

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

## Journal of Research in Personality

journal homepage: [www.elsevier.com/locate/jrp](http://www.elsevier.com/locate/jrp)

## Characterizing stress processes by linking big five personality states, traits, and day-to-day stressors

Whitney R. Ringwald<sup>a,\*</sup>, Sienna R. Nielsen<sup>b</sup>, Janan Mostajabi<sup>b</sup>, Colin E. Vize<sup>a</sup>,  
Tessa van den Berg<sup>c</sup>, Stephen B. Manuck<sup>a</sup>, Anna L. Marsland<sup>a</sup>, Aidan G.C. Wright<sup>a,b</sup>

<sup>a</sup> University of Pittsburgh, United States

<sup>b</sup> University of Michigan, United States

<sup>c</sup> Utrecht University, United States

## ARTICLE INFO

## Keywords:

Big Five personality states  
Stress  
Health  
Multi-level modeling  
Ecological momentary assessment  
Personality processes  
Personality traits

## ABSTRACT

The accumulation of day-to-day stressors can impact mental and physical health. How people respond to stressful events is a key mechanism responsible for the effects of stress, and individual differences in stress responses can either perpetuate or prevent negative consequences. Most research on daily stress processes has focused on affective responses to stressors, but stress responses can involve more than just affect (e.g., behavior, cognitions). Additionally, most research has studied the role of neuroticism in shaping those responses, but many other individual differences are associated with stress. In this study, we more broadly characterized daily stress processes by expanding the nomological networks of stress responses to include Big Five personality states. We also linked those stress responses to all Big Five traits, as well as individual differences in stress variety, severity, and controllability. We studied a sample of participants ( $N = 1,090$ ) who reported on stressful events, their appraisal of events in terms of severity and controllability, and their Big Five personality states daily for 8–10 days ( $N = 8,870$  observations). Multi-level structural equation models were used to separate how characteristics of the perceived stressful situation and characteristics of the person play into daily stress processes. Results showed that (1) all Big Five personality states shift in response to perceived stress, (2) all Big Five personality traits relate to average levels of perceived stress variety, severity, and controllability, (3) individual differences in personality and average perceived stress variety and perceived severity relate to the strength of personality state responses to daily stress, albeit in a more limited fashion. Our results point to new pathways by which stressors affect people in everyday life and begin to clarify processes that may explain individual differences in risk or resilience to the harmful effects of stress.

### 1. Introduction

Day-to-day stressors and hassles can accumulate and take a toll on physical and mental health. A key mechanism linking daily stressors to health outcomes is the way people tend to respond to stress, including the thoughts, emotions, and behaviors elicited by an event (Bolger & Zuckerman, 1995; Cohen & Edwards, 1989; Lazarus & Folkman, 1984). Not everyone experiences the same amount of stress nor copes with stress in the same way, however, and individual differences in stress exposure and responses may determine whether a person is resilient to the effects of stress (Lazarus, 1984; Vollrath, 2001). Most research has focused on emotional reactions to stressors, and the role of neuroticism and psychiatric disorders, which provides a limited window into

potential stress-health mechanisms. In this study, we provide an expanded description of transactional stress processes by examining how Big Five personality states change in response to daily stressors and how these processes are shaped by features of the stressful event and by a range of individual differences, including all Big Five personality traits.

#### 1.1. Situation characteristics in daily stress processes

According to transactional stress models, the outcomes of stress are jointly influenced by characteristics of the stressful event and characteristics of the person (Almeida, 2005; Bolger & Zuckerman, 1995; Lazarus, 1966; Lazarus & Folkman, 1984). Different types of stressful

\* Corresponding author at: Department of Psychology, University of Pittsburgh, 4305 Sennott Square, 210 S. Bouquet St., Pittsburgh, PA 15260, United States.  
E-mail address: [wringwald@pitt.edu](mailto:wringwald@pitt.edu) (W.R. Ringwald).

<https://doi.org/10.1016/j.jrp.2024.104487>

Received 30 November 2022; Received in revised form 24 July 2023; Accepted 14 March 2024

Available online 15 March 2024

0092-6566/© 2024 Elsevier Inc. All rights reserved.

events naturally elicit particular responses (Rothstein et al., 2016); for example, a tight work deadline may elicit the response of buckling down and focusing on the project whereas an argument with a spouse may bring about distant and cold behavior toward them. In addition to “objective” characteristics of a stressor, like whether it is a work- or home-related event, the way a person *perceives* the event dictates how they respond to it (Fisher et al., 2019; Lazarus & Folkman, 1984). How people respond to stressors, in turn, leads to better or worse outcomes when accumulated over time. Events that are perceived as severely stressful or outside of one’s control typically result in feelings of distress and actions to self-regulate (Folkman, 1984; Lazarus, 1966; Rothstein et al., 2016). The actions people take to regulate their emotions, attention, and behavior in the face of stress may be benign or even beneficial in the short term, but those actions often have negative consequences in the long run (e.g., drinking alcohol, avoiding obligations, withdrawing from friends). A variety of stressors can also pile-up, with stressors in one domain of life leading to stressors in another domain, putting even further strain on a person’s psychological and physical well-being (Almeida, 2002; Fisher et al., 2019). For example, when people experience stressors at work, that stress may “carry-over” to their homelife and possibly create conflict with their family (Bakker et al., 2008; Martinez-Corts et al., 2015; Nicholson & Griffin, 2015). In the case of pile-up across domains, even low severity stressors may elicit strong reactions that lead to negative consequences (Frese & Zapf, 1994). Not all stressors have negative consequences, however. Stressors that are perceived as being within one’s control tend to result in engagement, motivation, and problem-solving actions (Bakker & Demerouti, 2007; Karasek, 1998; Troy et al., 2023). Thus, stressors perceived as controllable can result in a sense of personal growth, meaning, mastery, and other positive consequences in the short- and long-term (Litt, 1988; Rothbaum et al., 1982; Thompson, 1981).

Ambulatory assessment research provides evidence for some of these processes in everyday life. The vast majority of this work has focused on links between daily stressors and negative affect, which has consistently shown that people experience more negative emotion on days stressful events occur (Bolger et al., 1989; DeLongis et al., 1988; Diehl & Hay, 2013; Howland et al., 2017; Kaurin et al., 2021; Kiang & Buchanan, 2014; Leger et al., 2016; Mroczek & Almeida, 2004) and less positive affect (Blaxton & Bergeman, 2017; Dunkley et al., 2017; Leger et al., 2016; Nezlek & Allen, 2006; van Eck et al., 1998; Zatura et al., 2005) on days stressful events occur. Ambulatory assessment research in organizational psychology supports the benefits of controllable stressors, with studies showing a sense of control or challenge (an appraisal linked to perceived control; Folkman, 1984) increases work engagement in the face of stress (Kühnel et al., 2012; Tadić et al., 2015). A few studies have shown daily stress relates to engagement in specific coping strategies (e.g., problem-solving; DeLongis & Holtzman, 2005; Dunkley et al., 2017), health-related behaviors (e.g., alcohol use; Fleming et al., 2021), or specific symptoms (e.g., binge-eating; Goldschmidt et al., 2014), but overall, there is far less ambulatory research on the non-affective components of typical, day-to-day stress responses (i.e., thoughts, behaviors) despite their prominent theoretical role in the cumulative effects of stress. A broader mapping of how people tend to respond to stress will help identify mechanisms linking stress to health outcomes.

### 1.2. Individual differences in daily stress processes

Although *most* people feel distressed by daily hassles, albeit less so when those stressors are viewed as within their control, individual differences play a prominent role in these processes. In particular, there are individual differences in the exposure to stressful events, appraisals of stress, and the way people respond to stress, which influence the link between daily hassles and distress (Lazarus, 1984; Vollrath, 2001). Individual differences in exposure to more severe or controllable stressors may be due to the environment a person lives in (e.g., neighborhood quality) or due to personality traits such that a person tends to create

more (un)stressful situations (e.g., preventing or starting arguments) or select into (un)stressful situations (e.g., avoiding or taking risks) (Buss, 1987; Caspi & Roberts, 2001; Ickes et al., 1997). People may *perceive* stressors in general as being more severe or within their control, independent of the objective situation characteristics (Funder, 2006; Reis, 2008). People also differ in how they typically respond to stress or cope with stress (Lazarus, 2006; Moos & Holahan, 2003). Furthermore, because daily stress processes consist of reciprocal transactions between a person and the environment, chronic stress exposure may further reinforce individual differences in stress appraisals and responses over time. However, there are conflicting ideas about whether stress exposure makes people more or less resilient to stress (Fisher et al., 2019; Frese & Zapf, 1994). One perspective is that repeated or prolonged exposure to (perceived) stress will make people *more* sensitive to stressful events because these experiences lead to neurobiological and cognitive changes that reduce ones threshold for perceiving stress (e.g., kindling hypothesis; Post, 2007). Chronic stress may also make people *less* sensitive to current stressors because they habituate to stress or, alternatively, gain experience with coping (e.g., inoculation hypothesis; Meichenbaum, 1985). The kindling and inoculation hypotheses are not mutually exclusive, however, and both assume that individual differences in stress responses arise from cumulative stress exposure.

Broader individual differences, including the Big Five personality traits, also have robust associations with stress appraisals and responses. Considerable research has shown that people higher on neuroticism tend to perceive events as highly stressful and uncontrollable, whereas those higher on conscientiousness, extraversion, and openness tend to perceive such events as within their control (Ebstrup et al., 2011; Kaiseler et al., 2012; Luo et al., 2017, 2022). Presumably as a downstream effect of these differences in stress appraisal (in part), Big Five traits also relate to how people cope with stress. People higher on neuroticism generally use more avoidant, emotion-focused coping strategies in response to stress, whereas people higher on conscientiousness, extraversion, and openness engage in more problem-solving strategies, and people higher on agreeableness take advantage of social support (Carver & Connor-Smith, 2010; Connor-Smith & Flachsbart, 2007). These patterns of stress appraisal and coping in more or less adaptive ways, in turn, are theorized to partially account for the negative health outcomes associated with neuroticism, and relatively positive health outcomes associated with the other Big Five personality traits (Ferguson, 2013; Friedman, 2008; Hampson & Friedman, 2008).

Taken together, the between-person associations among Big Five personality traits and average stress exposure, stress appraisals, and coping responses hint at the mechanisms underlying differential health outcomes. Such cross-sectional associations can only show *who* tends to experience more or less stress, not *how* they respond to stressors in ways that are harmful or protective. Research using ambulatory assessment methods to link individual differences to these within-person processes provides more direct evidence for potential mechanisms. For example, individual differences in perceived control over stress has been found to dampen negative emotion reactivity to stressful events, consistent with the idea that viewing stress as a challenge is protective (Hay & Diehl, 2010; Neupert et al., 2007). To take another example, it has been found that people who report more overall daily stressors, more major life events, or live in stressful environments are more (van Eck et al., 1998) and less (Caspi, 1987) reactive to daily stress providing evidence for both the kindling and inoculation hypotheses.

Research on the mechanisms linking the Big Five traits to within-person stress processes have primarily focused on whether people higher in neuroticism and related traits and disorders (e.g., insecure attachment, anxiety, depression) have stronger negative affect reactions to stressors than most people. In support of this potential mechanism, a large body of work has shown that these traits do indeed relate to stronger negative affect responses to stressors (Bolger et al., 1989; Bolger & Zuckerman, 1995; Howland et al., 2017; Longua et al., 2009; Mroczek & Almeida, 2004; Myin-Germeys et al., 2009; Parrish et al.,

2011; Pearson et al., 2017; Zatura et al., 2005) but not always (see e.g., Hisler et al., 2020). Very few studies have examined whether other Big Five traits relate to negative affect responses to stress, and among those that have, the findings are less consistent. Different studies have shown that conscientiousness, extraversion, agreeableness, and openness amplify (Suls et al., 1998; Wrzus et al., 2021), dampen (Leger et al., 2016), or are unrelated (Kaurin et al., 2021; Leger et al., 2016) to negative affective responses to daily stress. Studies that have examined positive affect responses to daily stress suggest extraversion and neuroticism are unrelated to the strength of positive affect responses (Hisler et al., 2020; Kaurin et al., 2020) and agreeableness buffers against declines in positive affect on stressful days (Leger et al., 2016).

One reason there are inconsistencies and null results for traits other than neuroticism may be the near-exclusive focus on negative affect as a response to stress. The amplified uptick in negative affect may be a somewhat trait-specific response to stress—that is, although most people are a little more neurotic on stressful days, those higher on neuroticism react to stress by becoming even more neurotic than usual. Other possible stress responses such as becoming more socially withdrawn, impulsive, and quarrelsome than usual (Shields et al., 2016; Stanton et al., 2019; Taylor et al., 2000) may be more relevant to the other Big Five traits. To illustrate, maybe most people are careless and forgetful when they are stressed due to the acute effects on memory (Gagnon & Wagner, 2016), but trait conscientiousness may buffer this effect such that more conscientious people are not more careless or even become *more* thorough and organized to cope with stress (Carver & Connor-Smith, 2010). Alternatively, more conscientious people may find it especially difficult to maintain their usual level thoroughness and organization in the face of stress and thus respond with even sharper declines in conscientious behavior from what is typical for them. Despite these plausible pathways linking Big Five personality traits to stress outcomes, there is scant empirical evidence to support them. To begin understanding potential trait-specific pathways may require broadening the scope of study to include stress responses that more directly map onto the Big Five traits—not just affect.

### 1.3. Current study

In this study, we more comprehensively characterize daily stress processes by expanding the nomological networks of stress responses to include Big Five personality states. We conceptualize stress responses as *shifts in personality states* that encompass trait-related thoughts, emotions, and behaviors. From this perspective, we not only examined a wider range of stress responses than just affect, we also directly connected all Big Five traits to trait-relevant stress responses and shed light on potential mechanisms driving variation in risk and resilience.

We studied a sample of participants who reported on stressful events, their appraisal of events in terms of severity and controllability, and their Big Five personality states every day. This study design allowed us to evaluate how characteristics of the perceived stressful *situation* and characteristics of the *person* play into daily stress processes with higher granularity than most previous investigations focused on negative affect and neuroticism. There were four main aims of this study: (1) establish typical Big Five personality state shifts in response to perceived stressor variety, perceived severity, and perceived controllability, (2) replicate associations between Big Five personality traits and average perceived stressor variety, severity, and controllability using average personality states instead of global cross-sectional trait measures, (3) evaluate how Big Five personality traits (i.e., average personality states) relate to the strength of corresponding personality state stress responses, (4) evaluate how individual differences in perceived stressor variety, severity, and control (i.e., average levels) relate to the strength of personality state stress responses.

## 2. Methods

For our analyses, we combined three independent sub-samples that were administered the same personality state and stress assessments during similar daily diary protocols. The total sample size was 1,090 participants. Sample specific characteristics are described below. One previous study used the personality state data from these samples (Ringwald et al., 2021); however, this work did not examine associations between personality and the stress variables, and no other study has been published using the stress variables examined in the current study.

### 2.1. Participants

#### Sample 1

Sample 1 consisted of undergraduate students enrolled in introductory psychology courses at the University of Pittsburgh. The sample is mostly White (86 %; 10 % Asian, 6.5 % Black or African American)<sup>1</sup> and female (62 %) with a mean age of 18.6 ( $SD = 0.96$ ). The total  $N$  for Sample 1 was 330, and only the 321 participants who completed daily diaries were included in our analyses.

#### Sample 2

Participants in Sample 2 were community members recruited from posted flyers and online postings for a study on personality and daily life. For inclusion in the study, participants had to be between 18 and 40 years of age. Participants also had to be users of a smartphone running iOS or Android software. To recruit a distinct community sample, individuals were not eligible if they were enrolled in a full-time undergraduate program. All participants in Sample 2 were pre-screened to ensure a gender-balanced sample as well as adequate representation of personality traits of interest for the parent study on narcissism. Namely, the modesty facet scale of the NEO Personality Inventory – Revised (NEO-PI-R; Costa & McCrae, 2008) was used to assess participants during the pre-screening interview. Participants with modesty scores in the lower tertile were oversampled such that a 2:1:1 ratio of low, moderate, and high levels of modesty within each gender were recruited. Sample 2 is mostly White (89 %; 8.5 % Asian, 4.4 % Black or African American), balanced on gender (female = 52 %), with a mean age of 27.6 ( $SD = 4.9$ ). The total  $N$  for Sample 2 was 342, and only the 327 participants who completed daily diaries were included in our analyses.

#### Sample 3

Sample 3 was drawn from the University of Pittsburgh Adult Health and Behavior (AHAB) project. AHAB provides a registry of behavioral and biological measurements for the study of individual differences. Participants 30–54 years of age were recruited via mass-mail solicitation from communities of southwestern Pennsylvania in two periods of data collection (2001–2005; 2008–2011). At enrollment, participants were in good general health, without reported history of atherosclerotic cardiovascular disease, chronic kidney or liver disease, recent treatment for cancer, major neurological disorders, or psychotic illness (e.g., Manuck et al., 2010). Data used in the present analyses derive from the second wave of AHAB data collection, occurring roughly 11–16 years following subjects' initial participation. The sample is mostly White (85 %, 14 % African American, < 0.01 % Asian, < 0.01 % bi-racial), 54 % female, with an average age of 59.5 ( $SD = 7.2$ ). The total  $N$  for Sample 3 was 458, and the 442 participants who completed daily diaries were included in our analyses.

### 2.2. Procedure

#### Sample 1 and Sample 2

<sup>1</sup> Percentages add up to > 100% because participants in Sample 1 and Sample 2 could identify with more than one race.

Study procedures were nearly identical for Sample 1 and Sample 2. For both samples, participants completed baseline self-report questionnaires, then could elect to participate in the daily diary portion of the study. Orientation to the protocol and participation were conducted entirely online without direct contact with study staff. Participants in Sample 1 received course credit for completing the study. In Sample 2, participants who completed baseline questionnaires were entered into prize drawings for \$75 Amazon gift cards. For the daily diary portion, they received a \$100 Amazon gift card for completing 90 % or greater of the total surveys administered during the study period. Gift cards of prorated value (for example, \$75 was given for 75 % participation) were given to those who completed less than 90 % of surveys.

Baseline assessments included self-report questionnaires on personality and psychological functioning. Baseline data were collected and managed using Research Electronic Data Capture (REDCap) hosted at the University of Pittsburgh (Harris et al., 2009, 2019). REDCap is a secure, web-based software platform designed to support data capture for research studies supported by the Department of Biomedical Informatics (Clinical and Translational Sciences Institute at the University of Pittsburgh Grant Number UL1-TR-001857).

The daily diary portion of the study for Samples 1 and 2 lasted ten days. When participants chose to participate in the daily diary protocol, they viewed a video training presentation explaining the daily diary procedures and instructions for downloading the MetricWire smartphone application (MetricWire, Inc., 2019) used to administer surveys. A short comprehension quiz was given following the training to check for understanding. Failure to show adequate comprehension led to exclusion from further participation. Each daily survey was administered at 9 PM. Participants had three hours after the initial push notification to complete the end of day survey.

### Sample 3

The study procedures for Sample 3 involved several in-person lab sessions and a daily diary protocol outside of the lab. Participants were compensated \$150–250, depending on their participation in an ancillary brain imaging protocol. Other components of data collection included neurocognitive testing, assessments of social and demographic factors, and instrumented measurements of physical functioning and cardiometabolic risk factors. Because only data from self-report questionnaires were used for this study, procedures from other sessions will not be detailed further.

The daily diary portion of the study for Sample 3 lasted 8 days. Participants were provided electronic tablets to complete end-of-day surveys and received in-person training about the protocol. Daily surveys were completed in Qualtrics and included the same questions administered to Sample 1 and Sample 2.

## 2.3. Measures

### Personality States

Personality states were measured at the end of the day with 20 bipolar adjective items informed by those used in Fleeson (2001). For each item, participants indicated the extent to which two adjectives best described them in the past 24 h. Items were rated on a 7-point Likert scale. For example, to assess state Extraversion, participants rated whether “Talkative describes me extremely well” (1) to “Silent me describes extremely well” (7), with the mid-point indicating “Both describe me equally well.” The following four items were averaged to calculate each personality state subscale score: agreeableness (Stingy/Generous, Distrustful/Trustful, Cold/Warm, Rude/Polite), conscientiousness (Careless/Thorough, Lazy/Hardworking, Frivolous /Serious, Inefficient/Efficient), extraversion (Lethargic/Energetic, Silent/Talkative, Timid/Bold, Unassertive/Assertive), neuroticism (Secure/Insecure, Relaxed/Tense, At Ease/Nervous, Unexcitable/Excitable), openness (Unimaginative/Imaginative, Uninquisitive/Curious, Conventional/Creative, Imperceptive/Perceptive). Previous work has shown that these scales capture a similar nomological network as well-validated, cross-

sectional Big Five personality trait measures (Ringwald et al., 2021). Internal consistency (indexed by McDonald’s omega) for the scales ranged from 0.44 to 0.56 at the within-person level and 0.81–0.87 at the between-person level. Full internal consistency results are in the supplementary materials on OSF (<https://osf.io/ujvh9/>).

### Daily Stress

The occurrence of 7 stressful events was assessed using a self-report version of the Daily Inventory of Stressful Events (Almeida et al., 2002). Each of the following stressors on the checklist were presented with the stem “*In the last 24 h, ...*”: (1) argument/disagreement (“...*did you have an argument or disagreement with anyone?*”), (2) avoided argument (“...*did anything happen that you could have argued or disagreed about, but you decided to let it pass?*”), (3) work-related stress (“...*did anything happen in your workplace or volunteer setting that most people would consider stressful?*”), (4) home-related stress (“...*did anything happen at home that most people would consider stressful?*”), (5) health-related stress (“...*did anything stressful regarding your personal health?*”), (6) vicarious stress related to friend/relative (“...*did anything happen to someone close to you that turned out to be stressful for you?*”), and (7) other stress (“...*did anything else happen that most people would consider stressful?*”).

For each stressful event endorsed, participants reported on the perceived severity of the events and their control over the events. Severity was measured by answer to the item “How STRESSFUL was this event for you?” on a scale of 0 (*Not at All*) to 3 (*Very*). Control was measured by the item “How much CONTROL do you feel you had over this stressor?” on a scale of 0 (*None*) to 3 (*A Lot*).

## 2.4. Analytic plan

Preprocessing of data was completed in R Version 4.2.0 (R core Team, 2023) and analytic models were estimated in Mplus Version 8.8 (Muthén & Muthén, 2020).

We examined three variables related to perceptions of daily stress characteristics. While there is no consensus on how to operationalize daily stress (Wright et al., 2020), in this study we assumed that perceived stressful events have an additive effect such that the accumulation of stressors (regardless of how severe they are) could increase risk for negative outcomes, as will the cumulative severity of stress experienced on a given day (whether due to many minor stressors or one major stressor). In contrast, we do not assume the protective effects of perceived controllability over a stressful event depend on how many stressors were encountered. Instead, we assume the overall level of control across perceived stressors on a given day provides the beneficial sense of mastery. Accordingly, we used the self-reported daily stress items to calculate (1) *perceived stress variety* (sum of endorsed stressful events from different life domains reported each day), (2) *perceived stress severity* (sum of severity ratings on each day), and (3) *perceived control over stressors* (mean of control ratings on each day).

For our main analyses, we used multi-level structural equation models (MSEMs). All MSEMs used Bayesian estimation with non-informative priors that are default in Mplus. MSEMs account for the nested structure of the data (i.e., days within persons) by decomposing each daily scale into within and between-person latent variables. The between-person latent variable is a random intercept that reflects each person’s average levels of personality and perceived stress characteristics (i.e., stressor variety, severity, controllability). The within-person latent variable reflects fluctuations around a person’s average personality states and stress characteristics on a given day.

At the within-person level, we modeled responses to the three stress characteristics with daily stress variables predicting a personality state (e.g., the relation between stress severity and state agreeableness). Random slopes were also estimated. These random slope coefficients indicate the strength of association between personality states and the experience of daily stress, and individuals are allowed to vary in the strength of these associations. At the between-person level, we investigated individual differences in perceived stress experiences. To examine

associations between personality traits (i.e., average levels of personality states) and average perceived stress characteristics, we estimated correlations between the random intercepts for personality and the stress variables. To determine whether individual differences in personality and perceived stress characteristics relate to the strength of personality state stress responses, we correlated the random intercepts and random slopes (i.e., cross-level effects). We modeled each pair of stress/personality variables separately resulting in 15 MSEM (3 stress variables x 5 personality state/traits).

All participants and observations were included in models of perceived stressor variety and severity ( $N = 1,090$  participants; 8,870 observations). On days that zero stressful events were reported, we imputed zeros for ratings of perceived stress severity. For models of perceived control, we only included observations in which a stressful event was reported ( $N = 974$  participants; 3,416 observations). This is because unlike perceived stress severity, we could not make informed assumptions about the level of perceived control on days without stressors.

Because Bayesian estimation was used, our inferences were made from point estimates drawn from the posterior distribution and associated 95 % credibility intervals. We considered parameter coefficients to be significantly different from zero if the 95 % credibility interval did not include zero.

### 3. Results

All codebooks, analysis code, and data needed to reproduce our analyses are available on the OSF page for this study (<https://osf.io/ujvh9/>). The OSF page also includes full model outputs for readers interested in the non-focal results from our main models reported in the manuscript. Prior to presenting results from our main analyses, we highlight several, noteworthy descriptive statistics and analyses supporting the construct validity of the variables used.

#### 3.1. Descriptive statistics

Descriptive statistics are reported in Table 1. First, the frequency of the stressful event categories shows that stressful events are common, with stressors reported on 39 % of the study days. The most common stressors were arguments and avoided arguments. Despite differences in developmental stage (e.g., college students vs. midlife adults) and other demographics (e.g., Sample 2 was oversampled for low modesty), very similar frequencies of stress event types were reported across sub-

**Table 1**  
Descriptive statistics for study variables.

Daily variable	Mean (SD)	ICC
Perceived stress variety	0.58 (0.89)	0.30
Perceived stress severity	1.10 (1.97)	0.35
Perceived control over stressor	1.66 (1.12)	0.50
Agreeableness	5.14 (1.00)	0.63
Conscientiousness	4.78 (1.03)	0.58
Extraversion	4.50 (1.00)	0.59
Neuroticism	3.50 (0.96)	0.58
Openness	4.66 (0.98)	0.66
<b>Stress events by category</b>	<b># Observations</b>	<b>% Total stressors</b>
Avoided argument	1089	12.27
Argument/disagreement	1027	11.58
Work-related stress	939	10.59
Home-related stress	613	6.91
Health-related stress	535	6.03
Other stress	512	5.77
Vicarious stress to friend/relative	413	4.66

Note.  $N = 1,090$  participants,  $N = 8,870$  total daily observations,  $n = 3416$  observations with stressors reported. ICC = intraclass correlation coefficient.

samples (these results are reported in the supplementary materials on OSF).

Second, in line with transactional stress models, the intraclass correlation coefficients (ICCs) confirm that stressor characteristics are influenced by both the situation (within-person effects) and the person (between-person effects). ICCs quantify the proportion of between-person variance in each variable; thus, these results show that perceived stress variety and severity are more situation-dependent than trait-like (i.e., more within-person than between-person variance), whereas perceived control was equally dependent on situation and person characteristics, with an ICC closer to those for personality than stressor variety or severity.

Third, bivariate correlations among the stress variables help to characterize how stress is experienced on a given day versus when it is accumulated over time. Perceived stressor variety and severity were strongly, positively correlated at both the within- ( $r = 0.87$ ) and between-person levels ( $r = 0.91$ ). This is expected mathematically given that both variables were calculated by summing across daily events, and it is expected conceptually because experiencing stressful events in multiple areas of one's life would understandably lead to higher levels of perceived stress. Perceived control was significantly, negatively correlated with both stressor variety ( $r = -0.04$ ) and severity ( $r = -0.06$ ) at the within-person level. There was a different pattern of correlations with control at the between-person level—it was negatively correlated with variety ( $r = -0.13$ ), but uncorrelated with severity ( $r = 0.02$ ). These results indicate that although people feel less control over stressors when they are more severe (within-person effect), people who generally view stressors as controllable do not experience less severe stress overall (between-person effect). Additionally, the differential associations with control provide evidence that stressor variety and severity are capturing different constructs to some degree.

#### 3.2. Correlations between stress event categories and personality states (within-person effects) and traits (between-person effects)

To evaluate the construct validity of our measures, we explored the correlations between individual stress event categories and the Big Five at both the within- and between-person levels (Table 2). Here we found evidence supporting theoretically consistent specificity in personality state responses to stress and in the associations between traits and types of stressors experienced on average. At the within-person level, people reported being more neurotic than usual on days that they experienced any type of stressor. Additionally, on days people reported having an argument or avoiding an argument, they reported lower agreeableness, on days with work-related stress they reported higher conscientiousness, and both health-related and home-related stressors appeared to be more domain-general stressors with people reporting decreases in all four of the more "adaptive" personality states. Days with vicarious stress related to a friend were only correlated with reporting higher neuroticism.

At the between-person level, people who reported more of any stress category on average were higher on neuroticism, like at the within-person level, but the pattern of results for the remaining traits was different. People who reported more arguments overall were lower on agreeableness, conscientiousness, and openness, whereas those who reported avoiding more arguments were only lower on agreeableness. People who reported more overall home-related stress and vicarious stress related to friends were lower on extraversion; those who reported more health-related stress were lower on agreeableness and extraversion; and those who reported more work-related stress overall were only higher on neuroticism, but were no more or less conscientious (in contrast to the within-person correlations).

#### 3.3. Big five personality state responses to stress (within-person effects)

Results for the MSEM testing our main study aims are in Tables 3-5. The within-person slopes reflect the sample average personality state

**Table 2**  
Correlations between specific stressors and Big Five personality states and traits.

Within-person correlations					
Stressor	Personality state	<i>r</i>	95 % CI		<i>p</i> -value
Argument/ disagreement	<b>Agreeableness</b>	<b>-0.10</b>	-0.12	-0.08	0.000
	Conscientiousness	0.01	-0.02	0.03	0.600
	Extraversion	-0.02	-0.05	0.00	0.160
	<b>Neuroticism</b>	<b>0.13</b>	0.10	0.15	0.000
	Openness	0.00	-0.03	0.02	0.700
Avoided argument/ disagreement	<b>Agreeableness</b>	<b>-0.04</b>	-0.07	-0.02	0.000
	Conscientiousness	0.01	-0.01	0.04	0.480
	Extraversion	-0.02	-0.04	0.00	0.080
	<b>Neuroticism</b>	<b>0.06</b>	0.03	0.08	0.000
	Openness	0.01	-0.02	0.03	0.600
Health-related stress	<b>Agreeableness</b>	<b>-0.05</b>	-0.08	-0.03	0.000
	<b>Conscientiousness</b>	<b>-0.05</b>	-0.07	-0.02	0.000
	<b>Extraversion</b>	<b>-0.08</b>	-0.10	-0.06	0.000
	<b>Neuroticism</b>	<b>0.07</b>	0.05	0.09	0.000
	<b>Openness</b>	<b>-0.06</b>	-0.08	-0.04	0.000
Home-related stress	<b>Agreeableness</b>	<b>-0.04</b>	-0.06	-0.01	0.000
	Conscientiousness	-0.01	-0.03	0.02	0.560
	<b>Extraversion</b>	<b>-0.06</b>	-0.08	-0.04	0.000
	<b>Neuroticism</b>	<b>0.11</b>	0.09	0.14	0.000
	<b>Openness</b>	<b>-0.03</b>	-0.06	-0.02	0.000
Vicarious stress to friend	Agreeableness	-0.01	-0.04	0.01	0.500
	Conscientiousness	0.01	-0.01	0.04	0.220
	Extraversion	-0.01	-0.04	0.01	0.140
	<b>Neuroticism</b>	<b>0.04</b>	0.02	0.06	0.000
	Openness	0.00	-0.03	0.01	0.600
Work-related	Agreeableness	-0.03	-0.05	0.00	0.020
	<b>Conscientiousness</b>	<b>0.09</b>	0.07	0.12	0.000
	Extraversion	0.01	-0.02	0.03	0.520
	<b>Neuroticism</b>	<b>0.13</b>	0.11	0.15	0.000
	Openness	0.00	-0.02	0.02	0.960
Between-person correlations					
Stressor	Personality trait	<i>r</i>	95 % CI		<i>p</i> -value
Argument/ disagreement	<b>Agreeableness</b>	<b>-0.14</b>	-0.23	-0.05	0.000
	Conscientiousness	-0.10	-0.18	-0.01	0.040
	Extraversion	-0.04	-0.13	0.03	0.300
	<b>Neuroticism</b>	<b>0.20</b>	0.11	0.28	0.000
	<b>Openness</b>	<b>-0.09</b>	-0.19	-0.01	0.020
Avoided argument/ disagreement	<b>Agreeableness</b>	<b>-0.10</b>	-0.17	-0.02	0.040
	Conscientiousness	-0.06	-0.16	0.02	0.160
	Extraversion	-0.08	-0.15	0.01	0.080
	<b>Neuroticism</b>	<b>0.14</b>	0.04	0.21	0.000
	Openness	-0.06	-0.13	0.04	0.400
Health-related stress	<b>Agreeableness</b>	<b>-0.11</b>	-0.16	-0.04	0.000
	Conscientiousness	-0.09	-0.19	0.01	0.100
	<b>Extraversion</b>	<b>-0.16</b>	-0.23	-0.10	0.000
	<b>Neuroticism</b>	<b>0.20</b>	0.12	0.27	0.000
	Openness	-0.06	-0.14	0.00	0.040
Home-related stress	Agreeableness	-0.08	-0.15	0.01	0.080
	Conscientiousness	-0.07	-0.17	0.00	0.020
	<b>Extraversion</b>	<b>-0.13</b>	-0.21	-0.03	0.040
	<b>Neuroticism</b>	<b>0.24</b>	0.15	0.33	0.000
	Openness	-0.03	-0.14	0.03	0.360

**Table 2 (continued)**

Within-person correlations					
Stressor	Personality state	<i>r</i>	95 % CI		<i>p</i> -value
Vicarious stress to friend	Agreeableness	-0.06	-0.13	0.03	0.140
	Conscientiousness	-0.08	-0.16	0.00	0.060
	<b>Extraversion</b>	<b>-0.09</b>	-0.16	-0.01	0.040
	<b>Neuroticism</b>	<b>0.16</b>	0.07	0.23	0.000
	Openness	-0.03	-0.11	0.06	0.540
Work-related	Agreeableness	-0.01	-0.08	0.11	0.920
	Conscientiousness	0.04	-0.06	0.15	0.400
	Extraversion	0.00	-0.11	0.07	0.980
	<b>Neuroticism</b>	<b>0.16</b>	0.07	0.24	0.000
	Openness	-0.01	-0.10	0.07	0.780

Note. *N* = 1,090 participants; 8,870 observations. Parameters for each personality trait/state are from separate multi-level structural equation models. CI = credibility interval. Bold parameters have credibility intervals that do not contain zero.

**Table 3**

Key parameters for perceived stress variety.

	$\beta$ / <i>r</i>	95 % CI		<i>p</i> -value
Association between among stress variety and Big Five personality states (within-person effects)				
stress variety → agreeableness	<b>-0.11</b>	-0.13	-0.07	0.000
stress variety → conscientiousness	0.03	0.00	0.06	0.020
stress variety → extraversion	<b>-0.06</b>	-0.09	-0.04	0.000
stress variety → neuroticism	<b>0.24</b>	0.21	0.26	0.000
stress variety → openness	<b>-0.03</b>	-0.06	-0.01	0.010
Correlations between Big Five traits and average stress variety (between-person effects)				
agreeableness*stress variety	<b>-0.13</b>	-0.22	-0.07	0.000
conscientiousness*stress variety	<b>-0.11</b>	-0.19	-0.02	0.000
extraversion*stress variety	<b>-0.13</b>	-0.19	-0.06	0.000
neuroticism*stress variety	<b>0.28</b>	0.21	0.34	0.000
openness*stress variety	<b>-0.08</b>	-0.15	-0.01	0.040
Correlations between Big Five traits and stress responses (cross-level effects)				
agreeableness*stress variety → agreeableness	<b>-0.14</b>	-0.26	-0.04	0.010
conscientiousness*stress variety → conscientiousness	0.02	-0.13	0.13	0.720
extraversion*stress variety → extraversion	0.09	-0.07	0.20	0.220
neuroticism*stress variety → neuroticism	0.15	0.00	0.36	0.064
openness*stress variety → openness	-0.15	-0.28	0.01	0.066
Correlations between average stress variety and stress responses (cross-level effects)				
stress variety*stress variety → agreeableness	0.07	-0.03	0.19	0.170
stress variety*stress variety → conscientiousness	0.05	-0.07	0.14	0.440
stress variety*stress variety → extraversion	0.06	-0.07	0.19	0.220
stress variety*stress variety → neuroticism	<b>-0.21</b>	-0.32	-0.09	0.004
stress variety*stress variety → openness	0.06	-0.08	0.22	0.306

Note. *N* = 1,090 participants; 8,870 observations. Parameters for each personality trait/state are from separate multi-level structural equation models. → = random slope, \* = correlation, stress variety = number of perceived stressful events per day, Big Five traits = random intercept of personality state, average stress variety = random intercept for stress variety, CI = credibility interval. Bold parameters have credibility intervals that do not contain zero.

**Table 4**  
Key parameters for perceived stress severity.

	$\beta / r$	95 % CI		p-value
<b>Association between stress severity and Big Five personality states (within-person effects)</b>				
severity → agreeableness	<b>-0.15</b>	-0.17	-0.07	0.000
severity → conscientiousness	0.03	0.00	0.06	0.080
severity → extraversion	<b>-0.09</b>	-0.12	-0.06	0.000
severity → neuroticism	<b>0.30</b>	0.26	0.33	0.000
severity → openness	<b>-0.06</b>	-0.10	-0.03	0.000
<b>Correlations between Big Five traits and average stress severity (between-person effects)</b>				
agreeableness*severity	<b>-0.10</b>	-0.14	-0.03	0.000
conscientiousness*severity	-0.02	-0.10	0.06	0.420
extraversion*severity	-0.09	-0.15	0.00	0.040
neuroticism*severity	<b>0.21</b>	0.14	0.28	0.000
openness*severity	-0.04	-0.10	0.04	0.240
<b>Correlations between Big Five traits and stress responses (cross-level effects)</b>				
agreeableness*severity → agreeableness	-0.06	-0.19	0.07	0.340
conscientiousness*severity → conscientiousness	0.08	-0.07	0.20	0.380
extraversion*severity → extraversion	0.10	-0.02	0.21	0.100
neuroticism*severity → neuroticism	0.13	-0.03	0.24	0.086
openness*severity → openness	-0.06	-0.19	0.07	0.420
<b>Correlations between average stress severity and stress responses (cross-level effects)</b>				
severity*severity → agreeableness	<b>0.12</b>	0.01	0.19	0.000
severity*severity → conscientiousness	-0.04	-0.16	0.05	0.560
severity*severity → extraversion	0.03	-0.06	0.12	0.580
severity*severity → neuroticism	<b>-0.20</b>	-0.31	-0.08	0.000
severity*severity → openness	0.04	-0.08	0.16	0.550

Note.  $N = 1,090$  participants; 8,870 observations. Parameters for each personality trait/state are from separate multi-level structural equation models.  $\rightarrow$  = random slope, \* = correlation, severity = perceived severity of stressors, Big Five traits = random intercept of personality state, average stress severity = random intercept for stress severity, CI = credibility interval. Bold parameters have credibility intervals that do not contain zero.

responses to different stressor characteristics (i.e., fixed effects). These results show that on days people perceived stressors in more areas of their life (Table 3), and on days stressors were perceived as being more severe (Table 4), they reported higher neuroticism and lower agreeableness, extraversion, and openness than usual. The stressor variety  $\rightarrow$  state conscientiousness and severity  $\rightarrow$  state conscientiousness slopes were positive but on the boundary of our threshold for significance (i.e., lower bound of the 95 % credibility interval = 0). The strongest association for both perceived stressor variety and severity was with state neuroticism.

Switching to effects for control (Table 5), except for conscientiousness, personality state responses to perceived control over stressors were in the opposite direction of stressor variety/severity; on days people perceived more control over stressors, they reported lower neuroticism and higher agreeableness, extraversion, openness than usual and they reported higher conscientiousness. Control had the strongest association with state extraversion. Importantly, the variances of every random slope were significant indicating there are individual differences in the strength of stress responses that may be explained by Big Five traits or average perceived stress characteristics (full results in the supplementary materials on OSF).

**Table 5**  
Key parameters for perceived control over stressors.

	$\beta / r$	95 % CI		p-value
<b>Association between control and Big Five personality states (within-person effects)</b>				
control → agreeableness	<b>0.07</b>	0.03	0.11	0.002
control → conscientiousness	<b>0.06</b>	0.03	0.10	0.000
control → extraversion	<b>0.11</b>	0.07	0.15	0.000
control → neuroticism	<b>-0.08</b>	-0.12	-0.04	0.000
control → openness	<b>0.08</b>	0.04	0.12	0.004
<b>Correlations between Big Five traits and average control (between-person effects)</b>				
agreeableness*control	<b>0.26</b>	0.18	0.35	0.000
conscientiousness*control	<b>0.45</b>	0.38	0.52	0.000
extraversion*control	<b>0.51</b>	0.43	0.57	0.000
neuroticism*control	<b>-0.59</b>	-0.65	-0.54	0.000
openness*control	<b>0.34</b>	0.26	0.40	0.000
<b>Correlations between Big Five traits and stress responses (cross-level effects)</b>				
agreeableness*control → agreeableness	-0.15	-0.36	0.03	0.138
conscientiousness*control → conscientiousness	<b>-0.36</b>	-0.72	-0.09	0.010
extraversion*control → extraversion	-0.13	-0.40	0.08	0.250
neuroticism*control → neuroticism	-0.01	-0.16	0.13	0.876
openness*control → openness	0.02	-0.19	0.36	0.856
<b>Correlations between average control and stress responses (cross-level effects)</b>				
control*control → agreeableness	0.05	-0.24	0.35	0.698
control*control → conscientiousness	-0.26	-0.59	0.22	0.178
control*control → extraversion	-0.16	-0.40	0.15	0.250
control*control → neuroticism	-0.19	-0.35	0.00	0.054
control*control → openness	-0.06	-0.26	0.18	0.700

Note.  $N = 974$  participants; 3,416 observations. Parameters for each personality trait/state are from separate multi-level structural equation models.  $\rightarrow$  = random slope, \* = correlation, control = perceived control over stressors, Big Five traits = random intercept of personality state, average control = random intercept for perceived control over stressors, CI = credibility interval. Bold parameters have credibility intervals that do not contain zero.

**3.4. Correlations between big five personality traits and average perceived stress characteristics (between-person effects)**

Correlations among the random intercepts are akin to cross-sectional associations between personality traits and average stress appraisals, except that we estimated Big Five traits from average personality states. Overall, the pattern of results was similar to what has been found with global self-report measures of the Big Five. People higher on agreeableness, conscientiousness, extraversion, and openness, and those lower on neuroticism, reported less stressor variety and more control over stressors. Correlations among the Big Five and perceived control-lability were considerably stronger than with stressor variety (median  $r = |0.45|$  versus  $|0.13|$ ). There were fewer correlations with perceived severity; only people higher on agreeableness reported less severe stressors on average and those high on neuroticism reported more severe stressors.

**3.5. Correlations between big five personality traits and stress responses (cross-level effects)**

Correlations between the random intercepts and random within-person slopes show whether Big Five traits relate to the strength of corresponding personality state responses to perceived stress. Overall, there were few significant, cross-level correlations. For those correlations that were significant, we conducted simple slopes analyses to aid interpretation (full results and plots are in the supplementary materials

on OSF). The significant correlation between the agreeableness intercept (between-person variable) and stress  $\rightarrow$  state agreeableness slope (within-person effect) indicates that people higher on trait agreeableness are more disagreeable on days when stressful events piled up compared to days with fewer different stressful events relative to most people, whereas people lower in agreeableness differ less in their disagreeableness when stress piles up (cross-level effect). The correlation between the conscientiousness intercept (between-person variable) and control  $\rightarrow$  state conscientiousness slope (within-person effect) indicates that people lower on trait conscientiousness are more conscientious on days with more controllable stressors compared to days with less controllable stressors relative to people higher in conscientiousness (cross-level effect).

### 3.6. Correlations between average perceived stress characteristics and stress responses (cross-level effects)

Although there were very few significant effects, some individual differences in stress exposure and perceived severity were also related to the strength of stress responses. The correlation between the stress variety intercept (between person variable) and variety  $\rightarrow$  state neuroticism slope (within-person effect) indicates that people who tend to experience stressful events in many areas of their life increase less in neuroticism on more stressful days compared to less stressful days relative to most people (cross-level effect). Correlations between the severity intercept (between-person variable) and severity  $\rightarrow$  state agreeableness and severity  $\rightarrow$  state neuroticism slopes (within-person effects) suggest that people who tend to perceive more severe stressors increase less on neuroticism and disagreeableness on more stressful days compared to less stressful days relative to most people (cross-level effects).

### 3.7. Sensitivity analyses

We conducted two sets of analyses to test the robustness of our results. First, to evaluate the degree of heterogeneity across samples, we conducted sample-specific analyses. Of the 60 effects tested per sample, 51 % replicated (i.e., the estimate's sign and statistical significance, defined as estimates with credibility intervals that did not contain zero, were the same) in all three samples and an additional 17 % replicated in two samples. Many of the effects that were significant in the pooled sample, but not in an individual sample, appear to be due to loss of precision from the smaller sample sizes. The issue of precision is evident in cases that a non-significant effect in an individual sample were of a magnitude that reached significance in pooled sample. The overall pattern of results was similar in every sample. Full sample-specific results are reported in the supplemental materials.

Second, given the significant correlations between personality states (median  $r_{\text{within-person}} = |0.29|$ , median  $r_{\text{between-person}} = |0.60|$ ; full correlations presented in the supplementary materials on OSF) we tested the extent to which the personality state/trait associations with stress were accounted for by shared variance with the other states/traits. For these analyses, we estimated the random slopes for all five personality states on a given stress variable in the same model, and allowed all random slopes and intercepts to correlate. Every effect of interest at the within- and between-person level remained significant, suggesting that the associations with stress are not due to the shared variance among personality states/traits.

## 4. Discussion

In this study, we sought to understand everyday transactional stress processes by characterizing effects of the situation perceptions, the person, and the links between them. We examined how Big Five personality states change in response to perceived stressful situations, relations between Big Five personality traits and overall stressor variety

and appraisals, and whether individual differences relate to the strength of personality state stress responses. Our results point to new pathways by which stress may impact us from day to day and begin to specify processes that explain individual differences in risk or resilience to the harmful effects of stress.

### 4.1. Typical personality state responses to daily stress characteristics

Our results give new meaning to the idea people are “not themselves” when they are stressed – all Big Five personality states change on days that stressful events occur. These personality states cover major domains of thinking, feeling, and behaving to provide a fuller picture of typical stress responses, engaging a broader swath of functioning beyond just affect. On days stressors piled up across different areas of a person's life, and on days stressors seemed especially severe, people tended to report being more tense, insecure, rude, stingy, distrustful, lethargic, timid, and unimaginative than usual. When people experience stress, they not only feel distressed, but they also act in ways that could create interpersonal problems, and they become socially, behaviorally, and intellectually disengaged. In contrast, on days people are confronted with stressors that seem more within their control, they tended to be more secure, generous, warm, energetic, bold, and creative than usual. This pattern of results reinforces how a stressful event can lead to divergent outcomes depending on how stressful events are perceived and how controllable they feel.

It is important to contextualize the size of these within-person effects. The occasional stressful event is part of the natural ebb and flow of everyday life and being a little grumpier and edgier than usual is unlikely to have a lasting impact on health. Rather, it is when people experience many minor stressors over time that these small effects can accumulate and produce negative outcomes. Thus, the “small” effect size of stress on personality states (median  $\beta = 0.08$  aggregated over eight days in this study) makes conceptual sense and these small effects add up or even multiply over time through reciprocal transactions between a person and their environment. For example, being grumpy towards a friend on a stressful day is par for the course, but if someone repeatedly experiences stressors day after day, that grumpiness may lead to more frequent squabbles that produce more stress and more disagreeableness that slowly erode their social supports and make them more vulnerable to stressors, and so on (e.g., Hammen, 1991; Santee et al., 2023). Likewise, regularly taking on manageable stressors and experiencing upticks in energy, security, diligence, and connectedness with others may lead to a sense of mastery that emboldens a person to take on more challenges that then could open up opportunities for growth in the long run.

### 4.2. Individual differences in daily stress processes

In addition to the role of situation characteristics, our study also provides insights into how a person's characteristics shape stress processes. We extended previous work on relations between Big Five personality traits measured by global, cross-sectional measures and stress by replicating these associations with Big Five traits estimated from daily personality states. Our between-person results were largely consistent with previous work in showing people high on neuroticism tend to experience stressors across multiple life domains and perceive them as more severe and out of their control, whereas people high on agreeableness, conscientiousness, extraversion, and openness tend to experience fewer stressors and generally perceive them as within their control. In contrast to previous studies (Luo et al., 2022), we found that only neuroticism and agreeableness (but not conscientiousness, extraversion, and openness) were correlated with average perceived stress severity. The discrepancy could be due to sampling variability. It may also be due to using different methods of assessing traits given evidence that averaged Big Five personality states capture somewhat distinct constructs from cross-sectional Big Five trait measures (Rauthmann et al., 2019; Ringwald et al., 2021). If our results are replicable, future



work investigating the reasons for differences across methods could provide insights into stress processes—for example, perhaps global trait assessments tap characteristic appraisal styles or aspects of identity that daily measures do not that have a distinct role in a person's ability to manage stress.

Regardless of why our findings diverged from previous work, the differential associations between stressor variety and severity imply that there are different processes underlying the experience of there being stressors in multiple areas of one's life versus appraisals of severity. Low stress variety—which could be due to a tendency to select into fewer stressful situations, create fewer stressful situations, and/or have a high threshold for what is perceived as a stressful event—appears to be general protective factor (i.e., associated with adaptive trait levels). Experiencing stress events as less stressful *when they occur* (either objectively or perceived), on the other hand, may be a protective factor uniquely conferred by emotional stability and agreeableness.

To open the black box linking Big Five personality traits to average levels of stress, we also investigated whether the Big Five traits relate to individual differences in trait-relevant daily stress responses (cross-level effects). Most traits were not significantly related to the strength of stress responses, with two exceptions. First, we found that more agreeable people are more disagreeable on stressful days than their usual relative to most people. People higher on trait agreeableness are still more generous and warm *relative to most people* (between-person effect), even on a stressful day, but their behavior changes *relative to their usual levels* of agreeableness more dramatically than it does for others (within-person effect). Viewed from another angle, this result indicates that more disagreeable people's interpersonal behavior does not change as much when they are stressed—they are their usual, grumpy selves. The fact that this amplification effect was only found for agreeableness suggests that high levels of interpersonal self-regulation may be particularly difficult to maintain when confronted with stressors, compared to functioning within other trait domains.

The second relation between a Big Five trait and trait-relevant stress responses was that people low on conscientiousness experience even greater increases in conscientiousness when they encounter controllable stressors compared to most people (cross level effect). This result suggests that people low on conscientiousness may benefit the most from feeling in control of stressors. On the reverse side, another way to think about this result is that people high on conscientiousness do not experience the same increases in conscientiousness that most people have when they feel in control of stressors. This may imply that more conscientious people feel in control of most stressors. Another interpretation is that more conscientious people are less sensitive to the controllability of stress, perhaps because they approach all stressors—regardless of their characteristics—with thoroughness and efficiency. Such a consistent manner of tackling day-to-day stressors could help explain how this trait buffers against the negative outcomes of stress. Taken in this light, these results are in line with Beckmann and colleagues (2010) finding that when managers experience more negative emotions they also behave more conscientiously, presumably because they are dealing with work stress. A potential implication of this result is that finding ways to increase a sense of personal control could be an especially powerful health intervention for people with problems related to trait disinhibition, such as overeating or harmful alcohol use.

Given the extensive literature on neuroticism and stress reactivity, the lack of cross-level association between trait neuroticism and neurotic responses to stress in our study is worth noting. This may be due to differences in how trait neuroticism was measured (i.e., averaged states vs. global cross-sectional measure). Another possibility is that because state neuroticism captures a broader construct than negative affect (the within-person  $r \sim 0.33$  between state neuroticism and negative affect in this sample; Ringwald et al., 2022), the “reactivity” of trait neuroticism may not extend to the less affective components of neuroticism (e.g., security, excitableness). In support of this latter possibility, the one other study to examine state neuroticism as a response to

daily stress similarly failed to find a moderating effect of trait neuroticism (Judge et al., 2014). Deciding on the appropriate level of analysis for a given study question (i.e., broad or narrow variables) is well-trodden territory for trait constructs, and our results reinforce that this issue is just as relevant for understanding state-level stress responses.

In addition to the Big Five traits, we examined whether individual differences in perceived stressor variety, severity, and controllability relate to daily stress responses (cross-level effects). There are opposing hypotheses in the literature about whether experiencing more stress overall will make people more or less reactive to stressors when they occur (i.e., “kindling” vs. “inoculation” hypotheses). Our results are more consistent with the so-called inoculation hypothesis; we found that people who tend to experience stressors in many areas of their life reported smaller upticks in neuroticism on days that stressors piled-up, and that people who tend to perceive more severe stressors likewise reported smaller increases in neuroticism and smaller decreases in agreeableness on stressful days. Our study elaborates on previous work showing that stress exposure relates to negative affective reactivity in finding associations with specific personality state responses. These results imply that exposure to stressors in multiple domains or to more severe perceived stressors over time makes people specifically less emotionally and interpersonally reactive to stressors, but does not “inoculate” against the typical decreases in openness and extraversion experienced on more stressful days.

#### 4.3. Implications

By examining Big Five constructs at within-person, between-person, and across levels, our study directly linked daily stress responses to personality traits and provides a more complete picture of how person-situation transactions might play out. Putting it all together, our results suggest that most personality traits do not serve as risk or resilience factors because they amplify or buffer harmful trait-relevant stress responses (cross-level effects)—rather, it may be? that the normative change in one's baseline personality state following a stressor is less impactful for people high on the corresponding trait because their baseline is higher. Thus, although the relative shift in personality state is similar regardless of trait standing (within-person effects), the absolute level of that state will be higher for someone with a higher baseline of the trait. To illustrate, extraversion may be negatively correlated with stressor variety because when someone high on this trait experiences the typical decrease in state extraversion on a stressful day, they are still more energetic and assertive than most people, which may protect against the sort of avoidant behaviors that cause stressors to pile up and permeate multiple domains of life (e.g., not returning an important phone call, not asking a roommate to pay their half of rent).

Expanding the nomological network of stress responses beyond negative affect revealed potential pathways by which stress affects health that have received little if any attention in the literature. For example, a major puzzle in clinical science has been understanding how daily stressors contribute to the development of depression (Hammen, 1991; Liu & Alloy, 2010; Stroud et al., 2008). Given that low mood is a core symptom of depression, negative affect reactivity to stress has been studied and supported as one piece of the puzzle (O'Neill et al., 2004; Wichers et al., 2007; 2009). However, anhedonia is another core depressive symptom with distinct correlates and prognosis from mood symptoms (Vrieze & Claes, 2009; Wardenaar et al., 2012), and the dips in energy and social/intellectual engagement (i.e., state extraversion, agreeableness, and openness) may be another set of processes that cause and maintain depression.

Studying stress responses other than negative affect will be necessary for a truly mechanistic understanding of how stress shapes health outcomes. Emotions only have an indirect effect in the transactional cycles of stress because it is the downstream *behavior* a person engages in that actually influences their environment and people around them (Furr, 2009). Given the known behavioral manifestations of Big Five traits, our

results provide a roadmap for the types of stress response behaviors to be studied in future work. Of the more novel avenues of research would be exploring the association between state openness and stress. Do people tend to disengage from leisure or hobbies when stressed? Are people less productive at work when stressed because they cannot think as creatively or come up with new ideas (Binnewies & Wörnlein, 2011)? In addition to behavior, there may be biological pathways related to personality that could link emotions to health outcomes. For example, neuroticism, extraversion, and conscientiousness predict cortisol levels, a biomarker for stress adaptation (Erickson et al., 2021). Identifying concrete behavioral and biological responses to stress is not only necessary to explain the long-term effects of stress, but such mediators would provide optimal targets for mental and physical health interventions.

#### 4.4. Limitations and future directions

There are some limitations of our study that can inform future research. First, because we relied on self-reports of stress events and personality states, we were unable to separate effects of “objective” stress exposure or stress responses from people’s subjective appraisals of them. This confound of stimulus and response pervades much of the stress literature, and clarifying the distinct mechanisms of situation selection, stress generation, appraisals, and coping responses will require multi-method study designs capable of disentangling these sources of variance. One approach could be using multiple raters of the same situation. This would allow researchers to separately examine stressors operationalized by their socially consensual interpretation (i.e., interrater agreement) and idiosyncratic appraisals of stress (i.e., person-specific residual). Another approach would be using passive sensing methods to assess aspects of the objective environment (e.g., GPS location, ambient noise) or of a person’s stress responses (e.g., physical activity detected by an accelerometer, social engagement assessed by phone activity) (see e.g., DaSilva et al., 2019; Weber et al., 2022). Perhaps the most challenging mechanism to study is situation selection given that it is difficult to measure what people did *not* do from day-to-day. This remains a pressing and vexing methodological issue for stress research moving forward.

A second limitation is that because stress events and personality states were both measured at the end of each day, we could not establish the precise temporal ordering and stress and personality state changes. We primarily conceptualized personality state shifts as a *response* to stress, but from a transactional perspective, we assume that personality state shifts also *cause* stressful events. At minimum, our results establish that stress and personality states covary from day-to-day suggesting that they are functionally related, and which is consistent with either or both directions of causality. Ambulatory assessment designs with denser sampling of personality states (e.g., multiple times within a day) are needed to track their trajectory before and after a stressful event occurs to clarify these processes. It would also be informative to specify the long-term trajectories of perceived stress and personality state dynamics to better understand which situation and person characteristics determine whether stress leads to better or worse outcomes. Some questions at this time scale could be: Do the effects on how a person responds to stressors of a chronically stressful environment (e.g., a workplace, neighborhood) resolve once the stressor is removed (e.g., due to changing jobs, moving) or persist (Fisher et al., 2019; Frese & Zapf, 1994)? Does the repeated expression of personality state responses to a chronically stressful environment lead to changes in personality traits over time (Wrzus et al., 2021)? Do individual differences in the strength of personality state responses to stress (i.e., reactivity) accelerate the cumulative effects of stress? Connecting daily stress response patterns to processes unfolding at longer time scales would provide a more direct test of many theoretical mechanisms linking daily stress to distal outcomes.

## 5. Conclusion

Our physical and mental health is shaped by our day-to-day experiences of stress. We showed that personality states shift to adapt to stressors and that there are individual differences in these processes that could explain why some people are more resilient or vulnerable to the effects of stressful events.

This research was supported by grants from the National Institute on Alcohol Abuse and Alcoholism (F31 AA030500), National Institute on Aging (R01 AG056043), National Institute of Diabetes and Digestive and Kidney Diseases (R01 DK110041), and the University of Pittsburgh’s Clinical and Translational Science Institute, which is funded by the National Institutes of Health Clinical and Translational Science Award program (UL1 TR001857). The opinions expressed are solely those of the authors and not those of the funding source.

#### CRediT authorship contribution statement

**Whitney R. Ringwald:** Conceptualization, Writing – original draft, Formal analysis. **Sienna R. Nielsen:** Conceptualization, Writing – review & editing. **Janan Mostajabi:** . **Colin E. Vize:** Conceptualization, Writing – review & editing. **Tessa van den Berg:** Conceptualization, Writing – review & editing. **Stephen B. Manuck:** Writing – review & editing, Resources, Funding acquisition. **Anna L. Marsland:** Writing – review & editing, Resources, Funding acquisition. **Aidan G.C. Wright:** Conceptualization, Writing – review & editing, Supervision, Resources, Funding acquisition.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### References

- Almeida, D. M. (2005). Resilience and vulnerability to daily stressors assessed via diary methods. *Current Directions in Psychological Science*, 14(2), 64–68. <https://doi.org/10.1111/j.0963-7214.2005.00336.x>
- Almeida, D. M., Wethington, E., & Kessler, R. C. (2002). The daily inventory of stressful events: An interview-based approach for measuring daily stressors. *Assessment*, 9(1), 41–55. <https://doi.org/10.1177/1073191102091006>
- Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology*, 22(3), 309–328. <https://doi.org/10.1108/02683940710733115>
- Bakker, A. B., Demerouti, E., & Dollard, M. F. (2008). How job demands affect partners’ experience of exhaustion: Integrating work-family conflict and crossover theory. *Journal of Applied Psychology*, 93(4), 901–911. <https://doi.org/10.1037/0021-9010.93.4.901>
- Binnewies, C., & Wörnlein, S. C. (2011). What makes a creative day? A diary study on the interplay between affect, job stressors, and job control. *Journal of Organizational Behavior*, 32(4), 589–607. <https://doi.org/10.1002/job.731>
- Blaxton, J. M., & Bergeman, C. S. (2017). A process-oriented perspective examining the relationships among daily coping, stress, and affect. *Personality and Individual Differences*, 104, 357–361. <https://doi.org/10.1016/j.paid.2016.08.041>
- Bolger, N., DeLongis, A., Kessler, R. C., & Schilling, E. A. (1989). Effects of daily stress on negative mood. *Journal of Personality and Social Psychology*, 57(5), 808–818. <https://doi.org/10.1037/0022-3514.57.5.808>
- Bolger, N., & Zuckerman, A. (1995). A framework for studying personality in the stress process. *Journal of Personality and Social Psychology*, 69(5), 890–902.
- Buss, D. M. (1987). Selection, evocation, and manipulation. *Journal of Personality and Social Psychology*, 53(6), 1214–1221. <https://doi.org/10.1037//0022-3514.53.6.1214>
- Carver, C. S., & Connor-Smith, J. (2010). Personality and coping. *Annual Review of Psychology*, 61(1), 679–704. <https://doi.org/10.1146/annurev.psych.093008.100352>
- Caspi, A. (1987). Personality in the life course. *Journal of Personality and Social Psychology*, 53(6), 1203–1213. <https://doi.org/10.1037/0022-3514.53.6.1203>
- Caspi, A., & Roberts, B. W. (2001). Personality development across the life course: The argument for change and continuity. *Psychological Inquiry*, 12(2), 49–66. [https://doi.org/10.1207/S15327965PLI1202\\_01](https://doi.org/10.1207/S15327965PLI1202_01)
- Cohen, S., & Edwards, J. R. (1989). In *Personality characteristics as moderators of the relationship between stress and disorder* (pp. 235–283). Wiley.

- Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: A meta-analysis. *Journal of Personality and Social Psychology*, 93(6), 1080–1107. <https://doi.org/10.1037/0022-3514.93.6.1080>
- Costa, P. T., & McCrae, R. R. (2008). The Revised NEO Personality Inventory (NEO-PI-R). In *The SAGE Handbook of Personality Theory and Assessment: Volume 2—Personality Measurement and Testing* (pp. 179–198). SAGE Publications Ltd.. <https://doi.org/10.4135/9781849200479.n9>
- DaSilva, A. W., Huckins, J. F., Wang, R., Wang, W., Wagner, D. D., & Campbell, A. T. (2019). Correlates of stress in the college environment uncovered by the application of penalized generalized estimating equations to mobile sensing data. *JMIR MHealth and UHealth*, 7(3), e12084.
- DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. *Journal of Personality and Social Psychology*, 54(3), 486–495. <https://doi.org/10.1037/0022-3514.54.3.486>
- DeLongis, A., & Holtzman, S. (2005). Coping in context: The role of stress, social support, and personality in coping. *Journal of Personality*, 73(6), 1633–1656. <https://doi.org/10.1111/j.1467-6494.2005.00361.x>
- Diehl, M., & Hay, E. L. (2013). Personality-related risk and resilience factors in coping with daily stress among adult cancer patients. *Research in Human Development*, 10(1), 47–69. <https://doi.org/10.1080/15427609.2013.760259>
- Dunkley, D. M., Lewkowski, M., Lee, I. A., Preacher, K. J., Zuroff, D. C., Berg, J.-L., Foley, J. E., Myhr, G., & Westreich, R. (2017). Daily stress, coping, and negative and positive affect in depression: Complex trigger and maintenance patterns. *Behavior Therapy*, 48(3), 349–365. <https://doi.org/10.1016/j.beth.2016.06.001>
- Ebstrup, J. F., Eplöv, L. F., Pisinger, C., & Jørgensen, T. (2011). Association between the Five Factor personality traits and perceived stress: Is the effect mediated by general self-efficacy? *Anxiety, Stress & Coping*, 24(4), 407–419. <https://doi.org/10.1080/10615806.2010.540012>
- Erickson, T. M., Jacobson, S. V., Banning, R. L., Quach, C. M., & Reas, H. E. (2021). Big five traits and interpersonal goals during stressors as predictors of hair cortisol. *Comprehensive Psychoneuroendocrinology*, 8, Article 100084. <https://doi.org/10.1016/j.cpnec.2021.100084>
- Ferguson, E. (2013). Personality is of central concern to understand health: Towards a theoretical model for health psychology. *Health Psychology Review*, 7(Suppl 1), S32–S70. <https://doi.org/10.1080/17437199.2010.547985>
- Fisher, D. M., Ragsdale, J. M., & Fisher, E. C. S. (2019). The importance of definitional and temporal issues in the study of resilience. *Applied Psychology*, 68(4), 583–620. <https://doi.org/10.1111/apps.12162>
- Fleming, M. N., Wycoff, A. M., Hepp, J., Griffin, S. A., Helle, A. C., Freeman, L. K., Vebares, T. J., & Trull, T. J. (2021). A daily-life study of interpersonal stressors and alcohol use in individuals with borderline personality disorder and community controls. *Drug and Alcohol Dependence*, 228, Article 109021. <https://doi.org/10.1016/j.drugalcdep.2021.109021>
- Folkman, S. (1984). Personal control and stress and coping processes: A theoretical analysis. *Journal of Personality and Social Psychology*, 46(4), 839–852.
- Frese, Z. D., & Zapf, D. (1994). Methodological issues in the study of work stress: Objective vs subjective measurement of work stress and the question of longitudinal studies. In *Causes, coping and consequences of stress at work* (pp. 375–411). John Wiley & Sons.
- Friedman, H. S. (2008). The multiple linkages of personality and disease. *Brain, Behavior, and Immunity*, 22(5), 668–675. <https://doi.org/10.1016/j.bbi.2007.09.004>
- Funder, D. C. (2006). Towards a resolution of the personality triad: Persons, situations, and behaviors. *Journal of Research in Personality*, 40(1), 21–34. <https://doi.org/10.1016/j.jrp.2005.08.003>
- Furr, R. M. (2009). Personality psychology as a truly behavioural science. *European Journal of Personality*, 23(5), 369–401. <https://doi.org/10.1002/per.724>
- Gagnon, S. A., & Wagner, A. D. (2016). Acute stress and episodic memory retrieval: Neurobiological mechanisms and behavioral consequences: Acute stress and episodic memory retrieval. *Annals of the New York Academy of Sciences*, 1369(1), 55–75. <https://doi.org/10.1111/nyas.12996>
- Goldschmidt, A. B., Wonderlich, S. A., Crosby, R. D., Engel, S. G., Lavender, J. M., Peterson, C. B., Crow, S. J., Cao, L., & Mitchell, J. E. (2014). Ecological momentary assessment of stressful events and negative affect in bulimia nervosa. *Journal of Consulting and Clinical Psychology*, 82(1), 30–39. <https://doi.org/10.1037/a0034974>
- Hammen, C. (1991). Generation of stress in the course of unipolar depression. *Journal of Abnormal Psychology*, 100(4), 555–561. <https://doi.org/10.1037/0021-843X.100.4.555>
- Hampson, S. E., & Friedman, H. S. (2008). Personality and health: A lifespan perspective. In *Handbook of personality: Theory and research* (pp. 770–794). The Guilford Press.
- Harris, P. A., Taylor, R., Minor, B. L., Elliott, V., Fernandez, M., O'Neal, L., McLeod, L., Delacqua, G., Delacqua, F., Kirby, J., & Duda, S. N. (2019). The REDCap consortium: Building an international community of software platform partners. *Journal of Biomedical Informatics*, 95, Article 103208. <https://doi.org/10.1016/j.jbi.2019.103208>
- Harris, P. A., Taylor, R., Thielke, R., Payne, J., Gonzalez, N., & Conde, J. G. (2009). Research electronic data capture (REDCap)—A metadata-driven methodology and workflow process for providing translational research informatics support. *Journal of Biomedical Informatics*, 42(2), 377–381. <https://doi.org/10.1016/j.jbi.2008.08.010>
- Hay, E. L., & Diehl, M. (2010). Reactivity to daily stressors in adulthood: The importance of stressor type in characterizing risk factors. *Psychology and Aging*, 25(1), 118–131. <https://doi.org/10.1037/a0018747>
- Hisler, G. C., Krizan, Z., DeHart, T., & Wright, A. G. C. (2020). Neuroticism as the intensity, reactivity, and variability in day-to-day affect. *Journal of Research in Personality*, 87, Article 103964. <https://doi.org/10.1016/j.jrp.2020.103964>
- Howland, M., Armeli, S., Feinn, R., & Tennen, H. (2017). Daily emotional stress reactivity in emerging adulthood: Temporal stability and its predictors. *Anxiety, Stress, & Coping*, 30(2), 121–132. <https://doi.org/10.1080/10615806.2016.1228904>
- Ickes, W., Snyder, M., & Garcia, S. (1997). Personality influences on the Choice of Situations. In *Handbook of Personality Psychology* (pp. 165–195). Elsevier. <https://doi.org/10.1016/B978-012134645-4/50008-1>
- Judge, T. A., Simon, L. S., Hurst, C., & Kelley, K. (2014). What I experienced yesterday is who I am today: Relationship of work motivations and behaviors to within-individual variation in the five-factor model of personality. *Journal of Applied Psychology*, 99(2), 199–221. <https://doi.org/10.1037/a0034485>
- Kaiseler, M., Polman, R. C. J., & Nicholls, A. R. (2012). Effects of the Big Five personality dimensions on appraisal coping, and coping effectiveness in sport. *European Journal of Sport Science*, 12(1), 62–72. <https://doi.org/10.1080/17461391.2010.551410>
- Karasek, R. A. (1998). Demand/Control Model: A social, emotional, and physiological approach to stress risk and active behaviour development. In *Encyclopaedia of Occupational Health And Safety* (p. 34.06-34.14).
- Kaurin, A., Wright, A. G. C., & Kamarck, T. W. (2021). Daily stress reactivity: The unique roles of personality and social support. *Journal of Personality*, 89(5), 1012–1025. <https://doi.org/10.1111/jopy.12633>
- Kiang, L., & Buchanan, C. M. (2014). Daily stress and emotional well-being among Asian American adolescents: Same-day, lagged, and chronic associations. *Developmental Psychology*, 50(2), 611–621. <https://doi.org/10.1037/a0033645>
- Kühnel, J., Sonnentag, S., & Bledow, R. (2012). Resources and time pressure as day-level antecedents of work engagement: Day-level JD-R model. *Journal of Occupational and Organizational Psychology*, 85(1), 181–198. <https://doi.org/10.1111/j.2044-8325.2011.02022.x>
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. McGraw Hill.
- Lazarus, R. S. (1984). *On the primacy of cognition*.
- Lazarus, R. S. (2006). Emotions and Interpersonal Relationships: Toward a Person-Centered Conceptualization of Emotions and Coping. *Journal of Personality*, 74(1), 9–46. <https://doi.org/10.1111/j.1467-6494.2005.00368.x>
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. Springer.
- Leger, K. A., Charles, S. T., Turiano, N. A., & Almeida, D. M. (2016). Personality and stressor-related affect. *Journal of Personality and Social Psychology*, 111(6), 917–928. <https://doi.org/10.1037/pspp0000083>
- Litt, M. D. (1988). Self-efficacy and perceived control: Cognitive mediators of pain tolerance. *Journal of Personality and Social Psychology*, 54(1), 149–160. <https://doi.org/10.1037/0022-3514.54.1.149>
- Liu, R. T., & Alloy, L. B. (2010). Stress generation in depression: A systematic review of the empirical literature and recommendations for future study. *Clinical Psychology Review*, 30(5), 582–593. <https://doi.org/10.1016/j.cpr.2010.04.010>
- Longua, J., DeHart, T., Tennen, H., & Armeli, S. (2009). Personality moderates the interaction between positive and negative daily events predicting negative affect and stress. *Journal of Research in Personality*, 43(4), 547–555. <https://doi.org/10.1016/j.jrp.2009.02.006>
- Luo, J., Derringer, J., Briley, D. A., & Roberts, B. W. (2017). Genetic and Environmental Pathways Underlying Personality Traits and Perceived Stress: Concurrent and Longitudinal Twin Studies. *European Journal of Personality*, 31(6), 614–629. <https://doi.org/10.1002/per.2127>
- Luo, J., Zhang, B., Cao, M., & Roberts, B. W. (2022). The Stressful Personality: A Meta-Analytical Review of the Relation Between Personality and Stress. *Personality and Social Psychology Review: An Official Journal of the Society for Personality and Social Psychology, Inc.* 10888683221104002. DOI: 10.1177/10888683221104002.
- Manuck, S. B., Phillips, J. E., Gianaros, P. J., Flory, J. D., & Muldoon, M. F. (2010). Subjective Socioeconomic Status and Presence of the Metabolic Syndrome in Midlife Community Volunteers. *Psychosomatic Medicine*, 72(1), 35–45. <https://doi.org/10.1097/PSY.0b013e3181c484dc>
- Martinez-Corts, I., Demerouti, E., Bakker, A. B., & Boz, M. (2015). Spillover of interpersonal conflicts from work into nonwork: A daily diary study. *Journal of Occupational Health Psychology*, 20(3), 326–337. <https://doi.org/10.1037/a0038661>
- Meichenbaum, D. (1985). *Stress inoculation training*. Pergamon.
- Moos, R. H., & Holahan, C. J. (2003). Dispositional and contextual perspectives on coping: Toward an integrative framework. *Journal of Clinical Psychology*, 59(12), 1387–1403. <https://doi.org/10.1002/jclp.10229>
- Mroczek, D. K., & Almeida, D. M. (2004). The Effect of Daily Stress, Personality, and Age on Daily Negative Affect. *Journal of Personality*, 72(2), 355–378. <https://doi.org/10.1111/j.0022-3506.2004.00265.x>
- Muthén, L., & Muthén, B. (2020). *Mplus (8.5)*. [Computer software].
- Myin-Germeys, I., Oorschot, M., Collip, D., Lataster, J. D., Delespaul, P., & van Os, J. (2009). Experience sampling research in psychopathology: Opening the black box of daily life. *Psychological Medicine*, 39(9), 1533–1547. <https://doi.org/10.1017/S0033291708004947>
- Neupert, S. D., Almeida, D. M., & Charles, S. T. (2007). Age differences in reactivity to daily stressors: The role of personal control. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, 62(4), P216–P225. <https://doi.org/10.1093/geronb/62.4.P216>
- Nezlek, J. B., & Allen, M. R. (2006). Social support as a moderator of day-to-day relationships between daily negative events and daily psychological well-being. *European Journal of Personality*, 20(1), 53–68. <https://doi.org/10.1002/per.566>
- Nicholson, T., & Griffin, B. (2015). Here today but not gone tomorrow: Incivility affects after-work and next-day recovery. *Journal of Occupational Health Psychology*, 20(2), 218–225. <https://doi.org/10.1037/a0038376>
- O'Neill, S. C., Cohen, L. H., Tolpin, L. H., & Gunther, K. C. (2004). Affective reactivity to daily interpersonal stressors as a prospective predictor of depressive symptoms. *Journal of Social and Clinical Psychology*, 23(2), 172–194. <https://doi.org/10.1521/jscp.23.2.172.31015>

- Parrish, B. P., Cohen, L. H., & Laurenceau, J.-P. (2011). Prospective relationship between negative affective reactivity to daily stress and depressive symptoms. *Journal of Social and Clinical Psychology, 30*(3), 270–296. <https://doi.org/10.1521/jscp.2011.30.3.270>
- Pearson, C. M., Lavender, J. M., Cao, L., Wonderlich, S. A., Crosby, R. D., Engel, S. G., Mitchell, J. E., Peterson, C. B., & Crow, S. J. (2017). Associations of borderline personality disorder traits with stressful events and emotional reactivity in women with bulimia nervosa. *Journal of Abnormal Psychology, 126*(5), 531–539. <https://doi.org/10.1037/abn0000225>
- Post, R. M. (2007). Kindling and sensitization as models for affective episode recurrence, cyclicity, and tolerance phenomena. *Neuroscience & Biobehavioral Reviews, 31*(6), 858–873. <https://doi.org/10.1016/j.neubiorev.2007.04.003>
- R core Team. (2023). *R: A language and environment for statistical computing*. Vienna, Austria: [Computer software]. Version 4.
- Reis, H. T. (2008). Reinvigorating the concept of situation in social psychology. *Personality and Social Psychology Review, 12*(4), 311–329. <https://doi.org/10.1177/1088868308321721>
- Ringwald, W. R., Manuck, S. B., Marsland, A. L., & Wright, A. G. C. (2021). Psychometric evaluation of a big five personality state scale for intensive longitudinal studies. *Assessment, 107319112110082*. <https://doi.org/10.1177/10731911211008254>
- Rothbaum, F., Weisz, J. R., & Snyder, S. S. (1982). Changing the world and changing the self: A two-process model of perceived control. *Journal of Personality and Social Psychology, 42*(1), 5–37. <https://doi.org/10.1037/0022-3514.42.1.5>
- Rothstein, M. G., McLarnon, M. J. W., & King, G. (2016). The role of self-regulation in workplace resiliency. *Industrial and Organizational Psychology, 9*(2), 416–421. <https://doi.org/10.1017/iop.2016.32>
- Santee, A. C., Rnic, K., Chang, K. K., Chen, R. X., Hoffmeister, J.-A., Liu, H., LeMoult, J., Dozois, D. J. A., & Starr, L. R. (2023). Risk and protective factors for stress generation: A meta-analytic review. *Clinical Psychology Review, 103*, Article 102299. <https://doi.org/10.1016/j.cpr.2023.102299>
- Shields, G. S., Sazma, M. A., & Yonelinas, A. P. (2016). The effects of acute stress on core executive functions: A meta-analysis and comparison with cortisol. *Neuroscience & Biobehavioral Reviews, 68*, 651–668. <https://doi.org/10.1016/j.neubiorev.2016.06.038>
- Stanton, C. H., Holmes, A. J., Chang, S. W. C., & Joormann, J. (2019). From stress to Anhedonia: Molecular processes through functional circuits. *Trends in Neurosciences, 42*(1), 23–42. <https://doi.org/10.1016/j.tins.2018.09.008>
- Stroud, C. B., Davila, J., & Moyer, A. (2008). The relationship between stress and depression in first onsets versus recurrences: A meta-analytic review. *Journal of Abnormal Psychology, 117*(1), 206–213. <https://doi.org/10.1037/0021-843X.117.1.206>
- Suls, J., Green, P., & Hillis, S. (1998). Emotional reactivity to everyday problems, affective inertia, and neuroticism. *Personality and Social Psychology Bulletin, 24*(2), 127–136. <https://doi.org/10.1177/0146167298242002>
- Tadić, M., Bakker, A. B., & Oerlemans, W. G. M. (2015). Challenge versus hindrance job demands and well-being: A diary study on the moderating role of job resources. *Journal of Occupational and Organizational Psychology, 88*(4), 702–725. <https://doi.org/10.1111/joop.12094>
- Taylor, S. E., Klein, L. C., Lewis, B. P., Gruenewald, T. L., Gurung, R. A. R., & Updegraff, J. A. (2000). Biobehavioral responses to stress in females: Tend-and-befriend, not fight-or-flight. *Psychological Review, 107*(3), 411–429. <https://doi.org/10.1037/0033-295X.107.3.411>
- Thompson, S. C. (1981). Will it hurt less if I can control it? A complex answer to a simple question. *Psychological Bulletin, 90*(1), 89–101. <https://doi.org/10.1037/0033-2909.90.1.89>
- Troy, A. S., Willroth, E. C., Shallcross, A. J., Giuliani, N. R., Gross, J. J., & Mauss, I. B. (2023). Psychological resilience: an affect-regulation framework. *Annual Review of Psychology, 74*(1), 547–576. <https://doi.org/10.1146/annurev-psych-020122-041854>
- van Eck, M., Nicolson, N. A., & Berkhof, J. (1998). Effects of stressful daily events on mood states: Relationship to global perceived stress. *Journal of Personality and Social Psychology, 75*(6), 1572–1585. <https://doi.org/10.1037/0022-3514.75.6.1572>
- Vollrath, M. (2001). Personality and stress. *Scandinavian Journal of Psychology, 42*(4), 335–347. <https://doi.org/10.1111/1467-9450.00245>
- Vrieze, E., & Claes, S. (2009). Anhedonia and increased stress sensitivity: Two promising endophenotypes for major depression. *Current Psychiatry Reviews, 5*(3), 143–152. <https://doi.org/10.2174/157340009788971083>
- Wardenaar, K. J., Giltay, E. J., van Veen, T., Zitman, F. G., & Penninx, B. W. J. H. (2012). Symptom dimensions as predictors of the two-year course of depressive and anxiety disorders. *Journal of Affective Disorders, 136*(3), 1198–1203. <https://doi.org/10.1016/j.jad.2011.11.037>
- Weber, J., Angerer, P., & Apolinário-Hagen, J. (2022). Physiological reactions to acute stressors and subjective stress during daily life: A systematic review on ecological momentary assessment (EMA) studies. *PLOS ONE, 17*(7), e0271996.
- Wichers, M. C., Barge-Schaapveld, D. Q. C. M., Nicolson, N. A., Peeters, F., de Vries, M., Mengelers, R., & van Os, J. (2009). Reduced stress-sensitivity or increased reward experience: The psychological mechanism of response to antidepressant medication. *Neuropsychopharmacology: Official Publication of the American College of Neuropsychopharmacology, 34*(4), 923–931. <https://doi.org/10.1038/npp.2008.66>
- Wichers, M., Myin-Germeys, I., Jacobs, N., Peeters, F., Kenis, G., Derom, C., Vlietinck, R., Delespaul, P., & Van Os, J. (2007). Genetic risk of depression and stress-induced negative affect in daily life. *British Journal of Psychiatry, 191*(3), 218–223. <https://doi.org/10.1192/bjp.bp.106.032201>
- Wrzus, C., Luong, G., Wagner, G. G., & Riediger, M. (2021). Longitudinal coupling of momentary stress reactivity and trait neuroticism: Specificity of states, traits, and age period. *Journal of Personality and Social Psychology, 121*(3), 691–706. <https://doi.org/10.1037/pspp0000308>
- Zatura, A. J., Affleck, G. G., Tennen, H., Reich, J. W., & Davis, M. C. (2005). Dynamic approaches to emotions and stress in everyday life: Bolger and Zuckerman reloaded with positive as well as negative affects. *Journal of Personality, 73*(6), 1511–1538. <https://doi.org/10.1111/j.0022-3506.2005.00357.x>