

Perceived Discrimination and Personality Development in Adulthood

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Perceived discrimination is common and a significant source of stress that may have implications for personality development across adulthood. In this study, we examined whether experiences with discrimination were associated with maladaptive changes in the 5 major dimensions of personality using 2 longitudinal samples that differed in age and follow-up interval. In the Health and Retirement Study, participants who perceived discrimination increased in their tendency to experience negative emotions (neuroticism), decreased in their tendency to be trusting (agreeableness), and decreased in their tendency to be organized and disciplined (conscientiousness). These associations replicated using participants from the Midlife in the United States study. The findings indicate that social pathways, in addition to biological and developmental tasks, are important for adult personality development.

Keywords: personality development, perceived discrimination, longitudinal, Five Factor Model

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The traits that define the Five Factor Model (FFM) of personality are generally stable across adulthood but also show predictable patterns of change (Terracciano, McCrae, Brant, & Costa, 2005). Even with this normative development, however, there are significant individual differences in their trajectory over time. Recognition of such individual differences has led to a great deal of interest in identifying factors associated with this change. Research on potential factors has focused heavily on normative life events, such as marriage and career, which are thought to promote personality change in the direction of greater maturity (Roberts & Mroczek, 2008). In addition to these transitions, unexpected events are also implicated in personality development. Individuals who experience a traumatic event, for example, tend to increase in

neuroticism, an association found in both community (Löckenhoff, Terracciano, Patriciu, Eaton, & Costa, 2009) and student (Boals, Southard-Dobbs, & Blumenthal, 2015) populations, although not all find this relation (Ogle, Rubin, & Siegler, 2014). Even negative experiences that are not discrete events can shape the trajectory of personality. Individuals who have more negative affect, for example, also increase more in neuroticism and decline more in conscientiousness and extraversion over time (Soto, 2015).

Less research has addressed the association between social stressors and change in personality. It is not uncommon for individuals to be treated unfairly on the basis of a personal characteristic, such as race, age, or sex (Kessler, Mickelson, & Williams, 1999). Such experiences with discrimination are prevalent and are thought to be particularly detrimental because these events are uncontrollable and unpredictable. And, indeed, perceived discrimination is associated with lower psychological well-being and worse physical health, measured both concurrently and with declines in health and well-being over time (Schmitt, Branscombe, Postmes, & Garcia, 2014; Sutin, Stephan, Carretta, & Terracciano, 2015). The detrimental effect of experiencing discrimination is not limited to emotional health, but extends to other aspects of psychological functioning. Children who perceive discrimination, for example, decline in self-control across adolescence (Gibbons et al., 2012), and older adults who experience age discrimination are more likely to report an older subjective age (Stephan, Sutin, & Terracciano, 2015). Less is known, however, about the extent to which experiencing discrimination is associated with changes in personality traits across adulthood.

To that end, the present research examines whether experiences with discrimination are associated with personality development in adulthood. We consider the relation between personality and discrimination conceptualized in three ways: (1) incident discrimination (i.e., new reports of discrimination between baseline and

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follow-up), (2) chronic discrimination (i.e., discrimination reported at both baseline and follow-up), and (3) cross-lagged associations in which the longitudinal associations were tested simultaneously and included the correlated covariates at baseline and stability paths for both discrimination and personality. Before we examine change in personality as an outcome, we first test whether baseline personality predicts who will report incident and chronic discrimination and whether personality is associated with changes in discrimination (cross-lags). We then test whether incident, chronic, and baseline discrimination (cross-lags) are associated with changes in personality. Given the cross-sectional and longitudinal associations between discrimination and psychological distress/well-being (Schmitt et al., 2014), we expect that experiences with discrimination will be associated with increases in neuroticism and decreases in extraversion over time. Discrimination has also been linked with anger and hostility (Williams et al., 2012); we thus expect such experiences will be associated with decreases in agreeableness (i.e., increased antagonism). Because discrimination is associated with declines in constructs related to conscientiousness in adolescence (Gibbons et al., 2012), we expect that perceived discrimination will be associated with declines in this trait. Although we do not have a strong hypothesis for openness, experiencing discrimination may be associated with declines in a willingness to try new things. We test these hypotheses in two large national samples of American adults: the Health and Retirement Study (HRS) and the Midlife in the United States (MIDUS) study.

Method

Participants: HRS

Participants were drawn from the Health and Retirement Study (HRS), a nationally representative longitudinal study of Americans ages 50 and older and their spouses (Health and Retirement Study, 2012). HRS participants are reinterviewed every 2 years. Starting in 2004, participants in the enhanced face-to-face interview re-

ceived a psychosocial questionnaire that they completed and returned by mail to the University of Michigan. Starting in 2006, this questionnaire included a measure of personality traits and items about the experience of discrimination (see below). Half of the HRS participants completed the psychosocial questionnaire in 2006; the other half completed it in 2008. We combined these two samples as our baseline. Participants completed the same scales again in 2010 and 2012. We combined these assessments as the follow-up. Thus, for all participants, there is a 4-year follow-up period. Personality and perceived discrimination were measured concurrently at baseline and again at follow-up. A total of 10,265 participants had some information on personality and discrimination at both baseline and follow-up. Compared with participants who had some data at both assessments ($n = 10,265$), those with only the baseline assessment ($n = 4,338$) were more likely to be older ($M = 71.49, SD = 11.69$ vs. $M = 66.92, SD = 9.66$), $F(1, 14,602) = 599.46, p < .01$, less educated ($M = 11.96, SD = 3.42$ vs. $M = 12.85, SD = 2.93$), $F(1, 14,602) = 254.22, p < .01$, male, $\chi^2 = 5.45, p < .05$, and African American, $\chi^2 = 78.53, p < .01$. Controlling for these demographic differences, participants who only had data at baseline reported more discrimination ($M = 1.66 [SE = .01]$ vs. $M = 1.60 [SE = .01]$), $F(1, 14,445) = 18.85, p < .01$; $d = .03$, and scored higher in neuroticism ($M = 2.12 [SE = .01]$ vs. $M = 2.03 [SE = .01]$), $F(1, 14,445) = 59.86, p < .01$; $d = .09$, lower in extraversion ($M = 3.16 [SE = .01]$ vs. $M = 3.21 [SE = .01]$), $F(1, 14,445) = 15.31, p < .01$; $d = -.11$, lower in agreeableness ($M = 3.51 [SE = .01]$ vs. $M = 3.53 [SE = .01]$), $F(1, 14,445) = 5.23, p < .01$; $d = -.08$, and lower in conscientiousness ($M = 3.29 [SE = .01]$ vs. $M = 3.38 [SE = .01]$), $F(1, 14,445) = 89.19, p < .01$; $d = -.26$; there was no difference in openness. For the analysis of incident discrimination, we selected participants who reported that they had not experienced discrimination at the baseline assessment and completed the follow-up assessment ($N = 3,358$; 33% of the total HRS longitudinal sample; see Table 1 for demographic information). Only participants who reported no discrimination at baseline were included in this analysis. For the analysis of chronic discrimination, we compared

Table 1
Descriptive Statistics for All Baseline Variables

Demographics	HRS		MIDUS	
	Full	Incident	Full	Incident
Age	66.92 (9.66)	69.05 (9.38)	47.10 (12.33)	48.80 (12.64)
Sex (female)	60% (6,148)	64.3% (2,160)	55.2% (2,062)	52% (820)
Race (Black)	11.4% (1,172)	10.4% (349)	3.5% (129)	.08% (12)
Education	12.85 (2.93)	12.53 (3.04)	7.16 (2.47)	7.14 (2.45)
Discrimination	1.61 (.71)	—	1.40 (.49)	—
Personality				
Neuroticism	2.04 (.61)	1.87 (.58)	2.21 (.66)	2.13 (.63)
Extraversion	3.21 (.55)	3.31 (.53)	3.19 (.55)	3.22 (.55)
Openness	2.95 (.55)	2.98 (.57)	3.48 (.49)	3.00 (.52)
Agreeableness	3.54 (.47)	3.63 (.42)	3.01 (.51)	3.49 (.50)
Conscientiousness	3.39 (.46)	3.47 (.45)	3.45 (.43)	3.49 (.42)
<i>N</i>	10,265	3,358	3,734	1,579

Note. HRS = Health and Retirement study; MIDUS = Midlife in the United States study. Full refers to full longitudinal sample used in the analysis of chronic discrimination and the cross-lagged analysis. Incident refers to the sample used in the analysis of new reports of discrimination at follow-up. Numbers are either means (*SDs*) or percentages (sample sizes). In HRS, education is coded as years of education. In MIDUS, education is coded as 1 = grade school to 12 = graduate/professional degree (7 = some college).

participants who reported any experiences with discrimination (however infrequent) at both time points ($n = 4,920$) to participants who reported no experiences at one or both of the two time points ($n = 5,345$). All participants, both those who reported no discrimination at baseline and those who reported discrimination at baseline were included in the analysis (i.e., all participants). The cross-lagged analyses also included all participants.

Participants: MIDUS

Data were also drawn from the MIDUS I and II (Brim, Ryff, & Kessler, 2004). At the first wave in 1994–1995, participants completed a 30-min telephone interview and a self-administered questionnaire that included the variables of interest in the present study. Participants completed the same measures again approximately 10 years later. Similar to HRS, personality and perceived discrimination were measured concurrently at baseline and again at follow-up. A total of 3,734 participants had some information on personality and discrimination at both baseline and follow-up. Compared with participants who had some data at both assessments ($n = 3,734$), those with only the baseline assessment ($n = 2,332$) were more likely to be younger ($M = 46.12$, $SD = 13.63$ vs. $M = 47.10$, $SD = 12.33$), $F(1, 6,065) = 8.42$, $p < .01$, less educated ($M = 6.45$, $SD = 2.41$ vs. $M = 7.16$, $SD = 2.47$), $F(1, 6,045) = 122.54$, $p < .01$, male, $\chi^2 = 32.14$, $p < .01$, and African American, $\chi^2 = 96.89$, $p < .01$. Controlling for these demographic differences, participants who only had data at baseline reported more discrimination ($M = 1.44$ [$SE = .01$] vs. $M = 1.42$ [$SE = .01$]), $F(1, 6,045) = 4.14$, $p < .05$; $d = .14$, and scored higher in neuroticism ($M = 2.25$ [$SE = .01$] vs. $M = 2.22$ [$SE = .01$]), $F(1, 6,045) = 5.22$, $p < .05$; $d = .08$, higher in openness ($M = 3.04$ [$SE = .01$] vs. $M = 3.01$ [$SE = .01$]), $F(1, 6,045) = 4.95$, $p < .05$; $d = .04$, higher in agreeableness ($M = 3.52$ [$SE = .01$] vs. $M = 3.47$ [$SE = .01$]), $F(1, 6,045) = 11.36$, $p < .01$; $d = .06$, and lower in conscientiousness ($M = 3.39$ [$SE = .01$] vs. $M = 3.44$ [$SE = .01$]), $F(1, 6,045) = 18.77$, $p < .01$; $d = -.18$; there was no difference in extraversion. For the analysis of incident discrimination, we selected participants who reported that they had not experienced discrimination at the baseline assessment and completed the follow-up assessment ($N = 1,579$; 42% of the total MIDUS longitudinal sample; see Table 1 for demographic information). Only participants who reported no discrimination at baseline were included in this analysis. For the analysis of chronic discrimination, we compared participants who reported any experiences with discrimination (however infrequent) at both time points ($n = 1,610$) to participants who reported no experiences at one or both of the two time points ($n = 2,124$). All participants, both those who reported no discrimination at baseline and those who reported discrimination at baseline, were included in the analysis (i.e., all participants). The cross-lagged analyses also included all participants.

Measures

Personality traits. Personality traits were assessed in both samples using the Midlife Development Inventory (MIDI; Lachman & Weaver, 1997). In the MIDUS, participants were asked how much 25 adjectives that assessed neuroticism (e.g., moody), extraversion (e.g., talkative), openness (e.g., creative), agreeable-

ness (e.g., helpful), and conscientiousness (e.g., organized) described themselves on a scale ranging from 1 (*not at all*) to 4 (*a lot*). The same scale was used in the HRS, except one additional item was added to the conscientiousness scale.

Perceived discrimination. In both samples, the measure of perceived discrimination was based on the perceived everyday experiences with discrimination scale (Williams, Yu, Jackson, & Anderson, 1997). Participants were asked, “In your day-to-day life, how often have any of the following things happened to you?” In the HRS, participants rated five items (e.g., “You are treated with less courtesy or respect than other people”) on a scale with response options of 1 (*never*), 2 (*less than once a year*), 3 (*a few times a year*), 4 (*a few times a month*), 5 (*at least once a week*), and 6 (*almost everyday*). In the MIDUS, participants answered these same five items plus four additional items on a scale with the response options of 1 (*never*), 2 (*rarely*), 3 (*sometimes*), and 4 (*often*). After making these ratings, participants were asked to specify the reasons they believed they were treated unfairly. In HRS, participants could attribute unfair treatment to ancestry, sex, race, age, weight, a physical disability, appearance, and/or sexual orientation. The attributions were similar in MIDUS, with the exception that one option was ethnicity rather than ancestry, and one option was weight/height rather than weight. In both studies, participants could choose as many or few attributions as appropriate. In both samples, participants completed this measure at baseline and follow-up ($r_{\text{retest}} = .53$ and $.54$, respectively, for HRS and MIDUS). We defined experiences with discrimination in three ways (1) incident (i.e., participants who reported discrimination at follow-up but not baseline), (2) chronic (i.e., participants who reported any discrimination at both baseline and follow-up), and (3) baseline (i.e., participants’ reports of discrimination at the first assessment; cross-lags).

Statistical Approach

To examine whether personality was associated with discrimination between the two assessments, we used logistic regression to predict incident (i.e., new reports of discrimination = 1, no discrimination at either time points = 0) and chronic (i.e., reported discrimination at both time points = 1, no reported discrimination at one or both time points = 0) from each personality trait, controlling for age, age squared, sex, ethnicity, and education. We ran the same analyses in each sample to determine whether the associations replicated across the two studies. To examine whether incident discrimination was associated with changes in personality over the follow-up period, we predicted personality at follow-up from incident discrimination experienced between baseline and follow-up (as a continuous variable), controlling for baseline personality and the demographic covariates (i.e., age, age squared, sex, race, and education). We followed a similar procedure to examine the association between chronic discrimination and change in personality. We also used cross-lag models (Ferrer & McArdle, 2003) to test the simultaneous, longitudinal relations between personality and discrimination. We tested a standard cross-lagged model, which specifies an autoregression, which is the stability of the construct over the follow-up period, a cross-lagged regression that represents the effect of the other variable at baseline, and a residual that is allowed to correlate with the

residual of the other variable. All components of the model, including the two cross-lagged paths, were tested simultaneously.

Finally, as supplemental analysis, we tested whether attributions for discrimination (e.g., race, age) were associated with personality change following the same regression procedure as described above, and we tested whether the association between incident discrimination and change in personality was moderated by attribution type by testing the interaction between each attribution and incident discrimination. For all analyses, we focus primarily on associations that replicated across both samples.

Results

Descriptive statistics for both samples are given in Table 1, and the bivariate correlations between discrimination and personality and at both time points are given in Table S1 (see online supplemental material). We first examined whether baseline personality traits were associated with incident, chronic, and cross-lagged changes in discrimination between baseline and follow-up (see Table 2). The results were very consistent for neuroticism and conscientiousness: across both samples, participants high in neuroticism and low in conscientiousness reported more incident and chronic discrimination and increased in discrimination across the follow-up period (cross-lags). Higher extraversion was likewise consistently associated with lower discrimination, with slightly weaker associations in MIDUS compared with HRS. Higher openness and agreeableness were associated with less chronic discrimination in HRS but not in MIDUS. None of the associations between personality and incident discrimination was moderated by age, sex, or race in either sample. None of the interactions for chronic discrimination replicated across the two studies, but there were sample-specific interactions. In HRS, the association be-

tween neuroticism and chronic discrimination was stronger among men than women ($OR_{interaction} = .85$, 95% CI = .74–.98, $p < .05$), and the association between agreeableness and conscientiousness and chronic discrimination was stronger among White than African American participants ($OR_{interaction} = 1.38$, 95% CI = 1.06–1.80, $p < .05$ and $OR_{interaction} = 1.32$, 95% CI = 1.03–1.70, $p < .05$, respectively). In MIDUS, although there was no main effect of either openness or agreeableness on chronic discrimination, there was a positive association between openness and chronic discrimination among African American participants ($OR_{interaction} = 2.44$, 95% CI = 1.13–5.28, $p < .05$) and a negative association between agreeableness and chronic discrimination among older participants ($OR_{interaction} = .98$, 95% CI = .97–.99, $p < .01$).

We next tested whether perceived discrimination was associated with changes in personality. Consistent with our hypotheses, experiencing discrimination between baseline and follow-up was associated most consistently with changes in neuroticism and conscientiousness in both samples (see Table 3). Participants who reported incident or chronic discrimination or more discrimination at baseline (cross-lags) increased more in neuroticism and declined more in conscientiousness across the follow-up period than participants who did not have those experiences (see Figure for HRS and Figure S1 in the online supplemental material available for MIDUS). Also consistent with our hypothesis, in both studies, discrimination was associated with more decline in agreeableness, but the associations were slightly weaker in MIDUS. Less consistent associations emerged for the other two traits. Consistent with our hypotheses, discrimination was associated with declines in both extraversion and openness, but only in HRS; these associations did not replicate in MIDUS.

Table 2
Association Between Baseline Personality and Incident, Chronic, and Change in Perceived Discrimination

Predictors	Incident		Chronic		Change (cross-lags)	
	HRS	MIDUS	HRS	MIDUS	HRS	MIDUS
Demographics						
Age	.95 (.88–1.03)	.86 (.80–.94)**	.77 (.74–.81)**	.98 (.97–.99)**	–.02*	–.09**
Age squared	1.11 (1.04–1.17)**	1.00 (.94–1.06)	1.01 (.98–1.05)	1.00 (.99–1.00)	.03**	.01
Sex (female)	.90 (.78–1.05)	1.19 (.97–1.47)	.70 (.64–.76)**	1.27 (1.11–1.45)**	–.02	–.01
Ethnicity (Black)	1.13 (.89–1.43)	1.36 (.43–4.27)	1.34 (1.18–1.52)**	6.92 (4.34–11.02)**	.03**	.07**
Ethnicity (Other)	1.33 (.82–2.14)	1.26 (.55–2.85)	1.19 (.93–1.54)	2.18 (1.52–3.13)**	.01	.03*
Education	1.00 (.97–1.02)	.94 (.90–.98)**	1.06 (1.05–1.08)**	.99 (.96–1.02)	–.02	–.06**
Personality						
Neuroticism	1.49 (1.31–1.69)**	1.22 (1.03–1.44)*	1.57 (1.50–1.64)**	1.27 (1.19–1.36)**	.07**	.08**
Extraversion	.80 (.70–.92)**	.97 (.81–1.17)	.78 (.75–.81)**	.91 (.85–.97)**	–.03**	–.02
Openness	.95 (.84–1.09)	1.02 (.84–1.25)	.88 (.85–.92)**	1.04 (.97–1.12)	.00	.02
Agreeableness	.85 (.71–1.01)	.86 (.69–1.06)	.76 (.72–.79)**	.96 (.89–1.02)	–.02*	–.01
Conscientiousness	.76 (.65–.90)**	.72 (.56–.92)**	.73 (.70–.77)**	.83 (.78–.89)**	–.05**	–.04*

Note. For incident discrimination, $N = 3,358$ for the HRS and $N = 1,579$ for the MIDUS. For chronic discrimination and change in discrimination, $N = 10,265$ for HRS and $N = 3,734$ for MIDUS. Incident discrimination refers to new reports of discrimination between baseline and follow-up compared with no reports of discrimination at both time points. Chronic discrimination refers to any reports of discrimination at both time points compared with no discrimination reported at one or both time points. Change refers to the cross-lagged association of baseline personality on change in discrimination. Odds ratios (95% confidence intervals) are from logistic regression predicting any experience of discrimination from baseline personality controlling for demographic covariates. Coefficients for the change analyses are from the cross-lagged analysis that specified discrimination at follow-up as a function of baseline personality, baseline discrimination, and the correlated residual, controlling for the demographic covariates. The cross-lags were tested simultaneously with the cross-lags for the effect of discrimination on change in personality, which is reported in Table 3.

* $p < .05$. ** $p < .01$.

Table 3
Association Between Perceived Discrimination and Changes in Personality

Predictors	Neuroticism		Extraversion		Openness		Agreeableness		Conscientiousness	
	HRS	MIDUS	HRS	MIDUS	HRS	MIDUS	HRS	MIDUS	HRS	MIDUS
Incident discrimination										
Age	.01	-.07**	-.07**	.03**	-.07**	.03**	-.05**	.06**	-.09**	-.07**
Age squared	.02	.03	-.04**	-.07**	-.02	-.09**	-.04**	-.07**	-.02	-.08**
Sex (female)	.04*	.01	.02	.03	.00	.00	.10**	.11**	.03*	.03
Ethnicity (Black)	-.05**	-.03	.00	.02	.02	-.01	-.04**	-.02	-.01	.00
Ethnicity (other)	.00	.04*	-.01	.03	.00	.04*	-.04**	.03	-.02	.02
Education	-.07**	-.04*	.04**	-.06**	.11**	.04*	.06**	-.07**	.07**	-.02
Baseline personality	.58**	.61**	.66**	.71**	.62**	.69**	.56**	.61**	.56**	.60**
Incident discrimination	.12**	.04*	-.08**	-.03	-.07**	.01	-.10**	-.04*	-.14**	-.07**
Chronic discrimination										
Age	.03**	-.08**	-.05**	.06**	-.06**	.04**	-.05**	.08**	-.08**	-.03
Age squared	.02**	-.02	-.02**	-.05**	-.02*	-.06**	-.03**	-.05**	-.02**	-.05**
Sex (female)	.04**	.05**	.03**	.03	.01	.00	.09**	.11**	.04**	.02
Race (Black)	-.04**	-.01	.01	.05**	.02*	.02	-.02*	.01	-.01	.00
Race (other)	.00	.02	.02*	.01	.02*	.03*	.00	.01	.01	.01
Education	-.05**	-.03*	.04**	-.01	.10**	.07**	.05**	-.04**	.08**	.01
Baseline personality	.61**	.60**	.68**	.69**	.64**	.68**	.59**	.61**	.60**	.60**
Chronic discrimination	.09**	.06**	-.03**	-.02	-.02*	.01	-.05**	-.03	-.06**	-.06**
Baseline discrimination (cross-lags)										
Age	.03**	-.08**	-.05**	.06**	-.05**	.04**	-.05**	.08**	-.08**	-.03*
Age squared	.02**	.02	-.02**	-.06**	-.01	-.06**	-.03**	-.06**	-.02**	-.05**
Sex (female)	.04**	.04**	.03**	.03*	.01	.00	.09**	.11**	.04**	.02
Race (Black)	-.05**	-.02*	.01	.06**	.02*	.02	-.01	.01	-.01	.01
Race (other)	.00	.02	.02*	.02	.01	.03*	.00	.02	.01	.02
Education	-.04**	-.04**	.03**	-.01	.09**	.06**	.04**	-.04**	.08**	.01
Baseline personality	.60**	.60**	.68**	.69**	.64**	.58**	.59**	.60**	.59**	.60**
Baseline discrimination	.07**	.06**	-.01	-.03**	.00	.00	-.04**	-.02	-.05**	-.06**

Note. For incident discrimination, $N = 3,358$ for the HRS and $N = 1,579$ for the MIDUS. For chronic discrimination and change in discrimination, $N = 10,265$ for HRS and $N = 3,734$ for MIDUS. Incident discrimination refers to new reports of discrimination between baseline and follow-up compared with no reports of discrimination at both time points. Chronic discrimination refers to any reports of discrimination at both time points compared with no discrimination reported at one or both time points. Baseline discrimination refers to the cross-lagged association of baseline discrimination on change in personality. For incident and chronic discrimination, coefficients are standardized betas from linear regression predicting personality at follow-up from perceived discrimination, controlling for baseline personality and demographic factors. For baseline discrimination, coefficients are from cross-lag analyses that specified personality at follow-up as a function of baseline discrimination, baseline personality, and the correlated residual at follow-up, controlling for the demographic covariates. The cross-lags were tested simultaneously with the cross-lags for the effect of personality on change in discrimination, which is reported in Table 2.

* $p < .05$. ** $p < .01$.

The results of these analyses should be put in the context of overall personality change in these two samples, which differed in age and developmental stage. HRS participants, on average, declined slightly in neuroticism and significantly in both agreeableness and conscientiousness. Our results thus indicated that discrimination pushed against the developmental trajectory of neuroticism (i.e., individuals who perceived discrimination increased in neuroticism rather than decreased) and accelerated the age-related decline in both agreeableness and conscientiousness. The difference in personality change between those who experienced incident discrimination and those who did not was nearly .2 SD for each of these traits ($d = .16$ for neuroticism, $d = .17$ for agreeableness, and $d = .18$ for conscientiousness). The magnitude of these effects was similar or larger than the effect of the demographic variables, such as education (see Table 3). MIDUS participants, on average, showed the declines in neuroticism and agreeableness and the increase in conscientiousness that is typically observed in middle adulthood. Thus, participants who reported incident discrimination declined less in neuroticism, had the accelerated decline in agreeableness, and did not show the typical

age-related increase in conscientiousness. Consistent with the regression analysis, the difference in personality change was more modest in MIDUS than in HRS, with effects $\leq .1$ SD for these traits ($d = .06$ for neuroticism, $d = .04$ for agreeableness, and $d = .10$ for conscientiousness).

We next examined whether the associations between discrimination and change in personality were moderated by sex, age, or race. No interactions replicated across the two samples. In HRS, incident discrimination had stronger associations with declines in extraversion among relatively younger than older participants ($\beta_{\text{interaction}} = .03$, $p < .05$) and with greater declines in openness and conscientiousness among White than African American participants (both $\beta_{\text{interaction}} = .03$, both p values $< .05$). In MIDUS, incident discrimination was associated with greater declines in agreeableness and conscientiousness among relatively older than younger participants (both $\beta_{\text{interaction}} = -.05$, both p values $< .05$) and with greater declines in extraversion among women than men ($\beta_{\text{interaction}} = -.05$, $p < .05$). In HRS, chronic discrimination was associated with greater declines in agreeableness among relatively older than younger participants ($\beta_{\text{interaction}} = -.03$, $p < .05$).

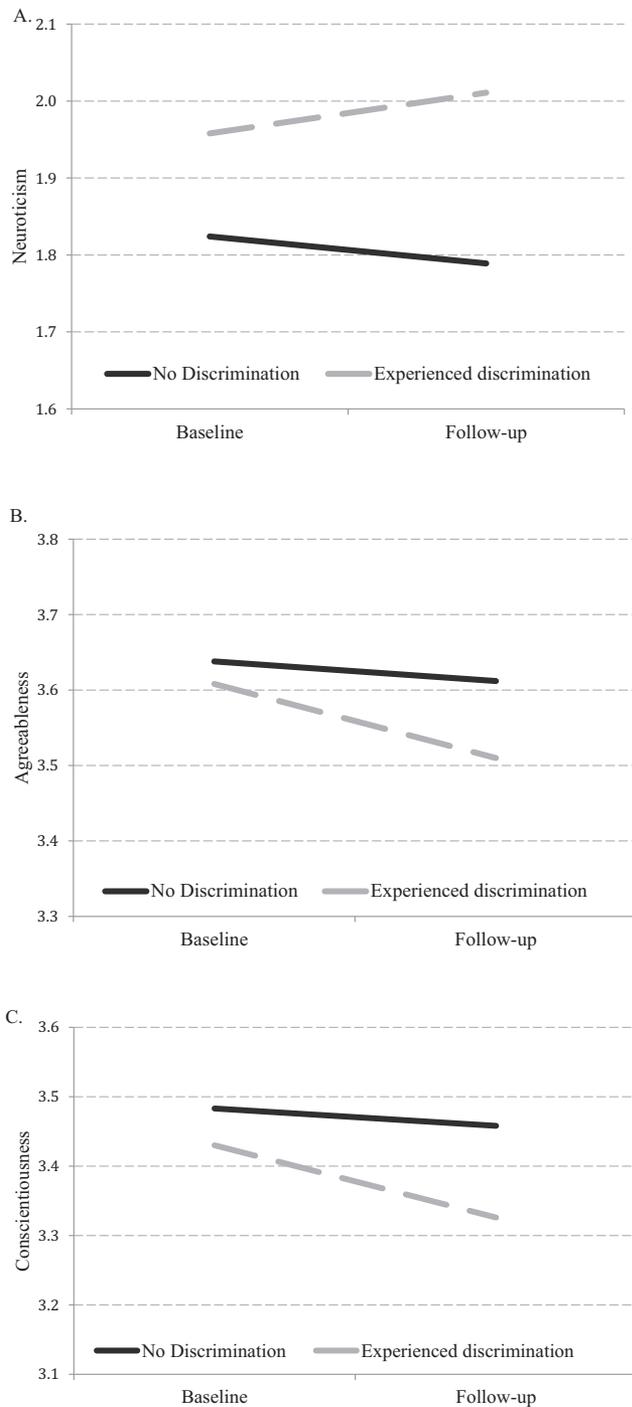


Figure 1. Change in neuroticism (A), agreeableness (B), and conscientiousness (C) by incident discrimination in the HRS.

Neither sex nor race moderated the association between discrimination and change in personality in HRS, and none of the demographic factors moderated the association between discrimination and change in personality in MIDUS.

In supplemental analyses, we examined whether attributions for discrimination were associated with change in personality (Table

S2 in the online supplemental material). From the HRS results, two patterns are worth noting. First, every attribution for discrimination was associated with increases in neuroticism, which suggested that unfair treatment, regardless of the reason, was associated with increases in the tendency to experience negative emotions. Second, discrimination based on age, weight, a physical disability, and appearance had similar personality change correlates (i.e., increases in neuroticism and declines in extraversion, openness, agreeableness, and conscientiousness), whereas the other attributions were largely unrelated to change in personality (except for neuroticism). In contrast to HRS, the attributions in MIDUS were largely unrelated to changes in personality. This lack of effect could be due, in part, to the relatively low prevalence of the attributions combined with the overall smaller sample size in MIDUS. We also tested whether the attributions for discrimination moderated the relation between discrimination and change in personality: Everyday discrimination was more detrimental to changes in conscientiousness among participants who had not experienced age discrimination ($\beta_{\text{interaction}} = .04$ and $.13$, respectively for HRS and MIDUS, both p values $< .05$).

Discussion

In two large samples of adults that differed in age and follow-up interval, experiences with perceived discrimination were associated with nonnormative personality development. Consistent with our hypotheses and across samples, participants who reported incident and chronic unfair treatment tended to increase in neuroticism and decline in agreeableness and conscientiousness across the follow-up period. There was less consistent evidence for the other two traits. Overall, the findings suggest that among middle-aged and older adults, those who perceive discrimination become more sensitive to negative emotions, less sympathetic, and less organized and disciplined over time. Unfair treatment is thus associated with long-term changes in trait psychological functioning. Similar to the effect of other unexpected life events on change in personality (Jeronimus, Ormel, Aleman, Penninx, & Riese, 2013), the effect of perceived discrimination was relatively modest but lasting and replicable.

As expected, in both samples, perceived discrimination was associated with increases in neuroticism and antagonism (i.e., declines in agreeableness). Individuals who perceive discrimination tend to decline in well-being (Schmitt et al., 2014) and report more symptoms of depression (Greene, Way, & Pahl, 2006). Over time, these acute increases in negative emotionality may contribute to a greater chronic dispositional proneness to feeling negative emotions (i.e., neuroticism). Similarly, the anger and hostility typically felt after being treated unfairly (Williams et al., 2012) may contribute to increases in a trait disposition toward antagonism (i.e., low agreeableness). Individuals who experience trauma also tend to increase in both their tendency to experience negative emotions, particularly anger, and their tendency to be argumentative (Löckenhoff et al., 2009). Like traumatic events, discrimination is unpredictable and uncontrollable, and just the threat of a discriminatory interaction is sufficient to elicit a cardiovascular stress response and negative emotions (Sawyer, Major, Casad, Townsend, & Mendes, 2012). Over time, these reactions may culminate in a greater susceptibility to negative emotions and greater vulnerability to stress.

Perceived discrimination was also associated with declines in conscientiousness. This association converges with related evidence that rejection, in general and specifically in regards to discrimination, is associated with reduced ability to self-regulate. Experimental evidence, for example, indicates that experiencing rejection (broadly defined) leads to decrements in self-regulation, including difficulty controlling one's behavior and persisting on a task (Baumeister, DeWall, Ciarocco, & Twenge, 2005). In addition, individuals who are experimentally manipulated to experience discrimination display more risk-taking behavior (Jamieson, Koslov, Nock, & Mendes, 2013). In more naturalistic contexts, experiences with perceived discrimination are associated with declines in self-control across adolescence (Gibbons et al., 2012). When navigating a hostile social environment, it may be difficult to focus on achievement and/or being productive. In addition, a large part of conscientiousness is about fitting in to society and adhering to social norms. If society rejects you, as in the case of discrimination, perhaps there is less motivation to conform to society's expectations.

The results were less consistent for extraversion and openness: Perceived discrimination was associated with declines in these two traits in HRS but not in MIDUS. Individuals who experience discrimination tend to report lower subjective well-being, and over time, such experiences may lead to less sensitivity to positive emotions. In addition, discrimination occurs in social settings, and more experiences with unfair treatment may lead to less interest in being around others and trying new things. The robustness of these findings is unclear, however, since they did not replicate in the MIDUS sample. The difference in associations between HRS and MIDUS may be due to many factors, including chance or age. It is also possible that discrimination may be associated with shorter-term declines in extraversion and openness, an effect that dissipated over the longer follow-up in the MIDUS sample.

In addition to the differences in extraversion and openness across the two samples, there were some differences in how discrimination was associated with the trajectory of the traits across the two samples. These differences may be due in part to the different developmental stages of the two samples. That is, there was an approximately 20-year mean difference in age between participants in HRS and MIDUS. Most of the traits do not follow a linear trajectory (Terracciano et al., 2005), and thus the same trait is expected to change in different ways during different developmental periods. The differences in the effect of discrimination on the trajectory are thus likely due to the different developmental stages of the samples rather than in how discrimination contributes to trait change. In addition to the age difference across the two samples, there were other demographic differences. We did control for demographic differences, as well as age, and found little evidence that the associations varied by either race or sex. It should be noted, however, that the pattern of attrition in both samples favored women and White participants. This pattern may have skewed the moderator analysis. The sample size for African Americans was relatively small, which also limited the power to detect potential race interaction effects. Thus, care should be taken when interpreting the relative lack of moderation by sex or race. There was also a difference in the follow-up interval between the two samples: there was a relatively brief interval between baseline and follow-up in HRS (4 years), whereas the interval was two and a half times longer in MIDUS (approximately 10 years). The mag-

nitude of the association between discrimination and change in neuroticism, agreeableness, and conscientiousness was stronger over the shorter follow-up interval and weaker over the longer follow-up. It may be that the association between discrimination and change in personality dissipates over time or that discrimination is associated with greater changes in these traits in older adulthood than middle adulthood. Indeed, older adults may be more vulnerable to the harmful effects of discrimination and over time may be more likely to come to resemble the negative stereotype of aging in terms of their characteristic ways of thinking, feeling, and behaving. Future research is needed to tease apart these possibilities. Despite these differences, however, it is of note that incident discrimination was associated with similar changes in three of the traits across two independent samples.

Unfair treatment, such as discrimination, has both physiological and social consequences that may contribute to change in personality. Some theories of personality development hypothesize that changes in personality are the result of biological factors. Although typically conceptualized as genetics, physiological responses, such as those associated with stressful experiences, may also be biological factors that contribute to change. Individuals who perceive discrimination, for example, have a stronger cardiovascular response (Smart Richman, Pek, Pascoe, & Bauer, 2010) and tend to have more chronic systemic inflammation (Sutin, Stephan, Luchetti, & Terracciano, 2014). Stress and inflammation may inhibit the regulation of both mood and behavior (Harrison et al., 2009) and, over time, may contribute to changes in the more stable aspects of psychological functioning.

There are also significant social consequences to discrimination that may contribute to personality change. Recent theorizing on personality development emphasizes how the social environment contributes to trait change across adulthood. Most of this theory and research has focused on age-graded normative developmental tasks, such as starting a family and establishing a career (e.g., Hutteman, Hennecke, Orth, Reitz, & Specht, 2014). Considerably less attention has been devoted to social stressors that threaten the individual's social position but that are not necessarily tied to specific life transitions or developmental tasks. The experience of discrimination is inherently social and a threat to belongingness (Smart Richman & Leary, 2009). The emotional and behavioral responses often elicited from these experiences may culminate over time in changes in trait psychological functioning. As such, social stressors may disrupt the "maturity principle," which states that personality development changes toward greater emotional stability, agreeableness, and conscientiousness.

Of note, the traits that appear to be the most sensitive to experiences with discrimination are also the ones that are the most commonly implicated in consequential health outcomes. Neuroticism and conscientiousness are associated with premature mortality (Chapman, Fiscella, Kawachi, & Duberstein, 2010) and are routinely implicated in worse health outcomes and declines in health over time (Sutin, Zonderman, Ferrucci, & Terracciano, 2013), as well as the trajectory of mental health (Soto, 2015). Antagonism (low agreeableness) has likewise been associated with declines in cardiovascular health (Sutin et al., 2010) and increased risk of cardiovascular mortality (Matthews, Gump, Harris, Haney, & Barefoot, 2003). The poor health outcomes associated with perceived discrimination (e.g., disease burden, loneliness; Sutin et al., 2015) may be partly through changes in dispositional traits

linked to health. Such a process may lead to double jeopardy and a vicious cycle for vulnerable populations.

The present study also suggests that certain personality traits are associated with who will report discrimination. In both HRS and MIDUS, participants who scored higher in neuroticism and lower in conscientiousness were more likely to report at follow-up that they experienced discrimination. There are a number of mechanisms that may contribute to these associations. First, individuals high in neuroticism and low in conscientiousness tend to evaluate situations negatively (Serfass & Sherman, 2013) and may thus be more likely to interpret ambiguous experiences in negative ways. That is, in an ambiguous social interaction, individuals high in neuroticism or low in conscientiousness may attribute a perceived negative interaction as discriminatory. Second, there are selection effects in personality (Friedman, 2000) such that individuals high in neuroticism or low in conscientiousness are less likely to avoid situations where discrimination is likely to occur. Finally, vulnerable people are often singled out as easy targets. Individuals high in neuroticism or low in conscientiousness may be particularly vulnerable to social attacks.

The present research has several strengths, including two large longitudinal samples that covered a substantial portion of the adult life span. There are also several limitations that could be addressed with future research. First, the associations were observed in samples of middle-aged and older adults. It would be worthwhile to address whether perceived discrimination has similar associations with personality change in younger adulthood. Second, we relied on self-reported discrimination. Although difficult to attain, future research could address whether there is a similar pattern with objectively verified discrimination. Third, the measure of discrimination did not specify a timespan. That is, some participants might have been thinking about their experiences over the last few weeks, whereas others might have been thinking about their experiences over the course of their lifetime. Thus, it is likely that the people who reported incident discrimination may have actually experienced discrimination in the past, but not around the time of the first assessment. In future research, it would be helpful to specify a timeframe for reporting such experiences. Fourth, the attrition analyses indicated that African Americans were more likely to not have follow-up data compared with White participants. Such attrition may have underestimated the association between discrimination and change in personality for African Americans. Future research needs to make a greater effort to retain African American participants in longitudinal studies. The potential effect of attrition on the pattern of results should also be kept in mind when interpreting the findings. Finally, future research could test the mechanisms (e.g., physiological, social) through which discrimination is associated with changes in personality. Despite these limitations, however, the present research indicates that unfair treatment is associated with changes in the personality traits that are most consequential for health. The findings suggest that unexpected negative social stressors, in addition to normative life events, contribute to the trajectory of personality traits in adulthood.

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