

Psychological Resilience, Positive Emotions, and Successful Adaptation to Stress in Later Life

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In 3 studies, the authors investigated the functional role of psychological resilience and positive emotions in the stress process. Studies 1a and 1b explored naturally occurring daily stressors. Study 2 examined data from a sample of recently bereaved widows. Across studies, multilevel random coefficient modeling analyses revealed that the occurrence of daily positive emotions serves to moderate stress reactivity and mediate stress recovery. Findings also indicated that differences in psychological resilience accounted for meaningful variation in daily emotional responses to stress. Higher levels of trait resilience predicted a weaker association between positive and negative emotions, particularly on days characterized by heightened stress. Finally, findings indicated that over time, the experience of positive emotions functions to assist high-resilient individuals in their ability to recover effectively from daily stress. Implications for research into protective factors that serve to inhibit the scope, severity, and diffusion of daily stressors in later adulthood are discussed.

Keywords: adaptation, positive emotion, recovery, resilience

Although emotions have long been viewed as serving an adaptive function in times of stress (Folkman & Lazarus, 1985; Frijda, 1986, 1987, 1988; Levenson, 1988), the vast majority of research on emotions has focused on how processes go awry and lead to illness, dysfunction, and disorder (for reviews, see Fredrickson, 1998, 2001). With little exception (i.e., Folkman, 1997; Fredrickson, Tugade, Waugh, & Larkin, 2003; Zautra, Johnson, & Davis, 2005), there remain few countervailing studies of the role of positive emotions in the stress process, particularly in later adulthood in which assessments of psychopathology have been the norm (Ong & Bergeman, 2004a; Ryff, 1989, 1995). Rarer still are studies that shed light on the many ways in which positive and

negative emotions are interconnected in times of stress (Zautra, 2003; Zautra, Affleck, Tennen, Reich, & Davis, 2005) or how adaptive outcomes in later life can be reached by a variety of different pathways (Bergeman & Wallace, 1999; Ryff, Singer, Love, & Essex, 1998). In short, we know relatively little about the essential nature of successful adaptation to stress, how it unfolds over time and across contexts, and still less about its significance in late life.

In this article, we examine how different protective factors shape and modify the unfolding experience of daily stress and emotion in later adulthood. The everyday challenges that accumulate in late life provide a natural context in which to investigate the mechanisms that underlie successful adaptation in the face of adversity (see Kling, Seltzer, & Ryff, 1997; Smider, Essex, & Ryff, 1996). Building on prior investigations of later life resilience (e.g., Ryff et al., 1998; Staudinger, Marsiske, & Baltes, 1993, 1995), we argue that there are multiple routes through which successful adaptation to stress might occur. First, adaptation might be reflected in the capacity to maintain positive outcomes in the face of untoward life events (Ryff & Singer, 1998; Staudinger et al., 1995). This conceptualization of adaptation converges with several distinct lines of recent work on the nature of affective relationships under stress (Cacioppo, Larsen, Smith, & Berntson, 2004; Zautra, Smith, Affleck, & Tennen, 2001), suggesting that the capacity to maintain and preserve the boundaries between positive and negative emotional states may represent one potential pathway

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underlying flexible adaptation. Successful adaptation may also be reflected in the capacity to recover more quickly from environmental stressors (Carver & Scheier, 1999; Davidson, 2000). In this view, stress is thought to evoke elevated negative emotional arousal that lingers for variable amounts of time, and certain homeostatic mechanisms function to speed the return to baseline levels of arousal. Finally, both *resistance* to and *recovery* from stress may, in turn, be linked to selective individual difference variables (Davis, Zautra, & Smith, 2004; Zautra, Affleck, et al., 2005). This integrative perspective suggests that equally important to delineating the diverse processes that lead to successful adaptation is identifying the broad protective factors that facilitate or contribute to sustaining the adaptive process (for reviews, see Ong & Bergeman, 2004b; Reich, Zautra, & Davis, 2003).

This article examines the question of how psychological resilience and daily positive emotions influence the experience of negative emotions in times of stress. Using a multilevel daily process design, we examine data from three samples to address (a) the moderating and mediating role that positive emotions can play in strengthening daily resistance to and recovery from stress and (b) the contribution of psychological resilience in shaping daily resistance and recovery processes. Throughout, we argue that an integrative approach to positive adaptation in later adulthood necessitates an understanding of how certain individuals are able to maintain and recover emotional well-being despite the presence of daily challenge and adversity.

Why Positive Emotions Facilitate Adaptation to Stress

Multiple studies have shown that positive emotions have a wide range of effects on individuals (for reviews, see Lyubomirsky, King, & Diener, 2005; Pressman & Cohen, 2005). Both theoretical and empirical work indicate that positive emotions promote flexibility in thinking and problem solving (Fredrickson & Branigan, 2005; Isen, Daubman, & Nowicki, 1987), counteract the physiological effects of negative emotions (Fredrickson & Levenson, 1998; Ong & Allaire, 2005), facilitate adaptive coping (Folkman & Moskowitz, 2000a, 2004), build enduring social resources (Fredrickson & Branigan, 2001; Keltner & Bonanno, 1997), and spark upward spirals of enhanced well-being (Fredrickson, 2000; Fredrickson & Joiner, 2002). Notably, positive emotions can co-occur with negative emotions with relatively high frequency, even in the midst of personally significant stress (Moskowitz, Folkman, Collette, & Vittinghoff, 1996; Ong, Bergeman, & Biscotti, 2004). For instance, in a study of AIDS-related caregiving and bereavement, Folkman (1997) reported that with the exception of the period immediately before and after their partner's death, the positive emotion scores of men whose partners had died of AIDS did not reliably differ from their negative emotion scores, and at 3 months postloss had returned to prebereavement levels. Similarly, Keltner and Bonanno (1997) observed that Duchenne laughter and smiling were exhibited at least once by a majority of conjugally bereaved participants as they discussed their interpersonal loss.

One way by which positive emotions may play a pivotal role in adaptation has been proposed by Zautra, Smith, Affleck, and Tennen (2001) in their dynamic model of affect (DMA). In contrast to other models of stress and coping, which view emotional adaptation entirely in terms of regulating psychological distress,

the DMA takes into account both negative and positive emotions in the stress process. The model predicts that under ordinary circumstances, positive and negative emotions are relatively independent, whereas during stressful encounters an inverse correlation between positive and negative emotions increases sharply (for a review, see Reich et al., 2003). One implication of the DMA is that positive emotions are more likely to diminish negative emotions on days of elevated stress. The model also predicts that a relative deficit in positive emotional experience should leave individuals more vulnerable to the effects of stress. Supportive evidence for the DMA comes from research demonstrating that during stressful periods, emotions are experienced along a single continuum in adults coping with chronic health conditions (Potter, Zautra, & Reich, 2000; Zautra et al., 2001), laboratory manipulations of stress (Zautra, Reich, Davis, Potter, & Nicolson, 2000), as well as everyday life events (Ong & Bergeman, 2004a; Zautra, Affleck, et al., 2005). Taken together, these prior investigations suggest that the experience of positive emotions amid challenge and adversity may contribute to stress resistance, and hence adaptation, by interrupting the ongoing experience of negative emotions during times of stress.

In addition to offsetting the immediate adverse consequences of stress, positive emotions may also play an important role in recovery processes. Fredrickson's (1998, 2001) broaden-and-build model of positive emotions raises the possibility that positive emotions are important facilitators of adaptive recovery, quieting or undoing the autonomic arousal generated by negative emotions. In several laboratory studies in which positive and negative emotions were experimentally induced, Fredrickson and colleagues (Fredrickson & Levenson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000) found that positive emotions were linked to faster cardiovascular recovery from negative emotional arousal. More recent investigations confirm the importance of positive emotions in fostering recovery from stressful life events (Fredrickson et al., 2003; Tugade & Fredrickson, 2004; see also Zautra, Johnson, & Davis, 2005). Taken together, theoretical and empirical work indicate that positive emotions may have both a protective and restorative function, guarding individuals from negative emotions as well as quelling the aftereffects of such emotions.

How Positive Emotions Arise in the Context of Stress

What psychological traits are implicated in the generation and maintenance of positive emotions in the face of stress? An emerging adult literature suggests that individual differences in psychological resilience may account for the adaptive ways in which life stressors are encountered, managed, and transformed. Theoretical writings indicate that psychological resilience is a relatively stable personality trait characterized by the ability to overcome, steer through, and bounce back from adversity (J. Block & Kremen, 1996; J. H. Block & Block, 1980). Recent research, moreover, suggests that positive emotions are a crucial component of trait resilience (Tugade & Fredrickson, 2004; Tugade, Fredrickson, & Barrett, 2004). Rather than being a simple by-product of resilience, however, the experience of positive emotion is thought to have adaptive benefits in the coping process (for reviews, see Folkman & Moskowitz, 2000a, 2004). Empirical support for this prediction comes from research demonstrating that resilient individuals tend to draw on positive emotion-eliciting coping strategies such as

benefit finding and positive reappraisal (Affleck & Tennen, 1996; Folkman & Moskowitz, 2000b), humor and infusing ordinary events with positive meaning (Folkman, Moskowitz, Ozer, & Park, 1997; Ong et al., 2004), and goal-directed problem-focused coping (Billings, Folkman, Acree, & Moskowitz, 2000; Folkman, 1997) to regulate negative emotional experiences. Taken as a whole, these findings indicate that traits (e.g., psychological resilience) with functional properties associated with positive emotions may serve to strengthen resistance to stress by affording greater access to positive emotional resources (Ong & Bergeman, 2004a; Tugade et al., 2004), which, in turn, may help to provide a momentary respite from ongoing stressful experiences (Folkman & Moskowitz, 2000a; see also, Zautra, Johnson, & Davis, 2005).

In addition to promoting stress resistance, a growing number of studies suggest that individual differences in psychological resilience predict accelerated recovery from stressful situations. In a series of coordinated experimental and individual difference studies, Fredrickson and colleagues (Fredrickson et al., 2003; Tugade et al., 2004) found that high-resilient individuals exhibited faster physiological and emotional recovery from stress. In one study (Tugade et al., 2004), higher trait resilience was linked to quicker cardiovascular recovery following a laboratory stressor. In another study (Fredrickson et al., 2003), higher trait resilience was associated with lower subsequent depressive symptoms. Most notably, the effect of trait resilience on duration of cardiovascular reactivity and depressive symptoms was mediated by subjective reports of positive emotion (Fredrickson et al., 2003; Tugade et al., 2004).¹ Although far from definitive, the available empirical evidence suggests that psychological resilience is associated with resistance to and recovery from stressful life events, and positive emotions may be the underlying mechanism by which high-resilient individuals achieve their adaptive outcomes.

A number of unresolved questions remain, however. One major question is whether previous findings generalize to older populations. Older individuals are at higher risk for many diseases, both acute and chronic (for reviews, see Hawkey & Cacioppo, 2004; Smith, 2003). In addition, older adults may be especially likely to experience certain psychosocial stressors, such as spousal caregiving and bereavement (Moss, Moss, & Hansson, 2001). Because negative life events and chronic life conditions are more likely to accumulate with age, studies are needed that clarify how certain older adults are able to maintain and regain emotional health in the face of ongoing stress (Ong & Bergeman, 2004b). A related gap in the literature is the relative dearth of daily process studies that track the real-world adaptational processes of individuals, particularly older adults, intensively over time (for a discussion, see Almeida, 2005; Mroczek, Spiro, & Almeida, 2003). Additionally needed, therefore, are studies that sharpen understanding of the ways in which older adults effectively negotiate stressors in their everyday lives (Mroczek et al., 2003). Finally, extant studies of resilience, from childhood to old age, have given limited attention to the dynamic interplay between process and trait conceptualizations of resilience (cf. J. Block & Kremen, 1996; Luthar, Cicchetti, & Becker, 2000). Crucially needed are empirical investigations that further elucidate how stable personality traits influence and support meaningful short-term adaptation to stress (Fleeson, 2004).

Overview of Research

What role do daily positive emotions play in fostering resistance to and recovery from stress? What psychological traits influence the capacity to maintain and regain emotional well-being in the face of stress? The current research was designed to address these questions. Study 1a used diary data to explore the moderating and mediating roles that positive emotions play in promoting daily resistance to and recovery from stress and the contribution of psychological resilience in shaping daily resistance and recovery processes. Study 1b was an empirical replication of Study 1a using an independent sample and different measures of trait resilience and daily emotions. Study 2 provided a critical extension of the relationships observed in Studies 1a and 1b to a sample of recently bereaved older widows. Throughout, we predicted that (a) daily variations in positive emotions would promote both resistance to and recovery from stress and (b) the adaptive benefits that ensue from daily positive emotions are rooted in individual differences in psychological resilience.

Study 1a

Study 1a was designed to provide an initial examination of the daily emotional processes associated with psychological resilience. Recent reviews of the resilience literature have underscored the need for greater operational precision in the (a) measurement of threat or challenge to the individual, (b) specification of criteria by which adaptation is judged to be successful, and (c) identification of attributes of the individual or ecological context that may help to shed light on the pathways through which effective negotiation of adversity is differentially expressed (for a discussion, see Luthar & Cicchetti, 2000). Throughout this investigation, the appraisal of threat or harm to the individual was considered an important indicator of the subjective experience of stress, the maintenance and recovery of emotional well-being were judged as markers of successful adaptation, and psychological resilience was examined as a potentially important individual difference factor that contributes to flexible adaptation to stress.

Following previous research, we hypothesized that elevations in positive emotions during times of heightened stress would be particularly important in the regulation of negative emotions (Zautra, Johnson, & Davis, 2005; Zautra et al., 2001). On the basis of findings from previous laboratory investigations of positive emotions (Fredrickson & Levenson, 1998; Fredrickson et al., 2000), we also predicted that positive emotions would aid in the recovery from daily stress. Because resilient individuals are characterized by high positive emotionality (Tugade & Fredrickson, 2004), we further predicted that the experience of positive emotions would be an important resource that contributes to stress resistance, assisting high-resilient individuals in their ability to effectively regulate negative emotional arousal in the face of ongoing stress. Finally,

¹ Increasing evidence from neuropsychological studies of brain activity (e.g., Davidson, 2000; Davidson, Jackson, & Kalin, 2000) further suggest that individuals who recover more quickly from emotional challenge are those who show less activation in the amygdala and more activation in the left prefrontal cortex, a focal area in the brain implicated in the experience of positive emotion. These effects, moreover, are present within the first year of life (Davidson & Fox, 1982).

because positive emotions have been shown to play a mediating role between psychological resilience and stress recovery (Fredrickson et al., 2003; Tugade et al., 2004), we predicted that the effect of psychological resilience on emotional recovery from stress would be transmitted at least partially through the experience of daily positive emotions.

Method

Participants

Participants were randomly selected from a proband sample of 226 individuals who had previously participated in the Notre Dame Family Study of Aging. Forty-five participants were contacted and invited to participate in a study of daily stress and emotion. Twenty-seven participants, ages 62–80 years ($M = 72.09$, $SD = 5.29$), agreed to take part in the 45-day study. Nearly half of the participants were women (48%; men, 52%) and married (52%) at the time of the study. Participants were predominantly European American (95.7%; African American, 4.3%) and half (52%) were educated through high school. Income was approximately normally distributed with 22.7% reporting family income less than \$14,999, 18.2% between \$15,000 and \$24,999, 45.5% between \$25,000 and \$40,000, and 13.6% reporting income greater than \$40,000. The characteristics of the sample, in general, reflect the Northern Indiana area. There were no significant differences in age, gender, or educational status for those who did not complete the study. Participants received a \$5 gift certificate for each week of assessment completed, for a total of \$30.

Procedure

Prior to the daily assessment phase of the study, participants completed a trait measure of psychological resilience. The daily data are from a 45-day study in which participants received a packet of diaries every 2 weeks. Each diary contained 14 days of response sheets. Each response sheet contained 28 emotion items traditionally assessed in dimensional measures of positive and negative affect (e.g., Watson, Clark, & Tellegen, 1988). In addition, participants completed a single item on the most stressful event of the day and then rated their perceptions of how stressful the event was. Participants were instructed to respond to the daily items in the evening and return the completed diaries at the end of each 2-week period. The total number of days participants were in the study ranged from 35 to 42 ($M = 37.4$, $SD = 3.6$). The total number of days in the study for all participants was 1,215 (27 participants \times 45 days). The total number of days of data the participants provided was 1,118 (92% complete).

Measures

Psychological resilience. The Ego-Resilience Scale (J. Block & Kremen, 1996) was used to assess psychological resilience, defined as “the capacity of the individual to effectively modulate and monitor an ever-changing complex of desires and reality constraints” (J. Block & Kremen, 1996, p. 359). The scale consists of 14 items, each responded to on a 4-point Likert scale, ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Sample items include “I get over anger with someone reasonably quickly” and “I enjoy dealing with new and unusual situations.” For this sample, the Cronbach’s alpha reliability was .72. J. Block and Kremen’s (1996) reported alpha was .76.

Positive and negative emotions. Daily positive and negative emotions were measured with the daily form of the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988). Participants were asked to indicate the extent to which they had experienced a range of emotions throughout the day. Ratings were made on a 5-point scale, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The original PANAS consists of 10 items from the Negative Activation subscale (afraid, ashamed, distressed,

guilty, hostile, irritable, jittery, nervous, scared, upset) and 10 items from the Positive Activation subscale (active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong). In addition to the original PANAS items, we included eight additional low-arousal items (cheerful, satisfied, relaxed, self-assured, depressed, worried, lonely, miserable) from selected octants of the mood circumplex (Feldman, 1995b). The final 28-item daily emotion measure represents a broad range of prototypical pleasant and unpleasant emotional states. Over all daily reports, moderate intercorrelations were observed between negative and positive emotion scales ($r = -.23$, $p < .001$).

Stress. In addition to reporting on their daily emotions, participants completed a single item on the most stressful event of the day and then rated their perceptions of how stressful the event was on a 5-point scale, ranging from 1 (*not very stressful*) to 5 (*very stressful*).

Results and Discussion

Descriptive Statistics

Preliminary analyses were conducted to obtain descriptive statistics and correlations among the person- and day-level variables. The daily variables were centered within each participant and aggregated across time. In comparison with negative emotion scores ($M = 1.35$, $SD = 0.78$), positive emotion scores were higher and more variable ($M = 2.97$, $SD = 0.93$). Overall, higher stress was associated with lower positive emotion ($r = -.35$, $p < .05$) and higher negative emotion ($r = .44$, $p < .05$).² Trait resilience, moreover, was significantly correlated with positive emotion ($r = .41$, $p < .05$) and stress ($r = -.38$, $p < .05$) but was unrelated to negative emotion ($r = -.11$, *ns*).

Overview of Multilevel Level Modeling Analyses

We tested our hypotheses using multilevel random coefficient modeling (MRCM; Raudenbush & Bryk, 2002). The flexibility of MRCM provides a number of advantages. First, MRCM is appropriate for diary data. In the current study, the data have a hierarchical structure with up to 45 daily observations nested within each of 27 participants. Second, MRCM does not require that all individuals be measured at all occasions. We can use the data from participants who entered the study after it began and from participants who have missing data for some occasions of the study. Third, in MRCM, more reliable units of observation contribute more to the estimation of parameters than less reliable units, a process known as precision weighting (for a discussion, see Bryk & Raudenbush, 1992, pp. 32–57). By separating true and error variance, MRCM thus provides more accurate and robust estimates of parameters than ordinary least squares regression analyses. Finally, a multilevel-modeling approach allows for the simultaneous estimation of day- and person-level effects.

Day-level effects address links between variables at the within-person level and yield slope and intercept coefficients to index these relations (e.g., “On days in which individuals report high stress, do they also exhibit elevated negative emotions?”). In

² Summary within-person correlations were converted to Fisher’s z' equivalents (Cohen & Cohen, 1983), which were weighted on the basis of their estimated standard errors, averaged, and evaluated for significance. Reported values reflect the reconversion of averaged Fisher’s z' scores back to r values to facilitate interpretation.

Table 1
Parameter Estimates for Daily Negative Emotions

Variable	B	t	df	p <
Intercept	16.537	17.56	22	.001
Stress	0.381	6.21	925	.01
Positive emotions	-0.073	<1	925	ns
Stress × Positive Emotions	-0.338	-5.43	925	.01
Stress × Trait Resilience	-0.293	-4.68	925	.01
Positive Emotions × Trait Resilience	-0.059	<1	925	ns
Stress × Positive Emotions × Trait Resilience	-0.235	-2.83	925	.05

Note. All day-level predictors were group-mean centered, and all person-level predictors were centered on sample means.

comparison, person-level effects address the relation between within-person coefficients and between-person variables (e.g., “Do high-resilient individuals also evidence a lower level of average negative emotion?”). In the current investigation, we also asked questions that assessed the interaction between our day-level variables (e.g., “On days in which people report high levels of positive emotion is there a weaker relation between stress and negative emotion?”). Finally, we assessed interactions across day and person levels (e.g., “Is the daily association between stress and negative emotion different in individuals who are low as opposed to high in psychological resilience?”).

The first set of analyses examined the reliability of the day-level measure of negative emotion and other daily measures. These analyses are referred to as *totally unconditional* (J. D. Singer & Willett, 2003) because daily negative emotion was not modeled as a function of other day- or person-level variables. The basic day-level (within-person or Level 1) model is as follows:

$$\text{NEG}_{ij} = \beta_{0j} + r_{ij}.$$

In this model, β_{0j} is a random coefficient representing the mean of daily negative emotion (NEG) for person j (across the i days for which each person provided data), r_{ij} represents the error associated with each measure of negative emotion, and the variance of r_{ij} constitutes the day-level residual (or error) variance. The basic person-level (between-person or Level 2) model is as follows:

$$\beta_{0j} = \gamma_{00} + u_{0j}.$$

In this model, γ_{00} represents the grand mean of the person-level means (β_{0j} s) from the day-level model, u_{0j} represents the error of β_{0j} , and the variance of u_{0j} constitutes the person-level residual variance.

We first examined the unconditional model. Following recommendations by Raudenbush and Bryk (2002), all day-level variables were centered on individuals' means, and all person-level variables were centered on sample means. This analysis estimated the mean level of daily negative emotion to be 1.35. The estimated within-person variance of daily negative emotion (the variance of r_{ij}) was 0.58, and the estimated between-person variance (the variance of u_{0j}) was 1.12. The estimated within-person reliability (defined as the ratio of true to total variance) of daily negative emotion was .97 (for a discussion, see Bryk & Raudenbush, 1992, pp. 43–44). These data thus indicated that the daily ratings of negative emotion were reliable and that there was sufficient variability at the day level to allow for the possibility of modeling

within-person relationships. The reliability estimates for daily positive emotion and daily stress were examined with a similar set of procedures. These analyses indicated that the coefficients for daily positive emotion (.95) and daily stress (.84) were also reliable.

Hypothesis 1: Positive Emotions Moderate the Effects of Stress

To test the hypothesis that daily positive emotion moderates the effects of stress, the following day-level model was analyzed:

$$\text{NEG}_{ij} = \beta_{0j} + \beta_{1j}(\text{Stress}) \pm \beta_{2j}(\text{POS}) + \beta_{3j}(\text{Stress} \times \text{POS}) + r_{ij}.$$

In this model, β_{0j} is a random coefficient representing the intercept of daily negative emotion (NEG) for person j (across the i days for which each person provided data); $\beta_{1j}(\text{Stress})$ is a random coefficient, a slope, representing the day-level (within-person) relationship between stress and negative emotion for person j ; $\beta_{2j}(\text{POS})$ represents the relationship between positive emotion and negative emotion; $\beta_{3j}(\text{Stress} \times \text{POS})$ is the concurrent interaction between stress and positive emotion; and r_{ij} represents error.³

To examine whether day-level relationships were significantly different from 0 across the individuals in the study, the following person-level model was examined:

$$\beta_{0j} = \gamma_{00} + u_{0j}.$$

$$\beta_{1j} = \gamma_{10} + u_{1j}.$$

$$\beta_{2j} = \gamma_{20} + u_{2j}.$$

$$\beta_{3j} = \gamma_{30} + u_{3j}.$$

In this model, the significance of γ_{10} indicated if, on average, the within-person relationship between stress and negative emotion differed from zero; the significance of γ_{20} indicated if, on average, the within-person relationship between positive emotion and negative emotion differed from zero; and the significance of γ_{30} indicated if, on average, the within-person interaction between stress and positive emotion differed from zero. The results of these analyses are summarized in Table 1.

³ Because the associations between variables of interest may reflect the influence of linear trends, we included day of study as a control variable in all analyses.

Across all participants, daily negative emotion scores tended to be higher on days when stress was higher, $\gamma_{10} = .381$, $t(925) = 6.21$, $p < .01$. This within-person coefficient is functionally equivalent to an unstandardized regression coefficient and can be interpreted as such. Thus, for every unit increase in daily stress, mean daily negative emotion increased .38 units. The strength of this relationship was examined by comparing random parameter estimates, and strength was operationalized as the between-person variance in daily negative emotion accounted for by stress (for a discussion, see Bryk & Raudenbush, 1992, p. 65). Examination of the random parameter estimates indicated that inclusion of daily stress resulted in an 18% reduction of within-person variance in negative emotion. This corresponds to a correlation of .42 (the square root of .18) between daily stress and negative emotion.⁴ In support of Hypothesis 1, higher levels of positive emotion interacted with stress to weaken its influence on negative emotion, $\gamma_{30} = -.338$, $t(925) = -5.43$, $p < .01$. For every unit increase in daily positive emotion, the stress–negative emotion slope decreased .34 units, a finding that is in line with predictions from the DMA (Davis et al., 2004; Zautra et al., 2001).

Hypothesis 2: Positive Emotions Mediate the Effects of Stress Recovery

Our second hypothesis stated that positive emotions would mediate the effects of stress recovery. To analyze mediated relationships, lagged associations between daily stress and emotion were examined. These analyses require that data be provided on consecutive days. Of the total 1,043 days recorded in the study, 935 had data recorded for the days immediately preceding them and were included in the analyses. To rule out the possibility that any lagged effect of stress on negative emotion might be an artifact of the initial level of negative emotion, baseline negative emotion was included in the model as a control variable. In such a model, the dependent variable can be interpreted as the residual change in negative emotion scores from day t to day $t + 1$ (Kessler & Greenberg, 1981).⁵ The analysis model for changes in daily negative emotion for each individual can be expressed as follows:

$$\Delta \text{NEG}_{t+1} = \beta_{0j} + \beta_{1j}(\text{NEG}_t) + \beta_{2j}(\text{Stress}_t) \pm \beta_{3j}(\text{POS}_t) + r_{t+1},$$

where ΔNEG_{t+1} is the change in negative emotion scores between day t and day $t + 1$; β_{0j} is a random regression intercept for person j ; β_{1j} is a random coefficient representing an individual's level of negative emotion on day t (with the grand mean across all person-days subtracted); $\beta_{2j} - \beta_{3j}$ represent the within-person associations of stress and positive emotion on next day's negative emotion; and r_{t+1} is a residual component of change in negative emotion.

To test the hypothesis that positive emotions mediate stress recovery, we used a *product of coefficients* test recently described by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002). This test assesses the indirect effect of a mediating variable as the product of two regression coefficients, one linking the explanatory variable and the mediator and the other linking the mediator and the dependent variable. The significance of this cross-product is divided by its standard error and tested for significance with a specialized sampling distribution. If the inclusion of daily positive emotion (β_{3j}) renders the slope between stress and next day's negative emotion (β_{2j}) nonsignificant (when it was significant in an analysis without β_{3j}), then it can be concluded that positive

emotion mediates the relationship between stress and next day's negative emotion. Alternatively, if daily positive emotion is added to the model and the lagged coefficient for daily stress remains significant, it can be concluded that (on average) some part of the covariation between stress and next day's negative emotion is independent of the covariation between daily stress and positive emotion. Our analyses revealed that when positive emotion was included in the analysis of emotional recovery, the relationship between stress and next day's negative emotion was reduced to nonsignificance (.08), whereas it was significant in an analysis without positive emotion (.31), suggesting that positive emotion mediates the relationship between stress and next day negative emotion. To the extent that such results can be used as a basis for making inferences about directionality of effects, it would appear that changes in emotional recovery from stress are due to changes in positive emotion. More specifically, part of the impact that stress may have on negative emotional recovery may be due to decreases in positive emotion brought about by stress. The presence of positive emotion, in contrast, functions to speed recovery from stress (Fredrickson et al., 2003; Tugade & Fredrickson, 2004).

Hypothesis 3: Trait Resilience, Positive Emotions, and Stress Resistance

Our third hypothesis was that trait resilience would contribute to greater stress resistance or a weaker association between positive and negative emotions, particularly on days of heightened stress. To determine if day-level relationships between stress and emotion varied as a function of person-level variables (i.e., trait resilience), coefficients from the day-level models described in Hypothesis 1 were analyzed at the person level with the following models:

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{Trait Resilience}) + u_{0j},$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}(\text{Trait Resilience}) + u_{1j},$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21}(\text{Trait Resilience}) + u_{2j},$$

$$\beta_{3j} = \gamma_{30} + \gamma_{31}(\text{Trait Resilience}) + u_{3j}.$$

In these models, each person's day-level slopes are predicted by an intercept, trait resilience, and a random error component.⁶ For example, γ_{10} can be interpreted as the predicted value of the stress–negative emotion association at average levels of trait resilience; γ_{11} can be interpreted as the partial relationship between trait resilience and the stress–negative emotion relationship. The

⁴ Although some authors have suggested that calculations of estimated effect sizes in multilevel data structures should be viewed with caution (e.g., Kreft & De Leeuw, 1998, pp. 115–119), we have presented them to provide some indication of the strength of the relationship between daily negative emotion and other daily measures with strength operationalized in terms of shared variance.

⁵ We note that although lagged and cross-lagged correlations provide some indication of the lead–lag relationship between two constructs, they are by no means a tool for making causal inferences (Rogosa, 1979).

⁶ Throughout this investigation, age was assessed in the same multilevel models as trait resilience. Across studies, we did not find any significant variation across people in the size of the primary slope coefficients as a function of age.

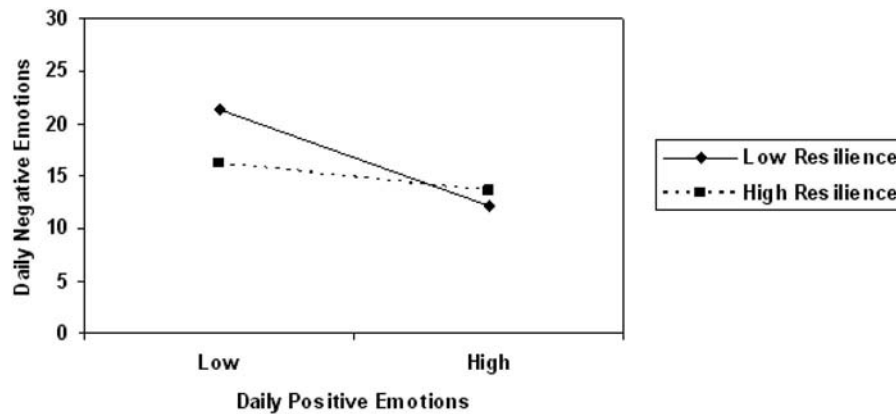


Figure 1. Study 1a: Concurrent relationship between daily positive and negative emotion as a function of trait resilience, one standard deviation above the mean in daily stress. High and low resilience were defined as one standard deviation from the mean.

analyses found that trait resilience moderated the relationship between daily stress and negative emotion, $\gamma_{11} = -.293$, $t(925) = -4.68$, $p < .01$. Thus, every unit increase in trait resilience was associated with a .29 unit decrease in the stress–negative emotion slope. In support of Hypothesis 3, the individual slopes relating positive emotion to negative emotion on days of above average stress were also predictable from trait resilience, $\gamma_{31} = -.235$, $t(925) = -2.83$, $p < .05$. To examine the form of this interaction, we used Aiken and West's (1991) procedures to generate separate positive and negative emotion regression lines for individuals high (one standard deviation above the mean) and low (one standard deviation below the mean) on trait resilience. For comparison purposes, we present two-panel figures describing the interaction between trait resilience and positive emotion on high- and low-stress days. As shown in Figure 1, individuals low in trait resilience showed an inverse relationship between daily positive and negative emotion. A test of planned contrast (see Bryk & Raudenbush, 1992, pp. 48–56) revealed that this relationship differed significantly across high-stress ($-.22$) and low-stress ($-.09$) days, $\chi^2(1, N = 27) = 8.12$, $p < .01$. In comparison, the relationship between daily positive and negative emotions was negligible for high-resilient individuals and did not differ significantly across high-stress ($-.06$) and low-stress ($-.02$) days, $\chi^2(1, N = 27) = 1.43$, $p > .05$ (cf. Figure 2). These findings thus provide further support for the DMA (Zautra et al., 2001) by identifying an important individual difference variable (i.e., trait resilience) that underlies the capacity for positive emotional engagement in the context of stress.

Hypothesis 4: Trait Resilience, Positive Emotions, and Stress Recovery

Our final hypothesis stated that positive emotions would mediate the effects of trait resilience on stress recovery. In the context of our person- and day-level models, this hypothesis implies a process of *mediated moderation* (Muller, Judd, & Yzerbyt, 2005), whereby the magnitude of stress recovery is moderated by trait resilience, and daily positive emotions are responsible for this moderating effect. To test for mediated moderation, lagged coefficients from the day-level models described in Hypothesis 2 were analyzed as a function of trait resilience. These analyses found that

the effect of stress on next day's negative emotion was moderated by trait resilience, $\gamma_{21} = -.243$, $t(925) = -3.46$, $p < .01$. Thus, every unit increase in trait resilience was associated with a .24 unit decrease in the lagged stress–negative emotion slope. Consistent with Hypothesis 4, our analyses also revealed that when positive emotion was included, the moderation of the residual direct effect of trait resilience was reduced to nonsignificance ($-.08$), suggesting that positive emotion mediates the moderating relationship of trait resilience and stress on next day's negative emotion. These findings thus strengthen the prediction that positive emotions may afford daily protective benefits by contributing to the ability of high-resilient individuals to recover more effectively from stressful experiences (Fredrickson et al., 2003; Tugade & Fredrickson, 2004; Tugade et al., 2004).⁷

Study 1b

In Study 1a, we presented evidence that trait-resilient individuals have a tendency to (a) experience positive emotions even amid stressful events and (b) draw on such experiences to resourcefully rebound from daily negative emotional encounters. However, given that trait resilience measures may be negatively correlated with neuroticism (Maddi et al., 2002), any observed associations with daily stress and emotion may be due to this shared neuroticism component rather than any actual adaptive benefits of trait resilience. Thus, it would be useful to determine the extent to which the correlations between trait resilience and daily stress and

⁷ It is also possible that the mediating effect of daily positive emotions varies as a function of the overall moderating influence trait resilience. This would imply a process of *moderation mediation* (Muller et al., 2005). Although the various ways in which moderated mediation can occur in the context of multilevel data is beyond the scope of this article (for a discussion, see Bauer, Preacher, & Gil, 2006; Kenny et al., 2003), we note that in none of the models we evaluated was there evidence that the mediating process (i.e., daily positive emotions) was different for individuals who differed in trait resilience. Rather, daily positive emotion appears to be responsible for the overall moderating effect of trait resilience in the current research, and when this process is controlled, the residual moderation of trait resilience is markedly reduced.

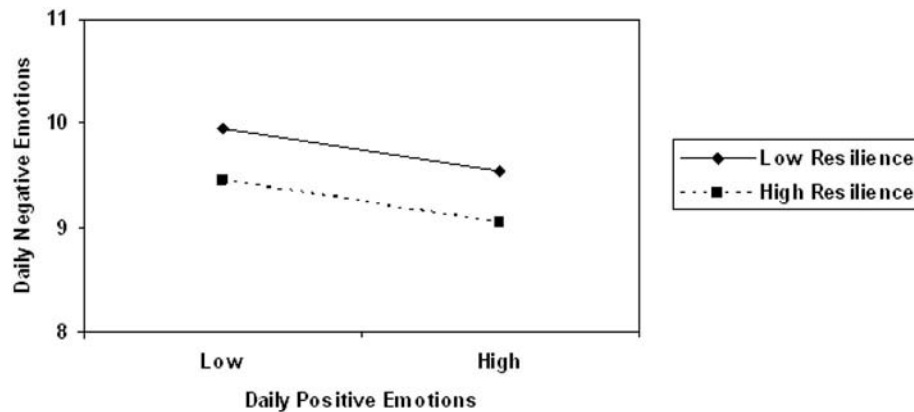


Figure 2. Study 1a: Concurrent relationship between daily positive and negative emotion as a function of trait resilience, one standard deviation below the mean in daily stress. High and low resilience were defined as one standard deviation from the mean.

emotion exist independently of their mutual associations with neuroticism. It would also be useful to determine whether the findings observed in Study 1a could be replicated on an independent sample with different measures of trait resilience and emotion. The goal of Study 1b, therefore, was to provide a conceptual replication of Study 1a while using different measures of trait resilience and daily emotion and controlling for the effects of neuroticism.

Method

Participants

An independent sample of older adults was randomly selected from the Notre Dame Longitudinal Study of Aging. Fifty participants were contacted and invited to participate in a study of daily stress and emotion. Forty participants, ages 60–85 years ($M = 75.5$, $SD = 6.28$), agreed to take part in the 30-day study. Half of the sample were women and half were men, and all were married at the time of the study. Participants were predominantly European American (97.5%, African American, 2.5%), and half were educated through high school. Income was normally distributed with 2.9% reporting family income less than \$14,999, 28.6% between \$15,000 and \$24,999, 48.6% between \$25,000 and \$40,000, and 22.9% reporting income greater than \$40,000. There were no significant differences in age, gender, income, or educational status for those who did not complete the study. Participants were not compensated for their participation in this study.

Procedure

The procedure of Study 1b resembled that of Study 1a. After completing a broad range of mental health measures that included trait measures of psychological resilience and neuroticism, participants then took part in a daily study of stress and emotions. Participants received a diary containing a packet of daily response sheets. Each response sheet contained 24 emotion items and a single item on the most stressful event of the day. Participants were given a month's supply of diary response sheets and were instructed to respond to the daily items in the evening and return the completed diaries at the end of the 30-day period. The total number of days participants were in the study ranged from 26 to 30 ($M = 28.4$, $SD = 2.6$). The total number of days in the study for all participants was 1,200 (40 participants \times 30 days). The total number of days of data the participants provided was 1,155 (96% complete).

Measures

Psychological resilience. Psychological resilience was assessed with a modified version of the Dispositional Resilience Scale (Bartone, Ursano, Wright, & Ingraham, 1989). The Dispositional Resilience Scale is composed of 45 items, with 15 items each assessing Commitment (e.g., "Most days life is interesting and exciting for me"), Control (e.g., "Planning ahead can help me avoid most future problems"), and Challenge (e.g., "Changes in routine are interesting to me") aspects of psychological resilience. A 4-point Likert scale, ranging from 0 (*not at all true*) to 3 (*completely true*), was used. Reliability data indicated alphas of .72, .68, .59, and .86 for the Commitment, Control, and Challenge subscales and for the overall psychological resilience measure, respectively.

Neuroticism. Neuroticism was assessed with a nine-item short form of the Eysenck Personality Inventory (Eysenck & Eysenck, 1975). Sample items include "I am often anxious" and "I am extra sensitive sometimes." The scale score is based on the sum of yes–no responses to 9 items. Cronbach's alpha for this sample was .71.

Positive and negative emotions. Daily positive and negative emotions were measured with subscales from the Mental Health Inventory (MHI; Veit & Ware, 1983). Participants were assessed each day for 30 days on positive emotional states as well as symptom-specific indicators of anxiety and depression. In addition to being a widely used mental health assessment inventory, the MHI is sensitive to intraindividual change (see McHorney & Ware, 1995; Ware, Gandek, & Group, 1994). In the current study, participants were asked to indicate on a 4-point scale, ranging from 1 (*not at all true*) to 4 (*completely true*), the extent to which they had experienced a range of positive emotions and depression or anxiety symptoms on a daily basis. Positive emotions were measured with the 11-item subscale of the MHI. Example positive emotion items include "Today, I felt cheerful, lighthearted," "Today, I felt calm and peaceful," and "Today, I was a happy person." Anxiety and depressive symptoms were assessed with the nine-item anxiety and four-item depression subscales of the MHI. Example items assessing anxiety are "Today, I was a very nervous person," "Today, I was anxious and worried," and "I had difficulty trying to calm down." Example items measuring depression are "Today, I felt downhearted and blue," "Today, I felt depressed," and "Today, I had low or very low spirits." A total daily negative emotion score was calculated for each individual by summing items from the Anxiety and Depression subscales, respectively.

Stress. As in Study 1a, in addition to reporting on their daily emotions, participants completed a single item on the most stressful event of the day

and then rated their perceptions of how stressful the event was on a 5-point scale, ranging from 1 (*not very stressful*) to 5 (*very stressful*).

Results and Discussion

Descriptive Statistics

Similar to results reported in Study 1a, daily positive emotion scores were higher and more variable ($M = 2.81$, $SD = 0.98$) than negative emotion scores ($M = 1.25$, $SD = 0.83$). Overall, daily positive emotion scores were inversely correlated with daily stress and negative emotions ($r = -.32$, $p < .05$, and $r = -.27$, $p < .05$, respectively). Trait resilience, moreover, was significantly correlated with daily positive emotion and stress ($r = .37$, $p < .05$, and $r = -.31$, $p < .05$, respectively), but unrelated to daily negative emotion ($r = -.09$, *ns*).

Hypothesis 1: Positive Emotions Moderate the Effects of Stress

As in Study 1a, our first aim was to investigate the extent to which daily positive emotions moderate the effects of stress. To investigate this, we used MRCM because of the multilevel structure of the data. In Study 1b, there were up to 30 observations nested within each of 40 participants. The equations predicting daily concurrent and lagged negative emotion in Study 1b were identical to those of Study 1a. As in previous analyses, daily scores were group-mean centered to eliminate the influence of parameter estimates of individual differences. The final parameter estimates from our MRCM analyses are summarized in Table 2. As in Study 1a, higher levels of daily stress were concurrently associated with higher levels of daily negative emotion, $\gamma_{10} = .379$, $t(984) = 5.84$, $p < .01$. It is important that our analyses also revealed significant reductions in the magnitude of the stress-negative emotion correlation on days in which greater positive emotion was present, $\gamma_{30} = -.373$, $t(984) = -5.61$, $p < .01$.

Hypothesis 2: Positive Emotions Mediate the Effects of Stress Recovery

Our second aim was to replicate findings observed in Study 1a, in which daily positive emotions were found to mediate the effects of stress recovery. We began by examining the time-lag dependency between daily stress and next day negative emotion scores. These analyses required that data be provided on consecutive days. Of the total 1,155 days recorded in the study, 992 had data recorded for the days immediately preceding them and were included in the analyses. Consistent with findings from Study 1a, the results of our lagged analyses revealed that stress on one day (day t) uniquely predicted negative emotion on the next day (day $t + 1$), above and beyond the relationship between negative emotion on day t and day $t + 1$. In support of Hypothesis 2, our analyses revealed that when positive emotion was included in the analysis of emotional recovery, the relationship between stress and next day's negative emotion was reduced to nonsignificance (.03), whereas it was significant in an analysis without positive emotion (.27), suggesting that positive emotion mediates the relationship between stress and next day negative emotional recovery.

Hypothesis 3: Trait Resilience, Positive Emotions, and Stress Resistance

As in Study 1a, we examined the extent to which trait resilience contributes to greater stress resistance by weakening the association between positive and negative emotions during times of stress. In addition to examining the daily emotional processes associated with trait resilience, however, we also evaluated the extent of reduction in these associations when neuroticism was statistically held constant. Table 2 shows the relationships between trait resilience and stress and emotion, with and without controlling for neuroticism. Although the coefficients for trait resilience, stress, and positive emotions and their interactions were smaller than they were in an analysis without neuroticism, Table 2 shows that all coefficients maintained their valence and remained statistically

Table 2
Parameter Estimates for Daily Negative Emotions, With and Without Controlling for Neuroticism

Variable	<i>B</i>	<i>t</i>	<i>df</i>	<i>p</i> <
Without neuroticism				
Stress	0.379	5.84	984	.01
Positive emotions	-0.162	<1	984	<i>ns</i>
Stress × Positive Emotions	-0.373	-5.61	984	.01
Stress × Trait Resilience	-0.325	-4.83	984	.01
Positive Emotions × Trait Resilience	-0.124	<1	984	<i>ns</i>
Stress × Positive Emotions × Trait Resilience	-0.257	-2.97	984	.05
With neuroticism				
Stress	0.269	3.27	984	.05
Positive emotions	-0.163	<1	984	<i>ns</i>
Stress × Positive Emotions	-0.338	-5.24	984	.01
Stress × Trait Resilience	-0.315	-4.73	984	.01
Positive Emotions × Trait Resilience	-0.114	<1	984	<i>ns</i>
Stress × Positive Emotions × Trait Resilience	-0.246	-2.81	984	.05

Note. All day-level predictors were group-mean centered, and all person-level predictors were centered on sample means.

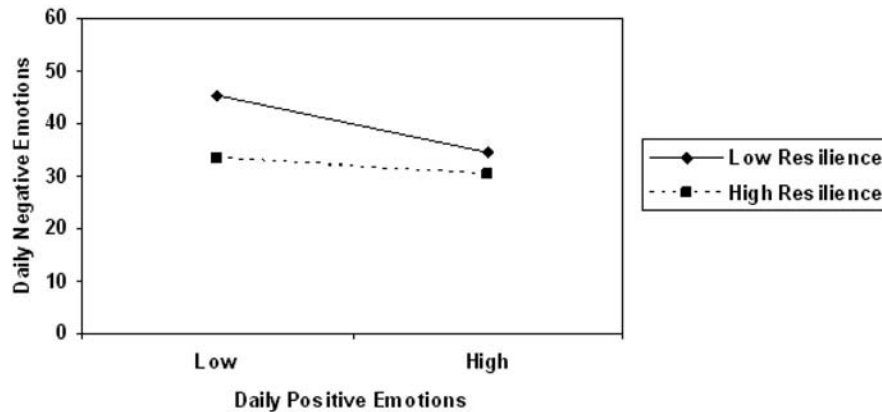


Figure 3. Study 1b: Concurrent relationship between daily positive and negative emotion as a function of trait resilience, one standard deviation above the mean in daily stress. High and low resilience were defined as one standard deviation from the mean.

significant after neuroticism was controlled. Thus, trait resilience still accounted for variance in daily stress resistance, $\gamma_{30} = -.246$, $t(984) = -2.81$, $p < .05$. As illustrated in Figure 3, individuals low in trait resilience showed an inverse relationship between positive and negative emotion, and this relationship differed significantly across high-stress ($-.24$) and low-stress ($-.09$) days, $\chi^2(1, N = 40) = 7.38$, $p < .01$. Consistent with findings from Study 1a, the relationship between positive and negative emotions for high-resilient individuals was nonsignificant and did not differ across high-stress ($-.07$) or low-stress ($-.04$) days, $\chi^2(1, N = 40) = 1.17$, $p > .05$ (cf. Figure 4).

Hypothesis 4: Trait Resilience, Positive Emotions, and Stress Recovery

Our final aim was to replicate the mediational effect of daily positive emotions observed in Study 1a while also controlling for neuroticism. As in Study 1a, our MRCM analyses involved tests of mediated moderation (Muller et al., 2005). As was expected, these analyses found that the lagged effect of stress on negative emotion was moderated by trait resilience, $\gamma_{21} = -.285$, $t(984) = -3.47$,

$p < .05$. That this effect was evident even after controlling for neuroticism is noteworthy. In addition, when positive emotion was included, the moderation of the residual direct effect of trait resilience was reduced to nonsignificance ($-.05$). These findings provide support for Hypothesis 4: The experience of daily positive emotions appears to aid resilient individuals in the ability to bounce back from daily stress.

Overall, findings from Study 1b provide additional empirical support for the prediction that the functional benefits of positive emotions are (a) strongest in the context of stressful life events (Zautra, Johnson, & Davis, 2005; Zautra et al., 2001) and (b) contoured by broad individual differences in psychological resilience (Ong & Bergeman, 2004a; Tugade & Fredrickson, 2004). The results are thus concordant with findings from Study 1a, despite variations in the measures used to assess trait resilience and daily positive and negative emotion, respectively. Although findings from Studies 1a and 1b help to establish the adaptational significance of trait resilience and positive emotions, a number of methodological features limit the generality of these findings. Foremost, Studies 1a and 1b were limited to relatively minor

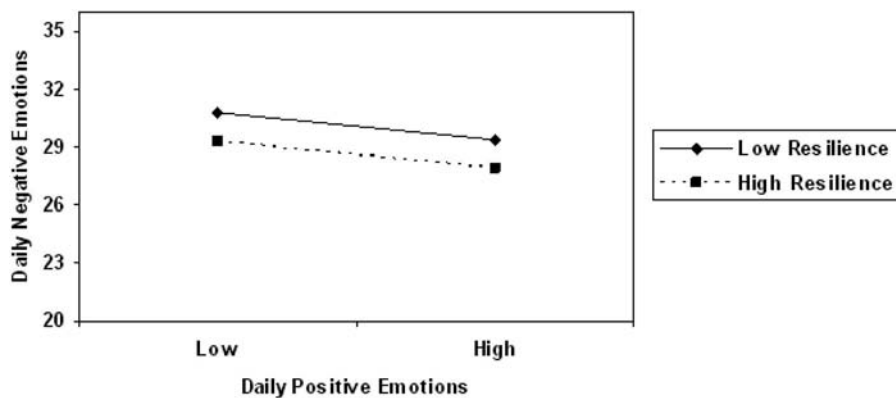


Figure 4. Study 1b: Concurrent relationship between daily positive and negative emotion as a function of trait resilience, one standard deviation below the mean in daily stress. High and low resilience were defined as one standard deviation from the mean.

stressors, and as such, examining the generality of these findings to major life events is also necessary. Our primary goal in Study 2, therefore, was to further explore how psychological resilience and positive emotions shape the day-to-day regulation of ongoing negative emotions following the potentially traumatic life event of losing a spouse.

Study 2

Like the child and adolescent literature on resilience (Luthar et al., 2000), perspectives on resilience in adulthood and later life have emphasized the need to assess positive outcomes in response to major life challenges (Ryff et al., 1998). Few life events affect adults more than the death of a spouse or life partner (Bonanno & Kaltman, 1999; Stroebe & Stroebe, 1983). Despite the distress and grief that the death of a loved one brings, however, there is considerable variability in individuals' responses to interpersonal loss; some individuals experience acute and enduring psychological distress, whereas others do not (Wortman & Silver, 1989, 1990). Accumulating evidence, in fact, indicates that a substantial minority of bereaved individuals experience and express positive emotions far more often than might have been previously anticipated (for a discussion, see Bonanno, 2004; Folkman, 2001). Thus, additional empirical work that addresses the adaptive processes through which individuals adjust to and recover from major life challenges is clearly needed. In Study 2, we explored how profiles of daily emotional responses to stress intersect with the significant adaptive pressures associated with conjugal loss. We tested the prediction that among high-resilient widows, the covariation in positive and negative emotions during times of stress differs in strength, duration, and significance. We predicted that (a) positive emotions would attenuate reactivity to and recovery from daily stress (Hypotheses 1 and 2) and (b) these within-person relationships would vary systematically as a function of psychological resilience (Hypothesis 3). Finally, on the basis of findings from Studies 1a and 1b, we predicted that the experience of daily positive emotions would mediate the effect of trait resilience on emotional recovery from stress (Hypothesis 4).

Method

Participants

Data for this study are from the Notre Dame Study of Adjustment to Widowhood, a longitudinal study of the effects of bereavement on the mental and physical health of older widows. Further details of the study are described elsewhere (Bisconti, Bergeman, & Boker, 2004; Ong et al., 2004). Briefly, the sample comprised 60 widows (age range = 57–83 years), who were randomly assigned to a target or control group. All participants took part in a pre- and postinterview and completed self-report questionnaires at the initial and postinterviews as well as at 8, 12, 16, 20, 24, 36, and 48 months (60-month data are currently being collected). In addition to the interview and questionnaire data, the target widowed group ($n = 34$) was asked to keep a daily record of their stress and emotions. These daily assessments lasted for 98 days. The 34 widows who took part in the daily diary study ranged in age from 61 to 83 years of age ($M = 71.94$, $SD = 6.11$). The majority of participants had at least a high school education (97.06%). Additionally, 55.87% of the women had received some post-high school education or training. Income levels were difficult to assess immediately following the death of their spouse. However, during the follow-up interview, which was approximately 4 months postloss,

16.67% of the participants reported an annual income between \$7,500 and \$15,000. In addition, 46.67% of the participants reported a yearly income between \$15,000 and \$25,000, 13.33% reported an annual income between \$25,000 and \$40,000, and 23.33% reported making over \$40,000 per year. The length of marriage ranged between 14 to 63 years ($M = 46.97$, $SD = 12.26$), and for 79.41% of the widows it was their first marriage. In addition, 61.76% of the widows expected the death of their husband to occur, and 91.18% of them were living alone following conjugal loss. Widows received \$30 in return for their participation.

Procedure

Participants received a battery of self-report questionnaires approximately 1 month postloss ($M = 28$ days, $SD = 6$). Participants then took part in a daily diary study of stress and emotion. Each daily packet was dated and mailed to the widows in bimonthly intervals. If a participant missed a day, she was instructed to leave that day's response sheet blank. The first set was given to the participants at the initial interview and included a self-addressed, postage-paid envelope to return surveys. Participants were instructed to complete response sheets in the evening and return diaries by mail every 2 weeks. To remind participants to mail the packet of daily assessments, regular weekly phone calls were made. These conversations were also a way to keep in touch with the widows over the 3-month project. The total number of days participants were in the study ranged from 14 to 98 ($M = 75.94$, $SD = 26.87$). The total number of days in the study for all participants was 3,332 (34 participants \times 98 days). The total number of days of data the participants provided was 2,590 (78% complete).

Measures

Both the person-level (i.e., trait resilience) and day-level (i.e., stress, positive and negative emotions) measures were identical to Study 2. Reliability data indicated alphas of .77 and .74 for the trait resilience and neuroticism measures, respectively.

Results and Discussion

Descriptive Statistics

Across the 98-day assessment period, daily negative emotion scores were higher and more variable ($M = 3.15$, $SD = 0.94$) than positive emotion scores ($M = 2.31$, $SD = 0.75$). Similar to Studies 1a and 1b, the two positive indicators of well-being (trait resilience and daily positive emotions) correlated significantly with each other ($r = .41$, $p < .01$), as did the two negative indicators (daily negative emotions and daily stress; $r = .45$, $p < .01$).⁸ In addition, greater daily positive emotion was associated with less daily negative emotion and stress ($r = -.29$, $p < .05$, and $r = -.35$, $p < .05$, respectively). Trait resilience, in addition, was negatively correlated with stress and daily negative emotion ($r = -.38$, $p < .05$, and $r = -.34$, $p < .05$, respectively).

⁸ In addition to negative emotions, we also assessed daily grief responses using the Grief Resolution Index (GRI; Remondet & Hansson, 1987). Sample items from the GRI include "Accepted the death of my husband" and "Was able to think through what my husband's death meant to me." Although the correlates of the GRI mirrored the correlates obtained on the daily negative emotion measure, we chose not to include the GRI in our MRCM analyses because nearly half (48%) of the diary entries for this measure were missing across the study period.

Hypothesis 1: Positive Emotions Moderate the Effects of Stress

We predicted that elevations in positive emotions on days characterized by high stress would be particularly important in the regulation of negative emotional states (Zautra et al., 2001). As in Studies 1a and 1b, our hypotheses were tested with MRCM because the data have a hierarchical structure. In this study, there were up to 98 observations nested within each of 34 participants. The final parameter estimates from our MRCM analyses are summarized in Table 3. As with Studies 1a and 1b, stress was related to increased negative emotions, $\gamma_{10} = .436$, $t(2388) = 8.52$, $p < .01$. Notably, positive emotions interacted with stress to interrupt its influence on negative emotions, $\gamma_{30} = -.411$, $t(2388) = -7.64$, $p < .01$.

Hypothesis 2: Positive Emotions Mediate Stress Recovery

Our hypothesis concerning the mediating role of positive emotions was also tested with MRCM. Of the total 2,590 days recorded in the study, 2,251 had data recorded for the days immediately preceding them and were included in the analyses. Similar to findings from Studies 1a and 1b, there was a strong lagged relationship between stress and negative emotion. In this study, stress continued to influence negative emotion as long as two lags later, $\gamma_{20} = .257$, $t(2388) = 4.36$, $p < .05$. As was expected (Hypothesis 2), when daily positive emotion was added to the model predicting next day negative emotion, the lagged coefficient for stress was reduced to nonsignificance (.06), whereas it was significant in an analysis without positive emotion (.32), suggesting the relationship between stress and next day negative emotion is mediated by daily positive emotions.

Hypothesis 3: Trait Resilience, Positive Emotions, and Stress Resistance

We next examined the extent to which trait resilience contributes to greater stress resistance by reducing the correlation be-

tween positive and negative emotions on days of elevated stress. As in Study 1b, we also examined the extent of reduction in these associations when neuroticism was held constant. Table 3 shows the relationships between trait resilience and stress and emotion, with and without controlling for neuroticism. As with Study 1b, after controlling for neuroticism, trait resilience still accounted for variance in daily stress resistance, $\gamma_{30} = -.251$, $t(2388) = -4.28$, $p < .05$. As depicted in Figure 5, individuals low in trait resilience showed an inverse relationship between positive and negative emotion, and this relationship differed significantly across high-stress (-.32) and low-stress (-.15) days, $\chi^2(1, N = 34) = 8.96$, $p < .01$. In comparison, the positive and negative emotion relationship was nonsignificant for high-resilient individuals and did not differ across high-stress (-.09) or low-stress (-.06) days, $\chi^2(1, N = 34) = 1.59$, $p > .05$ (cf. Figure 6).

Hypothesis 4: Trait Resilience, Positive Emotions, and Stress Recovery

Finally, we examined whether select mediating findings observed in Studies 1a and 1b could also be observed in our study of bereaved widows. We argued that if the experience of positive emotions helps resilient individuals recover from everyday stressful events, then such experiences should have adaptive functions for those undergoing real-life stressors as well. On the basis of findings from Studies 1a and 1b, we predicted that among widows high in trait resilience, daily positive emotions may afford protective benefits by contributing to effective emotional recovery from stress. As in Studies 1a and 1b, our hypotheses were tested with multilevel models for mediated moderation (cf. Kenny, Korchmaros, & Bolger, 2003; Muller et al., 2005). After controlling for neuroticism, these analyses found that the lagged effect of stress on negative emotion was moderated by trait resilience, $\gamma_{21} = -.269$, $t(2388) = -4.38$, $p < .05$. In support of Hypothesis 4, our analyses also revealed that when positive emotion was included, the moderation of the residual direct effect of trait resilience was reduced to nonsignificance (-.11).

Table 3
Parameter Estimates for Daily Negative Emotions, With and Without Controlling for Neuroticism

Variable	<i>B</i>	<i>t</i>	<i>df</i>	<i>p</i> <
Without neuroticism				
Stress	0.436	8.52	2388	.01
Positive Emotions	-0.388	-6.44	2388	.01
Stress \times Positive Emotions	-0.411	-7.64	2388	.01
Stress \times Trait Resilience	-0.353	-6.11	2388	.01
Positive Emotions \times Trait Resilience	-0.096	<1	2388	<i>ns</i>
Stress \times Positive Emotions \times Trait Resilience	-0.272	-4.41	2388	.05
With neuroticism				
Stress	0.283	4.63	2388	.05
Positive emotions	-0.327	-5.85	2388	.01
Stress \times Positive Emotions	-0.366	-6.27	2388	.01
Stress \times Trait Resilience	-0.324	-5.62	2388	.01
Positive Emotions \times Trait Resilience	-0.071	<1	2388	<i>ns</i>
Stress \times Positive Emotions \times Trait Resilience	-0.251	-4.28	2388	.05

Note. All day-level predictors were group-mean centered, and all person-level predictors were centered on sample means.

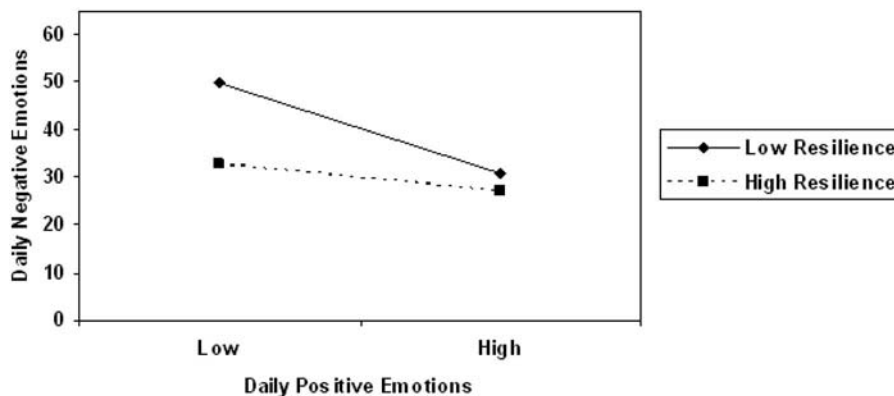


Figure 5. Study 2: Concurrent relationship between daily positive and negative emotion as a function of trait resilience, one standard deviation above the mean in daily stress. High and low resilience were defined as one standard deviation from the mean.

General Discussion

We began this article by underscoring how little we know about the dynamic interplay between positive and negative emotional states in later life, and we sought an explanation of what are the individual and contextual factors that account for successful adaptation in the face of adversity. The results of the present set of studies converge on five broad conclusions: (a) The adaptive benefits of positive emotions are greatest when individuals are under stress; (b) positive emotions are more common among high-resilient individuals; (c) those low in psychological resilience tend to have difficulty regulating negative emotions and exhibit heightened reactivity to daily stressful life events; (d) when present, positive emotions are especially important for low-resilient individuals, particularly in the context of stress; and (e) over time, positive emotions serve to assist high-resilient individuals in their ability to effectively rebound from adversity. On the whole, these findings add to the growing number of longitudinal studies suggesting that positive emotional processes are a key component of what it means to be resilient (Bonanno, 2004; Fredrickson et al., 2003; Zautra, Johnson, & Davis, 2005).

In a recent review of the loss and trauma literature, Bonanno (2004) provocatively concluded that resilience is a “common phenomenon, distinct from the process of recovery, and can be reached by a variety of different pathways” (p. 26). In general, although our results provide corroborative support for each of these conclusions, they also suggest that our understanding of how these processes operate at the day-to-day level in later adulthood is at best elementary. First, across studies, our findings indicate that the concept of resilience has relevance not only to those undergoing significant life challenge but also to those experiencing daily stressors that spontaneously arise and subside in naturally occurring contexts. As such, the findings add to the growing body of empirical evidence indicating that human resilience is a normative process that operates across the life span (Bonanno, 2005; Masten, 2001; Staudinger et al., 1995). Second, the process of stress resistance was observed to be distinct from the process of recovery. In the present set of studies, the maintenance of emotional differentiation under stress was judged as a marker of stress resistance. It is important that daily stress resistance was seen to operate entirely in situ. That is, the systematic covariation between

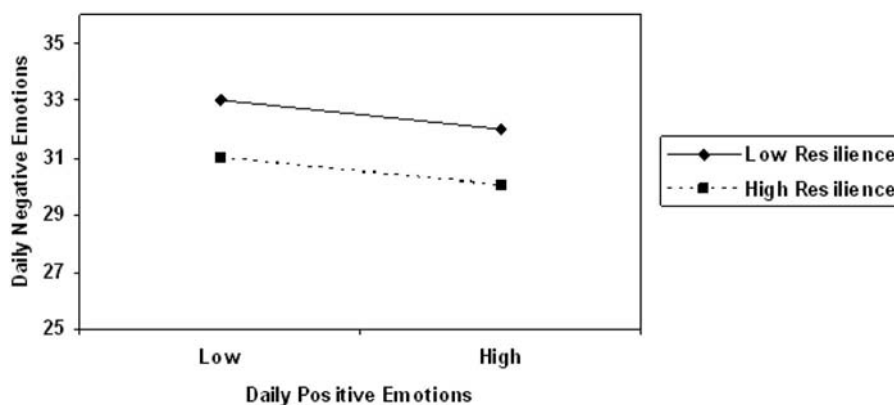


Figure 6. Study 2: Concurrent relationship between daily positive and negative emotion as a function of trait resilience, one standard deviation below the mean in daily stress. High and low resilience were defined as one standard deviation from the mean.

positive and negative emotions was found to reside largely in its concurrent interaction with stress. Individual differences in psychological resilience, moreover, appeared to influence the threshold at which individuals reacted to ongoing daily stressors. Further, our analyses of recovery processes revealed that for less resilient individuals, the unpleasant experience of one daily stressful event tends to follow on the heels of another, thereby ratcheting up subsequent stress levels even higher. Finally, our findings strongly support the assertion that flexible adaptation to adversity can be reached through a variety of protective pathways (Bonanno, 2004, 2005). Two such pathways were evident in the current research: one operating at the level of within-person variation (i.e., daily positive emotion) and the other at the level of between-person differences (i.e., psychological resilience). The breadth and convergence of evidence across studies raises important questions regarding the measurement and conceptualization of resilience in later adulthood.

The Adaptive Functions of Positive Emotions

More than 2 decades ago, Lazarus, Kanner, and Folkman (1980) suggested that under intensely stressful conditions, positive emotions may provide an important psychological time-out, sustain continued coping efforts, and restore vital resources that have been depleted by stress. Until recently, there has been little empirical support for these ideas. Foundational evidence for the adaptive function of positive emotions is beginning to accrue, however (e.g., Bonanno & Keltner, 1997; Folkman, 1997; Fredrickson et al., 2003; Tugade & Fredrickson, 2004; Zautra, Johnson, & Davis, 2005). Taken together, the present findings add to and strengthen the generality of extant empirical work on positive emotions. In particular, the present investigation extends research by its empirical attention to the real-life challenges and stresses of later life. A primary finding emerging from this research is that a significant proportion of older adults manage to experience positive emotions, even in the midst of overwhelming loss. Despite variation in the types of stressors experienced, however, the results across three independent samples are remarkably consistent: Positive emotions have demonstrably beneficial effects when present during times of stress.

Together with related work (e.g., Davis et al., 2004; Zautra et al., 2001), findings from the current research suggest that positive emotions may strengthen stress resistance by providing an important psychological breather when distress becomes particularly intense (Lazarus et al., 1980). Additionally, our findings join with past research (e.g., Fredrickson & Levenson, 1998; Fredrickson et al., 2003) in demonstrating that positive emotions may also protect against slow or prolonged recovery from stress. Fredrickson (1998, 2001) has argued that under stressful conditions, positive emotions may help to build and restore depleted personal resources. Consistent with this prediction, the present findings provide empirical support for the hypothesized building function of positive emotions. Moreover, by situating the study of positive emotions within existing dynamic models of stress and emotion (e.g., Zautra, Affleck, et al., 2005; Zautra et al., 2001), the current research provides an important conceptual and methodological link to previous laboratory studies. Overall, the data establish that positive emotions may function in the service of well-being not only by

interrupting the ongoing experience of stress but also by averting delays in adaptation to subsequent stressors.

The Emotional Underpinnings of Psychological Resilience

As Mischel (2004) and others have noted, trait data become especially powerful explanatory constructs when they are viewed in connection with dynamic processes that activate and make salient selective individual difference variables. Which traits help some to maintain and regain emotional well-being whereas others languish in feelings of helplessness and hopelessness? Particular attention has recently been paid to psychological traits that generate and sustain positive emotions under stressful conditions (e.g., Ong et al., 2004; Tugade et al., 2004; Zautra et al., 2001). Findings across studies indicate that differences in adaptation to stress may follow from one's habitual outlook on life; that is, how individuals react to, appraise, and interpret adverse life experiences. Overall, the present findings suggest that individual differences in psychological resilience may constitute an important route to understanding differential resistance to and recovery from daily stress in later adulthood.

Throughout this research, psychological resilience accounted for meaningful differences in emotional responses to daily stressors. That these relationships held, even after controlling for variables thought to influence these daily processes (i.e., neuroticism) is noteworthy. Perhaps nowhere was this truer, however, than in our widowhood study. These individuals meet the two criteria on which resilience, as a process, is predicated (Luthar et al., 2000). First, they have been exposed to significant adversity. Second, they have achieved positive outcomes despite these adverse experiences. Over time, what are the key differences that distinguished high-resilient widows from their less well-functioning, vulnerable peers who similarly suffered interpersonal loss? There are relatively few, but those are revealing: High-resilient widows were more likely to experience a range of positive (e.g., cheerful, peaceful, happy) and negative (e.g., anxious, worried, depressed) emotions throughout the bereavement process. A key distinguishing feature of this experience, however, is the capacity to maintain partial separation of positive and negative emotional states while under stress, thereby preserving emotional complexity (cf. Ong & Bergeman, 2004a; Zautra et al., 2001). These findings provide additional empirical footing for the DMA. In previous work, Zautra and colleagues reported related effects for mood clarity, an aspect of emotional intelligence that reflects the capacity for emotional understanding (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), and cognitive complexity, a characteristic of self-concept implicated in mood variability (Linville, 1985). Specifically, individuals with greater mood clarity (Zautra et al., 2001) and cognitive complexity (Potter et al., 2000) exhibited greater differentiation of positive and negative emotions. In the current investigation, a similar mechanism was found to underlie psychological resilience, suggesting that one adaptive outgrowth of resilience is an increase in emotional complexity during times of stress.

In addition to evidencing greater emotional complexity, high-resilient widows also showed greater control over their positive emotional experiences. Our mediational analyses revealed that high-resilient widows were also more likely to selectively mobilize positive emotions to recover and bounce back from daily stress. In the context of conjugal bereavement, these findings suggest that

psychological resilience may help bereaved spouses sustain access to daily positive emotional resources, which in turn may lead to accelerated recovery from stress (for related work, see Moskowitz, Folkman, & Acree, 2003). Collectively, these findings link up with prior research (e.g., Fredrickson et al., 2003; Tugade & Fredrickson, 2004) in demonstrating positive emotions' larger reach as well as its enduring connection to trait resilience.

Implications

The present findings have a range of implications. First, if the ability to experience positive emotions in the context of stress is indeed adaptive, then interventions designed to bolster individuals' capacity for seeing the complexity of emotions inherent in everyday stressful situations may prove to be beneficial. Zautra (2003) cited evidence that mindfulness-based approaches to stress reduction may offer a means of broadening emotional awareness and thus help to sustain positive emotional engagement under stressful conditions. In addition, interventions that facilitate the processing of emotions with greater complexity might also foster adaptive coping and adjustment to chronic stress and illness (Reich et al., 2003).

Second, the evidence that positive emotions may be important in helping resilient individuals recover from stress suggests that the experience of positive emotions may be potentially modifiable by intervention. Several studies indicate that coping styles marked by situational meaning (Park & Folkman, 1997) and perspective-taking (Fredrickson & Joiner, 2002) may facilitate adjustment to acute and persistent stress. Although we did not directly assess coping, our findings are in line with studies that indicate that changing the appraised personal significance of stressful conditions may be one mechanism by which to cultivate positive emotions in the midst of stress (Park & Folkman, 1997; Tugade & Fredrickson, 2004). Together with related research with younger adults (e.g., Fredrickson et al., 2003; Tugade & Fredrickson, 2004; Tugade et al., 2004), the present findings thus provide the basis for underscoring the importance of building positive emotional experiences into the ecology of older adults' everyday lives.

Finally, our findings are complemented by recent studies suggesting that the capacity for complex emotional experience may run in parallel with the progressive development of differentiated but integrated forms of cognition (for a discussion, see Labouvie-Vief, 2003, 2005).⁹ Discussing patterns in cognitive-affective differentiation from childhood to adulthood, Labouvie-Vief and Medler (2002) recently argued that age-related changes in emotional complexity are likely to be modified by relatively habitual individual differences in styles of emotion regulation. Labouvie-Vief and Medler (2002) further proposed that the most adaptive mode of emotion regulation is one that is characterized by high levels of positive emotion and integrative processing of positive and negative emotional information. This view of emotional development resonates with the general finding in the current research that differences in psychological resilience (an enduring self-regulatory capacity) can have an integrative function and promote overall adaptation by allowing individuals (a) to experience emotional complexity amid stressful experiences and (b) to capitalize on their positive emotions to successfully rebound from such experiences.

Caveats and Future Directions

A number of limitations of this research warrant comment. In the following, we describe notable caveats, as well as issues that might profitably be considered in future research. First, we operationally defined successful adaptation in the current research as the ability to maintain and regain emotional health in the face of daily stress. The maintenance and recovery of emotional functioning are not the only indicators of successful adaptation, however. Future research should be broadened conceptually to include the role of psychological well-being (Keyes, Shmotkin, & Ryff, 2002), psychological thriving (Carver, 1998), and posttraumatic growth (Tedeschi & Calhoun, 2004) in response to later life challenges. We acknowledge, however, that there are situations in which an exclusive focus on emotional and psychological wellness may not necessarily be appropriate. For certain severe life adversities, such as direct exposure to the brutalities of war, the absence of mental and physical illness may be a more pressing and valid indicator of successful adaptation (Luthar & Cushing, 1999). Yet a third way of conceptualizing health-promoting processes follows from consideration of the conditions in which positive and negative processes may be simultaneously activated (Cacioppo, Gardner, & Berntson, 1999; Schimmack, Oishi, & Diener, 2002). Such states of coactivation have been posited to represent an important adaptive mechanism that confers benefits through its impact on the individual's ability to directly engage and find meaning in challenge (Folkman et al., 1997; Larsen, Hemenover, Norris, & Cacioppo, 2003). When viewed together, these diverse representations of human resilience lend support to the notion of *multifinality* (Cicchetti & Rogosch, 1996), which emphasizes the dynamic and coordinated interplay between individual and contextually determined factors. We think this interplay is one of the most intriguing and promising areas for future study.

Second, the results of the current research do not speak to the general restriction in the range of plasticity or reserve capacity (M. M. Baltes, Kuhl, & Sowarka, 1992; P. B. Baltes & Kliegl, 1992), or even possible hidden costs that may accompany profiles of adaptive functioning in later adulthood (Staudinger et al., 1993, 1995). Several lines of evidence primarily from studies of childhood psychopathology (e.g., Werner & Smith, 1992; Zucker, Wong, Puttler, & Fitzgerald, 2003) suggest that children labeled as resilient may fare well in certain domains (e.g., academic competence, prosocial behavior), but show noticeable deficits in others (e.g., social and emotional competence). Evidence of ontogenic variability across selective life domains has also been documented among older adults adapting to various age-related losses and transitions (P. B. Baltes, 1997; P. B. Baltes & Baltes, 1990). As

⁹ We note that our conceptualization of emotional complexity specifically refers to individual differences in the intraindividual covariation between positive and negative emotional states. This conceptualization follows from the nomothetic-idiographic tradition of studying emotional experience (e.g., Feldman, 1995a; Wessman & Ricks, 1966; Zautra et al., 2001). As such, this research needs to be distinguished from related cognitive-developmental work that follows from the tradition of Piaget and Kohlberg (for a review, see Labouvie-Vief, 1994), in which the capacity for emotional complexity is seen as cognitive skill that develops according to the classic principles of the development of cognition in general (Labouvie-Vief & Diehl, 2000; Labouvie-Vief & Medler, 2002).

noted by others (e.g., Ryff et al., 1998), however, studies that include direct assessments of both flourishing and challenge in later life are limited. Future research should, therefore, extend these findings by examining the extent to which psychological resilience and positive emotions, when chronically mobilized in times of stress, exact tolls on other areas of functioning, thereby precipitating the inimical effects of allostatic load (McEwen, 1998).

A third limitation concerns the methodological drawbacks that were shared by all three studies, including small sample sizes, lack of experimental control over confounding variables, and reliance on self-reports. Several investigators have noted, for instance, that interaction models with small sample sizes, in practice, are prohibitively difficult to test (e.g., Luthar et al., 2000). Our relatively small samples did not, however, obscure the presence of fairly complex cross-level interactions. That such effects were detectable across all three studies and over several temporal lags is noteworthy. It is also possible that other factors that could not be adequately controlled for in the current research were driving the results. For example, it is possible that other types of stressors might show comparatively different effects. Several studies, however, have independently manipulated stress (Zautra et al., 2000) and have found that the subjective experience of stress is reliably associated with diminished emotional experience and recovery. Nonetheless, the combination of randomized designs and intensive day-to-day monitoring of phenomena such as stress and emotion, we believe, presents a rich opportunity to explore the real-world effects of interventions based on a resilience paradigm. Finally, our analyses of daily stress and emotion relied heavily on self-reports from respondents. These measures were completed at the end of the day, and hours could have passed since the occurrence of the daily stressor. It is possible that negative mood could have resulted in a distorted recollection and appraisal of events (Marco & Suls, 1993). Similarly, we evaluated day-to-day stress by asking participants to focus on "the most stressful event of the day" and then to rate their stress level in relation to that event. Although this approach has the intuitive appeal of being less removed from the participant's real experience, it assumes that the participant's end-of-day emotions are systematically influenced by the day's most stressful event. It is possible, however, that many of the "most stressful events" participants responded to were not particularly stressful (see Tennen & Affleck, 2002). Future investigations should thus take a multimethod approach (for a discussion, see J. E. Singer & Davidson, 1991) to stress assessment by including not only self-reports from respondents but also physiological outcomes, biochemical assessments, and behavioral measures of stress. Similarly, because the occurrence of any life change requires some type of readjustment (Monroe & McQuaid, 1994), studies that include greater coverage in the range of daily events, both positive and negative, should be a high priority for future research (Zautra, Guarnaccia, & Dohrenwend, 1986).

Fourth, a number of variables known to have an effect on the resilience process were not examined in the present research. In particular, we did not assess social support as a possible source of between-person differences affecting either daily stress or emotion. Converging life span evidence suggests that environmental supports routinely foster the development of successful adaptation among both children and adults under stress (cf. Luthar & Zelazo, 2003; Ryff et al., 1998). Our findings, moreover, relate only to

short-term stressors and cannot address the influence of psychological resilience on chronic strains of appreciable duration (e.g., caring for an ill spouse). Thus, it will be important for future studies to determine whether other protective resources, such as the social environment, contribute to adaptation to more protracted forms of later life challenge.

A fifth limitation concerns our exclusive adoption of a variable-focused approach in the current research. Although this approach provides a sensitive strategy for detecting synergistic nonadditive effects, variable-centered approaches cannot fully capture the subgroup heterogeneity that may be reflected in qualitatively distinct subtype patterns or subpopulations. Person-centered approaches such as latent class analysis and growth mixture modeling, in comparison, allow for the consideration of whether hidden categorical variables (classes) explain the trajectories of individuals over time (Nagin, 1999). Such methods thus permit investigations of the different trajectories of resilience that may correspond to the different clusters of respondents within a sample (Bonanno, Wortman, & Nesse, 2004).

Finally, we highlight the application of dynamical systems analysis (Boker & Nesselroade, 2002) as an innovative analytic technique for addressing process research questions within a resilience framework. One fundamental assumption underlying the process of resilience, for example, is that resilient functioning is characterized by quicker return to equilibrium (Curtis & Cicchetti, 2003; Davidson, 2000). Dynamical systems analysis allows one to directly test the extent to which a system of variables self-regulates over time and thereby show fluctuation about an equilibrium (Boker & Nesselroade, 2002). Using a subset of widows from the Notre Dame Study of Adjustment to Widowhood, Bisconti et al. (2004) assessed intraindividual variability in emotion regulation in the 3 months following the death of a spouse using dynamical system analysis. Results indicated that the trajectory of emotion regulation following the loss of a spouse resembles a pendulum with friction; that is, emotional responses during bereavement were consistent with an oscillating trajectory that dampens over time. Although this research was designed to assess the homeostatic mechanisms that are invoked following a major life event, an equally important line of research concerns tracking the processes that support *allostasis*, the process by which an organism remains stable in the face of challenge (McEwen, 1998). Because dynamical systems techniques can accommodate both person and situational changes, they are particularly well suited to exploring such processes. These methods may provide an important bridge between laboratory studies of the effects of stress exposure and reactivity, on the one hand, and field investigations of individual differences in stress recovery and the efficacy of restorative processes, on the other.

Concluding Remarks

Although a great deal of progress has been made in our understanding of successful adaptation across the life span (cf. Luthar et al., 2000; Ryff et al., 1998), the role of short-term adaptation to stress remains vastly understudied, particularly in later adulthood. Although this body of work is still small, the results of the current research have uncovered important findings: Positive emotions in later adulthood fluctuate on a day-to-day basis, and both stress and negative emotion are robustly affected by these fluctuations. It is

important that our results suggest that positive emotions are a prominent feature of psychological resilience in later life. For persons high in trait resilience, the experience of positive emotion tends to bracket the experience of daily stress and negative emotion.

In a recent review of the resilience research conducted over the past 30 years, Curtis and Cicchetti (2003) concluded with the following statement: "If we are to grasp the true complexity of the concept of resilience, then we must investigate it with a commensurate level of complexity" (p. 803). We join with these and other investigators (e.g., Ryff et al., 1998; Tugade et al., 2004; Zautra, Johnson, & Davis, 2005) in emphasizing that the time has come for researchers to maximize the potential advantages of combining a variety of methodological (e.g., experimental, daily diary, life story narratives) and innovative data analytic (e.g., multilevel modeling, growth mixture modeling, dynamical systems analysis) techniques for tackling the complex theoretical questions surrounding the measurement and modeling of adaptive processes.

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