences for health in later life. We predicted that younger individuals who held more negative age stereotypes would have a greater likelihood of experiencing cardiovascular events up to 38 years later than individuals with more positive age stereotypes.

## METHOD

### Participants

The cohort was drawn from the Baltimore Longitudinal Study of Aging. There were 440 individuals who met the three inclusion criteria: was age 49 years or younger at baseline, responded to the age-stereotype predictor, and had not experienced a cardiovascular event before baseline. Of the initial 440 eligible individuals, 54 were excluded from analyses because of missing covariates. The individuals who were excluded and those who were included did not differ significantly on the covariate measures or in the negativity of their age stereotypes.

At baseline, participants (age range = 18–49 years, mean age = 36.5 years) had a high level of self-rated health ( $M = 4.6$ , with a score of 5 representing *excellent health*). The final cohort consisted of 81 women and 305 men. Attrition for reasons other than death was 6%.

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## Measures

### Predictor: Age Stereotypes

Starting in 1968, age stereotypes were measured with the 16-item negative-age-stereotype subscale (e.g., “old people are helpless”) from the Attitudes Toward Older People Scale, a reliable and valid measure (Tuckman & Lorge, 1953). All of the items on the negative-age-stereotype subscale had loadings of .4 or greater on a single factor, meeting the definition of meaningful factor-analysis loadings (Hatcher, 1994). In a validity analysis conducted with a new sample of 40 individuals (age range = 20–75 years), we found that the negative-age-stereotype subscale significantly correlated in the expected direction with the Image of Aging Scale (Levy, Kasl, & Gill, 2004),  $r = .83$ ,  $p = .001$ .

### Outcome: Cardiovascular Event

The outcome, first cardiovascular event, was recorded from baseline in 1968 until 2007. We included 89 cardiovascular events (angina attacks, congestive heart failures, myocardial infarctions, strokes, and transient ischemic attacks). The median time between baseline and the first cardiovascular event was 11.24 years.

### Covariates

Covariates, assessed at baseline, included the following risk factors for cardiovascular events: age, body mass index, depression, education, elevated blood pressure, family history of cardiovascular death, gender, marital status, number of chronic conditions, race, self-rated health, serum total cholesterol (milligrams per deciliter), and smoking history. Depression was measured by the Cornell Medical Index Section N (Brodman, Erdman, Logre, Gershenson, & Wolff, 1952). Elevated blood pressure was defined as systolic blood pressure of at least 130 mmHg or diastolic blood pressure of at least 90 mmHg (Rosa-mond et al., 2008). Number of noncardiovascular chronic

conditions was measured by hospital records of arthritis, cancer, and diabetes.

## RESULTS

Consistent with our hypothesis, younger individuals who held more negative age stereotypes were significantly more likely to experience a cardiovascular event over the next 38 years, both in the unadjusted Cox proportional-hazards model (hazard ratio = 1.11,  $p < .01$ ,  $p_{\text{rep}} = .97$ ) and in the model adjusted for all covariates (hazard ratio = 1.08,  $p < .05$ ,  $p_{\text{rep}} = .92$ ).

Furthermore, at every time point, participants with negative-age-stereotype scores above the average were more likely to experience their first cardiovascular event than were participants with average or below-average scores, after adjusting for all covariates. For example, as depicted in Figure 1, 30 years after participants responded to the age-stereotype measure, 25% of those in the negative-age-stereotype group had experienced a cardiovascular event, compared to 13% in the positive-age-stereotype group.

We also examined a younger subset of 229 individuals (age range = 18–39 years, mean age = 31.6 years at baseline), who had their first cardiovascular event after their 60th birthday. Thus, this subset had at least a 21-year gap between measurement of their age stereotypes and cardiovascular events. We found that those who had more negative age stereotypes were significantly more likely to have had their first cardiovascular event before those with more positive age stereotypes (hazard ratio = 2.02,  $p = .004$ ,  $p_{\text{rep}} = .98$ ), after adjusting for all covariates.

Participants with negative-age-stereotype scores above the median and those with scores equal to or below the median did not differ significantly on any of the covariates, except gender. The significant effect of negative age stereotypes on risk of ex-

periencing a cardiovascular event remained when gender, as well as the other covariates, was included in the models.

## DISCUSSION

As predicted, among participants age 49 and under, those who held negative age stereotypes were significantly more likely to experience a cardiovascular event in the following 38 years than those with positive age stereotypes, after adjusting for a number of relevant variables. A similar effect occurred in a subgroup of participants under age 40 who experienced cardiovascular events after turning 60—an interval of more than two decades.

The findings are consistent with an assumption of previous research that age stereotypes held in later life were internalized decades before old age was reached (Levy, 2003). Until the present study, however, it was not possible to follow participants across stages of their life span as a way of exploring this assumption. Previous research on self-stereotypes concentrated on an experimental approach; hence, there had been no studies of individuals who pass from the stage of directing stereotypes at members of targeted groups to becoming members of that group.

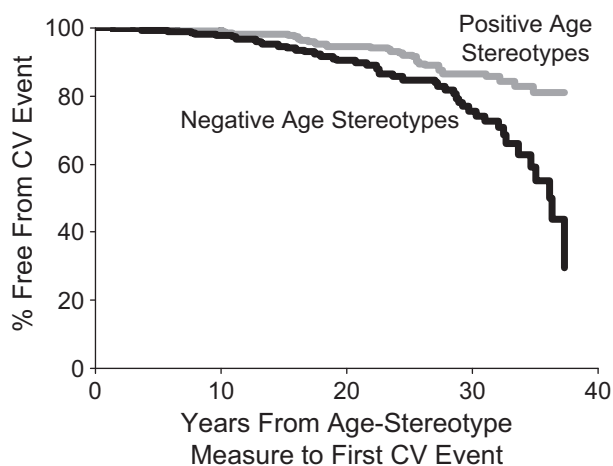
The strength of the association between negative age stereotypes and risk of cardiovascular events in the final model is notable. If an individual's age stereotypes became more negative by one point, the risk of experiencing a cardiovascular event would increase by 11%. Conversely, if an individual's age stereotypes increased in positivity by two standard deviations on the age-stereotype scale, this would lead to an 80% reduction in the risk of experiencing a cardiovascular event.

The study suggests that age stereotypes internalized earlier in life can have a far-reaching effect on health. In turn, this finding suggests that programs aimed at reducing the negative age stereotypes of younger individuals could benefit their cardiovascular health when they become older individuals.

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**Fig. 1.** Association between age stereotypes and time until experiencing a first cardiovascular (CV) event. The graph shows the percentage of participants who had not experienced a CV event as a function of time in each age-stereotype group.

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