

SENSITIZATION OR INOCULATION: INVESTIGATING THE EFFECTS OF EARLY
ADVERSITY ON THE DEVELOPMENT OF PERSONALITY TRAITS AND STRESS
EXPERIENCES IN ADULTHOOD

BY

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DISSERTATION

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Abstract

Cumulative evidence has been found for the concurrent and longitudinal associations between personality traits and stress experiences in adulthood. However, less is known about the etiology underlying these associations. The present study tested the effects of early adversity on the development of personality traits and stress experiences in adulthood, as well as their concurrent and longitudinal associations. Two samples of older adults from the Health and Retirement Study (HRS) and one sample of middle-aged adults from the Midlife in the United States Survey (MIDUS) were used. Across three studies, positive linear effects of early adversity were found on the level and changes in stress experiences in adulthood. The results also suggested significant linear effects of early adversity on the level of neuroticism across studies and the level of other personality traits in the middle-aged cohort. For the concurrent and longitudinal covariances between personality traits and stress experiences, some evidence was found for linear effects of early adversity in the middle-aged sample but not the older cohorts.

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Chapter 1: Introduction

The preponderance of research suggests that stress has crucial impacts on various life outcomes (Cohen & Williamson, 1991; Dyson & Renk, 2006; Neff & Karney, 2004; Sauter & Murphy, 1995). In search of individual characteristics that relate to stress experiences, personality traits have been shown to be associated with both exposure to stressors and subjective perceptions of stress (Ludtke, Roberts, Trautwein, & Nagy, 2011; Luo, Derringer, Briley, & Roberts, 2017). However, developmental factors that may influence the associations between personality traits and stress experiences remain unknown. Accumulated evidence has suggested early adversity to be one of the most prominent developmental factors that predisposes individuals to heightened risk for negative outcomes later in life (Anda et al., 2006; Dong et al., 2004; Harkness & Washburn, 2016). Theoretical models have been devoted to understanding the process of how early adversity may impact different outcomes in adulthood, two of which are the stress sensitization and the stress inoculation models. The stress sensitization model suggests that the experiences of adversity early in life lead to heightened reactivity to subsequent stressful events, increasing the likelihood of negative consequences (Hammen, Henry, & Daley, 2000; McLaughlin, Conron, Koenen, & Gilman, 2010). In contrast, according to the stress inoculation hypothesis, a curvilinear relationship between early adversity and adulthood outcomes may be present such that exposure to moderate levels of adversity early in life may promote the development of resilience rather than vulnerability to stress later in life, protecting individuals from potential negative consequences (Dienstbier, 1989; Gunnar, Frenn, Wewerka, & Van Ryzin, 2009; Parker et al., 2006). The current study aimed to test the two competing theoretical models for how the experiences of early adversity may affect the development of personality traits, stress experiences, and their associations in adulthood.

Stress Exposure, Perceived Stress, and Personality Traits

It has been agreed that stress can be defined as a process which involves exposure to stressors, appraisals of the stressors, and responses to the stressors (Cohen, Kessler, & Gordon, 1995). According to the transactional model of stress (Lazarus, 1966; Lazarus & Folkman, 1984), individuals' perception of the stressor makes important contributions to emotional and behavioral problems. Research has consistently shown associations between exposure to stressors, including stressful life events and daily hassles, and the perception of stress (Beatty, Lee, & Wade, 2009; McIntyre, Korn, & Matsuo, 2008; Willemen, Koot, Ferdinand, Goossens, & Schuengel, 2008).

The results of previous research also suggested that other factors can impact the link between exposure to stressors and the perception of stress. A study investigated the influences of negative life events on perceived stress in a sample of depressed outpatients reported that negative life events acted as significant predictors to the levels of perceived stress in untreated patients but not after treatment. The authors suggested that the results implied mood as a potential factor that modulate individuals' experiences of stress to negative life events (Otto et al., 1997). Daily hassles were also found to show different effects on perceived stress, indicating the type of stress one experiences is a moderator of the relationship between stress exposure and the perception of stress (McIntyre et al., 2008). When the associations between stress exposure and perceived stress were extended to a longitudinal perspective in a sample of adults aged 60 and above, it was reported that stress exposure increased while perceptions of stress decreased over time (Vasunilashorn, Lynch, Glei, Weinstein, & Goldman, 2014). Moreover, the results also showed that changes in exposure to stressors were not generally associated with changes in perceptions of stress, with the exception of exposure to health-related stressors which displayed a

positive association with changes in perceived stress over time. Thus, the findings of previous research suggest that exposure to stressors is associated with perceptions of stress and the association is likely to be moderated by unknown factors.

Stress exposure has also been shown to be related to changes in personality traits over time. It has been suggested that exposure to stressful events impacts personality traits in a bottom-up fashion such that individuals may exhibit prolonged changes in emotions, thoughts, and behaviors in response to stressful experiences (Bleidorn, Hopwood, & Lucas, 2018). A study reported that individuals who experienced extremely horrifying or frightening events displayed increases in neuroticism, decreases in the compliance facet of agreeableness, and decreases in openness relative to those without the experiences (Lockenhoff, Terracciano, & Patriciu, 2009). It was found that compared to individuals who did not experience divorce, those who experienced at least one divorce showed more pronounced decreases in extraversion over a 12-year period (Allemand, Hill, & Lehmann, 2015). Increases in conscientiousness were found in women as a response of widowhood, whereas men displayed decreases in conscientiousness after the death of a spouse (Specht, Egloff, & Schmukle, 2011). Other studies reported the relationships between the experience of unemployment and changes in personality traits. For example, it was found that individuals who were fired displayed increases in neuroticism and decreases in conscientiousness when compared to those who were promoted (Costa, Herbst, McCrae, Siegler, 2000). Results from a study that examined the influences of unemployment on personality traits suggested changes in agreeableness, conscientiousness, and openness following the experience of unemployment, with the influences of unemployment contingent upon gender, the number of years of unemployment, and the experiences of reemployment (Boyce, Wood, Daly, & Sedikides, 2015). Therefore, according to previous research, it is possible that

personality traits change in response to exposure to stressful experiences, and the relationship between stress exposure and personality traits may be affected by other factors.

Numerous studies have found that not only the exposure to stressful events but also the perception of stress is related to personality traits. Personality traits have been suggested to be strongly related to both the descriptive situation representations of stress and the evaluative aspects of the perceptions of stressful situations (Vollrath, 2001). Specifically, neuroticism is related to negative descriptions of the environment, while conscientiousness and agreeableness were found to be associated with positive biases. For subjective evaluations, individuals high on neuroticism were more likely to interpret everyday situations as threatening or damaging, and they were prone to appraise their susceptibility to health risks as higher. In contrast, individuals high on conscientiousness, extraversion, and agreeableness view mundane situations as less threatening and perceive their vulnerability to health risks as lower. Previous research has provided evidence for the associations between personality and perceptions of stress. Neuroticism was found to be positively related to perceived stress, while extraversion, agreeableness, conscientiousness, and openness displayed negative correlations with perceived stress (Baldasaro, Shanahan, & Bauer, 2013; Ebstrup, Eplov, Pisinger, & Jorgensen, 2011; Penley & Tomaka, 2002).

Recently, personality traits have been shown to be dynamically associated with perceived stress. Specifically, increases in conscientiousness and facets of conscientiousness were found to be correlated with decreases in perceived stress over time (Luo & Roberts, 2015). A second genetically informed study examined the longitudinal relationships between the Big Five personality traits and perceived stress (Luo et al., 2017). Changes in all of the Big Five personality traits displayed significant relations with changes in perceived stress over a ten-year

period of time. Furthermore, environmental influences accounted for a larger proportion of the covariance between changes in personality traits and changes in perceived stress than genetic influences. However, the environmental factors that may be pertinent to the association between stress and personality traits remain unknown.

Therefore, according to previous research, personality traits and stress experiences in adulthood were associated with each other both concurrently and longitudinally. However, less is known about etiology of the association between personality traits and stress experiences. According to previous research, early adversity may play a role in influencing the association between personality traits and stress experiences.

Stress Sensitization Model

Originally presented as a theory to explain the role of early adversity in the vulnerability to depression, the stress sensitization model proposes that exposure to stress early in life lowers the threshold for the amount of stress to trigger the onset of a depressive episode later in life. It is thought that the adverse experiences sensitize individuals to heightened reactivity to subsequent stress (Hammen, et al., 2000; McLaughlin et al., 2010; Laurent, Gilliam, Wright, & Fisher, 2015). The stress sensitization model suggests that individuals with a history of adverse experiences in childhood show greater sensitivity and reactivity to subsequent stress than those without a history of childhood adversity, resulting in an increased risk for negative outcomes, such as depressive symptoms. It has been speculated that adverse experiences early in life may lead to alterations in individuals' stress response system such as biological and cognitive stress mechanisms (Heim & Nemeroff, 2001; Nolen-Hoeksema, Girgus, & Seligman, 1992).

Although the stress sensitization model was originally proposed to account for the lifelong effects of early adversity on the occurrence of depression later in life, previous research

has supported the argument from the stress sensitization model that early stress leads to a higher likelihood of depression later in life. In a study that tested the stress sensitization hypothesis in a sample of young women in the transition to adulthood (Hammen et al., 2000), the results indicated that women who were exposed to one or more adversities in childhood were more likely to develop depressive symptoms following less total levels of stress than women without a history of adversity. Moreover, the results could not be accounted for by prior depressive episodes. Other studies have also found support for the stress sensitization process as a mechanism by which adversity early in life contributes to heightened susceptibility of depressive symptoms upon subsequent stressors in children (Rudolph & Flynn 2007), adolescents (Espejo et al., 2006; Harkness, Bruce, & Lumley, 2006; La Rocque, Harkness, & Bagby, 2014), and adults (McLaughlin et al., 2010).

In accordance with the stress sensitization hypothesis, adversity early in life was also found to increase the risk of other negative outcomes to stress experiences later in life. For example, individuals experienced adversity early in life reported lower levels of stress prior to bipolar recurrence and younger age of bipolar onset than those without early adversity (Dienes, Hammen, Henry, Cohen, Daley, 2006). Similarly, stress sensitization effects were found to be present for depression, post-traumatic stress disorder (PTSD), other anxiety disorders in a national sample, and perceived stress (McLaughlin, et al., 2010). Exposure to childhood adversity was also related to increased risk for disordered cannabis use among men and women and opiate use among men only. Moreover, the associations between childhood adversity and stressful life events in the past predicted disordered stimulant and opiate use in women (Myers, McLaughlin, Wang, Blanco, & Stein, 2014). Significant stress sensitization effects were found such that stressors in the past year were associated with elevated risk of intimate partner violence

in both men and women who experienced high levels of childhood adversity (Roberts, McLaughlin, Conron, & Koenen, 2011). Finally, stressful life events were found to be related to lower likelihood of smoking cessation for women with a history of childhood adversity than those without; however, the effects were not found among men (Smith, Oberleitner, Smith, & McKee, 2016).

Therefore, previous research provided support to the stress sensitization model such that individuals with a history of adversity early in life are more likely to experience negative outcomes as a result of increased reactions to stressful events later in life. In these studies, the role of early adversity in important life outcomes was usually examined by testing the effects of early adversity on the outcome variables in response to subsequent stressful life events in a linear fashion.

Stress Inoculation Model

In contrast to the stress sensitization model, the stress inoculation model assumes a more complicated relation between early stress and outcomes later in life. Rather than positing a monotonic relationship between early adversity and reactivity to stress later in life, the stress inoculation model proposes a curvilinear relation. Specifically, the stress inoculation model assumes a curvilinear relation between stress exposure early in life and later reactions to stress such that exposure to a moderate level of early adversity may confer protective effects, rather than vulnerability, to subsequent stress and its potential detrimental consequences (Dienstbier, 1989; Gunnar, Frenn, Wewerka, & Van Ryzin, 2009; Parker et al., 2006). According to the stress inoculation model, moderate stress is not overwhelming but is sufficiently challenging for the development of emotional and physiological resources to better cope with future stress experiences. Thus, moderate early adversity has some “tempering” effects that protect

individuals from future stress and its potential negative influences (Garmezy, 1986; Rutter, 2006). Low levels of early adversity are not sufficiently arousing to stimulate the development of relevant resources, leaving the individual unprepared and sensitive to future stressful experiences. In contrast, severe adversity in early life overwhelms and makes the individual unable to manage future stressful situations (Liu, 2015; Sih, 2011).

Evidence supporting the stress inoculation model was first found in animal studies (Lyons and Parker, 2007; Lyons, Parker, & Schatzberg, 2010). Experimental designs with manipulation of stress exposure and control is commonly adopted in animal models on the tempering effects of early life stress. In animal studies, moderate levels of early adversity are operationalized as either early handling or maternal separation. Several studies found that neonatal rats that experienced postnatal handling which included brief repeated maternal separations showed an attenuated hypothalamic-pituitary-adrenal (HPA) axis response to stressors in adulthood than those in the non-handled condition. Moreover, when compared with their counterparts who experienced no stress, those who experienced postnatal handling as a moderate stressor also displayed a greater tendency to explore their environments and a decreased behavioral fear response (Denenberg, 1964; Lyons et al., 2010; Meaney, 2001). Similarly, when compared with counterparts in a non-separation condition, infant squirrel monkeys that experienced temporary separation from their natal group displayed a reduction in basal levels of stress hormones, such as ACTH and cortisol, in novel environments (Parker, Buckmaster, Schatzberg, & Lyons, 2004). Moreover, monkeys in the moderate stress condition exhibited reduced anxious behavior and increased exploratory behavior and food consumption in a novel environment. In a study investigating the impacts of moderate early stress on symptoms of schizophrenia, pups exposed to moderate levels of stress displayed lower levels of stress

hormone ACTH in response to subsequent stressors than those in the non-stress condition (Tejedor-Real, Sahagun, Biguet, & Mallet, 2007). Finally, one study also reported improved performance on a cognitive task after exposure to a temporary removal from the natal group when compared with those in the non-stress condition (Parker, Buckmaster, Justus, Schatzberg, & Lyons, 2005). Taken together, animal studies suggested possible moderating effects of early adversity on resilience to later stress experiences, physiological and behavioral reactivity to later stressors, and cognitive performance.

Stress inoculation effects have also been reported in studies using human subjects. For example, individuals with a history of some lifetime adversity were found to report better mental health and well-being than individuals experienced a high level of adversity or those with no history lifetime adversity (Seery, Holman, & Silver, 2010). Specifically, U-shaped quadratic relationships suggested that the experiences of relatively moderate lifetime adversity predicted lower global distress, lower self-rated functional impairment, fewer posttraumatic symptoms, and higher levels of life satisfaction. Evidence of inoculating effects of early adversity were also suggested by a multi-wave prospective study which found that exposure to moderate types of stressors in early in life contributed to an attenuated depressive responses to proximal negative events during early adolescence (Shapero et al., 2015). Additionally, a study reported another quadratic relationship between early life stress and implicit anxiety in a sample of healthy adult women, while a linear relationship was detected between early life stress and explicit anxiety (Edge et al., 2009). Evidence has also been found for curvilinear relations between early life stress and health outcomes in adulthood. In a sample of subjects suffering from chronic back pain, significant U-shaped quadratic relationships emerged between histories of lifetime adversity and different health outcomes. Specifically, the protective effects of moderate adversity

manifested as lower levels of self-rated functional impairment, disabled employment status, frequency of physician or clinic visits for chronic back pain, and prescription analgesic use (Seery, Leo, Holman, and Silver, 2010). An ecobiodevelopmental framework on the impacts of early experiences and environmental influences on long-term health also suggested the protective effects of early adverse experiences (Shonkoff et al., 2012). Specifically, when compared to toxic stress which results from strong, frequent, or prolonged activation of the body's stress response system in the absence of buffering protection, a positive stress response in childhood that refers to a physiological state that is brief and mild to moderate in magnitude provided important opportunities for children to observe, learn, and practice healthy, adaptive resources to adverse experiences.

Some studies tested both the stress sensitization and the stress inoculation hypotheses. For example, a study examined the impact of early parental loss on emotional reactions and physiological reactions to subsequent minor stress in late adolescence/young adulthood reported support for both the stress sensitization and the stress inoculation models (Luecken, Kraft, Appelhans, & Enders, 2009). Specifically, it was suggested that the stress inoculation model was supported by the findings that individuals who experienced parental bereavement displayed lower blood pressure than those in the nonbereaved group. However, within the bereaved group, results indicated that individuals with lower perceived caring from the surviving parent showed higher levels of negative emotional reactions to stress than those without, which were interpreted as evidence for the stress sensitization hypotheses. In a study that examined the role of childhood social stress in depressive reactions to subsequent interpersonal stress in two independent samples, evidence was found in pubertal girls and prepubertal boys for the stress sensitization processes but not the stress inoculation model (Ruodolph & Flynn, 2007). However, in both of

the studies, the relationships between adversity in childhood and stress later in life and reactions to the later stress were only tested in linear but not curvilinear models.

Previous research has found some support for stress inoculation model. However, the studies reviewed varied in sample sizes with 4 of them included samples of fewer than 200 subjects. Meanwhile, some studies (e.g., Seery, Holman, & Silver, 2010) tested the inoculation effects of lifetime adversity rather than adversity in childhood. Also, when compared to studies that examined other models of the influences of early adversity on subsequent outcomes such as the stress sensitization model, a limited number of studies were found for the test of the stress inoculation hypothesis. One possibility is that publication bias may be present such that only studies reported significant results for the stress inoculating effects were published. Therefore, more research is needed to test whether the experiences of adversity early in life exhibit protecting effects on negative consequences to stressful experiences in adulthood.

Early Adversity and Development of Personality Traits

Based on extensive longitudinal research, personality traits are now assumed to develop throughout the life span (Roberts, Walton, & Viechtbauer, 2006). According to the sociogenomic model of personality traits (Roberts, 2017), development of personality traits over the life course is guided by both intrinsic and exogenous processes. Environmental factors, such as negative life events (Kandler, Bleidorn, Riemann, Angleitner, & Spinath, 2012), important life transitions (Ludtke et al., 2011), clinical interventions (Roberts et al., 2017), and cognitive stimulation (Jackson, Hill, Payne, Roberts, & Stine-Morrow, 2012), have been reported to be associated with the development of personality traits.

Early adversity has also been linked to later development of personality traits. In a study examining the effects of early adversity on abnormalities in electrical brain activity, personality

dimensions, and increased vulnerability to substance abuse and depression, individuals who experienced childhood adversity displayed significantly higher levels of neuroticism and openness, but lower levels of conscientiousness (McFarlane et al., 2005). Similar findings were suggested by a second study in which subjects exposed to high levels of early life stress were found to endorse higher neuroticism and openness; however, other dimensions of the Big Five were not found to be affected by early life stress (Hoth et al., 2006). Similarly, a study that examined the link of early adversity to personality traits reported early adversity to be related to greater levels of anger and aggression, lower levels of agreeableness, and higher levels of extrinsic focus (Carver, Johnson, McCullough, Forster, & Joormann, 2014). In a study that examined the relations between childhood adversity and personality traits in samples of subjects from three age cohorts, high childhood adversity was found to be related to higher levels of neuroticism, but not significantly related to extraversion or psychoticism. Moreover, the pattern did not vary across age groups (Rosenman & Rodgers, 2006). In a study investigating the effects of maltreatment on children's personality, maltreated children were found to exhibit lower agreeableness, conscientiousness, openness and higher neuroticism than children who did not experience maltreatment at the age of 6. Also, in the analysis of personality clusters or types, the majority of children who did not have the experience of maltreatment were shown to represent the adaptive gregarious and reserved personality clusters, whereas maltreated children were more likely to be classified as the less adaptive personality profiles, such as the overcontroller, undercontroller, and dysphoric clusters. Moreover, continuity in the personality liabilities were observed in maltreated children across ages of 7, 8, and 9 (Rogosch & Cicchetti, 2004).

Taken together, previous research suggests early adversity to be associated with less adaptive development of personality traits. However, all of the reported associations were

examined under the assumption that linear relations exist between early adverse experiences and personality traits later in life. Given the inoculating effects of early adversity, it is possible that exposure to moderate levels of adversity early in life benefits the development of personality traits in adulthood and protects personality development from the influences of stressful life events.

Project Overview

Previous research has provided evidence for both the stress sensitization and stress inoculation hypotheses on the effects of adversity on subsequent stress reactions and other important life outcomes. However, less is known about how early adversity may influence the development of personality traits, stress experiences, and their associations in adulthood over time. The current project aimed to test alternative hypotheses on the effects of early adversity on personality traits and stress experiences in adulthood from both the concurrent and longitudinal perspectives in a series of three studies (shown in Figure 1). Specifically, we tested how does early adversity relate to (1) the level and changes in the experiences of stressful life events and perceived stress; (2) the level and changes in the Big Five personality traits; (3) the covariances among the level of stressful life events, the level of perceived stress, and the level of the Big Five personality traits, as well as the covariances among changes in stressful life events, changes in perceived stress, and changes in the Big Five personality traits. Study 1 and Study 2 examined the above mentioned research questions in two older samples using data from the Health and Retirement Study (HRS). Study 3 tested the questions using the middle-aged sample from the Midlife in the United States Survey (MIDUS).

Chapter 2: The Influences of Early Adversity on Adulthood Personality and Stress

Experiences

Study 1

Method

Participants

The data used in Study 1 were drawn from the eighth (2006), tenth (2010), and twelfth (2014) waves of assessment from the Health and Retirement Study (HRS), which is a large longitudinal panel study of a nationally representative sample of subjects who were older than 50 and their spouses (Burkhauser & Gertler, 1995). In 2006, 5464 participants (58.9% female) who provided complete data for each item of the early adversity measure were retained in the current study. The mean age of the sample at Time 1 was 66.71 (SD = 9.93). Participants reported an average of 12.92 years of education. About 85.2% of the participants were self-identified as White or Caucasian, 11.1% as African American, and 3.7% as other ethnicities. In 2010, all of the participants retained at Time 1 provided data on variables used in the current study at Time 2. The mean age of the sample was 70.71 at Time 2. At Time 3, 4232 of the participants (60.2% female) provided usable data on variables included in the current study. The mean age of the sample was 73.37 (SD = 9.29), and the average years of education was 13.09. About 85.3% of the sample identified themselves as White or Caucasian, 10.7% as African American, and 3.7% as other ethnicities.

Whether attrition resulted in an unrepresentative longitudinal sample was tested. The results suggested that participants who completed the assessment at Time 3 were younger ($t = -19.18, p = 0.000, d = .59$) than those who did not. There was an effect for gender ($\chi^2 = 13.11, p = 0.000, 60.23\%$ female in those completed the assessment at Time 3, and 54.46% in those did not)

such that males were more likely to drop out from the study than females. Participants who completed the assessment at Time 3 had higher scores on extraversion ($t = 2.77, p = .006, d = .09$), higher scores on agreeableness ($t = 2.37, p = .018, d = .08$), higher scores on conscientiousness ($t = 5.09, p = 0.000, d = .16$), higher scores on openness ($t = 3.43, p = .001, d = .11$), and higher scores on stressful life events ($t = 4.91, p = 0.000, d = .17$), than those who did not. Those who did and did not complete the assessment at Time 3 were not different in terms of neuroticism ($t = -1.68, p = .09, d = .05$) and perceived stress ($t = -.84, p = .399, d = .03$).

Measures

Early adversity. Items of all the measures used are listed in Appendix. The initial selection of early adversity items included items about experiences before 18. Then 3 researchers independently rated each item according to the definition of early adversity, and 4 items measured in 2006 were used to index exposure to adversity early in life based on agreement among raters. Participants were asked to check the occurrence of the adverse events on a binary scale based on their experiences before they were 18 years old. The adversity items included were “did you have to do a year of school over again”, “were you ever in trouble with the police”, “did either of your parents drink or use drugs so often that it caused problems in the family”, and “were you ever physically abused by either of your parents”.

Personality. The Big Five personality traits were measured at all of the three time points using the MIDUS Big Five Adjectival scale (Lachman & Bertrand, 2001). A total of 26 adjectives were used to assess neuroticism, extraversion, agreeableness, conscientiousness, and openness. Each adjective was rated on a four-point scale with 1 as “a lot” and 4 as “not at all”. Cronbach alphas for the five personality traits in the present sample at Time 1, Time 2, and Time 3 respectively were as follows: .71, .71 and .72 for neuroticism, .76, .76 and .77 for

extraversion, .78, .78 and .80 for agreeableness, .66, .68 and .68 for conscientiousness, and .79, .80 and .81 for openness.

Stressful life events. The measure of stressful life events was available at Time 1 and Time 2. Participants were instructed to check whether they experienced each of the 5 major stressful life events at some point in the past 5 years on a binary scale. The items used to assess the experience of major stressful life events were “have you involuntarily lost a job for reasons other than retirement”, “have you been unemployed and looking for work for longer than 3 months”, “was anyone else in your household unemployed and looking for work for longer than 3 months”, “have you moved to a worse residence or neighborhood”, and “were you robbed or did you have your home burglarized”.

Perceived stress. Perceived stress was measured at all of the three time points by 7 items capturing participants’ subjective experiences of ongoing stressors in different areas of life, including ongoing health problems, ongoing physical or emotional problems, ongoing problems with alcohol or drug use in family members, ongoing difficulties at work, ongoing financial strain, ongoing housing problems, and ongoing problems in a close relationship. Each item was rated on a 4-point scale (1 = no, didn’t happen; 2 = yes, but not upsetting; 3 = yes, somewhat upsetting; 4 = yes, very upsetting). Cronbach alphas for the perceived stress scale were .63 at Time 1, .64 at Time 2, and .65 at Time 3, respectively.

Statistical analysis

All the analyses were conducted using Mplus 7.4 (Muthen & Muthen, 1998-2015). The scripts for the analyses that are described can be found at <https://osf.io/x4pe3/>. Full information maximum likelihood (FIML) was used for estimation due to missing data across the time points. A series of latent growth/change models were constructed to model the level and changes over

time for each of the Big Five personality traits, stressful life events, and perceived stress. The 4 neuroticism items, 5 extraversion items, 5 agreeableness items, 5 conscientiousness items, 7 openness items, and 7 perceived stress items were used as manifest indicators for the latent traits of neuroticism, extraversion, agreeableness, conscientiousness, and openness. The latent variables for each of the Big Five personality traits and perceived stress were specified at each of three time points. The latent variables at each time point were used to estimate the latent intercept and slope for each of the five personality traits and perceived stress. Specifically, the latent mean constructs from all the three waves were used to form the latent intercept, which modeled the level of the construct across the three time points, while the latent mean constructs from the second and third waves were used to form the latent slope, which represented changes of the six variables over time (McArdle, 2009). The intercept and change parameters of each of the variables were set to correlate with each other. All the item loadings and item residual variance were fixed to be equivalent across the three waves. Latent change model was constructed for stressful life events using data from Time 1 and Time 2 in which the composite scores from both waves were used to form the latent intercept, while the composite score at Time 2 was used to form the latent slope.

The stress sensitization hypothesis implies a linear relationship between early adversity and outcome variables, while the stress inoculation hypothesis suggests a possible quadratic relationship early adversity and outcomes such that beneficial effects may be observed among individuals with moderate exposure to adversity early in life. To investigate the relationship between early adversity and the level and changes in personality traits, stressful life events, and perceived stress over time, the mean centered composite score of early adversity and the squared mean centered early adversity score were regressed on the intercepts or slopes of the latent

growth/change models for each of the constructs (shown in Figure 2-5). Age and gender were controlled in all the models.

Then the moderating effects of early adversity on the concurrent and dynamic covariance among the stressful life event, personality traits, and perceived stress were tested using the moderated nonlinear factor analysis (MNLFA) model (Bauer, 2017). Originally developed for evaluating measurement invariance and differential item functioning, the MNLFA model permits model parameters, such as variances, covariances, and factor loadings, to differ as a function of multiple individual characteristics. The moderating effects of early adversity on the covariance between the level and changes in stressful life events and the level and changes in personality traits and perceived stress were tested using data from Time 1 and Time 2, while the moderating effects of early adversity on the covariance between the level and changes in personality traits and the level and changes in perceived stress were examined across the three time points. Separate models were fitted to examine the early adversity moderation of the covariance for intercepts and slopes (shown in Figure 6-9). Specifically, each model included the mean centered early adversity and the squared mean centered early adversity moderation of the intercepts or slopes of the two constructs (stressful life events and personality traits, perceived stress or personality traits and perceived stress), variance of the two intercepts or slopes, and moderation of the intercepts or slope covariance. Age and gender were controlled. The moderating effects of early adversity and the quadratic term of early adversity on the covariance were the focus in this step of the analyses.

Results

Table 1 displays the means, standard deviations, and correlations of manifest variables included in the analyses for all of the three waves in Study 1. As shown in the table, early

adversity exhibited significant positive correlations with neuroticism, stressful life events, and perceived stress and significant negative correlations with conscientiousness across waves. Stressful life events were positively associated with neuroticism, openness, and perceived stress. Neuroticism showed significant positive correlations with perceived stress, while extraversion, agreeableness, conscientiousness, and openness displayed significant negative associations with perceived stress across time points.

Given that 34 tests were conducted in the present study in total, we used Bonferroni corrected alpha ($p \leq .001$) which was adjusted to the number of hypotheses tested to define significance. Fit indices for all the model can be found in Table A.5. We first tested the linear and quadratic effects of early adversity on the level and changes in stressful life events and perceived stress. The results indicated that early adversity displayed positive linear associations with the level of stressful life events ($\beta = .06, p = 0.000$) and the level of perceived stress ($\beta = .18, p = 0.000$). However, the quadratic relations of early adversity on the level of stressful life events and the level of perceived stress were not significant ($\beta = .03, p = .154$ for the level of stressful life events, and $\beta = .04, p = .099$ for the level of perceived stress). In terms of changes in stressful life events, early adversity was related to neither changes in stressful life events ($\beta = .00, p = .930$ for linear effects, and $\beta = .03, p = .097$ for quadratic effects) nor changes in perceived stress ($\beta = .08, p = .073$ for linear effects, and $\beta = .04, p = .421$ for quadratic effects).

Table 2 shows the linear and quadratic effects of early adversity on the levels of the Big Five personality traits and the effects on changes in personality traits. As shown in the table, early adversity only showed significant associations with the level of neuroticism.

Then we examined the moderating effects of early adversity on the association between the level of stressful life events and the level of perceived stress, and the association between the

level of stressful life events and the level of the Big Five personality traits. Table 3 displays the parameter estimates for the moderation of the covariance. As shown in the table, we did not find any significant moderating effects of early adversity on the association between the level of stressful life events and the level of personality traits. Contrary to our expectation, an inverted U-shape was observed (Figure 10) in the moderating effects of early adversity on the association between the level of stressful life events and the level of perceived stress such that their association peaked among individuals who experienced a moderate amount of adversity early in life. Then we examined the moderating effects of early adversity on the link between changes in stressful life events and changes in perceived stress, and the link between changes in stressful life events and changes in personality traits. As shown in Table 3, the associations between changes in stressful life events and changes in personality traits and the association between changes in stressful life events and changes in perceived stress were not predicted by early adversity.

Table 4 displays the parameter estimates for the effects of early adversity on the associations between the level of personality traits and the level of perceived stress, as well as the associations between changes in personality traits and changes in perceived stress. The results for changes in openness and changes in perceived stress were not available due to model non-convergence. None of the associations were moderated by early adversity.

Study 2

Method

Participants

The data used in Study 2 were drawn from the ninth (2008), eleventh (2012), and thirteenth (2016) waves of assessment from the HRS. In 2008, 6656 participants (60.7% female) who provided complete data for each item of the early adversity measure were used in the

current study. The mean age of the sample at Time 1 was 69.63 (SD = 10.17). Participants reported an average of 12.62 years of education. About 83.4% of the participants were self-identified as White or Caucasian, 12.1% as African American, and 4.5% as other ethnicities. A total of 4669 participants (61.7% female) from Time 1 provided data on variables used in the current study in 2012. The mean age of the sample was 72.41 at Time 2. Participants reported an average of 12.82 years of education at Time 2. The ethnic background of the sample at Time 2 was 84.7% White or Caucasian, 10.8% African American, and 4.5% other ethnicities. At Time 3, 2999 of the participants (62.8% female) provided usable data on variables included in the current study in 2016. The mean age of the sample was 74.83 (SD = 8.5), and the average years of education was 13.09. About 84.5% of the sample identified themselves as White or Caucasian, 10.8% as African American, and 4.7% as other ethnicities.

Analyses were conducted to examine whether attrition resulted in an unrepresentative longitudinal sample. The results suggested that participants who completed the assessment at all the three time points were younger ($t = -20.81, p = 0.000, d = .53$) than those who did not. There was an effect for gender ($\chi^2 = 9.40, p = .002, 62.77\%$ female in those completed the assessment at three time points, and 59.02% in those did not) such that males were more likely to drop out from the study than females. Participants who completed the assessment at three time points had lower scores on neuroticism ($t = -4.17, p = 0.000, d = .10$), higher scores on extraversion ($t = 4.26, p = 0.000, d = .11$), higher scores on agreeableness ($t = 2.33, p = 0.000, d = .06$), higher scores on conscientiousness ($t = 9.23, p = 0.000, d = .23$), and higher scores on openness ($t = 5.66, p = 0.000, d = .14$), than those who did not. Those who did and did not complete the assessment at three time points were not different in terms of the experience of stressful life events ($t = 1.15, p = .251, d = .03$).

Measures

6 items measured in 2008 were used to index exposure to adversity early in life. In addition to the 4 items used in Study 1, two additional items available in the current sample were “concussion or severe head injury for a period of time” and “disability for 6 months or more” before the age of 16. The same measures used in Study 1 were used to assess the Big Five personality traits and perceived stress. Personality traits were measured using the MIDUS Big Five Adjectival scale (Lachman & Bertrand, 2001). Cronbach alphas for neuroticism, extraversion, agreeableness, conscientiousness, and openness at the three time points were .72, .71 and .71 for neuroticism, .73, .74 and .74 for extraversion, .78, .79 and .79 for agreeableness, .66, .67 and .67 for conscientiousness, and .79, .79 and .80 for openness. The assessment of perceived stress was available in the waves of 2012 and 2016. Cronbach alphas for perceived stress were .65 at Time 2 and .67 at Time 3, respectively. The measure of stressful life events was available in the waves of 2008 and 2012. In addition to the 5 items used in Study 1, one item added to the current sample was “have you been the victim of fraud in the past five years”.

Statistical analysis

Following the methods described in Study 1, the effects of early adversity and the quadratic term of early adversity on the level and changes in stressful life events were examined using the data at Time 1 and Time 2, the effects on perceived stress were examined using the data at Time 2 and Time 3, and the effects on the Big Five personality traits were tested across the three time points. Then the moderating effects of early adversity and the squared early adversity were investigated on the intercept and slope covariance between stressful life events and personality traits across Time 1 and Time 2, and the moderating effects of early adversity

and the squared early adversity on the intercept and slope covariance between personality traits and perceived stress across Time 2 and Time 3.

Results

Table 5 shows the means, standard deviations, and correlations of manifest variables included in the analyses for all of the three waves in Study 2. Similar to Study 1, early adversity consistently displayed significant positive associations with neuroticism, stressful life events, perceived stress, and negative associations with conscientiousness across waves. Stressful life events were positively associated with neuroticism and openness. A positive link between stressful life events and perceived stress was found at Time 2. Also, consistent with the results in Study 1, neuroticism exhibited positive association with perceived stress, whereas extraversion, agreeableness, conscientiousness, and openness showed negative associations with perceived stress across waves.

Similar to Study 1, a Bonferroni correction adjusted to the number of tests conducted in the present study was used to define significance ($p \leq .001$). The associations of early adversity with the level and changes in stressful life events and perceived stress were examined. Positive linear associations of early adversity were found with the level of stressful life events ($\beta = .07, p = 0.000$) and the level of perceived stress ($\beta = .23, p = 0.000$). The quadratic effects of early adversity were not significant on both the level of stressful life events ($\beta = .03, p = .073$) and the level of perceived stress ($\beta = -.04, p = .135$). Neither the linear effects nor the quadratic associations of early adversity were found to be significant on changes in stressful life events ($\beta = .02, p = .246$ for linear effects and $\beta = .00, p = .806$ for quadratic effects) and changes in perceived stress ($\beta = .07, p = .070$ for linear effects, and $\beta = .03, p = .438$ for quadratic effects)

Table 6 displays the estimates of the linear and quadratic associations of early adversity on the level and changes in the Big Five personality traits. As shown in the table, significant associations of early adversity were observed only on the level of neuroticism such that the level of neuroticism increased with early adversity¹.

Next, the potential moderating effects of early adversity on the covariances between the level of stressful life events and the level of personality traits, the covariances between changes in stressful life events and changes in personality traits were examined. The moderating effects of early adversity are displayed in Table 7. As shown in the table, neither the associations between the level of stressful life events and the level of personality traits nor the associations between changes in stressful life events and changes in personality traits were moderated by early adversity.

Table 8 shows the effects of early adversity on the covariances between the level of personality traits and the level of perceived stress, as well as the covariances between changes in personality traits and changes in perceived stress. No significant moderating effects of early adversity were found.

Study 3

Method

Participants

The data used in Study 3 were drawn from the Midlife in the United States Survey (MIDUS I, II, and III; Brim, Ryff, & Kessler, 2004). The survey data were collected from a nationally representative sample with the participants completing a 30-min telephone interview

¹When the 4 early adversity items were used as in Study 1, the linear association between early adversity and the level of conscientiousness was significant in Study 2. Other results were not different from those analyzed by using the 6 items of early adversity.

and self-administered questionnaires. Participants who had complete data for early maltreatment were included in the present study. At Time 1, 5938 participants (52% female) were included in the analyses. The mean age of the sample at Time 1 was 46.62 (SD = 12.82). 63.3% of the participants received 1 to 2 years of college education and above. A total of 4420 (53.5% female) participants from the first wave had data on the variables used in the current study in the second wave. Participants in the second wave had a mean age of 55.48 (SD = 12.34). 66.3% of the sample had at least 1 to 2 years of college education. In the third wave, 3019 (55% female) participants provided usable data. The mean age of the participants at Time 3 was 63.66 (SD = 11.33). 70.1% of the sample reported at least 1 to 2 years of college education.

Analyses were conducted to examine whether attrition resulted in an unrepresentative longitudinal sample. The results suggested that participants who completed the assessment at all the three time points were younger ($t = -5.96, p = 0.000, d = .15$) than those who did not. There was an effect for gender ($\chi^2 = 21.62, p = 0.000, 54.99\%$ female in those completed the assessment at three time points, and 49.00% in those did not) such that males were more likely to drop out from the study than females. Participants who completed the assessment at three time points had lower scores on neuroticism ($t = -2.91, p = .004, d = .08$), higher scores on conscientiousness ($t = 5.86, p = 0.000, d = .15$), and lower scores on perceived stress ($t = -4.20, p = 0.000, d = .11$) than those who did not.

Measures

Early adversity. As described in Study 1, based on rating agreement among raters, early maltreatment, including emotional abuse, physical abuse, and severe physical abuse from parents, siblings, and others, measured at Time 1 were used to index early adversity exposure. The questions assessing childhood abuse were taken from a revised version of the Conflict Tactics

Scale (Straus & Gelles, 1990). Participants were presented with a list of emotional, moderate and severe physical abusive behaviors and were instructed to indicate the frequency on a 4-point scale (1 = often; 2 = sometimes; 3 = rarely; 4 = never) of each type of abuse in reference to mother, father, sister, brother, and anyone else.

Personality. The Big Five personality traits were measured by the Midlife Development Inventory (MIDI; Lachman & Weaver, 1997). The MIDI personality inventory contains 25 adjectives that assess neuroticism, conscientiousness, extraversion, agreeableness, and openness. The items were rated on a 4-point scale from 1 “not at all” to 4 “a lot”. Cronbach alphas for each trait at all of the three time points were as follows: .75, .74 and .71 for neuroticism, .78, .76 and .75 for extraversion, .81, .80 and .77 for agreeableness, .56, .58 and .56 for conscientiousness, and .78, .77 and .77 for openness.

Perceived stress. A standard measure of perceived stress was not administered to the MIDUS sample, therefore we developed a measure of stress out of the items in the survey (Luo et al., 2017). In developing the perceived stress measure, 19 items rating work, finance, relationship, and life in general were chosen from different sections of the Midlife Development Inventory (MIDI; Brim & Featherman, 1998). The 19 items were posted together with the Perceived Stress Scale (PSS; Cohen & Williamson, 1988) on Amazon Mechanical Turk (MTurk) and a sample of 435 participants who rated each item and the Perceived Stress Scale. In the MTurk sample, the item-total correlations of the PSS items ranged from .42 to .72, the average inter-item correlation was .41, and the alpha reliability was .88. Therefore, we chose the MIDI items that had correlations higher than .41 with the total PSS score as indicators of perceived stress. 7 items met this criterion for inclusion. In the current MTurk sample, the 7-item stress scale had item-total correlations ranging from .30 to .74, the average inter-item correlation of .37,

and alpha reliability of .79. The correlation between the total score of the 7-item stress measure and the PSS total score was .73 in the MTurk sample. In the current MIDUS sample, Cronbach alphas were .72, .73, and .74 in the three waves, respectively.

Statistical analysis

Following the methods and steps described in Study 1 and 2, the latent growth models were first constructed for each of the Big Five personality traits and perceived stress using data all across the three waves. Then the linear and quadratic effects of early adversity were examined on the level and changes in each of the constructs. Finally, the moderation of the intercept and slope covariance between personality traits and perceived stress was tested by including both early adversity and the squared early adversity in the MNLFA models.

Results

Table 9 displays the means, standard deviations, and correlations of manifest variables included in the analyses for all the three waves in Study 3. As shown in the table, across the three time points, early adversity was positively correlated with neuroticism and perceived stress and negative correlated with agreeableness and conscientiousness. Also, in all three waves, neuroticism was positively associated with perceived stress, while extraversion, agreeableness, conscientiousness, and openness were negatively associated with perceived stress.

A Bonferroni correction was applied so that significance was defined as $p \leq .002$. We first examined the linear and quadratic influences of early adversity on the level and changes in the Big Five personality traits and perceived stress. A positive linear relation was found between early adversity and the level of perceived stress ($\beta = .20, p = 0.000$), while the quadratic relation of early adversity and the level of perceived stress was not significant ($\beta = .00, p = .928$). The linear and quadratic relations of early adversity with changes in perceived stress were not

significant ($\beta = .11, p = .004$ for linear effects and $\beta = .00, p = .990$ for quadratic effects). For the associations of early adversity with personality traits, as shown in Table 10, early adversity had positive linear associations with the level of neuroticism and negative linear relations with the level of conscientiousness. No significant associations were found between early adversity and changes in personality traits.

Next, we tested the moderating effects of early adversity on the covariance between the level of personality traits and the level of perceived stress. Parameter estimates are displayed in Table 11. No significant moderating effects of early adversity were found on the associations between the level of personality traits and the level of perceived stress. Estimates of the effects of early adversity on the covariances between changes in personality traits and changes in perceived stress can also be seen in Table 11. As shown in Figures 11 and 12, significant linear associations of early adversity were found with the association between changes in conscientiousness and changes in perceived stress, and the association between changes in openness and changes in perceived stress such that the correlations increased in strength with early adversity.

Table 12 provides a summary of the effects of early adversity on the parameters tested across all three studies. The table indicates the direction of both the linear and quadratic effects on all the parameters, as well as whether the results were replicated across studies.

Chapter 3: General Discussion

Using three samples from large longitudinal panel studies, the HRS and MIDUS, the present research examined the linear and quadratic associations of early adversity on the level of the Big Five personality traits, the level of stressful life events, and the level of perceived stress across time points, as well as changes in personality traits, changes in stressful life events, and changes in perceived stress over time. Furthermore, we also tested the linear and quadratic moderating effects of early adversity on the associations among personality traits level, stressful life events level, and perceived stress level, as well as the associations among changes in personality traits, changes in stressful life events, and changes in perceived stress over time.

Early adversity consistently demonstrated positive linear associations with the level of stressful life events. Consistent with previous findings, individuals high on early adversity tended to have a higher level of exposure to stressful life events in adulthood. It has been suggested that the continuity in stress exposure may occur as the experience of early adversity is likely to be rooted in relatively stable structural contexts, such as financial difficulties and conflict in social relationship, which may either lead to increasing exposure to stressors later in life or influence the environments that individuals select into (Pearlin, 1989; Raposa, Hammen, Brennan, O'Callaghan, & Najman, 2014). Cumulative evidence has been found to show that individuals who experienced adversity early in life were more vulnerable to both episode and chronic stressful experiences later in life (Hazel, Hammen, Brennan, & Najman, 2008; Raposa et al., 2014). Most of the studies testing continuity in stress exposure focused on the periods of adolescence or young adulthood. Our study extended the findings to show that individuals exposed to adversity early in life tended to have a higher level of exposure to stressful life events even in their 60's and 70's.

Across the three studies, early adversity exhibited positive linear associations with the level of perceived stress. Given that linear positive relationships, rather than the quadratic relationship, were found between early adversity and the levels perceived stress, the results were more in line with the stress sensitization model, rather than the stress inoculation hypothesis. As the stress sensitization suggests that exposure to adversity early in life leads to larger reactions to subsequent stress experiences (Hammen, et al., 2000; Monroe & Harkness, 2005), individuals with higher scores on early adversity were found to have higher levels of perceived stress. Moreover, the effects remained to be salient even in samples of adults in their older ages. Previous research has suggested some possible mechanisms linking early adversity to heightened reactions to stress later in life. For example, cognitive biases may be the mechanisms such that individuals with exposure to early adversity are more likely to interpret ambiguous situations as threatening, leading to increased levels of stress perception (Chen, Cohen, & Miller, 2010). Also, it has been suggested that individuals who experienced adversity early in life tend to display attention biases in a way that they are more likely to attend to threatening cues and allocate more attentional resources to threatening stimuli (McLaughlin & Lambert, 2017; Shackman, Shackman, & Pollak, 2007).

Early adversity consistently displayed positive linear effects on the level of neuroticism across the three studies. In general, the results were consistent with the stress sensitization hypothesis as higher levels of early adversity showed negative associations with the levels of neuroticism. The sociogenomic model of personality suggests a dynamic process of the development of personality traits in which states mediate the relationship between the environment and personality trait development (Roberts, 2017). Specifically, the model proposes that experiences, such as early adversity, act largely upon states, and the changed states will

result in the development of personality traits after being internalized, automatized, and generalized. Negative linear relationship between early adversity and the level of conscientiousness was only observed in Study 3. It is possible that individuals who were exposed to early adversity were more likely to experience states, such as negative moods and low levels of perceived control over life, which resulted in higher levels of neuroticism but lower levels of conscientiousness over time. The effects of early adversity on conscientiousness were only observed in the middle-aged but not the older samples. It is possible that the effects of early adversity on personality traits may disappear as people age. However, only one sample of middle-aged adults was examined in the current research. Future replication is needed with different age groups. Finally, the results indicated that changes in personality traits were generally not related to early adversity.

The moderating effects of early adversity on the association between stressful life events and perceived stress in adulthood were examined only in Study 1. Contrary to the stress inoculation hypothesis, inverted U-shaped relations were observed such that individuals with a moderate exposure to early adversity showed stronger associations between stressful life events level and perceived stress level and between changes in stressful life events and changes in perceived stress. Therefore, rather than protecting individuals from heightened reactions to stressors, individuals with moderate early adversity were more likely to appraise their life as stressful when experiencing stressful life events in adulthood. Consistent with the stress sensitization model, individuals who experienced a moderate amount of adversity early in life displayed stronger associations between encounters of stressors and perceptions of stress than those with a low exposure to early adversity; however, the association between stressful life events and perceived stress decreased among those with a high exposure to adversity early in life.

One possible explanation is that given the relatively narrow range of early adversity in Study 1, the number of participants who endorsed a high level of early adversity was small, making the estimation at the high end less reliable.

The moderating effects of early adversity on the associations between stressful life events and personality traits were tested in Study 1 and 2. Both the concurrent and longitudinal associations between stressful life events and personality traits were not dependent on the level of early adversity. The moderating effects of early adversity on the associations between personality traits and perceived stress were tested in all of the three studies. The covariance between changes in conscientiousness and changes in perceived stress and the covariance between changes in openness and changes in perceived stress were linearly related to early adversity in the MIDUS sample, but the findings were not observed in the two HRS samples.

Several limitations of the current research must be considered. First, the assessment of early adversity in all of the three studies was not exhaustive. Previous research has suggested that adverse events in childhood tend to co-occur with each other (Dong et al., 2004). Individuals who experienced one form of adversity are likely to also have experienced other adversities. It is possible that the curvilinear relationships between early adversity and other parameters in the models are more salient when a substantial range of early adversity was assessed. On the other hand, the potential beneficial effects of moderate early adversity may be offset by more severe ones when a comprehensive assessment is conducted (Liu, 2015). Moreover, there is one caveat to the measure of early adversity in Study 1 and 2 that the items assessed participants' experiences before the age of 16 or 18. However, studies about early adversity usually measured experiences earlier than that assessed in the current study. It would be more appropriate to

interpret the early adversity assessed in the current study as the adversity experienced prior to adulthood.

The current research used the summary scores from checklist measures as an indicator of the level of early adversity. However, such a method did not take the severity of individual stressor into account. The frequency of childhood abuse was measured in Study 3, but the severity of the experiences was not evaluated (e.g., moderate physical abuse vs. severe physical abuse). Although there is no consensus on what should be viewed as “a moderate level of adversity” in the stress inoculation hypothesis, the importance of differentiating the severity of individual stressor has been agreed (Daley, Hammen, & Rao, 2000; Hammen, 2005). Future studies should employ interview approaches to assess early adversity so that different factors, such as the frequency, persistence, recurrence, and other contextual information pertaining to the stressor, can be incorporated to determine the severity of each stressor.

Early adversity was measured in a retrospective way in all the samples used in the current research. It has been suggested that the relationship between early adversity and other outcomes in the adulthood can be biased by retrospective report of childhood adversity. Retrospective assessment of early adversity may result in under-reporting of the adversity due to recall failure (Hardt & Rutter, 2004), and on the other hand, the assessment may also be biased by the participants’ current mental state (Colman et al., 2016). Mixed findings have been reported on the comparison of findings from retrospective and prospective assessment of early adversity. For example, one study found a significant association between retrospectively, but not prospectively, measured childhood maltreatment and drug misuse in young adulthood, suggesting that the association between childhood maltreatment and mental health outcomes in adulthood may be spurious due to recall bias (Widom, Raphael, & DuMont, 2004; Widom, Weiler, & Cottler,

1999). However, no difference in the strength of the associations between childhood maltreatment and mental disorders in young adulthood was reported in another study (Scott, McLaughlin, Smith, & Ellis, 2012). Thus, future research should employ both retrospectively and prospectively assessed early adversity.

Exposure to stressors in adulthood focused exclusively on stressful life events in the past five years in the current research. It is possible that early adversity may display different influences on adulthood exposure to chronic stressors unrelated to childhood adversity and exposure to acute stressors. Finally, perceived stress was assessed as the extent that participants evaluated ongoing problems in different domains as upsetting, and we constructed our perceived stress scale in MIDUS based on available items. Psychometrically validated perceived stress measures should be used in future studies.

According to the current research, the stress sensitization model was supported in that the exposure to stressful life events and perceived stress in adulthood increased as the exposure to early adversity went up. Moreover, early adversity showed positive relationships to neuroticism but negative relationships to adaptive personality traits, such as conscientiousness and extraversion. However, the associations of early adversity on personality traits tended to diminish when examining older cohorts. Generally no moderating effects of early adversity were observed on the associations between personality traits and stress experiences in adulthood. Future studies are needed to detect environmental factors that are pertinent to the associations between personality traits and stress experiences.

Tables and Figures

Table 1.

Means, standard deviations, and correlations among manifest variables in Study 1.

2006	1	2	3	4	5	6	7	8	Mean	SD
1. Early Adversity	-	.11 **	-.04 **	-.05**	-.07**	-.01	.14**	.19**	.39	.68
2. Neuroticism		-	-.22**	-.11**	-.23**	-.19**	.10**	.35**	2.05	.59
3. Extraversion			-	.56**	.39**	.53**	-.01	-.17**	3.22	.54
4. Agreeableness				-	.41**	.40**	-.01	-.05**	3.53	.46
5. Conscientiousness					-	.44**	.00	-.14**	3.39	.45
6. Openness						-	.06**	-.07**	2.96	.54
7. Stressful life events							-	.26**	.25	.57
8. Perceived stress								-	1.48	.46
<hr/>										
2010										
1. Early Adversity	-	.10**	0.03*	-0.03	-.06**	-.01	.10**	.17**	.39	.68
2. Neuroticism		-	-.25**	-.14**	-.25**	-.23**	.10**	.35**	1.99	.60
3. Extraversion			-	.58**	.42**	.55**	-.04**	-.15**	3.17	.56
4. Agreeableness				-	.47**	.45**	-.02	-.04**	3.51	.49
5. Conscientiousness					-	.49**	-.02	-.15**	3.37	.49
6. Openness						-	.05**	-.06**	2.90	.57
7. Stressful life events							-	.25**	.26	.59
8. Perceived stress								-	1.51	.46
<hr/>										
2014										
1. Early Adversity	-	.07**	-.02	-.02	-.06**	.00	.13**		.39	.68
2. Neuroticism		-	-.30**	-.19**	-.27**	-.25**	.36**		1.96	.60
3. Extraversion			-	.60**	.46**	.59**	-.20**		3.16	.59
4. Agreeableness				-	.51**	.48**	-.07**		3.49	.50
5. Conscientiousness					-	.50**	-.18**		3.36	.50
6. Openness						-	-.12**		2.88	.57
7. Perceived Stress							-		1.53	.46

Note. * $p < .05$; ** $p < .01$.

Table 2.

Standardized estimates of the linear and quadratic effects of early adversity on the levels and changes in personality traits in Study 1.

	Level				Change			
	β_{EA}	p-value	β_{EA^2}	p-value	β_{EA}	p-value	β_{EA^2}	p-value
N	.09	.000	.01	.580	.02	.718	.05	.255
E	-.02	.432	-.02	.365	-.03	.461	.01	.910
A	-.01	.669	.00	.927	.01	.844	.00	.993
C	-.04	.110	-.06	.029	-.02	.097	.00	.665
O	-.04	.088	.03	.221	-.07	.147	.09	.055

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

Table 3.

Parameter estimates of the linear and quadratic moderating effects of early adversity on the covariances between the level and changes in stressful life events and the level and changes in personality traits and perceived stress in Study 1.

	Level				Change			
	EA	p-value	EA ²	p-value	EA	p-value	EA ²	p-value
N	.08	.106	-.01	.505	.02	.602	-.01	.663
E	-.12	.026	.03	.085	-.04	.264	.02	.301
A	-.01	.903	.00	.831	.00	.998	.00	.878
C	-.07	.271	.02	.375	.00	.987	.00	.903
O	.01	.804	-.01	.716	.00	.943	.00	.833
PS	.24	.000	-.08	.000	.04	.319	-.02	.114

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness; PS = perceived stress.

Table 4.

Parameter estimates of the linear and quadratic moderating effects of early adversity on the covariances between the level and changes in personality traits and the level and changes in perceived stress in Study 1.

	Level				Change			
	EA	p-value	EA ²	p-value	EA	p-value	EA ²	p-value
N	.02	.633	.01	.658	-.07	.175	.03	.270
E	-.01	.725	.00	.961	-.05	.306	.07	.023
A	.01	.732	.02	.497	.01	.878	.00	.896
C	.00	.926	.00	.994	.02	.690	.04	.155
O	.00	.914	.02	.507	-	-	-	-

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

Table 5.

Means, standard deviations, and correlations among manifest variables in Study 2.

2008	1	2	3	4	5	6	7	8	Mean	SD
1. Early Adversity	-	.08**	-0.03**	-.04**	-.07**	.01	.14**		.57	.81
2. Neuroticism		-	-.22**	-.13**	-.26**	-.21**	.10**		2.03	.63
3. Extraversion			-	.55**	.40**	.55**	-.01		3.20	.55
4. Agreeableness				-	.44**	.41**	.01		3.54	.48
5. Conscientiousness					-	.46**	-.01		3.36	.48
6. Openness						-	.07**		2.93	.56
7. Stressful life events							-		.29	.64
<hr/>										
2012										
1. Early Adversity	-	.08**	-.02	-.03	-.06**	.03	.10**	.18**	.57	.81
2. Neuroticism		-	-.25**	-.14**	-.28**	-.24**	.04**	.35**	1.99	.61
3. Extraversion			-	.56**	.42**	.56**	.00	-.13**	3.16	.56
4. Agreeableness				-	.48**	.43**	.02	-.03*	3.51	.49
5. Conscientiousness					-	.46**	.01	-.15**	3.36	.49
6. Openness						-	.08**	-.04**	2.89	.57
7. Stressful life events							-	.29**	.31	.68
8. Perceived stress								-	1.51	.46
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2016										
1. Early Adversity	-	.06**	-.01	-.05**	-.07**	.03	.15**		.57	.81
2. Neuroticism		-	-.27**	-.18**	-.27**	-.26**	.35**		1.91	.59
3. Extraversion			-	.58**	.43**	.57**	-.17**		3.17	.57
4. Agreeableness				-	.48**	.47**	-.07**		3.52	.50
5. Conscientiousness					-	.52**	-.17**		3.35	.51
6. Openness						-	-.09**		2.88	.59
7. Perceived Stress							-		1.58	.50

Note. * $p < .05$; ** $p < .01$.

Table 6.

Standardized estimates of the linear and quadratic effects of early adversity on the levels and changes in personality traits in Study 2.

	Level				Change			
	β_{EA}	p-value	β_{EA^2}	p-value	β_{EA}	p-value	β_{EA^2}	p-value
N	.11	0.000	-.02	.476	.06	.170	.02	.665
E	-.05	.031	.00	.891	.07	.215	-.11	.036
A	-.01	.808	-.02	.350	.00	.951	-.06	.198
C	-.06	.005	-.04	.113	-.02	.626	-.06	.227
O	.02	.362	-.02	.350	.06	.706	.03	.801

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

Table 7.

Parameter estimates of the linear and quadratic moderating effects of early adversity on the covariances between the level and changes in stressful life events and the level and changes in personality traits in Study 2.

	Level				Change			
	EA	p-value	EA ²	p-value	EA	p-value	EA ²	p-value
N	-.03	.424	.01	.317	-.08	.009	.04	.011
E	.05	.087	-.01	.352	.03	.271	.00	.815
A	.02	.453	.00	.991	.02	.411	.00	.995
C	.02	.610	.00	.964	.03	.302	.00	.964
O	.07	.026	-.01	.626	.05	.126	.00	.773

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

Table 8.

Parameter estimates of the linear and quadratic moderating effects of early adversity on the covariances between the level and changes in personality traits and the level and changes in perceived stress in Study 2.

	Level				Change			
	EA	p-value	EA ²	p-value	EA	p-value	EA ²	p-value
N	-.07	.062	.02	.275	.03	.576	-.08	.019
E	.04	.266	.01	.616	-.05	.406	.05	.113
A	.03	.387	.01	.584	-.07	.201	.02	.479
C	.08	.040	-.02	.454	-.13	.047	.06	.192
O	.04	.191	.02	.310	-.06	.310	.01	.710

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

Table 9.

Means, standard deviations, and correlations among manifest variables in Study 3.

Wave 1	1	2	3	4	5	6	7	Mean	SD
1. Early Adversity	-	.16**	-.03*	-.08**	-.11**	.03*	.17**	1.66	.47
2. Neuroticism		-	-.16**	-.05**	-.20**	-.17**	.43**	2.23	.66
3. Extraversion			-	.53**	.28**	.52**	-.30**	3.19	.56
4. Agreeableness				-	.29**	.35**	-.16**	3.49	.49
5. Conscientiousness					-	.27**	-.31**	3.42	.44
6. Openness						-	-.19**	3.02	.53
7. Perceived stress							-	.04	.65
<hr/>									
Wave 2									
1. Early Adversity	-	.14**	-.04*	-.06**	-.10**	.01	.13**	1.66	.47
2. Neuroticism		-	-.20**	-.12**	-.20**	-.22**	.42**	2.06	.63
3. Extraversion			-	.50**	.26**	.51**	-.33**	3.10	.57
4. Agreeableness				-	.27**	.33**	-.17**	3.45	.50
5. Conscientiousness					-	.27**	-.31**	3.47	.45
6. Openness						-	-.25**	2.90	.54
7. Perceived stress							-	-.05	.64
<hr/>									
Wave 3									
1. Early Adversity	-	.13**	-.02	-.05**	-.08**	.03	.12**	1.66	.47
2. Neuroticism		-	-.16**	-.06**	-.19**	-.19**	.40**	2.05	.62
3. Extraversion			-	.48**	.26**	.52**	-.29**	3.07	.58
4. Agreeableness				-	.27**	.35**	-.11**	3.43	.50
5. Conscientiousness					-	.29**	-.29**	3.47	.45
6. Openness						-	-.20**	2.89	.54
7. Perceived Stress							-	-.01	.66

Note. * $p < .05$; ** $p < .01$.

Table 10.

Standardized estimates of the linear and quadratic effects of early adversity on the levels and changes in personality traits in Study 3.

	Level				Change			
	β_{EA}	p-value	β_{EA^2}	p-value	β_{EA}	p-value	β_{EA^2}	p-value
N	.16	0.000	.00	.966	.10	.042	.01	.817
E	-.05	.014	.02	.243	-.01	.829	.03	.551
A	-.05	.008	.02	.193	.00	.931	-.02	.609
C	-.12	.000	.03	.163	-.20	.347	-.03	.805
O	.01	.606	.02	.392	.04	.335	-.02	.534

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

Table 11.

Parameter estimates of the linear and quadratic moderating effects of early adversity on the covariances between the level and changes in personality traits and the level and changes in perceived stress in Study 3.

	Level				Change			
	EA	p-value	EA ²	p-value	EA	p-value	EA ²	p-value
N	.01	.735	.01	.862	.00	.946	.07	.289
E	-.02	.614	-.05	.294	-.14	.024	-.03	.703
A	.06	.078	-.06	.210	-.09	.100	-.10	.200
C	-.02	.588	.00	.940	-.27	0.000	.15	.104
O	.07	.045	-.12	.015	-.22	0.000	-.01	.899

Note. EA = early adversity; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

Table 12.

Summary of the results and replication of the effects of early adversity on all the parameters tested across the three studies.

	Study 1		Study 2		Study 3		Replicated in 2 Studies	Replicated in 3 Studies
	EA	EA ²	EA	EA ²	EA	EA ²		
SLE Level	+	/	+	/	na	na	yes	
PS Level	+	/	+	/	+	/	yes	yes
SLE Change	/	/	/	/	na	na		
PS Change	/	/	/	/	/	/	no	no
N Level	+	/	+	/	+	/	yes	yes
E Level	/	/	/	/	/	/		
A Level	/	/	/	/	/	/		
C Level	/	/	/	/	-	/	no	no
O Level	/	/	/	/	/	/		
N Change	/	/	/	/	/	/		
E Change	/	/	/	/	/	/		
A Change	/	/	/	/	/	/		
C Change	/	/	/	/	/	/		
O Change	/	/	/	/	/	/		
SLE Level – PS Level	+	-	na	na	na	na		
SLE Change – PS Change	/	/	na	na	na	na		
SLE Level – N Level	/	/	/	/	na	na		
SLE Level – E Level	/	/	/	/	na	na		
SLE Level – A Level	/	/	/	/	na	na		
SLE Level – C Level	/	/	/	/	na	na		
SLE Level – O Level	/	/	/	/	na	na		
SLE Change – N Change	/	/	/	/	na	na		
SLE Change – E Change	/	/	/	/	na	na		
SLE Change – A Change	/	/	/	/	na	na		

Table 12 (continued).

E Level – PS Level	/	/	/	/	/	/		
A Level – PS Level	/	/	/	/	/	/		
C Level – PS Level	/	/	/	/	/	/		
O Level – PS Level	/	/	/	/	/	/		
N Change – PS Change	/	/	/	/	/	/		
E Change – PS Change	/	/	/	/	/	/		
A Change – PS Change	/	/	/	/	/	/		
C Change – PS Change	/	/	/	/	-	/	no	no
O Change – PS Change	na	na	/	/	-	/	no	no

Note. Replication was marked only when significant effects were found in at least on study. “+” indicates a positive effect; “-” indicates a negative effect; “/” indicates a nonsignificant effect. EA = early adversity; SLE = stressful life events; PS = perceived stress; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.

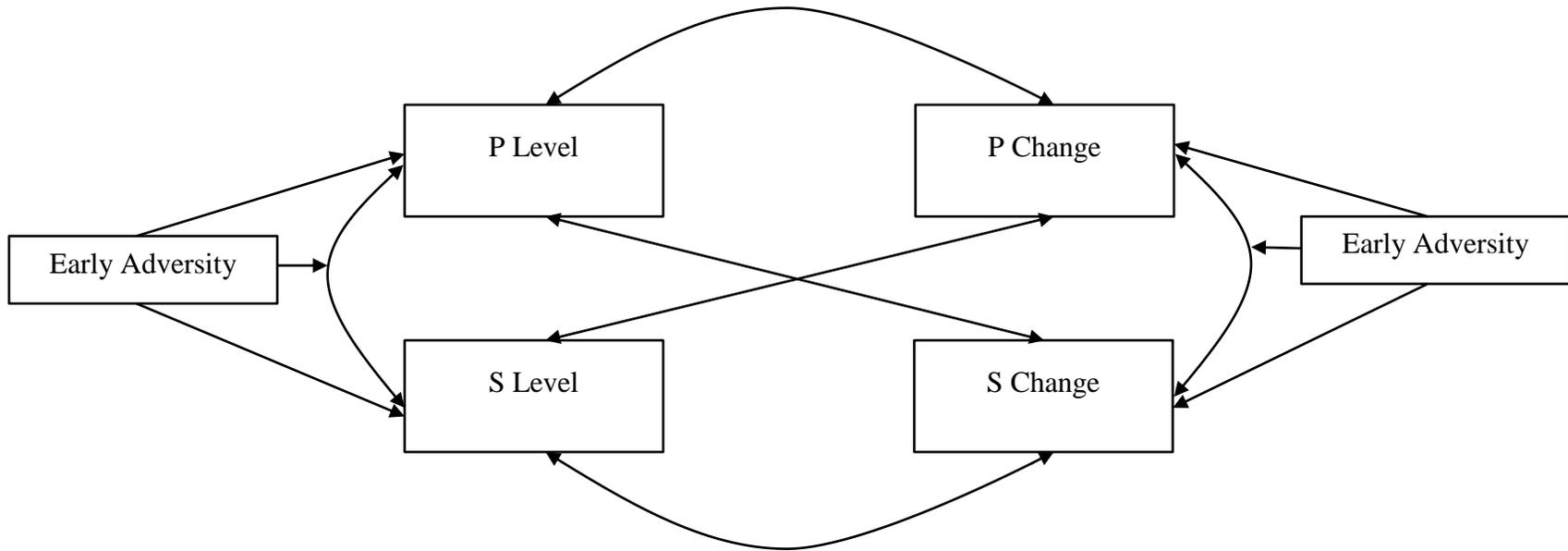


Figure 1. The conceptual diagram of the research questions tested in the current research. P = personality traits; S = stressful life events/perceived stress.

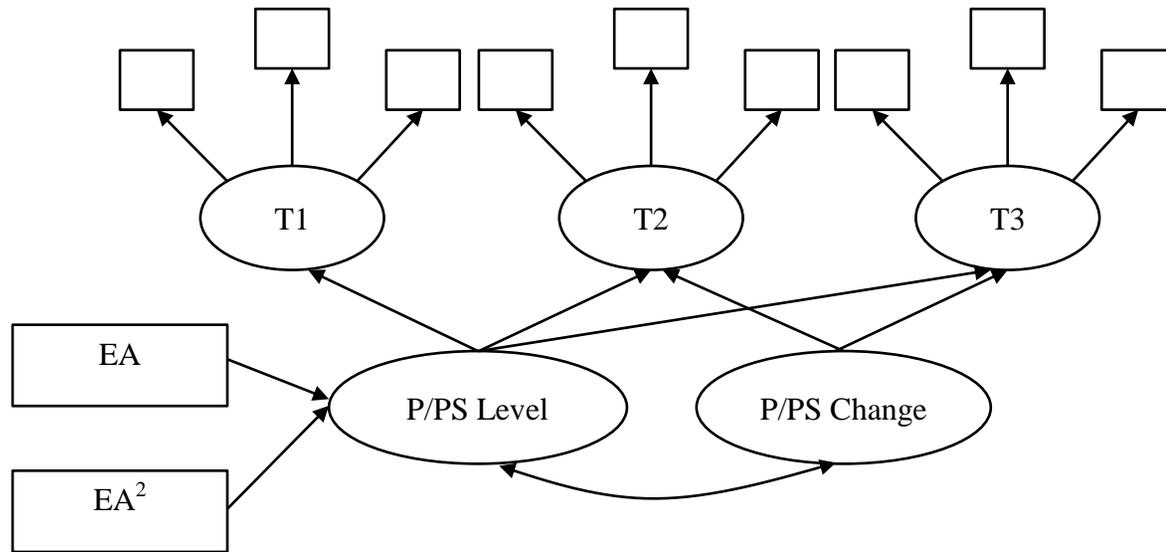


Figure 2. Model fitted to test linear and quadratic effects of early adversity on the level of personality traits and the level of perceived stress. P = personality traits; PS = perceived stress; EA = early adversity.

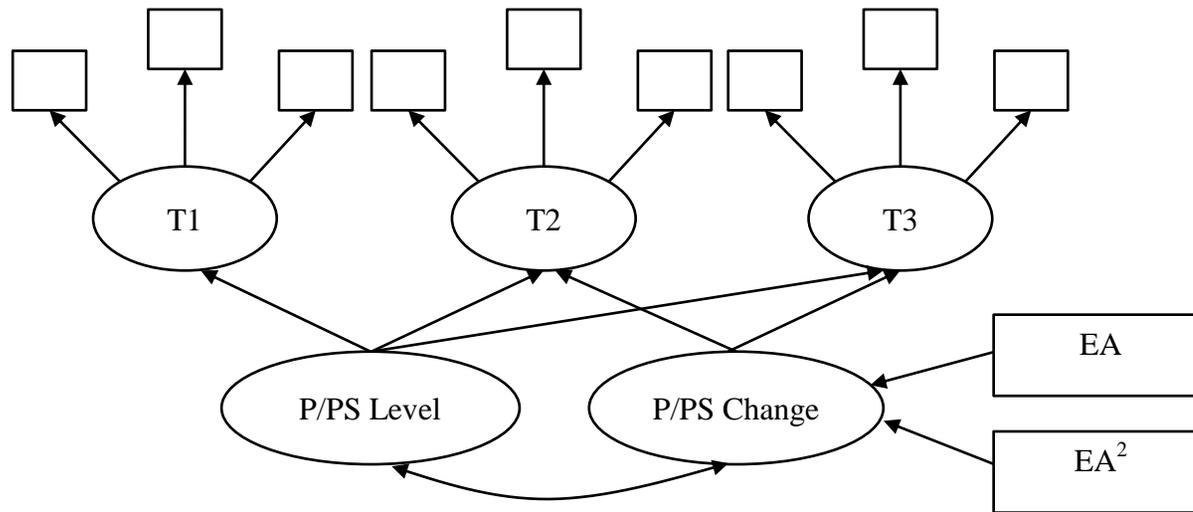


Figure 3. Model fitted to test linear and quadratic effects of early adversity on changes in personality traits and changes in perceived stress. P = personality traits; PS = perceived stress; EA = early adversity.

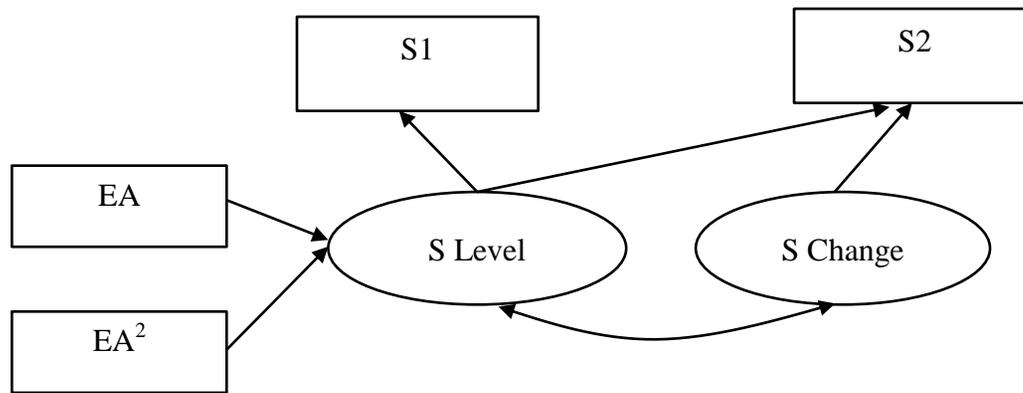


Figure 4. Model fitted to test linear and quadratic effects of early adversity on the level stressful life events. S = stressful life events; EA = early adversity.

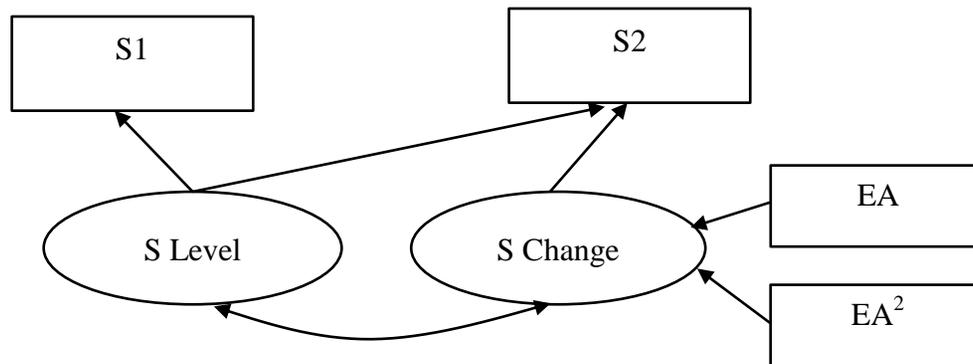


Figure 5. Model fitted to test linear and quadratic effects of early adversity on changes in stressful life events. S = stressful life events; EA = early adversity.

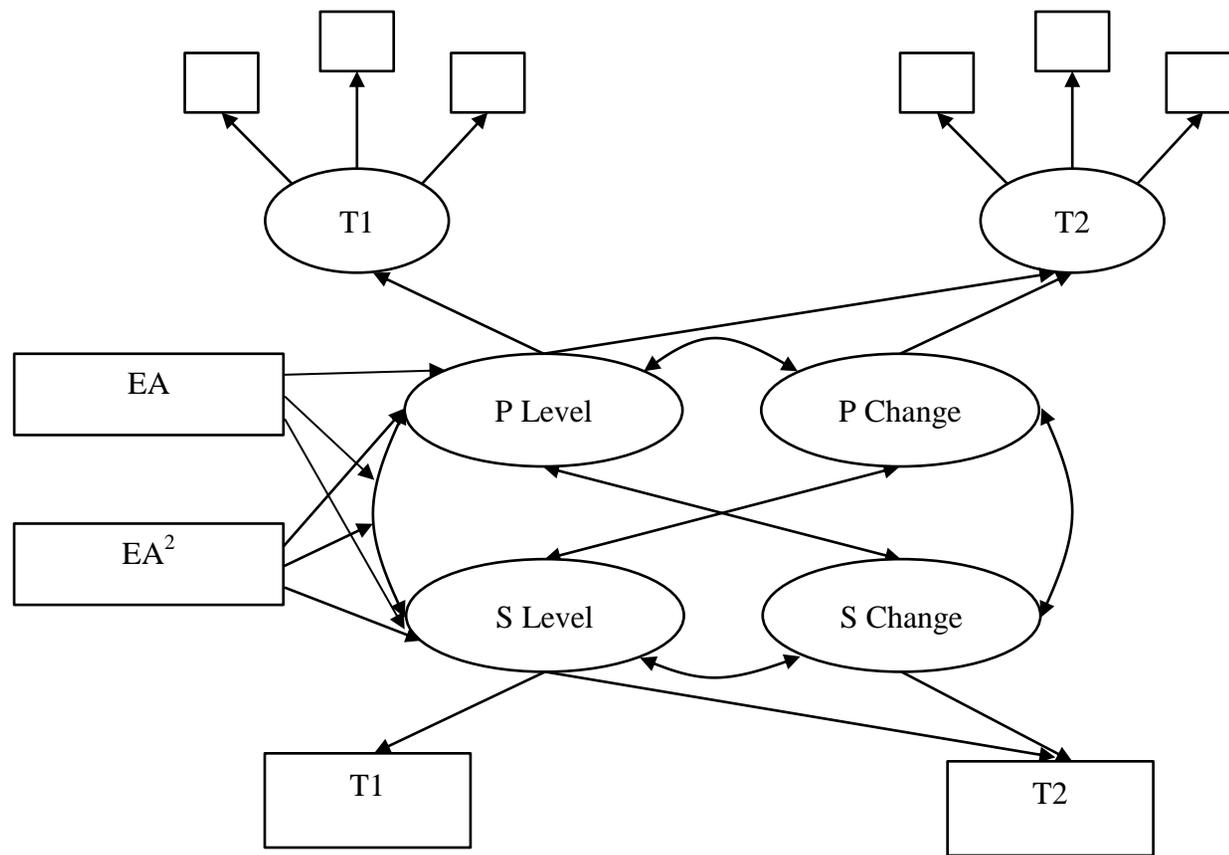


Figure 6. Model fitted to test the linear and quadratic moderating effects of early adversity on the covariance between the level of personality traits and the level of stressful life events. P = personality traits; S = stressful life events; EA = early adversity.

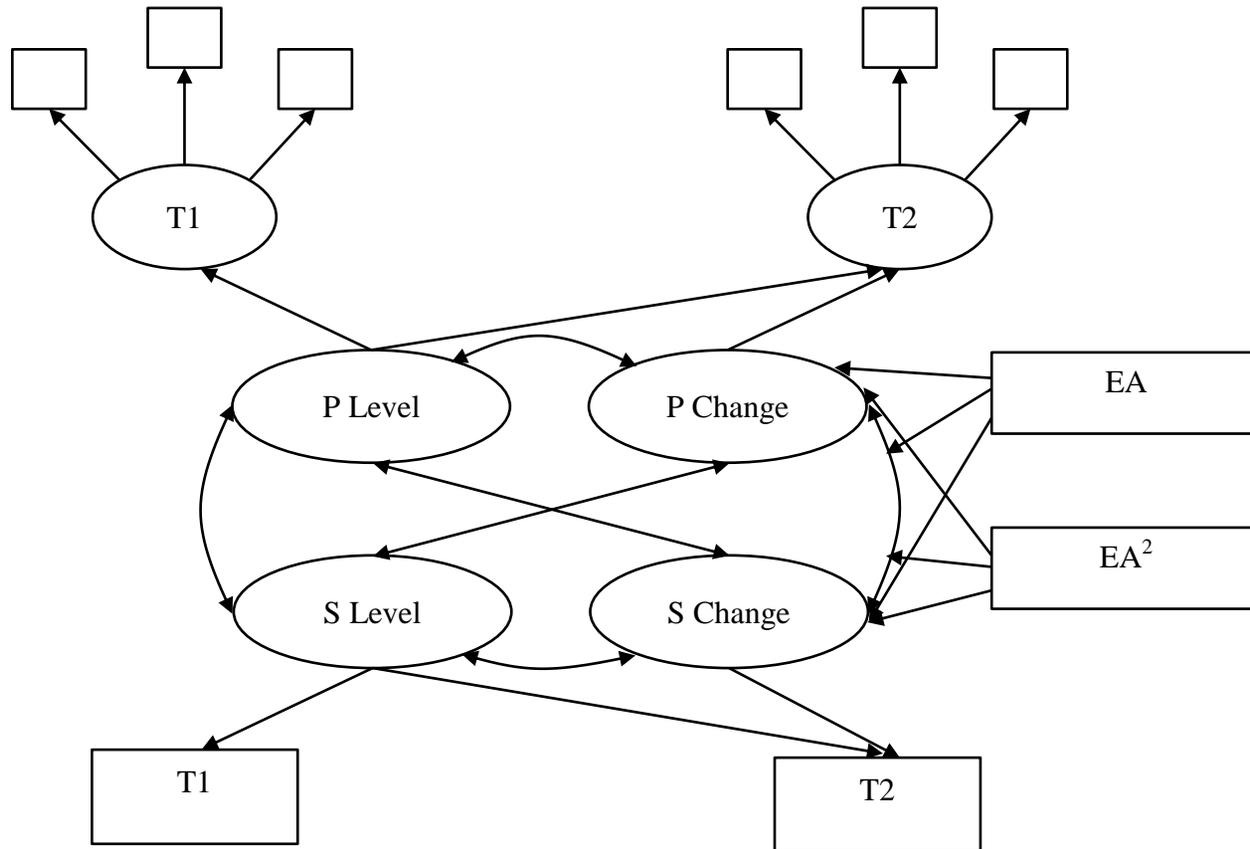


Figure 7. Model fitted to test the linear and quadratic moderating effects of early adversity on the covariance between changes in personality traits and changes in stressful life events. P = personality traits; S = stressful life events; EA = early adversity.

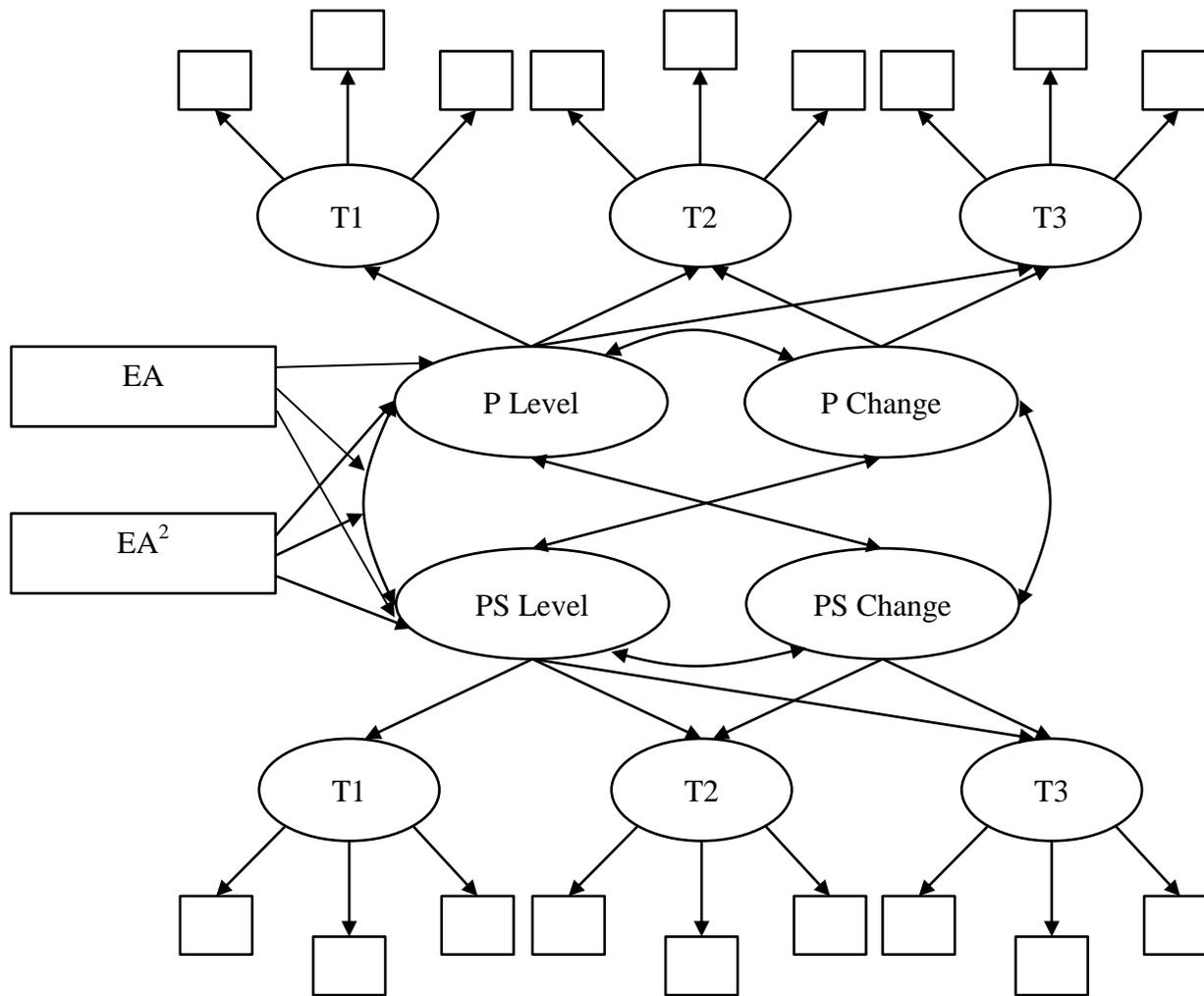


Figure 8. Model fitted to test the linear and quadratic moderating effects of early adversity on the covariance between the level of personality traits and the level of perceived stress. P = personality traits; PS = perceived stress; EA = early adversity.

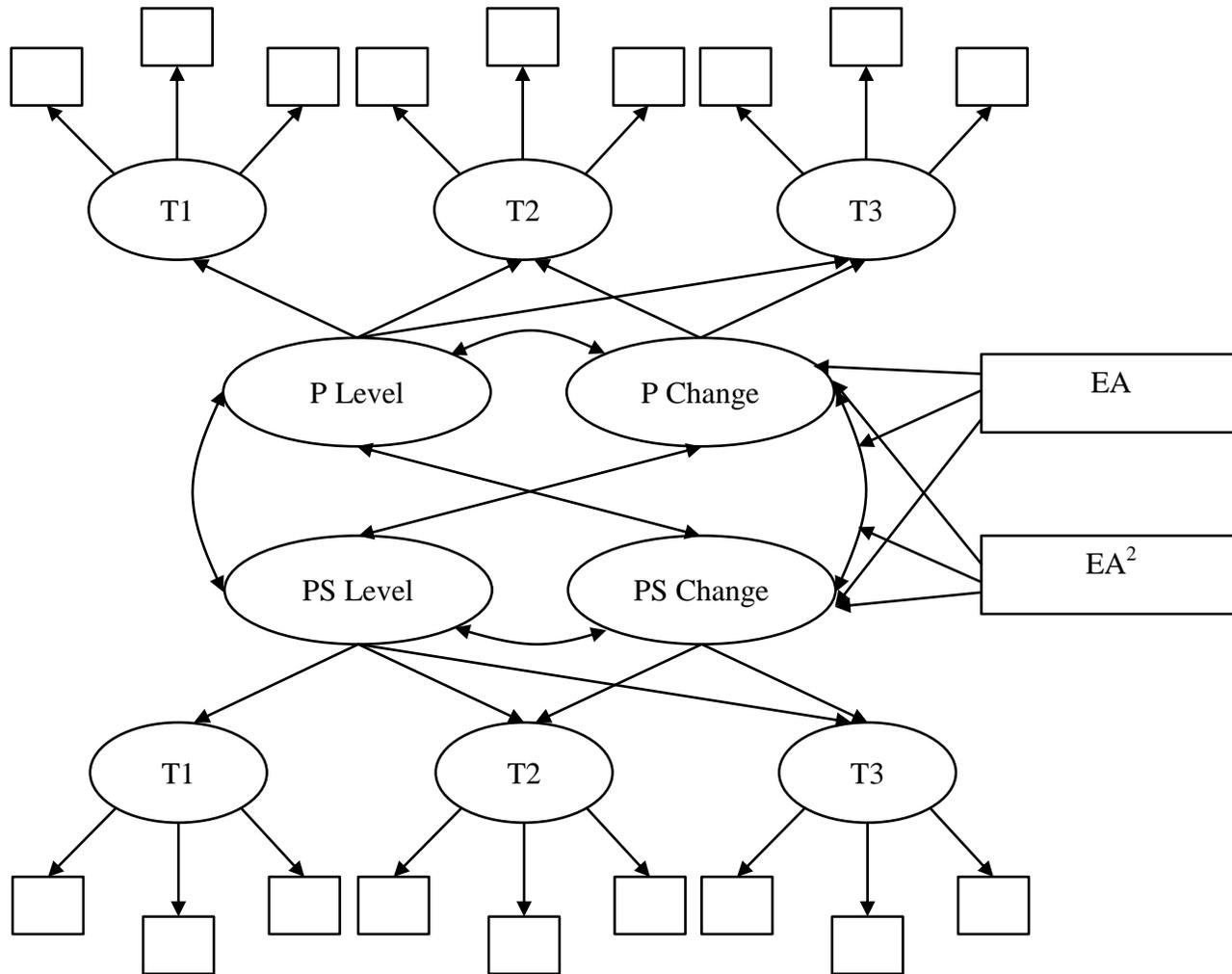


Figure 9. Model fitted to test the linear and quadratic moderating effects of early adversity on the covariance between the level of personality traits and the level of perceived stress. P = personality traits; PS = perceived stress; EA = early adversity.

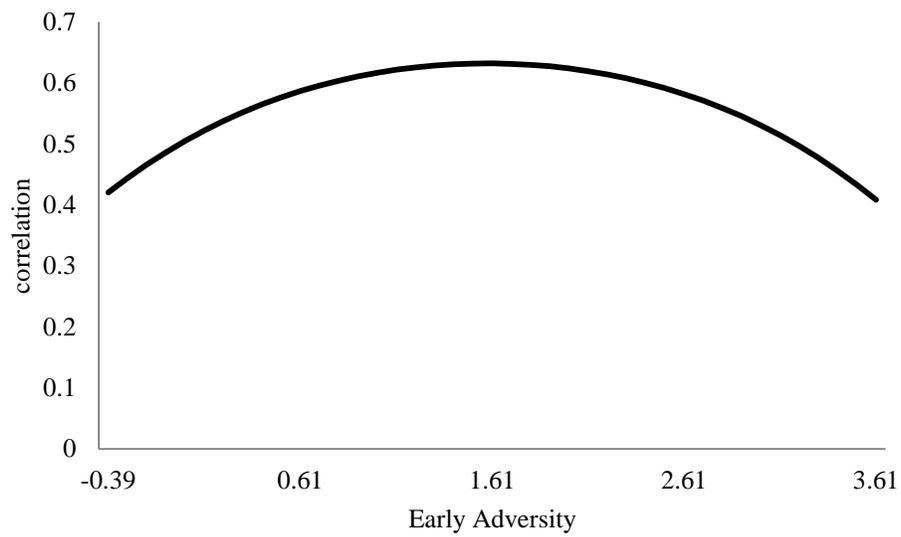


Figure 10. The moderating effects of early adversity on the correlation between the level of stressful life events and the level of perceived stress in Study 1.

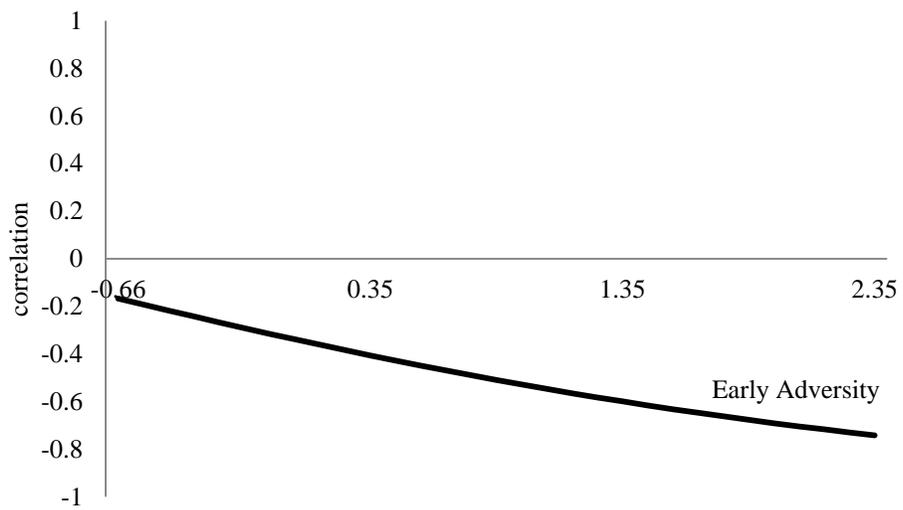


Figure 11. The moderating effects of early adversity on the correlation between changes in conscientiousness and changes in perceived stress in Study 3.

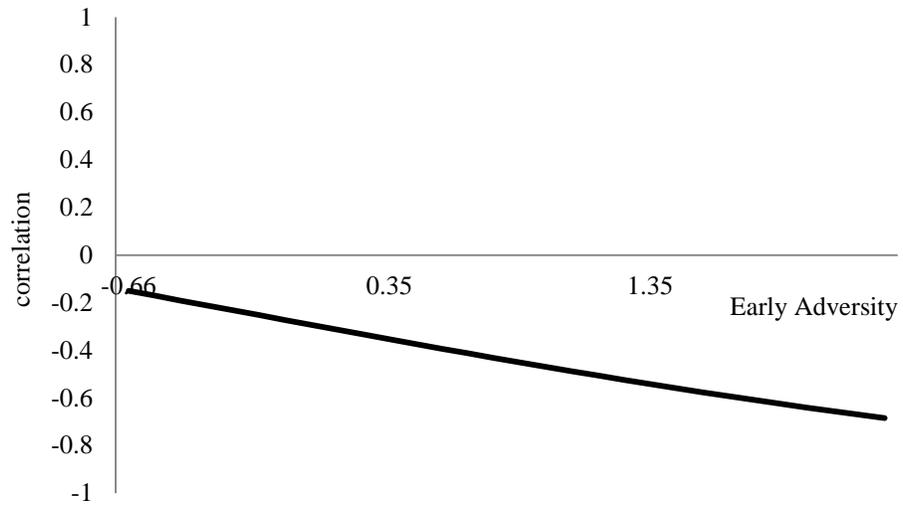


Figure 12. The moderating effects of early adversity on the correlation between changes in openness and changes in perceived stress in Study 3.

References

- Allemand, M., Hill, P. L., & Lehmann, R. (2015). Divorce and personality development across middle adulthood. *Personal Relationships*, 22(1), 122-137.
doi:<http://dx.doi.org/10.1111/per.12067>
- Anda, R. F., Felitti, V. J., Bremner, J. D., Walker, J. D., Whitfield, C., Perry, B. D., . . . Giles, W. H. (2006). The enduring effects of abuse and related adverse experiences in childhood: A convergence of evidence from neurobiology and epidemiology. *European Archives of Psychiatry and Clinical Neuroscience*, 256(3), 174-186.
doi:<http://dx.doi.org/10.1007/s00406-005-0624-4>
- Baldasaro, R. E., Shanahan, M. J., & Bauer, D. J. (2013). Psychometric properties of the mini-IPIP in a large, nationally representative sample of young adults. *Journal of Personality Assessment*, 95(1), 74-84. doi:<http://dx.doi.org/10.1080/00223891.2012.700466>
- Bauer, D. J. (2017). A more general model for testing measurement invariance and differential item functioning. *Psychological Methods*, 22(3), 507-526.
doi:<http://dx.doi.org/10.1037/met0000077>
- Beatty, L., Lee, C., & Wade, T. D. (2009). A prospective examination of perceived stress as a mediator of the relationship between life-events and QOL following breast cancer. *British Journal of Health Psychology*, 14(4), 789-804.
doi:<http://dx.doi.org/10.1348/135910709X412459>
- Bleidorn, W., Hopwood, C. J., & Lucas, R. E. (2018). Life events and personality trait change. *Journal of Personality*, 86(1), 83-96. doi:<http://dx.doi.org/10.1111/jopy.12286>

- Boyce, C. J., Wood, A. M., Daly, M., & Sedikides, C. (2015). Personality change following unemployment. *Journal of Applied Psychology, 100*(4), 991-1011.
doi:<http://dx.doi.org/10.1037/a0038647>
- Brim, O. G., & Featherman, D. L. (1998). *Surveying midlife development in the United States*. Unpublished manuscript.
- Brim, O. G., Ryff, C. D., & Kessler, R. C. (2004). The MIDUS national survey: An overview. *How healthy are we?: A national study of well-being at midlife* (pp. 1-34). Chicago, IL, US: University of Chicago Press, Chicago, IL.
- Burkhauser, R. V., & Gertler, P. J. (1995). Introduction to special issue on the Health and Retirement Survey/data quality and early results. *Journal of Human Resources, 30*, S1–S6.
- Carver, C. S., Johnson, S. L., McCullough, M. E., Forster, D. E., & Joormann, J. (2014). Adulthood personality correlates of childhood adversity. *Frontiers in Psychology, 5*
Retrieved from <https://search.proquest.com/docview/1690659030?accountid=14553>
- Chen, E., Cohen, S., & Miller, G. E. (2010). How low socioeconomic status affects 2-year hormonal trajectories in children. *Psychological Science, 21*(1), 31-37.
doi:<http://dx.doi.org/10.1177/0956797609355566>
- Cohen, S., Kessler, R. C., & Gordon, L. U. (1995). Strategies for measuring stress in studies of psychiatric and physical disorders. In S. Cohen, R. C. Kessler & L. U. Gordon (Eds.), *Measuring stress: A guide for health and social scientists* (pp. 3-26, Chapter xii, 236 Pages). New York, NY, US, US: Oxford University Press, New York, NY. Retrieved from <https://search.proquest.com/docview/618756655?accountid=14553>
- Cohen, S., & Williamson, G. M. (1991). Stress and infectious disease in humans. *Psychological Bulletin, 109*(1), 5-24. doi:<http://dx.doi.org/10.1037/0033-2909.109.1.5>

- Colman, I., Kingsbury, M., Garad, Y., Zeng, Y., Naicker, K., Patten, S., . . . Thompson, A. H. (2016). Consistency in adult reporting of adverse childhood experiences. *Psychological Medicine*, 46(3), 543-549. doi:<http://dx.doi.org/10.1017/S0033291715002032>
- Costa, P. T., Jr., Herbst, J. H., McCrae, R. R., & Siegler, I. C. (2000). Personality at midlife: Stability, intrinsic maturation, and response to life events. *Assessment*, 7(4), 365-378. doi:<http://dx.doi.org/10.1177/107319110000700405>
- Daley, S. E., Hammen, C., & Rao, U. (2000). Predictors of first onset and recurrence of major depression in young women during the 5 years following high school graduation. *Journal of Abnormal Psychology*, 109(3), 525-533. doi:<http://dx.doi.org/10.1037/0021-843X.109.3.525>
- Denenberg, V. H. (1964). Critical periods, stimulus input, and emotional reactivity: A theory of infantile stimulation. *Psychological Review*, 71(5), 335-351. doi:<http://dx.doi.org/10.1037/h0042567>
- Dienes, K. A., Hammen, C., Henry, R. M., Cohen, A. N., & Daley, S. E. (2006). The stress sensitization hypothesis: Understanding the course of bipolar disorder. *Journal of Affective Disorders*, 95(1-3), 43-49. doi:<http://dx.doi.org/10.1016/j.jad.2006.04.009>
- Dienstbier, R. A. (1989). Arousal and physiological toughness: Implications for mental and physical health. *Psychological Review*, 96(1), 84-100. doi:<http://dx.doi.org/10.1037/0033-295X.96.1.84>
- Dong, M., Anda, R. F., Felitti, V. J., Dube, S. R., Williamson, D. F., Thompson, T. J., . . . Giles, W. H. (2004). The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. *Child Abuse & Neglect*, 28(7), 771-784. doi:<http://dx.doi.org/10.1016/j.chiabu.2004.01.008>

Dyson, R., & Renk, K. (2006). Freshmen adaptation to university life: Depressive symptoms, stress, and coping. *Journal of Clinical Psychology, 62*(10), 1231-1244.

doi:<http://dx.doi.org/10.1002/jclp.20295>

Ebstrup, J. F., Eplov, 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: An International Journal, 24*(4), 407-419.

doi:<http://dx.doi.org/10.1080/10615806.2010.540012>

Edge, M. D., Ramel, W., Drabant, E. M., Kuo, J. R., Parker, K. J., & Gross, J. J. (2009). For better or worse? stress inoculation effects for implicit but not explicit anxiety. *Depression and Anxiety, 26*(9), 831-837. doi:<http://dx.doi.org/10.1002/da.20592>

Espejo, E. P., Hammen, C. L., Connolly, N. P., Brennan, P. A., Najman, J. M., & Bor, W. (2007). Stress sensitization and adolescent depressive severity as a function of childhood adversity: A link to anxiety disorders. *Journal of Abnormal Child Psychology, 35*(2), 287-299.

doi:<http://dx.doi.org/10.1007/s10802-006-9090-3>

Garnezy, N. (1986). Children under severe stress: Critique and commentary. *Journal of the American Academy of Child Psychiatry, 25*(3), 384-392.

doi:[http://dx.doi.org/10.1016/S0002-7138\(09\)60261-2](http://dx.doi.org/10.1016/S0002-7138(09)60261-2)

Gunnar, M. R., Frenn, K., Wewerka, S. S., & Van Ryzin, M. J. (2009). Moderate versus severe early life stress: Associations with stress reactivity and regulation in 10-12-year-old children. *Psychoneuroendocrinology, 34*(1), 62-75.

doi:<http://dx.doi.org/10.1016/j.psyneuen.2008.08.013>

- Hammen, C., Henry, R., & Daley, S. E. (2000). Depression and sensitization to stressors among young women as a function of childhood adversity. *Journal of Consulting and Clinical Psychology, 68*(5), 782-787. doi:<http://dx.doi.org/10.1037/0022-006X.68.5.782>
- Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry, 45*(2), 260-273. doi:<http://dx.doi.org/10.1111/j.1469-7610.2004.00218.x>
- Harkness, K. L., & Washburn, D. (2016). Stress generation. In G. Fink (Ed.), *Stress: Concepts, cognition, emotion, and behavior* (pp. 331-338, Chapter xiii, 487 Pages). San Diego, CA, US, US: Elsevier Academic Press, San Diego, CA. Retrieved from <https://search.proquest.com/docview/1817570882?accountid=14553>
- Harkness, K. L., Bruce, A. E., & Lumley, M. N. (2006). The role of childhood abuse and neglect in the sensitization to stressful life events in adolescent depression. *Journal of Abnormal Psychology, 115*(4), 730-741. doi:<http://dx.doi.org/10.1037/0021-843X.115.4.730>
- Hazel, N. A., Hammen, C., Brennan, P. A., & Najman, J. (2008). Early childhood adversity and adolescent depression: The mediating role of continued stress. *Psychological Medicine, 38*(4), 581-589. doi:<http://dx.doi.org/10.1017/S0033291708002857>
- Heim, C., & Nemeroff, C. B. (2001). The role of childhood trauma in the neurobiology of mood and anxiety disorders: Preclinical and clinical studies. *Biological Psychiatry, 49*(12), 1023-1039. doi:[http://dx.doi.org/10.1016/S0006-3223\(01\)01157-X](http://dx.doi.org/10.1016/S0006-3223(01)01157-X)
- Hoth, K.F. (1,6), Paul, R. H. (. 1.), Gunstad, J. (. 1.), Cohen, R. A. (. 1.), Williams, L. M. (. 2.), Dobson-Stone, C., . . . Gordon, E. (. 5.). (2006). Associations between the COMT Val/Met polymorphism, early life stress, and personality among healthy adults. *Neuropsychiatric Disease and Treatment, 2*(2), 219-225. doi:10.2147/nedt.2006.2.2.219

- Jackson, J. J., Hill, P. L., Payne, B. R., Roberts, B. W., & Stine-Morrow, E. A. L. (2012). Can an old dog learn (and want to experience) new tricks? cognitive training increases openness to experience in older adults. *Psychology and Aging, 27*(2), 286-292.
doi:<http://dx.doi.org/10.1037/a0025918>
- Kandler, C., Bleidorn, W., Riemann, R., Angleitner, A., & Spinath, F. M. (2012). Life events as environmental states and genetic traits and the role of personality: A longitudinal twin study. *Behavior Genetics, 42*(1), 57-72. doi:<http://dx.doi.org/10.1007/s10519-011-9491-0>
- Lachman, M. E., & Bertrand, R. M. (2001). Personality and the self in midlife. In M. E. Lachmann (Ed.), *Handbook of midlife development* (pp. 279–309). Hoboken, NJ: Wiley.
- Lachman, M.E., & Weaver, S.L. (1997). *The Midlife Development Inventory (MIDI) personality scales: Scale construction and scoring* (Tech. Rep. No. 1). Waltham, MA: Brandeis University, Department of Psychology.
- La Rocque, C. L., Harkness, K. L., & Bagby, R. M. (2014). The differential relation of childhood maltreatment to stress sensitization in adolescent and young adult depression. *Journal of Adolescence, 37*(6), 871-882. doi:<http://dx.doi.org/10.1016/j.adolescence.2014.05.012>
- Laurent, H. K., Gilliam, K. S., Wright, D. B., & Fisher, P. A. (2015). Child anxiety symptoms related to longitudinal cortisol trajectories and acute stress responses: Evidence of developmental stress sensitization. *Journal of Abnormal Psychology, 124*(1), 68-79.
doi:<http://dx.doi.org/10.1037/abn0000009>
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York, NY, US, US: McGraw-Hill, New York, NY. Retrieved from <https://search.proquest.com/docview/615466261?accountid=14553>

- Lazarus, R. S., & Folkman, S. (1984). *Stress, Appraisal and Coping*. New York: Springer Pub. Co.
- Liu, R. T. (2015). A developmentally informed perspective on the relation between stress and psychopathology: When the problem with stress is that there is not enough. *Journal of Abnormal Psychology, 124*(1), 80-92. doi:<http://dx.doi.org/10.1037/abn0000043>
- Löckenhoff, C. E., Terracciano, A., Patriciu, N. S., Eaton, W. W., & Costa, P. T., Jr. (2009). Self-reported extremely adverse life events and longitudinal changes in five-factor model personality traits in an urban sample. *Journal of Traumatic Stress, 22*(1), 53-59. doi:<http://dx.doi.org/10.1002/jts.20385>
- Lüdtke, O., Roberts, B. W., Trautwein, U., & Nagy, G. (2011). A random walk down university avenue: Life paths, life events, and personality trait change at the transition to university life. *Journal of Personality and Social Psychology, 101*(3), 620-637. doi:<http://dx.doi.org/10.1037/a0023743>
- Luecken, L. J., Kraft, A., Appelhans, B. M., & Enders, C. (2009). Emotional and cardiovascular sensitization to daily stress following childhood parental loss. *Developmental Psychology, 45*(1), 296-302. doi:<http://dx.doi.org/10.1037/a0013888>
- 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, ,* No Pagination Specified. doi:<http://dx.doi.org/10.1002/per.2127>
- Luo, J., & Roberts, B. W. (2015). Concurrent and longitudinal relations among conscientiousness, stress, and self-perceived physical health. *Journal of Research in Personality, 59*, 93-103. doi:<http://dx.doi.org/10.1016/j.jrp.2015.10.004>

- Lyons, D. M., & Parker, K. J. (2007). Stress inoculation-induced indications of resilience in monkeys. *Journal of Traumatic Stress, 20*(4), 423-433.
doi:<http://dx.doi.org/10.1002/jts.20265>
- Lyons, D. M., Parker, K. J., & Schatzberg, A. F. (2010). Animal models of early life stress: Implications for understanding resilience. *Developmental Psychobiology, 52*(7), 616-624.
doi:<http://dx.doi.org/10.1002/dev.20500>
- McArdle, J. J. (2009). Latent variable modeling of differences and changes with longitudinal data. *Annual Review of Psychology, 60*, 577-605.
doi:<http://dx.doi.org/10.1146/annurev.psych.60.110707.163612>
- McFarlane, A., Clark, C. R., Bryant, R. A., Williams, L. M., Niaura, R., Paul, R. H., . . . Gordon, E. (2005). The impact of early life stress on psychophysiological, personality and behavioral measures in 740 non-clinical subjects. *Journal of Integrative Neuroscience, 4*(1), 27-40.
Retrieved from
<http://www.library.illinois.edu/proxy/go.php?url=http://search.ebscohost.com/login.aspx?direct=true&db=cmedm&AN=16035139&site=eds-live&scope=site>
- McIntyre, K. P., Korn, J. H., & Matsuo, H. (2008). Sweating the small stuff: How different types of hassles result in the experience of stress. *Stress and Health: Journal of the International Society for the Investigation of Stress, 24*(5), 383-392.
doi:<http://dx.doi.org/10.1002/smi.1190>
- McLaughlin, K. A., Conron, K. J., Koenen, K. C., & Gilman, S. E. (2010). Childhood adversity, adult stressful life events, and risk of past-year psychiatric disorder: A test of the stress sensitization hypothesis in a population-based sample of adults. *Psychological Medicine, 40*(10), 1647-1658. doi:<http://dx.doi.org/10.1017/S0033291709992121>

- McLaughlin, K. A. (2016). Future directions in childhood adversity and youth psychopathology. *Journal of Clinical Child and Adolescent Psychology, 45*(3), 361-382.
doi:<http://dx.doi.org/10.1080/15374416.2015.1110823>
- McLaughlin, K. A., & Lambert, H. K. (2017). Child trauma exposure and psychopathology: Mechanisms of risk and resilience. *Current Opinion in Psychology, 14*, 29-34.
doi:<http://dx.doi.org/10.1016/j.copsyc.2016.10.004>
- Meaney, M. J. (2001). Maternal care, gene expression, and the transmission of individual differences in stress reactivity across generations. *Annual Review of Neuroscience, 24*, 1161-1192. doi:<http://dx.doi.org/10.1146/annurev.neuro.24.1.1161>
- Monroe, S. M., & Harkness, K. L. (2005). Life stress, the "kindling" hypothesis, and the recurrence of depression: Considerations from a life stress perspective. *Psychological Review, 112*(2), 417-445. doi:<http://dx.doi.org/10.1037/0033-295X.112.2.417>
- Muthén, L.K. and Muthén, B.O. (1998-2015). Mplus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén
- Myers, B., McLaughlin, K. A., Wang, S., Blanco, C., & Stein, D. J. (2014). Associations between childhood adversity, adult stressful life events, and past-year drug use disorders in the national epidemiological study of alcohol and related conditions (NESARC). *Psychology of Addictive Behaviors, 28*(4), 1117-1126.
doi:<http://dx.doi.org/10.1037/a0037459>
- Neff, L. A., & Karney, B. R. (2004). How does context affect intimate relationships? linking external stress and cognitive processes within marriage. *Personality and Social Psychology Bulletin, 30*(2), 134-148. doi:<http://dx.doi.org/10.1177/0146167203255984>

- Nolen-Hoeksema, S., Girgus, J. S., & Seligman, M. E. (1992). Predictors and consequences of childhood depressive symptoms: A 5-year longitudinal study. *Journal of Abnormal Psychology, 101*(3), 405-422. doi:<http://dx.doi.org/10.1037/0021-843X.101.3.405>
- Otto, M. W., Fava, M., Penava, S. J., Bless, E., Muller, R. T., & Rosenbaum, J. F. (1997). Life event, mood, and cognitive predictors of perceived stress before and after treatment for major depression. *Cognitive Therapy and Research, 21*(4), 409-420.
doi:<http://dx.doi.org/10.1023/A:1021980209878>
- Parker, K. J., Buckmaster, C. L., Justus, K. R., Schatzberg, A. F., & Lyons, D. M. (2005). Mild early life stress enhances prefrontal-dependent response inhibition in monkeys. *Biological Psychiatry, 57*(8), 848-855. doi:<http://dx.doi.org/10.1016/j.biopsych.2004.12.024>
- Parker, K. J., Buckmaster, C. L., Schatzberg, A. F., & Lyons, D. M. (2004). Prospective investigation of stress inoculation in young monkeys. *Archives of General Psychiatry, 61*(9), 933-941. doi:<http://dx.doi.org/10.1001/archpsyc.61.9.933>
- Parker, K. J., Buckmaster, C. L., Sundlass, K., Schatzberg, A. F., & Lyons, D. M. (2006). Maternal mediation, stress inoculation, and the development of neuroendocrine stress resistance in primates. *PNAS Proceedings of the National Academy of Sciences of the United States of America, 103*(8), 3000-3005.
doi:<http://dx.doi.org/10.1073/pnas.0506571103>
- Pearlin, L. I. (1989). The sociological study of stress. *Journal of Health and Social Behavior, 30*(3), 241-256. doi:<http://dx.doi.org/10.2307/2136956>
- Penley, J. A., & Tomaka, J. (2002). Associations among the big five, emotional responses and coping with acute stress. *Personality and Individual Differences, 32*(7), 1215-1128.
doi:[http://dx.doi.org/10.1016/S0191-8869\(01\)00087-3](http://dx.doi.org/10.1016/S0191-8869(01)00087-3)

- Raposa, E. B., Hammen, C. L., Brennan, P. A., O'Callaghan, F., & Najman, J. M. (2014). Early adversity and health outcomes in young adulthood: The role of ongoing stress. *Health Psychology, 33*(5), 410-418. doi:<http://dx.doi.org/10.1037/a0032752>
- Roberts, A. L., McLaughlin, K. A., Conron, K. J., & Koenen, K. C. (2011). Adulthood stressors, history of childhood adversity, and risk of perpetration of intimate partner violence. *American Journal of Preventive Medicine, 40*(2), 128-138. doi:<http://dx.doi.org/10.1016/j.amepre.2010.10.016>
- Roberts, B. W. (2017). A revised sociogenomic model of personality traits. *Journal of Personality, ,* No Pagination Specified. doi:<http://dx.doi.org/10.1111/jopy.12323>
- Roberts, B. W., Luo, J., Briley, D. A., Chow, P. I., Su, R., & Hill, P. L. (2017). A systematic review of personality trait change through intervention. *Psychological Bulletin, 143*(2), 117-141. doi:<http://dx.doi.org/10.1037/bul0000088>
- Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin, 132*(1), 1-25. doi:<http://dx.doi.org/10.1037/0033-2909.132.1.1>
- Rogosch, F. A., & Cicchetti, D. (2004). Child maltreatment and emergent personality organization: Perspectives from the five-factor model. *Journal of Abnormal Child Psychology, 32*(2), 123-145. doi:<http://dx.doi.org/10.1023/B:JACP.0000019766.47625.40>
- Rosenman, S., & Rodgers, B. (2006). Childhood adversity and adult personality. *Australian and New Zealand Journal of Psychiatry, 40*(5), 482-490. doi:<http://dx.doi.org/10.1111/j.1440-1614.2006.01826.x>

Rudolph, K. D., & Flynn, M. (2007). Childhood adversity and youth depression: Influence of gender and pubertal status. *Development and Psychopathology*, 19(2), 497-521.

doi:<http://dx.doi.org/10.1017/S0954579407070241>

Rutter, M. (2006). Implications of resilience concepts for scientific understanding. In B. M. Lester, A. Masten & B. McEwen (Eds.), *Resilience in children* (pp. 1-12, Chapter xv, 370 Pages). Malden: Blackwell Publishing, Malden. Retrieved from

<https://search.proquest.com/docview/621659684?accountid=14553>

Sauter, S. L., & Murphy, L. R. (1995). The changing face of work and stress. In S. L. Sauter, & L. R. Murphy (Eds.), *Organizational risk factors for job stress* (pp. 1-6, Chapter xii, 400 Pages). Washington, DC, US, US: American Psychological Association, Washington, DC.

doi:<http://dx.doi.org/10.1037/10173-024> Retrieved from

<https://search.proquest.com/docview/618772656?accountid=14553>

Scott, K. M., McLaughlin, K. A., Smith, D. A. R., & Ellis, P. M. (2012). Childhood maltreatment and DSM-IV adult mental disorders: Comparison of prospective and retrospective findings. *The British Journal of Psychiatry*, 200(6), 469-475.

doi:<http://dx.doi.org/10.1192/bjp.bp.111.103267>

Seery, M. D., Holman, E. A., & Silver, R. C. (2010). Whatever does not kill us: Cumulative lifetime adversity, vulnerability, and resilience. *Journal of Personality and Social Psychology*, 99(6), 1025-1041. doi:<http://dx.doi.org/10.1037/a0021344>

Seery, M. D., Leo, R. J., Holman, E. A., & Silver, R. C. (2010). Lifetime exposure to adversity predicts functional impairment and healthcare utilization among individuals with chronic back pain. *Pain*, 150(3), 507-515. doi:<http://dx.doi.org/10.1016/j.pain.2010.06.007>

Seery, M. D., Leo, R. J., Holman, E. A., & Silver, R. C. (2010). Lifetime exposure to adversity predicts functional impairment and healthcare utilization among individuals with chronic back pain. *Pain*, 150(3), 507-515. doi:<http://dx.doi.org/10.1016/j.pain.2010.06.007>

- Shackman, J. E., Shackman, A. J., & Pollak, S. D. (2007). Physical abuse amplifies attention to threat and increases anxiety in children. *Emotion*, 7(4), 838-852.
doi:<http://dx.doi.org/10.1037/1528-3542.7.4.838>
- Shapero, B. G., Hamilton, J. L., Stange, J. P., Liu, R. T., Abramson, L. Y., & Alloy, L. B. (2015). Moderate childhood stress buffers against depressive response to proximal stressors: A multi-wave prospective study of early adolescents. *Journal of Abnormal Child Psychology*, 43(8), 1403-1413. doi:<http://dx.doi.org/10.1007/s10802-015-0021-z>
- Shonkoff, J. P., Garner, A. S., Siegel, B. S., Dobbins, M. I., Earls, M. F., McGuinn, L., . . . Wood, D. L. (2012). The lifelong effects of early childhood adversity and toxic stress. *Pediatrics*, 129(1), e232-e246. doi:<http://dx.doi.org/10.1542/peds.2011-2663>
- Sih, A. (2011). Effects of early stress on behavioral syndromes: An integrated adaptive perspective. *Neuroscience and Biobehavioral Reviews*, 35(7), 1452-1465.
doi:<http://dx.doi.org/10.1016/j.neubiorev.2011.03.015>
- Smith, P. H., Oberleitner, L. M. S., Smith, K. M. Z., & McKee, S. A. (2016). Childhood adversity interacts with adult stressful events to predict reduced likelihood of smoking cessation among women but not men. *Clinical Psychological Science*, 4(2), 183-193.
doi:<http://dx.doi.org/10.1177/2167702615584589>
- Specht, J., Egloff, B., & Schmukle, S. C. (2011). Stability and change of personality across the life course: The impact of age and major life events on mean-level and rank-order stability of the big five. *Journal of Personality and Social Psychology*, 101(4), 862-882.
doi:<http://dx.doi.org/10.1037/a0024950>
- Straus, M. A. and R. J. Gelles. 1990. *Physical violence in American families: Risk factors and adaptations to violence in 8,145 families*. New Brunswick, NJ: Transaction Publishers.

- Tejedor-Real, P., Sahagún, M., Biguet, N. F., & Mallet, J. (2007). Neonatal handling prevents the effects of phencyclidine in an animal model of negative symptoms of schizophrenia. *Biological Psychiatry*, 61(7), 865-872. doi:<http://dx.doi.org/10.1016/j.biopsych.2006.08.033>
- Vasunilashorn, S., Lynch, S. M., Gleib, D. A., Weinstein, M., & Goldman, N. (2015). Exposure to stressors and trajectories of perceived stress among older adults. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, 70(2), 329-337. doi:<http://dx.doi.org/10.1093/geronb/gbu065>
- Vollrath, M. (2001). Personality and stress. *Scandinavian Journal of Psychology*, 42(4), 335-347. doi:<http://dx.doi.org/10.1111/1467-9450.00245>
- Widom, C. S., Raphael, K. G., & DuMont, K. A. (2004). The case for prospective longitudinal studies in child maltreatment research: Commentary on Dube, Williamson, Thompson, Felitti, and Anda (2004). *Child Abuse & Neglect*, 28(7), 715-722. doi:<http://dx.doi.org/10.1016/j.chiabu.2004.03.009>
- Widom, C. S., Weiler, B. L., & Cottler, L. B. (1999). Childhood victimization and drug abuse: A comparison of prospective and retrospective findings. *Journal of Consulting and Clinical Psychology*, 67(6), 867-880. doi:<http://dx.doi.org/10.1037/0022-006X.67.6.867>
- Willemsen, A. M., Koot, H. M., Ferdinand, R. F., Goossens, F. A., & Schuengel, C. (2008). Change in psychopathology in referred children: The role of life events and perceived stress. *Journal of Child Psychology and Psychiatry*, 49(11), 1175-1183. Retrieved from <https://search.proquest.com/docview/621607478?accountid=14553>

Appendix – Additional Tables

Table A.1.

Items used to measure early adversity in the three studies.

Study 1	
Before you were 18 years old, did you have to do a year of school over again?	Yes/No
Before you were 18 years old, were you ever in trouble with the police?	Yes/No
Before you were 18 years old, did either of your parents drink or use drugs so often that It caused problems in the family?	Yes/no
Before you were 18 years old, were you ever physically abused by either of your parents?	Yes/No
Study 2	
Before you were 18 years old, did you have to do a year of school over again?	Yes/No
Before you were 18 years old, were you ever in trouble with the police?	Yes/No
Before you were 18 years old, did either of your parents drink or use drugs so often that It caused problems in the family?	Yes/no
Before you were 18 years old, were you ever physically abused by either of your parents?	Yes/No
Before you were 16 years old, did you have a blow to the head, a head injury or head trauma that was severe enough to require medical attention, to cause loss of consciousness or memory loss for a period of time?	Yes/No
Before you were 16 years old, were you ever disabled for six months or more because of a health problem? That is, were you unable to do the usual activities of classmates or other children your age?	Yes/No
Study 3	
<i>Pre-question: Below, and on the next page, are three lists of things that happen to some children. After each list, please indicate how often your parents, siblings, or anyone else did things like this to you. (If a question does not apply because there was no such person in your family when you were growing up, circle 'does not apply').</i>	
Emotional abuse:	
<i>LIST A: Insulted you or swore at you; Sulked or refused to talk to you; Stomped out of the room; Did or said something to spite you; Threatened to hit you; Smashed or kicked something in anger.</i>	
During your childhood, how often did your mother, or the woman raised you, do any of the things on List A to you?	Often/Sometimes/Rarely/Never

Table A.1 (continued).

During your childhood, how often did your sisters do any of the things on List A to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did anybody else do any of the things on List A to you?	Often/Sometimes/Rarely/Never
Physical abuse:	
<i>LIST B: Pushed, grabbed, or shoved you; Slapped you; Threw something at you.</i>	
During your childhood, how often did your mother, or the woman raised you, do any of the things on List B to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did your father, or the man raised you, do any of the things on List B to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did your brothers do any of the things on List B to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did your sisters do any of the things on List B to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did anybody else do any of the things on List B to you?	Often/Sometimes/Rarely/Never
Severe physical abuse:	
<i>LIST C: Kicked, bit, or hit you with a fist; Hit or tried to hit you with something; Beat you up; Choked you; Burned or scalded you.</i>	
During your childhood, how often did your mother, or the woman raised you, do any of the things on List C to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did your father, or the man raised you, do any of the things on List C to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did your brothers do any of the things on List C to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did your sisters do any of the things on List C to you?	Often/Sometimes/Rarely/Never
During your childhood, how often did anybody else do any of the things on List C to you?	Often/Sometimes/Rarely/Never

Table A.2.

Items used to measure stressful life events in adulthood in Study 1 and 2.

Have you involuntarily lost a job for reasons other than retirement at any point in the past five years?	Yes/No
Have you been unemployed and looking for work for longer than 3 months at some point in the past five years?	Yes/No
Was anyone else in your household unemployed and looking for work for longer than 3 months in the past five years?	Yes/No
Have you moved to a worse residence or neighborhood in the past five years?	Yes/No
Were you robbed or did you have your home burglarized in the past five years?	Yes/No
Have you been the victim of fraud in the past five years?	Yes/No

Table A.3.

Items used to measure perceived stress in the three studies.

Study 1 & 2	
Ongoing health problems (in yourself).	No, didn't happen/Yes, but not upsetting/Yes, somewhat upsetting/Yes, very upsetting
Ongoing physical or emotional problems (in spouse or child).	No, didn't happen/Yes, but not upsetting/Yes, somewhat upsetting/Yes, very upsetting
Ongoing problems with alcohol or drug use in family member.	No, didn't happen/Yes, but not upsetting/Yes, somewhat upsetting/Yes, very upsetting
Ongoing difficulties at work.	No, didn't happen/Yes, but not upsetting/Yes, somewhat upsetting/Yes, very upsetting
Ongoing financial strain.	No, didn't happen/Yes, but not upsetting/Yes, somewhat upsetting/Yes, very upsetting
Ongoing housing problems.	No, didn't happen/Yes, but not upsetting/Yes, somewhat upsetting/Yes, very upsetting
Ongoing problems in a close relationship.	No, didn't happen/Yes, but not upsetting/Yes, somewhat upsetting/Yes, very upsetting
Study 3	
How would you rate the amount of control you have over your financial situation these days?	None-Very much (0-10)
During the past year, how often have you thought your relationship might be in trouble?	Never/Once/A few times/Most of the time/All of the time
How would you rate your life overall these days?	Worst-Best (0-10)
How would you rate the amount of control you have over your life overall these days?	None-Very much (0-10)
Please indicate how strongly you agree that the demands of everyday life often get me down.	Agree strongly/Agree somewhat/Agree a little/Don't know/Disagree a little/Disagree somewhat/Disagree strongly
Please indicate how strongly you agree that what happens in my life is often beyond my control.	Agree strongly/Agree somewhat/Agree a little/Don't know/Disagree a little/Disagree somewhat/Disagree strongly
At present, how much control do you have over your life in general?	A lot/Somewhat/A little/Not at all

Table A.4.
Items used to measure the Big Five personality traits in the three studies.

Neuroticism	A lot/Some/A little/Not at all
Moody	
Worrying	
Nervous	
Calm	
Extraversion	A lot/Some/A little/Not at all
Outgoing	
Friendly	
Lively	
Active	
Talkative	
Agreeableness	A lot/Some/A little/Not at all
Helpful	
Warm	
Caring	
Softhearted	
Sympathetic	
Conscientiousness	A lot/Some/A little/Not at all
Organized	
Responsible	
Hardworking	
Careless	
Thorough*	
Openness	A lot/Some/A little/Not at all
Creative	
Imaginative	
Intelligent	
Curious	
Broad-minded	
Sophisticated	
Adventurous	

Note. *Not available in Study 3

Table A.5.
Summary of model fit indices for models fitted across the three studies.

	Study 1		Study 2		Study 3	
	CFI	RMSEA	CFI	RMSEA	CFI	RMSEA
SLE Level	.996	.015	.995	.017	/	/
PS Level	.886	.042	.851	.049	.855	.042
SLE Change	.684	.142	.670	.130	/	/
PS Change	.867	.046	.821	.053	.876	.044
N Level	.954	.042	.952	.037	.929	.046
E Level	.945	.047	.940	.040	.930	.044
A Level	.965	.035	.964	.030	.951	.036
C Level	.934	.042	.939	.034	.908	.042
O Level	.921	.049	.911	.044	.894	.047
N Change	.948	.045	.942	.041	.914	.051
E Change	.944	.047	.941	.040	.929	.045
A Change	.951	.041	.949	.036	.930	.043
C Change	.934	.042	.935	.035	.900	.043
O Change	.921	.049	.910	.045	.892	.047
	AIC	BIC	AIC	BIC	AIC	BIC
SLE Level – PS Level	178332.719	178682.814	/	/	/	/
SLE Change – PS Change	177970.863	178320.958	/	/	/	/
SLE Level – N Level	110153.494	110424.337	115632.294	115909.838	/	/
SLE Level – E Level	123243.660	123540.928	131422.007	131726.635	/	/
SLE Level – A Level	106952.232	107249.499	112599.285	112903.913	/	/
SLE Level – C Level	122029.313	122333.186	128366.519	128671.133	/	/
SLE Level – O Level	176382.924	176733.038	183654.299	184013.074	/	/
SLE Change – N Change	109540.940	109811.784	115110.381	115387.924	/	/
SLE Change – E Change	122576.639	122873.906	130747.525	131052.153	/	/
SLE Change – A Change	106665.381	106962.648	112297.398	112602.026	/	/
SLE Change – C Change	121419.145	121723.019	127774.481	128079.094	/	/
SLE Change – O Change	175685.311	176035.425	183030.964	183389.740	/	/
N Level – PS Level	341190.534	341785.068	170402.092	170838.833	316868.023	317470.029
E Level – PS Level	359300.260	359934.429	182680.403	183142.882	328912.544	329554.685

Table A.5 (continued).

O Level – PS Level	431446.983	432160.424	218023.626	218537.456	385412.747	386135.154
N Change – PS Change	341745.082	342339.616	170797.496	171234.237	317272.914	317874.920
E Change – PS Change	359884.012	360518.182	183060.422	183522.901	329173.876	329816.016
A Change – PS Change	340567.813	341201.983	171468.167	171930.599	311559.209	312201.349
C Change – PS Change	358993.111	359627.281	182044.222	182506.670	297762.593	298364.599
O Change – PS Change	/	/	218449.635	218963.466	385716.491	386438.899

Note. SLE = stressful life events; PS = perceived stress; N = neuroticism; E = extraversion; A = agreeableness; C = conscientiousness; O = openness.