Age-Based Stereotype Threat and Work Outcomes: Stress Appraisals and Rumination as Mediators

Courtney von Hippel  
The University of Queensland

Elise K. Kalokerinos  
The University of Newcastle

Katri Haanterä  
The University of Queensland

Hannes Zacher  
Leipzig University

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Author Note

Courtney von Hippel, School of Psychology, The University of Queensland, Australia. Elise K. Kalokerinos, School of Psychology, The University of Newcastle, Australia. Katri Haanterä, School of Psychology, The University of Queensland, Australia. Hannes Zacher, Institute of Psychology, Leipzig University, Germany. The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. The materials, data, and code used in this study are available on the Open Science Framework at osf.io/v7e9b.

Address correspondence to Courtney von Hippel, School of Psychology, The University of Queensland, St Lucia, QLD 4072 Australia, E-mail: c.vonhippel@uq.edu.au
Abstract

Both older and younger employees experience age-based stereotype threat in the workplace, but only older employees appear to be vulnerable to disengagement as a consequence. The present study examines two mechanisms that might explain this age difference: (1) stress appraisals of challenge and hindrance and (2) rumination. Using a weekly diary study design over five weeks, 280 employees across the lifespan (aged between 18 and 66 years), completed 1,288 weekly surveys. Work outcomes examined were job satisfaction, job engagement, affective organizational commitment, workplace wellbeing, and intentions to quit. Results showed that while both older and younger employees experienced age-based stereotype threat, it was uniquely problematic for older employees. Furthermore, challenge appraisals mediated the relationships between age-based stereotype threat and job engagement, commitment, and intentions to quit among older, but not younger, employees. Rumination mediated the relationships between age-based stereotype threat and job satisfaction, commitment, wellbeing, and intentions to quit among older, but not younger, employees. These findings suggest that stereotype threat might be detrimental to work outcomes because older employees are less likely to appraise stereotype threat as a challenge, and more likely to ruminate when they experience stereotype threat.

*Keywords:* stereotype threat; employee outcomes; disengagement; stress appraisals; rumination
AGE-BASED STEREOTYPE THREAT

Compared to their younger counterparts, older employees are often stereotyped as less productive, less physically and mentally capable, more resistant to change, and more averse to learning new technologies (Fisher, Truxillo, Finkelstein, & Wallace, 2017; Posthuma & Guerrero, 2013; Van Dalen, Henkens, & Schippers, 2010). Despite the fact that age is generally unrelated to job performance (e.g., Ng & Feldman, 2008), older employees are likely to be aware of stereotypes about their age group and hence may experience stereotype threat at work (Kulik & Perera, 2016; Roberson & Kulik, 2007; von Hippel, Kalokerinos & Henry, 2013). Stereotype threat is the concern about confirming or being reduced to a negative stereotype (Steele & Aronson, 1995). Stereotype threat can emerge in the absence of stereotyping behaviors or the perceived validity of the stereotype: people need only worry they might be stereotyped for stereotype threat to occur (Steele, 1997). For example, older employees who are savvy with smart phones may worry that their preference for a paper calendar will confirm the stereotype that older employees are less willing to learn new technologies, and that they will be judged as less technically skilled or valuable as a result.

Studies have demonstrated that stereotype threat leads to acute performance deficits (Spencer, Logel, & Davies, 2016; for a meta-analysis, see Nguyen & Ryan, 2008), and these effects have been demonstrated with age-based stereotype threat (Lamont, Swift, & Abrams, 2015). In addition to performance decrements, Steele (1997) also proposed that stereotype threat can lead to disidentification or disengagement from the stereotyped domain over the long term. Consistent with this possibility, stereotype threat in the workplace has been associated with negative work outcomes such as perceptions that career goals are unlikely to be reached, decreased likelihood of recommending one’s field, burnout, more negative job attitudes, and increased intentions to quit (e.g., Hall, Schmader, & Croft, 2015; Kalokerinos, von Hippel, &
Negative age-related stereotypes exist for both younger and older employees, making both age groups susceptible to stereotype threat. For example, older employees are often characterized as technologically incompetent and resistant to change (Ng & Feldman, 2008), while younger employees are characterized as unreliable and inexperienced (Bal, Reiss, Rudolph & Baltes, 2011; Van Dalen et al., 2010). In line with these stereotypes, younger and older employees both reported experiencing stereotype threat (von Hippel et al., 2013). Importantly, however, stereotype threat appears to have negative consequences only for older employees. Specifically, von Hippel and colleagues (2013) found that among older employees, stereotype threat was associated with greater intentions to quit, poorer workplace wellbeing, and more negative job attitudes (i.e., lower job satisfaction and organizational commitment). Among younger employees, these relationships were largely non-existent, despite the finding that younger employees reported higher levels of stereotype threat than older employees (von Hippel et al., 2013).

The goal of the current study was to examine why age-based stereotype threat has negative effects for older, but not younger employees. We propose that stress appraisals and rumination mediate the relationship between stereotype threat and disengagement from work among older employees. Specifically, to the degree that older employees interpret stereotype threat events more in terms of hindrances than challenges and ruminate about these events more than younger employees, they will report greater disengagement from work, as indicated by lower job satisfaction, commitment, job engagement, workplace wellbeing, and higher turnover intentions. Our conceptual model is outlined in Figure 1 and explicated below.

Age and Stereotype Threat
To examine the mechanisms underlying the consequences of stereotype threat among older employees, the first goal of the current research was to assess whether employee age was associated with age-based stereotype threat experiences in an age-continuous sample ranging from 18 to 66 years of age. Based on the stereotypes of younger and older employees (previously described), and the lack of stereotypes about middle-aged employees (Posthuma & Campion, 2009), a curvilinear relationship was predicted between age and stereotype threat, such that younger and older employees will experience greater levels of stereotype threat compared to their middle-aged counterparts (Hypothesis 1). Additionally, consistent with the findings of von Hippel et al. (2013), age was predicted to moderate the relationship between stereotype threat and disengagement from work, such that stereotype threat should be associated with lower job satisfaction, commitment, job engagement, workplace wellbeing, and higher turnover intentions among older but not younger employees (Hypothesis 2).

**Exploring why Stereotype Threat is Associated with Negative Work Outcomes for Older but not Younger Employees**

**Stress appraisals (challenge and hindrance).** Stereotype threat can be a notable stressor (Blascovich, Spencer, Quinn, & Steele, 2001). When people experience a stressor, they might appraise it as a *challenge* or a *hindrance* (Lazarus & Folkman, 1984; LePine, Podsakoff, & LePine, 2005; see also Scheibe & Zacher, 2013). A *challenge appraisal* is made when individuals feel that they have the resources to overcome the stressor, whereas a *hindrance appraisal* occurs when individuals feel their resources are insufficient. Importantly, the same stressor can be interpreted as a challenge or hindrance depending on situational or personal factors (Keller & Bless, 2008).

Employees who appraise work stressors as challenges experience higher levels of job satisfaction, organizational commitment, and positive affect, and lower levels of turnover
intentions and withdrawal behavior (Cavanaugh, Boswell, Roehling, & Boudreau, 2000; Podsakoff et al., 2007; Searle & Auton, 2015). Employees who appraise work stressors as hindrances, on the other hand, experience lower levels of job satisfaction, organizational commitment, and positive affect, and higher levels of turnover intentions and withdrawal behavior (Cavanaugh et al., 2000; Podsakoff et al., 2007; Searle & Auton, 2015). Consistent with Lazarus and Folkman’s (1984) stress appraisal style theory, these findings suggest that challenge appraisals are associated with positive outcomes and hindrance appraisals are associated with negative outcomes.

Although few studies have examined appraisal style in a stereotype threat context, the research that exists suggests that appraising a stereotype threat event as a hindrance results in more negative outcomes (Alter, Aronson, Darley, Rodriguez, & Ruble, 2010; Vick et al., 2008). Younger and older employees may differ in the way they appraise age-related stereotyping as a function of whether people expect the stereotypes to decline over time (Garstka, Schmitt, Branscombe, & Hummert, 2004). Younger employees will eventually “outgrow” the stereotypes attributed to their age and move into an age group (i.e., middle-age) that is of higher status in the workplace (Garstka et al., 2004). Young employees gain experience with time, and thus, naturally shed stereotypes about youth and inexperience. In contrast, older employees cannot outgrow or escape the negative stereotypes associated with their age, as the stereotypes will only get stronger over time (Garstka et al., 2004).

Because of their inability to move beyond stereotypes about their age group, we propose that older employees should be more likely than younger employees to appraise examples of age-based stereotyping as a hindrance. These hindrance appraisals should lead older adults to disengage from work as indicated by more negative job attitudes (i.e., reduced job satisfaction and commitment), greater intentions to quit, poorer workplace wellbeing, and lower job
engagement. Thus, Hypothesis 3 predicts moderated mediation whereby stereotype threat results in hindrance appraisals among older, but not younger employees, and the effect of the interaction between stereotype threat events and age on work outcomes is mediated by higher levels of hindrance appraisals among older employees.

In contrast, because they will outgrow the stereotypes about their age, we propose that younger employees should be more likely than older employees to appraise instances of age-based stereotype threat as a challenge. Thus, Hypothesis 4 also predicts moderated mediation whereby stereotype threat events are positively associated with challenge appraisals among younger, but not older employees, and the effect of the interaction between stereotype threat events and age on work outcomes is mediated by lower levels of challenge appraisals among older employees. To rule out the alternative possibility that older and younger employees simply appraise stressful events differently, we compared stereotype threat experiences to a stressful event experienced at work. We did not expect age differences to emerge in appraisals when employees experience a stressful event at work unrelated to age-based stereotyping.

**Rumination.** Numerous psychological mechanisms have been proposed to explain the performance decrements brought about by stereotype threat (Pennington, Heim, Levy, & Larkin, 2016). Of particular relevance to the current research are the findings that stereotype threat leads to intrusive (Schmader & Johns, 2003) and negative thoughts (Candinu, Maass, Rosabianca, & Kiesner, 2005). Thus, stereotype threat might cause people to ruminate about the threat-related experience. Research on rumination reveals that people differ in the tendency to repetitively focus on their distressing situation when they experience stressful events (Lyubomirsky & Nolen-Hoeksema, 1993). Importantly, rumination exacerbates the negative effects of stressful workplace events (e.g., Wang et al., 2013) and stigma-related events (Hatzenbuehler et al., 2009), and thus
employees who ruminate about their stereotype threat experiences should be susceptible to more negative consequences.

Age-related declines in executive control are well documented (Henry & Phillips, 2006; Phillips & Henry, 2008), and these declining cognitive resources have been linked to an increased tendency to ruminate (von Hippel et al., 2008). As a consequence, when faced with a stereotype threat experience, older employees may be less capable of putting it out of their mind as they have less effective control over their ruminative thoughts. In turn, these ruminative thoughts may lead older employees to experience more pronounced consequences of stereotype threat. Thus, differential susceptibility to ruminative tendencies may also help explain the vulnerability to stereotype threat of older but not younger employees. The final proposed effect of stereotype threat events on work outcomes also predicts moderated mediation. Specifically, we predict that older employees will be more likely than younger employees to ruminate after a stereotype threat event, which in turn will lead to more negative job attitudes, greater intentions to quit, poorer workplace wellbeing, and lower job engagement (Hypothesis 5).

The Current Study

The present study examines the effects of everyday experiences of age-based stereotype threat using a weekly diary study design. Previous research has investigated stereotype threat primarily with experiments and cross-sectional survey designs. In contrast, diary designs allow investigation of within-person fluctuations in experiences and behavior (e.g., Beal, 2015). A diary design also allows us to explore whether stereotype threat events (rather than chronic feelings of stereotype threat as previously measured) are more likely to be experienced among older than younger employees. Middle-aged employees are not typically stereotyped on the basis of their age (Posthuma & Campion, 2009), and thus should not be as susceptible to age-based stereotype threat. Nonetheless, in line with recommendations in the literature on work and aging (Bohlmann,
Rudolph, & Zacher, 2018), we operationalize age as a continuous variable instead of comparing only two age groups (i.e., younger and older workers). Thus, we included employees across the lifespan to examine age differences in the experiences and consequences of stereotype threat.

Method

Recruitment and Participants

Participants were recruited in Australia through social media, emailing organizational contacts a flier about the study, placing an advertisement in a University staff newsletter, and approaching people during lunchtime in the downtown area of a capital city in Australia. The study received approval from the School of Psychology Ethics Committee at the University of Queensland. Potential participants registered their interest in the study through the web address provided. After reading a general information page outlining the study, they completed a short survey assessing their age and employment status (full-time vs part-time). This information was used to ensure a representative distribution of ages and that younger participants who were full-time students with part-time jobs were not included in the study. Potential participants who were working full-time and whose age group was not already over-represented were sent a link to the baseline survey. Part-time employees, full-time students, and respondents whose ages were already well-represented in the sample were sent an email thanking them for their interest in the research and explaining that due to greater than expected interest in the study we did not require their participation at this time.

The final sample consisted of 280 employees (89 men, 191 women) who completed 1,288 weekly surveys (on average, 4.39 surveys per employee out of 5 requested, $SD = 1.17$). The mean age of participants was 39.35 ($SD = 12.86$). Recruitment aimed for a roughly equal number of participants across three broad age groups: 91 participants were younger employees aged 18 – 30 (29 men, 62 women), 105 participants were middle-aged employees aged 31 – 49 (35 men, 70
women), and 84 participants were older than 50 (the oldest person was 66 years; 25 men, 59 women). Participants were compensated with a gift card of $40 AUD (approximately $30 USD).

Participants had a mean of 6.06 years ($SD = 7.00$) tenure in their organization, and 9.01 years ($SD = 10.04$) tenure in their occupation. One hundred and eighty-six participants (66.7%) worked for organizations with more than 250 employees, 48 participants (17.2%) worked for organizations with between 50 – 250 employees, and 45 participants (16.1%) worked for organizations with less than 50 employees. Participants were employed in a variety of industries, including education ($N = 98, 25\%$), science and technology ($N = 40, 14.3\%$), health and community services ($N = 36, 12.9\%$), retail ($N = 20, 7.1\%$), and manufacturing ($N = 13, 4.6\%$). Only ten participants (ranging in age from 21 to 59) worked in blue-collar positions.

Compliance with the study protocol was high. Most participants ($N = 202, 72.14\%$) completed all 5 weekly surveys, although some participants completed fewer (1 survey: 17 participants (6.07%); 2 surveys: 13 participants (4.64%); 3 surveys: 17 participants (6.07%); 4 surveys: 31 participants (11.07%). The original sample included 288 participants and 1,315 weekly surveys, but some surveys were lost due to various reasons. Two of the weekly surveys were removed because of a technical error preventing the surveys from being linked with a participant. Four surveys were removed because they were duplicates (i.e., participants completed a survey for that week twice). In one of these cases, the first survey was incomplete because of a technical error, so the second survey was retained. In the three remaining cases, the first survey was retained. Finally, eight participants did not specify their age so they were removed from the sample. Consistent with best practice, we retained all other available data for the analyses (Newman, 2009).

**Procedure**
Participants completed a baseline survey, and then one weekly survey per week across five weeks. Each week participants were emailed a survey link with a deadline of one week for survey completion. A reminder email was sent two days before the link expired.

**Baseline survey.** In the first week, participants completed a longer baseline survey (approximately 20 minutes in length), which consisted of a series of trait questionnaires.

**Weekly survey.** Participants received five identical short weekly surveys (approximately 5 minutes in length). Scherbaum and Ferreter (2009) recommend approximately five measures at the within-person level to ensure sufficient statistical power to detect medium sized effects with a sample size of 40 or more participants. Additionally, given the expected low base rate of stereotype threat events we felt a weekly design would better capture meaningful variability in stereotype threat events compared to other designs (e.g., daily, hourly).

Each weekly survey started by asking participants whether they felt they had been judged negatively at work based on their age in the past week. If participants answered yes they were asked to briefly describe the event. Participants who answered no were asked to describe a stressful event instead. Stressful events were chosen as a comparison to the stereotype threat events, allowing us to address the possibility that age differences in vulnerability to stereotype threat events might be due to age differences in dealing with negative events.

**Measures**

The data were collected as part of a larger research project. Only the scales relevant to the current research questions are covered, but the full list of scales is in the supplementary materials section. Consistent with previous diary research, the number of scale items for the weekly scales were minimized to reduce the time it took to complete each weekly survey (Searle & Auton, 2015; Tuckey et al., 2015). All items were answered on response scale ranging from 1 (strongly
disagree) to 7 (strongly agree), unless indicated otherwise. All weekly scales had excellent between-person reliability (see Table 1).

**Baseline survey.**

**Demographics.** Participants provided their age, gender, level of education, industry, job level, tenure in their current organization, tenure in the occupation, and organization size.

**Chronic age-based stereotype threat** ($\alpha = .86$) was measured using von Hippel et al.’s (2013) 5-item scale, which was itself adapted from Steele and Aronson’s (1995) original scale to measure stereotype threat in a laboratory context. A sample item is “Some of my colleagues feel that I have less to contribute because of my age.”

**Weekly survey.**

**Age-based Stereotype threat event.** Participants were given the following instructions at the start of each weekly survey:

*Sometimes in the workplace people feel that they are being negatively evaluated based on their membership in a group. For example, some people feel that their age group may impact how people treat them at work. Over this past week at work, have you been judged negatively based on your age?*

Participants responded with either yes or no. If participants answered yes they were asked to describe the situation in one or more sentences, after which they were asked, “*How likely is it that this experience was due to your age?*” (1 = extremely unlikely, 2 = somewhat unlikely, 3 = somewhat likely, 4 = extremely likely). They were then asked to complete all the weekly survey measures with reference to how they felt after experiencing the event.

**Stressful event.** If participants answered no they were asked to “describe a negative or stressful event that happened to you while working this week.” After describing the event in one
or more sentences they were then asked to complete all the weekly survey measures with reference to how they felt after experiencing this event.

*Job satisfaction* was measured using Judge et al.’s, (1998) 5-item scale. A sample item is “I feel satisfied with my present job.” Higher scores indicated higher levels of job satisfaction.

*Job engagement* was measured with the highest loading items from each of the physical, emotional, and cognitive engagement subscales developed by Rich, LePine, and Crawford (2010; 3 items). A sample item is “I tried my hardest to perform well on my job” with higher scores indicating greater job engagement.

*Organizational commitment* was measured using the three highest loading items from the affective commitment scale by Allen and Meyer (1990). A sample item is “I felt a strong sense of belonging to the organization.” with higher scores indicating greater commitment to the organization.

*Intentions to quit* were assessed with a single item from Boroff and Lewin’s (1997) intent to quit scale (“I am seriously considering quitting this job for an alternative employer”), with higher scores indicating greater turnover intentions.

*Workplace wellbeing* was measured using a 12-item scale adapted from Warr (1990). Participants were asked to report the degree to which they felt six negatively valenced states at work (for example “depressed”) and six positively valenced states at work (for example “optimistic”). The response scale ranged from 1 (*not at all*) to 5 (*extremely*) with higher scores indicating better workplace wellbeing.

*Rumination* was measured using a 5-item scale adapted from Lundh and Sperling (2002). A sample item is “How much did you think about the event that day?” The response scale ranged from 1 (*not at all*) to 5 (*a great deal*) with higher scores indicating greater rumination.
Stress appraisal (hindrance and challenge) style was measured using a 7-item scale adapted from Peacock and Wong’s (1990) Stress Appraisal Measure and Skinner and Brewer’s (2002) Cognitive Appraisal Scale, with modifications for a stereotype threat context. Three items assessed challenge appraisal (e.g., “This event was an opportunity to test my skills and abilities at work”) and four items assessed a hindrance appraisal (“I felt I could not overcome the immediate challenges posed by this event”). The items were averaged to form two separate scales: a hindrance appraisal scale, and a challenge appraisal scale. Higher scores indicated that an event was appraised as more of a hindrance or more of a challenge.

Statistical Analyses

Weekly surveys included in analyses. There were 1,011 weekly surveys in which participants did not experience a stereotype threat event, 211 surveys in which participants experienced a stereotype threat event, and 6 surveys in which participants did not answer this question.

Stereotype threat events. Across the sample, 189 (68%) participants never reported a stereotype threat event and 89 (32%) reported at least one stereotype threat event. Of those participants who reported a stereotype threat event, 20 did so in one of their surveys, 17 in two of their surveys, 24 in three of their surveys, 14 in four of their surveys, and 14 in all five of their weekly surveys.\footnote{This variability in number of stereotype threat events experienced raises the possibility that our results are driven by individual differences in susceptibility to stereotype threat. To examine this possibility, the analyses reported in Table 4 were also conducted controlling for chronic stereotype threat (measured in the baseline survey) and the interaction between chronic stereotype threat and age. The analyses revealed the same pattern of results, suggesting that acute experiences of stereotype threat have effects above and beyond chronic experiences of stereotype threat. These analyses are provided in Table S3 of the online supplementary materials.} Given the focus on age-based stereotype threat in our research, only experiences that participants definitively attributed to their age were included. Therefore, weekly surveys...
were removed where participants reported an age-based stereotype threat event, but reported being unsure that the event was due to their age (i.e., they answered 1 “extremely unlikely” or 2 “somewhat unlikely” when asked whether they believed the event was due to their age). This decision criteria resulted in the removal of 29 surveys (6 surveys were reported as “extremely unlikely” and 23 surveys were reported as “somewhat unlikely” to be due to participants’ age). There were also 6 surveys in which participants reported a stereotype threat experience, but did not answer this likelihood question. To take a conservative approach, these 6 surveys were also removed from analyses.

Thus, for the reported analyses, 35 weekly surveys for which participants provided data were excluded, leaving 176 surveys with stereotype threat experiences, and 278 participants remaining in the study (i.e., two participants diaries only included stereotype threat events which they were unsure were caused by their age). To check the robustness of these results, we also ran all analyses including these omitted surveys. These results were substantively similar to those reported.

To ensure the recalled events were age-based stereotype threat events, a coder went through the descriptions for all 176 remaining weekly surveys and made a dichotomous judgement about whether it was indeed a stereotype threat event. To assess inter-rater reliability, a second rater evaluated a random subset of 50 stereotype threat events. Raters achieved 100% concordance and thus only one rater coded all events. In 27 surveys, participants did not write anything in response to the question asking them to briefly describe the stereotype threat event. In 5 of the remaining surveys, the event description provided by participants was very unclear. In the reported analyses, we include all 176 of these stereotype threat events. However, we also conducted a set of analyses including only the 144 events with full descriptions. We found no differences between these results and the results reported in the main text.
Stressful events. A coder evaluated the qualitative descriptions of the stress events for all 1,011 relevant weekly surveys and made a dichotomous judgement about whether it was indeed a stressful event. To assess inter-rater reliability, a second rater coded a random subset of 100 stressful events. Because the inter-rater reliability was perfect, only one coder evaluated each event. In 741 surveys, participants were able to recall a stressful event. In 194 surveys, participants were not able to recall a stressful event at work. In 76 surveys, participants did not write anything in response to the question asking them to briefly describe the stressful event.

In the reported analyses, we compare stereotype threat events to all other responses (i.e., independent of whether the participant recalled a stressful event or not). We also conducted analyses comparing stereotype threat experiences to unambiguously stressful events only (i.e., omitting diaries in which participants could not recall a stressful event or did not provide a qualitative description of the event they experienced). No substantive differences were found between these analyses and the analyses reported, again speaking to the robustness of our results.

Data analytic approach. The data have a multilevel structure (weekly surveys nested within persons), and therefore we used the lme4 package in R (Bates, Maechler, Bolker, & Walker, 2015) to fit linear mixed effects models to the data. P values were calculated using the lmerTest package in R, which uses a Satterthwaite approximation for degrees of freedom (Kuznetsova, Brockhoff, & Christensen, 2013). Pairwise deletion was used with missing data. In all models, we include random intercepts and slopes.

Multilevel models were used to investigate the effects of weekly stereotype threat events, age, and their interaction on the outcome variables and mediators. We modeled a fixed effect of age, a continuous person-level variable, which was grand-mean centered. We also modelled a fixed effect of stereotype threat event, a dichotomous survey-level variable, where 0 was coded as a stressful event, and 1 was coded as a stereotype threat event. Finally, we modelled a fixed
effect of the cross-level interaction between these two variables. The equations below outline these models:

**Level 1 – Weekly Survey Level**
Dependent variable $y_j = \beta_{0j} + \beta_{1j} \text{ (stereotype threat event)} + r_{ij}$

**Level 2 – Person Level**
$\beta_{0j} = \gamma_{00} + \gamma_{01} \text{ (age)} + \mu_{0j}$
$\beta_{1j} = \gamma_{10} + \gamma_{11} \text{ (age)} + \mu_{1j}$

All models were also run adding a fixed effect of quadratic age and a cross-level interaction between quadratic age and stereotype threat event, but neither variable was significant in any of these models, so only the analyses with linear age are reported.

Moderated mediation analyses using the R package mediation (Tingley, Yamamoto, Hirose, Keele, & Imai, 2014) were conducted to examine the age-conditional indirect effects of stereotype threat events on the outcome variables through the mediators. Quasi-Bayesian 95% confidence intervals around the indirect effect based on 1,000 resamples were calculated. We first calculated whether there was an indirect effect of stereotype threat events on each dependent variable through the mediator across the entire sample (i.e., without considering the role of age). Conditional mediation effects were then calculated, establishing whether there was an indirect effect of stereotype threat events on the dependent variables for younger employees (1 $SD$ below the mean on age; 26.40 years) and older employees (1 $SD$ above the mean on age; 52.16 years) separately. As in the first set of models, age was grand-mean centered. The direct effects of the mediators on the outcome variables across the whole sample are also reported.

**Results**

Table 1 presents descriptive statistics and intra-class correlations. Table 2 displays between-group and within-group bivariate correlations (calculated using the psych package in R;
Revelle, 2017). The bivariate correlations indicate that, at the within-person level, stereotype threat events were only negatively associated with organizational commitment and challenge appraisals. At the between-person level, aggregated stereotype threat events were positively related to intentions to quit, hindrance appraisals, rumination, and chronic stereotype threat. To illustrate the data, Table 3 provides examples of stereotype threat and stressful events recalled by younger and older employees.

The Relationship between Chronic Stereotype Threat and Weekly Stereotype Threat Events

A multilevel logistic regression was run predicting stereotype threat experiences (0 = stressful event, 1 = stereotype threat event) from grand-mean centered chronic stereotype threat. There was a significant positive effect of chronic stereotype threat on stereotype threat events, $\gamma = 0.94$, Odds Ratio (OR) = 2.57, $SE = 0.14$, $p < .001$, revealing that people who report greater chronic stereotype threat are more likely to experience stereotype threat events at work.

The Relationship between Age and Weekly Stereotype Threat Events

First, we investigated the role of age in predicting the likelihood of experiencing stereotype threat events at work over the five weekly surveys. The percentage of diaries containing a stereotype threat event by age is displayed in Figure 2. To test the linear effect of age, a multilevel logistic regression predicting stereotype threat events from grand-mean centered age was run. The linear effect of age on stereotype threat events was not significant, $\gamma = -0.02$, OR = 0.98, $SE = 0.02$, $p = .195$.

To test whether a curvilinear relationship exists between age and stereotype threat (Hypothesis 1), a second model was run including the linear and quadratic effects of age. In this model, no significant effect of linear age was found, $\gamma = -0.03$, OR = 0.97, $SE = 0.02$, $p = .067$, but a significant effect of quadratic age emerged, $\gamma = 0.003$, OR = 1.003, $SE = 0.001$, $p = .036$. 
The sign of this quadratic term was positive, indicating a convex curve. To illustrate this curve, the estimated probability of experiencing a stereotype threat event by age is plotted in Figure 2. This figure demonstrates that the odds of experiencing a stereotype threat event are higher for younger workers, but drop for middle-aged workers. They then rise again for older workers, although to a level below that of younger workers. This pattern of results provides support for Hypothesis 1.

**The Effect of Age, Stereotype Threat Events, and their Interaction on the Outcome Variables**

To test Hypothesis 2, we investigated whether age moderated the relationship between stereotype threat and the outcome variables. The results of these analyses are outlined in Table 4. There was a main effect of stereotype threat events on intentions to quit: when employees experienced a stereotype threat event (compared to a stressful event) they reported increased intentions to quit. There was also an effect of stereotype threat events on workplace wellbeing such that weekly stereotype threat events were associated with lower wellbeing. There were positive main effects of age on job satisfaction, job engagement, and workplace wellbeing. That is, older age was associated with higher job satisfaction, greater job engagement, and better workplace wellbeing.

In line with Hypothesis 2, these main effects were qualified by significant age X stereotype threat event interactions on job satisfaction, job engagement, and workplace wellbeing. However, interactions did not emerge on organizational commitment or turnover intentions, so the results provide only partial support for Hypothesis 2. To illustrate the shape of the significant interactions, we calculated simple slopes (Preacher, Curran, & Bauer, 2006) of stereotype threat events on the outcome variables for younger employees (1 SD below the mean
of age; 26.40 years) and older employees (1 SD above the mean of age; 52.16 years). The pattern of the simple slopes for all three variables is consistent with Hypothesis 2.

**Simple slopes on job satisfaction.** Although the interaction was significant, there was no effect of stereotype threat events on job satisfaction in either group: $b = 0.15, t(271) = 1.22, p = .222$ for younger employees; $b = -0.22, t(271) = 1.70, p = .090$ for older employees (see Figure 3, Panel A).

**Simple slopes on job engagement.** For younger employees, there was no effect of stereotype threat events on job engagement, $b = 0.06, t(271) = 0.48, p = .634$. In contrast, for older employees, stereotype threat was associated with a decrease in job engagement, $b = -0.35, t(271) = 2.48, p = .014$ (see Figure 3, Panel B).

**Simple slopes on workplace wellbeing.** For younger employees, there was no effect of stereotype threat events on wellbeing, $b = 0.06, t(269) = 0.80, p = .424$. In contrast, for older employees, stereotype threat events were associated with poorer workplace wellbeing, $b = -0.35, t(269) = 4.13, p < .001$ (see Figure 3, Panel C).

**Testing the Role of Hindrance Appraisals**

To test whether stereotype threat results in hindrance appraisals among older, but not younger employees, and determine if these hindrance appraisals mediate the relationship between stereotype threat events and disengagement (Hypothesis 3), we first investigated whether age moderated the relationship between stereotype threat and hindrance appraisals. The results of these analyses are in Table 4. There was a main effect of stereotype threat events on hindrance appraisals, such that those who experienced a stereotype threat event were more likely to evaluate the experience through a hindrance-appraisal lens. There was a main effect of age on hindrance appraisals, such that older age was associated with reduced hindrance appraisals. Contrary to predictions, the age X stereotype threat event interaction did not predict hindrance appraisals.
Second, a series of multilevel moderated mediation analyses was run to determine whether stereotype threat events have indirect effects on work outcomes via hindrance appraisals among older, but not among younger employees (see Table 6). Contrary to predictions, there was no evidence of indirect effects of stereotype threat events on work outcomes via hindrance appraisals for older employees. The direct effects of hindrance appraisals on each outcome variable can be seen in Table 5.

**Testing the Role of Challenge Appraisals**

To test whether stereotype threat results in challenge appraisals among younger, but not older employees, and determine if reduced challenge appraisals mediate the relationship between stereotype threat events and disengagement (Hypothesis 4), we first investigated whether age moderated the relationship between stereotype threat and challenge appraisals. The results of these analyses are in Table 4. There was a main effect of stereotype threat events on challenge appraisals, such that stereotype threat events were associated with reduced challenge appraisals. There was a main effect of age on challenge appraisals, such that older age was associated with reduced challenge appraisals. Contrary to predictions, the age X stereotype threat event interaction was not significant.

Second, we conducted a series of moderated mediation analyses to determine whether stereotype threat events have indirect effects on outcomes via challenge appraisals as a function of employee age. The results are displayed in Table 6. We also report the direct effects of challenge appraisals on each outcome variable in Table 5.

Across the entire sample, there was a negative indirect effect of stereotype threat events via challenge appraisals on job engagement and organizational commitment, and a positive indirect effect of stereotype threat on intentions to quit. Stereotype threat events were associated
with lower challenge appraisals. In turn, challenge appraisals were associated with increased job engagement and organizational commitment, and reduced intentions to quit.

Turning to the conditional nature of the indirect effects, for older employees, the effects were as described above, but these indirect effects were not present for younger employees. That is, among older employees, experiencing a stereotype threat event was associated with reduced challenge appraisals, and challenge appraisals in turn predicted increased job engagement and organizational commitment, and reduced intentions to quit. These mediation models are depicted in Figure 4 and suggest that stereotype threat events may be uniquely problematic for older employees because of their association with reduced challenge appraisals. There were no direct effects of the stereotype threat event X age interaction on intentions to quit or commitment, and these effects are indirect only.

Testing the Role of Rumination

To test Hypothesis 5, we first investigated whether age moderated the relationship between stereotype threat and rumination (see Table 4). There was a positive main effect of stereotype threat events on rumination, such that when a stereotype threat event occurred, participants reported ruminating more. There was a negative main effect of age on rumination, such that older age was associated with reduced rumination. In line with Hypothesis 5, there was a significant age X stereotype threat interaction on rumination, which we decomposed using simple slopes as described previously. For younger employees, there was no effect of stereotype threat events on rumination, \( b = 0.06, t(271) = 0.60, p = .549 \). However, for older employees, stereotype threat events were associated with increased rumination, \( b = 0.50, t(271) = 4.44, p < .001 \) (see Figure 3, Panel D).

Second, we conducted a series of moderated mediation analyses to determine whether stereotype threat events have indirect effects on work outcomes via rumination among older, but
not younger employees (see Table 6). The direct effects of rumination on each outcome variable are reported in Table 5. Across the entire sample, there was an indirect effect of stereotype threat events through rumination on intentions to quit, although not on any of the other outcome variables. Experiencing a stereotype threat event was associated with increased rumination, which in turn was associated with greater intentions to quit.

Turning to the conditional indirect effects, for younger employees there was no evidence of an indirect effect through rumination on any of the outcome variables. In line with Hypothesis 5, for older employees, there were indirect effects through rumination on job satisfaction, workplace wellbeing, and intentions to quit (see Figure 5). That is, among older employees, experiencing a stereotype threat event was associated with greater rumination, which in turn was associated with reduced job satisfaction and workplace wellbeing, and greater intentions to quit. As in the previous analyses, there were no direct effects of the stereotype threat event X age interaction on commitment or intentions to quit. Thus, for these variables we find only indirect, and not direct effects of the stereotype threat X age interaction.

Discussion

Both older and younger employees are susceptible to age-based stereotyping, but stereotype threat is uniquely problematic for older employees (von Hippel et al., 2013). The current research sought to better understand this differential relationship between feelings of being stereotyped and disengagement among older and younger employees. A five-week diary study revealed a curvilinear relationship between age and stereotype threat events, whereby older and younger employees were more likely to experience stereotype threat events compared to their middle-aged counterparts. Although younger employees experienced more stereotype threat events than older employees (consistent with von Hippel et al., 2013), only older employees showed decreased job satisfaction, job engagement, and workplace wellbeing after a stereotype
threat event. Stereotype threat did not relate to commitment and intentions to quit, however. By comparing stereotype threat events to stressful events, this research demonstrates that age differences in the vulnerability to the negative consequences of stereotype threat are not simply a function of the way older and younger employees deal with general workplace stress. Rather, it is age-based stereotype threat in particular, rather than stress in general, that poses unique problems for older employees.

There was some evidence for the mediating role of age differences in appraisal style in the effects of stereotype threat on work outcomes, although the pattern of findings was not as predicted. Age did not moderate the effects of stereotype threat events on challenge appraisals. However, there were age differences in the degree to which challenge appraisals mediated the effects of stereotype threat events on the outcome variables. Only among older employees were reduced challenge appraisals related to decreased job engagement and organizational commitment, and increased intentions to quit. This finding suggests that reduced challenge appraisals may help explain why stereotype threat is uniquely problematic for older adults. This pattern of relationships is consistent with the idea that challenge appraisals are associated with positive job outcomes (Cavanaugh et al., 2000; Podsakoff et al., 2007; Searle & Auton, 2015; Tuckey et al., 2015). Nonetheless, this finding was unexpected because we had predicted that mediation would emerge via older employees’ appraisals of stereotype threat as a hindrance, not their reduced likelihood of appraising stereotype threat as a challenge. These results suggest that interventions targeting challenge appraisals might help to buffer some of the deleterious consequences of stereotype threat among older employees. Framing new tasks as an opportunity to improve or learn new skills should facilitate challenge appraisals (see Alter et al., 2010).

In contrast, there were no indirect effects of stereotype threat events through hindrance appraisals on any of the outcome variables for younger or older employees. Although null
findings are difficult to interpret, these findings suggest that challenge appraisals, rather than
hindrance appraisals, play a more important role in whether stereotype threat events are
associated with negative work outcomes. It seems that the negative experience of stereotype
threat could be exacerbated by a corresponding drop in the ability to appraise the stereotype
threat event as a challenge.

In addition to the effects of stress appraisals, our findings suggest that rumination plays a
role in age differences in reactions to stereotype threat. Age moderated the effect of stereotype
threat events on rumination: experiencing a stereotype threat event was associated with increased
rumination among older employees, but not younger employees. In addition, for older employees,
there were indirect effects of stereotype threat events through rumination on three of the outcome
variables: stereotype threat events were associated with increased rumination, which in turn was
associated with lower job satisfaction and workplace wellbeing, as well as greater intentions to
quit. In contrast, there were no indirect effects of stereotype threat through rumination among
younger employees on any of the outcome variables. Thus, rumination seems to be a mechanism
for the uniquely consequential nature of stereotype threat among older employees. These findings
suggest that cognitive restructuring training may be useful in addressing rumination. If employees
can be taught to identify and change patterns of thinking surrounding stereotype threat events it
could help ameliorate the negative consequences of stereotype threat.

**Study Limitations and Future Research Directions**

Diary studies have the advantage that they reduce retrospective bias, which can interfere
with the validity of responses due to limitations of memory recall (Reis & Gable, 2000). The
extent to which this advantage is realized, however, depends on the time between the event of
interest and the collection of data (Ohly et al., 2010). To reduce the burden on participants and
minimize dropout rates, data were collected only once a week. If employees experienced a
stereotype threat event several days prior to their report of it, they may have forgotten the event when completing the survey, or they may not have accurately recalled their behaviors and feelings following the event. Future research using an event-sampling methodology, which involves the recording of data immediately after the event, would help reduce retrospective bias (e.g., Tschan, Rochat & Zapf, 2005).

The stereotype threat measurement was both a strength and a limitation. Previous research in organizational contexts has relied almost exclusively on assessment of chronic stereotype threat, such that participants indicate the degree to which they generally feel stereotype threat at work. Given the ethical and logistical constraints involved in manipulating stereotype threat in the workplace, reliance on such a measure seems sensible. The approach adopted in this study, in which employees indicated whether they had been evaluated negatively on the basis of their age since completion of the last survey, is novel and its validity is not established. Nonetheless, employees who reported greater chronic stereotype threat in the baseline survey were more likely to indicate that they experienced stereotype threat events at work over the five weeks of the study, providing initial evidence of the validity of the diary measure. This measure of stereotype threat also enabled us to disentangle stereotype threat from potentially associated personality traits such as negative affectivity.

This focus on stereotype threat events in the prior week had the added cost that it resulted in some ambiguity about the actual frequency of these events. In the current sample, stereotype threat events were reported on 14.8% of measurement occasions. This frequency estimate may have underestimated actual stereotype threat events, however. Because employees only indicated whether they experienced an age-related stereotype threat event since the last survey, it is impossible to know if they experienced more than one event. For this reason, we cannot distinguish between employees who experienced numerous stereotype threat events throughout
the week and employees who experienced only one, and the results may underestimate the frequency of stereotype threat events experienced by respondents. To get a more accurate estimate of frequency, experience sampling methodology would be useful.

By testing two distinct mechanisms (stress appraisals and rumination) the current research provides a better understanding of why some employees are negatively affected by stereotype threat. Nonetheless, these mediators do not provide a complete picture, as multiple mechanisms will be required to adequately explain age-based differences in vulnerability to the consequences of stereotype threat. For example, in their conceptual model on the effects of workplace age-based meta-stereotypes (a concept similar to age-based stereotype threat), Finkelstein, King, and Voyles (2015) suggested a “boost reaction” when people are viewed under the positive light of a stereotype, in addition to challenge and hindrance reactions.

Employees’ motivations can systematically differ across the lifespan, which may provide an alternative explanation for the differential reactions to stereotype threat. For example, older employees may be less economically dependent on the job, and thus may be more likely to consider quitting their jobs when they experience stereotype threat in comparison to their younger counterparts. In contrast to this possibility, research shows that it takes younger employees less time to secure a new job (Lippmann, 2008), and older employees typically fare worse when they become re-employed (Koeber & Wright, 2001), suggesting that older employees are likely to be more cautious before leaving their employers. There are also age differences in many job attitudes (e.g., job satisfaction, engagement, organizational commitment), with older employees reporting more positive attitudes compared to their younger counterparts (Ng & Feldman, 2010), as was found in the current study. Future research could explore the moderating effect of age on the association between work demands and work outcomes.
Finally, research should also investigate whether employees experience more age-related stereotype threat events in certain industries. Some industries are more likely to value older employees (e.g., for their expertise and wisdom, such as the legal profession), whereas other industries are more likely to value younger employees (e.g., for their physical strength and stamina, such as law enforcement). Consistent with this observation, survey research suggests that age-related stereotyping is more problematic for older employees in jobs involving physical labor (von Hippel et al., 2013). Although participants in the current study were from a large range of industries, the sample size made it impossible to conduct meaningful inferential statistics examining the relationship between age and occupational type (especially with only 10 participants in blue-collar positions, though underrepresentation of blue-collar employees is common [Bergman & Jean, 2016]). Future research could help shed light on the importance and prevalence of such industry differences by examining stereotype threat and its consequences in industries that vary in systematic ways, such as those that are high vs low in openness to hiring older employees (Hutchens, 1986).

Conclusion

Over the next few decades, the aging population in industrialized nations will pose major challenges for maintaining the needed size of the workforce (Hertel & Zacher, 2018; Kulik, Ryan, Harper, & George, 2014). To address predicted labor shortages, policy makers and organizations have created inducements to retain older employees and delay retirement. Such inducements can be effective, but they may still fail if they neglect important countervailing forces. One such force is negative stereotypes of older employees. A more complete understanding of age-related stereotype threat and its consequences is needed to inform the development of effective interventions that enhance resilience and reduce vulnerability to the negative consequences of stereotype threat. The current study suggests that interventions
targeting rumination and challenge appraisals might improve job attitudes and workplace wellbeing of older employees. These outcomes, in turn, will benefit older workers directly, as well as the organizations who employ them.
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### Table 1

**Descriptive Statistics**

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<th>Measure</th>
<th>N</th>
<th>SD</th>
<th>M</th>
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<th>Within persons</th>
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<td>3.06</td>
<td>1.33</td>
<td>-</td>
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<td>-</td>
</tr>
</tbody>
</table>

**Notes.** ICC = intraclass correlation, which represents the proportion of variance at the between-person level. For weekly variables, M is the mean of the person-means. Mean, standard deviations, and the ICC are not provided for stereotype threat experience because it is a dichotomous variable. Reliability estimates are calculated in the psych package (Revelle, 2017) using equations from Shrout and Lane (2012). RKF is a between-person reliability coefficient, estimating the reliability as an average over k time points for fixed coefficients (F), and is indicative of the consistency of item responses over time and across people. Reliability estimates are not provided for intentions to quit because it was assessed with a single item.
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
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<td>-</td>
<td>.00</td>
<td>-.05</td>
<td>-.07*</td>
<td>-.05</td>
<td>.05</td>
<td>.04</td>
<td>-.10***</td>
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<td>.49***</td>
<td>-.48***</td>
<td>-.35***</td>
<td>.06*</td>
<td>-.34***</td>
<td>-</td>
<td>-</td>
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<td>3. Job engagement</td>
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<td>.69***</td>
<td>-</td>
<td>.31***</td>
<td>.27***</td>
<td>-.34***</td>
<td>-.34***</td>
<td>.25***</td>
<td>-.05</td>
<td>-</td>
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<td>.61***</td>
<td>-</td>
<td>.24***</td>
<td>-.30***</td>
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<td>.22***</td>
<td>-.09***</td>
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<td>5. Workplace wellbeing</td>
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<td>.66***</td>
<td>.46***</td>
<td>.39***</td>
<td>-</td>
<td>-.30***</td>
<td>-.46***</td>
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<td>-.56***</td>
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<td>6. Intentions to quit</td>
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<td>-.66***</td>
<td>-.50***</td>
<td>-.44***</td>
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<td>-</td>
<td>.35***</td>
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<td>.18***</td>
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<td>7. Hindrance appraisals</td>
<td>.38***</td>
<td>-.61***</td>
<td>-.42***</td>
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<td>.24***</td>
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<td>.15***</td>
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<td>9. Rumination</td>
<td>.37***</td>
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<td>-.17***</td>
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<td>-.56***</td>
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<td>.13**</td>
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<td>-.15***</td>
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<td>11. Age squared</td>
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<td>12. Chronic stereotype threat</td>
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<td>-.01</td>
<td>.15**</td>
<td>.09</td>
<td>.00</td>
<td>-.01</td>
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</table>

Notes. *** p < .001. ** p < .01. * p < .05. Due to missing data, person-level Ns range from 276 to 278 participants and diary-level Ns range from 1,104 to 1,187 diaries. Correlations above the diagonal are within-person correlations. Within-person correlations represent the correlation between a participant’s temporal deviations on a pair of variables, averaged across participants (Curran & Bauer, 2011). Correlations below the diagonal are between-person correlations. Between-person correlations are correlations between a participant’s mean on a pair of variables, weighted by the number of completed diaries for that participant. Only between-person correlations are provided for person-level variables. Correlations were calculated using the statsBy function of the psych package in R (Revelle, 2017).
Table 3.

*Examples of Stereotype Threat and Stressful Events Recalled by Younger and Older Employees in the Weekly Surveys.*

<table>
<thead>
<tr>
<th>Stereotype Threat Events</th>
<th>Older employees (55 and older)</th>
<th>Stressful Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>I deal with new clients everyday and they question a few things many times, to see if I am allowed to do this. I feel as if they question it due to me being 21.</td>
<td>Our whole section is undergoing restructuring. There has been almost no real consultation. I suspect that because we are mostly older women, we are seen as more expendable and easier to replace.</td>
<td>Some equipment needed for work wasn't working therefore creating an added pressure for people demanding same level of service in the same amount of time.</td>
</tr>
<tr>
<td>A co-worker has doubted my theoretical knowledge due to my age on multiple occasions.</td>
<td>Miscommunication and the misconception that I was unhappy with a situation, when in reality I was only questioning some of the aspects. It could have been perceived as being older and less flexible.</td>
<td>A new coworker started working and was very demanding and unpleasant.</td>
</tr>
<tr>
<td>People have judged a client's interactions with me as this client usually engages better with an older worker. Although I was making ground, there were still negative comments made due to my age, regardless of my work.</td>
<td>My boss questioned about my 'health' and if I was up to the job or not. I felt it was really about my age.</td>
<td>Filing someone else's court work and having to fix their mistakes, with all expectations falling on me.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fellow worker unhappy with day work roster which I produced. The person changed it in a fit of rage after I refused to change it.</td>
</tr>
<tr>
<td>Age-based Stereotype Threat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

At a conference, people were critical of my social media use, because I was being a 'Typical Millennial' despite the fact that I was working in the engagement sphere and social media was essential.

Both my supervisor and her boss checked up on my ability to conduct a simple process.

I have a looming deadline and my supervisor has not been reviewing the work in adequate time.

I've been doing a lot of work at home to try and meet my deadlines - I haven't had as much sleep as I should have.
Table 4.

The Effects of Age, Stereotype Threat Events, and their Interaction on the Study Variables

<table>
<thead>
<tr>
<th>Work outcomes</th>
<th>Intercept</th>
<th>Stereotype Threat Event</th>
<th>Age</th>
<th>Stereotype Threat Event x Age</th>
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<tr>
<td></td>
<td>$\gamma$</td>
<td>SE</td>
<td>$p$</td>
<td>$\gamma$</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>4.36</td>
<td>0.06</td>
<td>&lt;.001</td>
<td>-0.03</td>
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<tr>
<td>Job engagement</td>
<td>5.01</td>
<td>0.06</td>
<td>&lt;.001</td>
<td>-0.14</td>
</tr>
<tr>
<td>Organizational commitment</td>
<td>4.38</td>
<td>0.08</td>
<td>&lt;.001</td>
<td>-0.21</td>
</tr>
<tr>
<td>Workplace wellbeing</td>
<td>3.07</td>
<td>0.04</td>
<td>&lt;.001</td>
<td>-0.14</td>
</tr>
<tr>
<td>Intentions to quit</td>
<td>2.73</td>
<td>0.09</td>
<td>&lt;.001</td>
<td>0.44</td>
</tr>
</tbody>
</table>

Psychological mediators

| Hindrance appraisals        | 3.44       | 0.06        | <.001| 0.37       | 0.11        | <.001| -0.01      | 0.004       | .015 | 0.003      | 0.01        | .723 |
| Challenge appraisals        | 4.75       | 0.05        | <.001| -0.28      | 0.11        | .016 | -0.01      | 0.004       | .006 | -0.01      | 0.01        | .099 |
| Ruminination                | 2.20       | 0.04        | <.001| 0.28       | 0.08        | <.001| -0.01      | 0.003       | .003 | 0.02       | 0.01        | .004 |

Notes. Separate models were run for each dependent variable. Significant effects are bolded. N = 278 participants. Due to missing data, diary-level Ns range from 1,104 to 1,187 diaries.
Table 5.

*The Direct Effects of the Mediators (Stress Appraisals and Rumination) on the Outcome Variables across the Whole Sample*

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Hindrance appraisals</th>
<th>Challenge appraisals</th>
<th>Rumination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>γ</td>
<td>SE</td>
<td>p</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>-0.27</td>
<td>0.03</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Job engagement</td>
<td>-0.31</td>
<td>0.04</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Organizational commitment</td>
<td>-0.15</td>
<td>0.04</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Workplace wellbeing</td>
<td>-0.24</td>
<td>0.02</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Intentions to quit</td>
<td>0.38</td>
<td>0.05</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Notes.* Separate models were run for each dependent variable and predictor. N = 278 participants. Due to missing data, diary-level Ns range from 1,104 to 1,187 diaries.
<table>
<thead>
<tr>
<th>Model</th>
<th>Mediator: hindrance appraisals</th>
<th>Mediator: challenge appraisals</th>
<th>Mediator: rumination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Across the entire sample</td>
<td>Conditional effect – younger workers (-1 SD on age; 26.40 years)</td>
<td>Conditional effect – older workers (+ 1 SD on age; 52.16 years)</td>
</tr>
<tr>
<td></td>
<td>Direct effect after mediator included</td>
<td>Indirect effect through mediator</td>
<td>Direct effect after mediator included</td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>95% CI</td>
<td>b</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>0.06 [-0.12, 0.24]</td>
<td>-0.02 [-0.06, 0.02]</td>
<td>0.25 [0.01, 0.48]</td>
</tr>
<tr>
<td>Job engagement</td>
<td>-0.11 [-0.29, 0.07]</td>
<td>-0.02 [-0.07, 0.02]</td>
<td>0.07 [-0.18, 0.30]</td>
</tr>
<tr>
<td>Organizational commitment</td>
<td>-0.15 [-0.35, 0.05]</td>
<td>-0.01 [-0.04, 0.01]</td>
<td>0.02 [-0.24, 0.28]</td>
</tr>
<tr>
<td>Workplace wellbeing</td>
<td>-0.09 [-0.21, 0.04]</td>
<td>-0.02 [-0.05, 0.02]</td>
<td>0.13 [-0.04, 0.28]</td>
</tr>
<tr>
<td>Intentions to quit</td>
<td>0.34 [0.03, 0.68]</td>
<td>0.03 [-0.03, 0.09]</td>
<td>0.29 [-0.14, 0.74]</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>-0.02 [-0.19, 0.16]</td>
<td>-0.04 [-0.03, 0.00]</td>
<td>0.15 [-0.09, 0.38]</td>
</tr>
<tr>
<td>Job engagement</td>
<td>-0.06 [-0.24, 0.14]</td>
<td>-0.03 [-0.08, -0.01]</td>
<td>0.10 [-0.15, 0.35]</td>
</tr>
<tr>
<td>Organizational commitment</td>
<td>-0.16 [-0.37, 0.06]</td>
<td>-0.03 [-0.07, -0.01]</td>
<td>0.003 [-0.29, 0.29]</td>
</tr>
<tr>
<td>Workplace wellbeing</td>
<td>-0.12 [-0.24, 0.00]</td>
<td>-0.004 [-0.02, 0.00]</td>
<td>0.06 [-0.10, 0.21]</td>
</tr>
<tr>
<td>Intentions to quit</td>
<td>0.39 [0.06, 0.69]</td>
<td>0.03 [0.003, 0.06]</td>
<td>0.38 [-0.04, 0.79]</td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>-0.02 [-0.19, 0.15]</td>
<td>-0.02 [-0.06, 0.02]</td>
<td>0.11 [-0.12, 0.33]</td>
</tr>
<tr>
<td>Job engagement*</td>
<td>-0.13 [-0.33, 0.08]</td>
<td>-0.003 [-0.01, 0.00]</td>
<td>0.06 [-0.20, 0.31]</td>
</tr>
<tr>
<td>Organizational commitment</td>
<td>-0.19 [-0.39, 0.01]</td>
<td>-0.01 [-0.02, 0.00]</td>
<td>-0.03 [-0.30, 0.24]</td>
</tr>
<tr>
<td>Workplace wellbeing</td>
<td>-0.08 [-0.18, 0.02]</td>
<td>-0.02 [-0.07, 0.02]</td>
<td>0.02 [-0.10, 0.16]</td>
</tr>
<tr>
<td>Intentions to quit</td>
<td>0.44 [0.14, 0.76]</td>
<td>0.02 [-0.02, 0.05]</td>
<td>0.41 [0.03, 0.80]</td>
</tr>
</tbody>
</table>
Notes. 95% CI = quasi-Bayesian 95% confidence intervals based on 1,000 resamples (Tingley et al., 2014). Separate models were run for each dependent variable and mediator. Significant effects are bolded. *Random slopes of rumination were not included for the models with rumination as a mediator and workplace wellbeing and job engagement as outcome variables because of convergence errors.
Figure 1. Conceptual model.

Note. H = Hypothesis. The dashed arrows indicate that the moderated effects proposed in H2 are further proposed to be mediated by hindrance appraisal (H3), challenge appraisal (H4), and rumination (5).
Figure 2. The quadratic line represents the estimated probability that a stereotype threat event occurred by age (grey shaded areas represents 95% confidence intervals). For ease of interpretation, we plot age uncentered, although it was grand-mean centered in analyses. The bars are person-level aggregates of the raw data and represent the mean percentage of weekly surveys containing a stereotype threat event by age.
Figure 3. The simple slopes of stereotype threat events on Job Satisfaction (Panel A), Job Engagement (Panel B), Workplace Wellbeing (Panel C), and Rumination (Panel D) at 1 SD (12.88 years) below the mean of age (i.e., 26.40 years) and above the mean of age (i.e., 52.16 years).
Figure 4. Conditional indirect effects of stereotype threat events through challenge appraisals for older employees on job engagement (panel a), organizational commitment (panel b), and intentions to quit (panel c). There is no conditional indirect effects for younger employees. Numbers are unstandardized regression coefficients. Numbers inside parentheses represent coefficient after inclusion of the mediator. *** p < .001. ** p < .01. * p < .05.
Figure 5. Conditional indirect effects of stereotype threat events through rumination for older employees on job satisfaction (panel a), workplace wellbeing (panel b), and intentions to quit (panel c). There is no conditional indirect effects for younger employees. Numbers are unstandardized regression coefficients. Numbers inside parentheses represent coefficient after inclusion of the mediator. *** $p < .001$. ** $p < .01$. * $p < .05$. 