



Stress-related changes in personality: A longitudinal study of perceived stress and trait pessimism



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ABSTRACT

Although research has shown that certain aspects of personality can change over time, the determinants of such change remain unclear. Stress alters neural dynamics and precipitates disorders that shape personality traits involving negative affectivity. In this study, therefore, we assessed the perceived stress and pessimism levels of 332 young, middle-aged, and older adults for five weeks to examine how levels of stress and pessimism change and interrelate over time. The best fitting longitudinal model was a bivariate latent growth curve model, which indicated that stress and pessimism both changed and exhibited significant variability in change over time. Moreover, changes in stress were associated with changes in pessimism. Pessimism thus changes over time, with alterations in stress potentially structuring these changes.

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1. Introduction

Early research on personality largely conceptualized personality traits as relatively stable constructs that do not readily change over time (Costa & McCrae, 1988). In contrast with this historical view of personality, however, studies of personality occurring over the past few decades have produced substantial evidence that personality can change across time and development (e.g., Bleidorn, 2012; Bleidorn, Kandler, Riemann, Angleitner, & Spinath, 2009; Helson & Wink, 1992; Jayawickreme & Blackie, 2014; Roberts & Mroczek, 2008; Roberts, Walton, & Viechtbauer, 2006; Robins, Fraley, Roberts, & Trzesniewski, 2001). For example, in an influential meta-analysis of mean-level changes in personality traits across time, Roberts et al. (2006) found that social dominance, agreeableness, conscientiousness, and openness to experience increase from younger to upper-middle age in adulthood, whereas social vitality and neuroticism decrease over that same time period. Research has also shown that personality can fluctuate across shorter timescales

than years (Fleeson, 2001; Fleeson & Jayawickreme, 2015), with within-person changes in personality potentially occurring over days and representing more than just fluctuations in affect (Wilson, Thompson, & Vazire, 2016). Because changes in personality traits such as neuroticism and conscientiousness predict subsequent changes in health (Magee, Heaven, & Miller, 2013; Turiano et al., 2012) and even mortality (Mroczek & Spiro, 2007), it is important to understand factors that contribute to changes in personality over time. To date, however, these factors remain largely unknown.

Psychological stress is one process that may play a role in shaping personality, especially aspects of personality involving negative affectivity. Stressors are circumstances or situations that are perceived as threatening or challenging, or that exceed a person's ability to cope (Allen, Kennedy, Cryan, Dinan, & Clarke, 2014; Monroe & Slavich, 2016). Exposure to a stressor elicits subjective feelings of stress as well as a biological reaction known as the *stress response*, which includes upregulation of the hypothalamic–pituitary–adrenal axis, sympathetic nervous system, and innate immune system (Allen et al., 2014; Dickerson & Kemeny, 2004; Slavich, O'Donovan, Epel, & Kemeny, 2010; Steptoe, Hamer, & Chida, 2007). The characteristics that stressors possess can be important factors influencing

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the effects that such experiences have on individuals, but these effects are ultimately mediated by individuals' *stress appraisal* (Slavich & Cole, 2013). As an example, stressors perceived as highly threatening have been shown to trigger strong stress responses while those perceived as less threatening do so to a lesser degree (Denson, Spanovic, & Miller, 2009; Gaab, Rohleder, Nater, & Ehlert, 2005; Lebois, Hertzog, Slavich, Feldman Barrett, & Barsalou, 2016).

Time-limited stress responses may not affect health, but stress can also exert sustained effects on neural structure and function, including in brain regions that subserve representations of the self and others, social working memory, and threat perception (McEwen, 2007). As a result, stress has been implicated in the development of several highly recurrent and chronic forms of psychopathology, including anxiety disorders and depression (Slavich & Irwin, 2014), which can promote persistent changes in affective aspects of personality (Klein, Kotov, & Bufferd, 2011). Consistent with a hypothesized link between stress and personality, recent research has shown that major life transitions that occur infrequently over the life course, such as graduating from high school, can prompt changes in personality (e.g., Bleidorn, 2012). It is possible that more frequently occurring stressors, such as stressful interpersonal interactions and unexpected or threatening events, also lead to changes in affective aspects of personality, but to our knowledge this issue has not yet been examined.

The personality trait of pessimism may be particularly likely to be influenced by stress. Pessimism is distinct from optimism (Marshall, Wortman, Kusulas, Hervig, & Vickers, 1992; cf. Kam & Meyer, 2012), and it is possible to be highly pessimistic and highly optimistic at the same time (Benyamini, 2005). Pessimism is positively correlated with neuroticism and inversely correlated with other Big 5 personality traits, such as agreeableness and conscientiousness (Kam & Meyer, 2012). Pessimism in adulthood is predicted by self-esteem in early and late adolescence (Heinonen, Rääkkönen, & Keltikangas-Järvinen, 2005), and pessimism is predictive of numerous negative outcomes. For example, trait pessimism predicts delays in recovery following surgery (Bowley, Butler, Shaw, & Kingsnorth, 2003), disruption of social and leisure activities (Carver, Lehman, & Antoni, 2003), poorer quality of life in early-stage breast cancer patients (Carver et al., 1994), signs of biological aging including elevated inflammatory activity and telomere shortening (O'Donovan et al., 2009), and, finally, early mortality (Brummett, Helms, Dahlstrom, & Siegler, 2006; Schulz, Bookwala, Knapp, Scheier, & Williamson, 1996). Understanding how stress affects pessimism should thus be a high priority.

Prior research on links between stress and pessimism has been informative. For example, this work has revealed that levels of stress and pessimism are correlated (McCarthy, Cuskelly, van Kraayenoord, & Cohen, 2006). In addition, at least two studies that employed a common stressor approach found that pessimism levels in adult caregivers of children with attention deficit/hyperactivity disorder (ADHD; Baldwin, Brown, & Milan, 1995) or fragile X syndrome (McCarthy et al., 2006) are associated with the severity of these conditions, with worse ADHD symptoms and behavioral problems in children predicting greater pessimism in caregivers. Data like these suggest that changes in stress may be associated with changes in pessimism over time, but to our knowledge, this question has not been examined.

To address this issue, we recruited a large sample of young, middle-aged, and older adults from the community, and followed them longitudinally over five weeks. We selected this timeframe because daily assessments seemed too close in time for changes in stress to contribute to actual changes (rather than minor fluctuations) in levels of pessimism (cf. Wilson et al., 2016). Monthly assessments of these constructs would have also enabled us to test our hypotheses (below), but the limited resources we had to conduct this study would have only allowed us to perform two

monthly assessments, which would not have permitted us to conduct the most appropriate analyses of change. Therefore, each week for five weeks, we assessed participants levels of perceived stress and pessimism, which enabled us to model changes in these two factors over a five-week time period.

Based on the extant research described above, we hypothesized that changes in perceived stress would be associated with changes in pessimism during the five week study period. To test this hypothesis, we fit three models to the data to evaluate different potential patterns of association in the data over time. The models belonged to three classes: cross-lagged regression, multivariate latent growth curve, and multivariate latent difference score models. Cross-lagged regression models assess changes in rank ordering (i.e., relative position of an individual around the average) rather than changes in actual values or scores on a measure over time. Latent growth models assess changes in values over time, rather than assessing changes in rank ordering. Finally, latent difference score models go beyond latent growth curves by assessing both overall rates of change and time point-to-time point change. All of these models, however, allow for an examination of how changes in one variable relate to changes in another variable.

2. Method

2.1. Participants and procedure

To increase the potential for study findings to generalize across a broad age range, we recruited 332 young, middle, and older aged adults (124 male, 208 female) from college campuses and the surrounding community. Participants ranged in age from 16 to 79 years old ($M = 27.9$, $Median = 21$) at the beginning of the study, with the number of individuals per age group listed in Table 1. To recruit this convenience sample, each member of a 34-person research team generated a list of 10 acquaintances and invited them to participate in the study. A total of 340 individuals were thus initially contacted, of which 332 responded to this initial invitation. Each research team member was in turn responsible for sending weekly reminders to their participants to maximize participation and minimize attrition. Using this retention strategy, the number of participants completing Time 1, Time 2, Time 3, Time 4, and Time 5 measures were 327, 298, 287, 273, and 240, respectively. Participants completed the study measures (see below) each week for five consecutive weeks and were instructed to think about the previous week when responding to the items. All participants provided informed consent before beginning the study and all study procedures received Institutional Review Board approval prior to the start of the study.

2.2. Materials

2.2.1. Perceived stress

Participants' levels of perceived stress over the past week were assessed at each time point using the 10-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), which is the most

Table 1
Sample stratified by age.

Age	N
16–19	36
20–29	220
30–39	6
40–49	20
50–59	40
60–69	6
70–79	1

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