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Resilience Comes of Age: Defining Features in Later Adulthood

Anthony D. Ong¹, C. S. Bergeman², and Steven M. Boker³

¹ Cornell University

² University of Notre Dame

³ University of Virginia

Historically, resilience research has been largely the purview of developmental investigators dealing with early childhood and adolescence. This research primarily focused on at-risk children who were exposed to significant and severe life adversities (e.g., extreme poverty, parental mental illness, community violence). The study of resilience in adulthood and later life, by comparison, remains largely understudied. In this article, we describe a program of research on adulthood resilience. We begin with a selective review of the broad literature on resilience, giving emphasis to the major approaches, empirical findings, and guiding principles that characterize prior studies. We then summarize our own approach to the phenomenon of resilience and illustrate select parts of our previous and ongoing studies of older adults. Findings from this research add to the growing body of empirical evidence suggesting that resilience is a common phenomenon that emerges from the coordinated orchestration of basic human adaptive processes.

Resilience has had numerous meanings in prior research, but it generally refers to a pattern of functioning indicative of *positive adaptation* in the context of significant *risk* or adversity. Underlying this notion are two fundamental conditions: (a) exposure to significant risks and (b) evidence of positive adaptation despite serious threats to development. In early investigations of childhood resilience (e.g., Garmezy, Masten, & Tellegen, 1984; Rutter, 1987; Werner & Smith, 1982), risk factors were defined as discrete experiences (e.g., parental psychopathology, community violence) that carried high odds for maladjustment. In subsequent work (e.g., Luthar, 1999; Luthar & Cushing, 1999; Masten & O'Connor, 1989; Masten & Wright, 1998; Sameroff, Gutman, & Peck, 2003), the concept of risk was broadened to include cumulative risk indices (e.g., tallies of adverse life events over time), acute trauma and chronic life difficulties (e.g., sexual abuse, neighborhood disorganization), and factors that statistically predicted later maladjustment in the general population (e.g., low birth weight).

Positive adaptation, the second core component of resilience, represents adaptation that is substantially better than would be expected given exposure to significant risk. Although indicators of positive adaptation have varied across the context, population, and risk factor understudy (for a review, see Luthar, 2006), extant conceptualizations have, in general, included three kinds of phenomena: good developmental outcomes despite high risk, sustained competence under stress, and recovery from trauma (Masten, Best, & Garmezy, 1990). Under each of these conditions, researchers have focused their attention on identifying *protective factors* that served to modify the adverse effects of risks in a positive direction. On the basis of early reviews of the childhood and adolescence literature, Garmezy (1985) described three major categories of protective factors: *individual attributes*

(e.g., an engaging “easy” temperament and good self-regulation skills), *relationships* (e.g., parental qualities with high trust, warmth, cohesion, and close relationships with competent adults), and *external support systems* (e.g., quality neighborhoods and schools and connections to prosocial organizations). These set of protective factors have been remarkably reliable in predicting positive psychological functioning following adversity (Garmezy, 1987; Masten & Coatsworth, 1998; Rutter, 1987; Werner & Smith, 1992). The consistent support for these assets and resources led Masten (2001) to conclude that resilience emerges not from rare or extraordinary qualities and circumstances, but from “the everyday magic of ordinary, normative human resources in the minds, brains, and bodies of children, in their families and relationships, and in their communities” (p. 201).

At the other end of the life course is the growing literature on *optimal aging* (Baltes & Baltes, 1990; Rowe & Kahn, 1987; Schulz & Heckhausen, 1996) that has delineated distinct patterns of developmental plasticity (i.e., changes in adaptive capacity) across multiple life domains. This work underscores distinctions between resilience as *recovery* from the negative consequences of adversity and resilience as *maintenance* of development in the face of cumulative risks (for a review, see Staudinger, Marsiske, & Baltes, 1995). Other research has conceptualized resilience as distinct from the process of recovery (Bonanno, 2004). This perspective derives from studies demonstrating that resilience and recovery are distinct outcome trajectories that are empirically separable following highly aversive events such as interpersonal loss (e.g., Bonanno et al., 2002) and psychological trauma (e.g., Bonanno, Galea, Bucciarelli, & Vlahov, 2006). Finally, several lines of adulthood research emphasize the need to assess positive outcomes (e.g., psychological well-being, developmental growth) in response to challenge (Ryff & Singer, 2003a; Ryff, Singer, Love, & Essex, 1998; Staudinger, Marsiske, & Baltes, 1993; Staudinger et al., 1995). Studies within this tradition have elaborated how age-graded influences (e.g., Baltes, 1987; Ryff & Heidrich, 1997), normative transitions (e.g., Smider, Essex, & Ryff, 1996), nonnormative events (e.g., Baltes, Reese, & Lipsitt, 1980; Tweed & Ryff, 1991), and chronic life difficulties (e.g., Baltes & Baltes, 1990; Singer & Ryff, 1999) are linked to various aspects of adult mental and physical health.

Recent reviews of the burgeoning research on child and adulthood resilience (Bonanno, 2005; Luthar & Brown, 2007; Ryff & Singer, 2003a) reveal notable parallels as well as salient differences. Although an exhaustive review of the major differences and similarities across these two literatures is beyond the scope of this article, we briefly highlight convergent themes and guiding principles that shore up idiosyncratic viewpoints and approaches evident in prior work. From the perspective of risk avoidance, it is noteworthy that extant studies of resilience have given limited empirical attention to the exact nature of the stressors and challenges confronting resilient children and adults. As Ryff et al. (1998) note, in many instances, risk factors are inferred from aversive or otherwise unfavorable contexts (e.g., poverty, parental psychopathology, widowhood) rather than empirically assessed. Within the developmental and adult literatures, most researchers additionally agree that it is important to consider adaptive functioning more broadly beyond just the avoidance of psychopathology or negative developmental outcomes (Masten et al., 1990; Ryff & Singer, 2003a). Luthar and her colleagues (Luthar, Cicchetti, & Becker, 2000; Luthar & Zelazo, 2003), for example, underscore the importance of considering the role of biological factors in resilience.

Both child and adult literatures (Bonanno, 2004; Luthar & Brown, 2007; Masten, 2001; Ryff & Singer, 2000) emphasize the need to assess the relative contribution of personality assets (e.g., ego resilience, positive self-concepts, hardiness) and environmental resources (e.g., access to supportive relationships, close and nurturing family bonds, quality relationships within the community) in response to challenge. Finally, understanding of specific

mechanisms that underlie resilience is a central interest in both child and adulthood literatures (Luthar et al., 2000; Rutter, 2000; Ryff & Singer, 2003a; Ryff et al., 1998). That is, rather than simply studying which individual assets and social resources are associated with positive adaptation, there is growing awareness of the need to consider *how* such factors contribute to resilience in the face of challenge.

In this article, we describe select parts of ongoing studies to illustrate how previous conceptualizations of resilience have guided our program of empirical research. In particular, we focus on four critical measurement priorities that have emerged from the child and adulthood literatures on resilience that include the need for empirical assessments of (a) life challenge and adversity, (b) proximal biological processes, (c) modifiable protective factors, and (d) specific mechanisms underlying protection. We summarize and integrate findings from our program of research, in which we have relied heavily on daily process methods. We describe findings from these studies to illustrate the ways in which daily process approaches can be used to examine key issues about resilience as it unfolds both within individuals and across everyday life experiences.

A DAILY PROCESS APPROACH TO RESILIENCE IN LATER ADULTHOOD

A primary goal of our research has been to investigate the daily context in which positive adaptation occurs in response to challenge. Here we have adopted a daily process approach (i.e., diary methods) to examine how the nature of stressors, the personality of those involved, and the broader social context can affect mental and physical health in later adulthood. This approach involves intensive, day-to-day monitoring of study variables, allowing us to view change in fluctuating processes, such as stress and mood, closer to their real-time moments of change. In addition to providing a framework in which to study inherently intra-individual (within-person) questions (Bolger, Davis, & Rafaeli, 2003), diary methods confer specific methodological advantages for the study of resilience. As has been suggested (e.g., Almeida, 2005), perhaps the primary advantage of this methodology is its ability to reveal dynamic processes (e.g., stress duration and recovery) that are of particular interest to resilience researchers. In addition, diary methods allow individuals to report their behavior and experiences over the range of potentially stressful circumstances encountered in everyday life, thereby facilitating ecologically valid research (Reis & Gable, 2000). Finally, diary designs have the potential for greater internal validity, because the shorter lag between experience and reporting minimizes memory distortions (Stone, Shiffman, & DeVries, 1999).

In our research we have embarked on the study of resilience in everyday life by utilizing statistical methodologies that are responsive to complex, dynamic changes over time. A major strength of the analytic approaches we utilize is the ability to model processes that may be simultaneously occurring within individuals and across contexts. The emphasis on multiple pathways and multiple levels of analysis is prominent in recent reviews of both child and adulthood resilience (Cicchetti & Dawson, 2002; Luthar & Brown, 2007; Masten, 2007; Ryff & Singer, 2003b). The contemporary statistical approaches that we adopt (e.g., multilevel modeling, dynamic systems analysis) have enabled us to address a variety of questions, including some that are difficult, if not impossible, to address with traditional cross-sectional methods. In particular, processes that involve patterns of change (e.g., cycles or rhythms), rate of change (e.g., duration or recovery), speed of change (e.g., nonlinear processes), and covariation in change (e.g., co-occurrence, lagged associations) are all ideally suited for study using hierarchical linear modeling (HLM) and dynamic systems analysis (for a discussion, see Ong & Zautra, 2009).

PROGRAM OF RESEARCH

Here we present findings from select parts of our previous as well as ongoing studies of older adults. Although these studies involved multiple methods of data collection (i.e., longitudinal, diary, life history interviews), we highlight findings derived from the daily diary process component of our research. A detailed description of the samples and procedures can be found elsewhere (Ong & Bergeman, 2004b; Ong, Bergeman, & Bisconti, 2005; Ong, Edwards, & Bergeman, 2006). Below we summarize major themes that have emerged from our research, focusing on salient risk and protective processes, as well as underlying mechanisms. We also present new data building on the findings from our prior studies. Finally, drawing on these findings, as well as relevant work by others, we discuss priority recommendations for future research.

Resilient Personalities

Both the child and adult literatures on resilience emphasize the importance of personality characteristics that could protect individuals against the negative consequences of stressful life experiences. One stable personality trait that has emerged as an important psychological asset is “ego resiliency,” defined as the capacity to overcome, steer through, and bounce back from adversity (J. Block & Kremen, 1996; J. H. Block & Block, 1980). In longitudinal studies of personality, ego-resilient children were described as confident, perceptive, insightful, and able to form warm and open relations with others (J. Block, 1971, 1993). “Ego-brittle” children, by contrast, exhibited behavioral problems, depressive symptoms, and higher levels of drug use in adolescence (J. Block, Block, & Keyes, 1988; J. Block & Gjerde, 1990). Similar lines of resilience research in adults have yielded evidence of the benefits of ego resiliency. For example, in a series of coordinated experimental and individual difference studies, Fredrickson and colleagues (Fredrickson, Tugade, Waugh, & Larkin, 2003; Tugade, Fredrickson, & Barrett, 2004) found that high ego-resilient individuals exhibited faster physiological and emotional recovery from stress. In one study (Tugade et al., 2004), higher ego resiliency was linked to quicker cardiovascular recovery following a laboratory stressor. In another study (Fredrickson et al., 2003), higher ego resiliency was associated with lower subsequent depressive symptoms following the September 11th attacks on the United States.

From the perspective of protective processes, it is noteworthy that developmental researchers have cautioned against viewing resilience as a stable personality trait. Commenting on the distinction between ego resiliency and resilience, Luthar et al. (2000) noted, “The term ego-resiliency and resilience differ on two major dimensions. Ego-resiliency is a personality characteristic of the individual, whereas resilience is a dynamic developmental process. Second, ego-resiliency does not presuppose exposure to substantial adversity, whereas resilience, by definition, does” (p. 546). Recognizing that personality data may become especially powerful explanatory constructs when viewed in connection with dynamic processes that activate and make salient selective individual differences (Fleeson, 2004; Mischel, 2004), our program of research has emphasized the dynamic interplay between both *trait* and *process* conceptualizations of resilience. In particular, our daily process research has explored the ways in which resilient personality traits (i.e., ego resilience and psychological hardiness) influence and support meaningful short-term adaptation to daily stress.

In our first study (Ong & Bergeman, 2004a), we conducted a daily process study with older adults to assess the influence of personality on daily emotional well-being. As an index of trait resilience, we used an adapted version of the personality hardiness scale (Bartone, Ursano, Wright, & Ingraham, 1989). Proposed by Kobasa and colleagues (Kobasa, Maddi, & Kahn, 1982; Kobasa & Puccetti, 1983) to account for individual differences in responses

to life stressors, *hardiness* is defined as the presence of three interrelated dispositions: commitment (rather than alienation), control (rather than powerlessness), and challenge (rather than threat).

Given the documented increase in emotional dialecticism (Labouvie-Vief, Devoe, & Bulka, 1989; Turk Charles, 2005) and effective emotion regulation with age (Carstensen, Pasupathi, Mayr, & Nesselrode, 2000), we hypothesized individuals high in trait resilience (as measured by personality hardiness) would show greater complexity in self-reports of online emotional experience. We examined two types of emotional experience: differentiation and co-occurrence. To obtain an index of emotion differentiation, we extracted, for each participant, the number of principal component factors with eigenvalues greater than unity. We took as an index of emotional differentiation the number of within-person factors needed to account for the variation in each person's emotional experience. A low score reflects little differentiation in emotional states, whereas a higher score reflects more differentiation. In keeping with previous work (e.g., Carstensen et al., 2000), we also calculated, for each participant, the average intra-individual correlation between positive and negative emotions over the 30-day sampling period. Positive within-subject correlations reflect greater degrees of co-occurrence and more blending between pleasant and unpleasant feeling states, whereas smaller correlations reflect little blending of emotional states (Zelenski & Larsen, 2000). Finally, to test whether trait resilience predicted our emotion complexity indices, we conducted two separate multiple regression analyses, one for each of our differentiation and co-occurrence measures of emotional complexity.

Our major hypothesis was supported (Ong & Bergeman, 2004a). Higher levels of trait resilience predicted greater differentiation and more co-occurrences of positive and negative emotions, suggesting that one adaptive outgrowth of resilience is an increase in emotional complexity. Because there was growing evidence suggesting that stress may alter the structure of emotional experience (e.g., Zautra, Potter, & Reich, 1997; Zautra, Smith, Affleck, & Tennen, 2001), we speculated that emotional complexity may be a resource that resilient individuals draw upon during times of challenge and adversity.

Personality and Stress Resistance—Both child and adult literatures (Bonanno, 2005; Curtis & Cicchetti, 2003; Ryff & Singer, 2003a) have repeatedly emphasized the need to identify protective traits that can account for *stress resistance* or the maintenance of positive outcomes in the face of challenge. One way by which personality may play a pivotal role in stress resistance has been proposed by Zautra and colleagues (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, Zautra, & Davis, 2003). One implication of the DMA is that the capacity to experience positive and negative emotions in a dialectical fashion may represent one potential pathway underlying stress resistance (for a similar point, see Lindquist & Barrett, 2008). Thus, personality traits that are important in emotional complexity (i.e., trait resilience) should also contribute to flexible resistance to stress.

A second study (Ong, Bergeman, Bisconti, & Wallace, 2006) allowed us to test the relationship between trait resilience and daily stress resistance in three independent samples of older adults. We predicted that trait resilience would be an important protective attribute that contributes to stress resistance, assisting high-resilient individuals in their ability to effectively regulate negative emotional arousal in the midst of stress. To test the generalizability of our findings, we used different measures of trait resilience (i.e., ego

resilience, personality hardiness) and daily distress (i.e., negative affect, anxiety and depressive symptoms). In a third, independent sample, we examined how profiles of daily emotional responses to stress intersect with the significant challenges associated with conjugal loss. Finally, given that trait resilience may be negatively correlated with neuroticism (Maddi et al., 2002), we explored the extent to which the associations between trait resilience and daily stress and emotion existed separately from their mutual associations with neuroticism.

Our hypothesis was supported across all three samples (Ong, Bergeman, et al., 2006). In particular, we predicted that trait resilience would contribute to greater stress resistance or a weaker association between positive and negative emotions, particularly on days of heightened stress. In support of this hypothesis, our HLM analyses revealed that the individual slopes relating positive emotion to negative emotion on days of above average stress were predictable from trait resilience. Individuals low in trait resilience showed an inverse relationship between daily positive and negative emotion. A test of planned contrast revealed that this relationship differed significantly across high and low stress days. In comparison, the relationship between daily positive and negative emotions was negligible for high-resilient individuals and did not differ significantly across high and low stress days. Taken together, findings from our study of older adults provided further support for the DMA (Zautra et al., 2001) by identifying an important personality disposition (i.e., trait resilience) underlying daily stress resistance.

Personality and Stress Recovery—In addition to examining stress resistance, our daily process studies also allowed us to examine the role of personality in stress recovery. Both child and adult literatures (Bonanno, 2004; Curtis & Cicchetti, 2003; Tugade & Fredrickson, 2004) have suggested that resilient adaptation may be reflected in the capacity to “bounce back” or recover more quickly from environmental stressors. We hypothesized that trait resilience would constitute an important route to understanding differential recovery from daily stress in later adulthood. To analyze recovery relationships, lagged associations between daily stress and emotion were examined. The results of our lagged analyses revealed that stress on one day uniquely predicted psychological distress on the next day.

Of primary interest to us was the possibility that intra- or interindividual differences in the slopes relating lagged predictors to outcome variables might be functionally related to trait resilience. Across all three independent samples, day-to-day variability in slopes was significantly predicted by individual differences in trait resilience. Those high in trait resilience showed weaker time-lagged effects of stress on psychological distress. Thus, individuals high in trait resilience appeared to recover more quickly from daily stress than did their less resilient counterparts. In contrast, our analyses of recovery processes revealed that for less resilient individuals, the unpleasant experience of one daily stressful event tended to follow on the heels of another, thereby ratcheting up subsequent reactivity to stress even higher. Perhaps nowhere was this truer than in our widowhood sample. Among widows low in trait resilience, daily stress continued to precipitate negative mood as long as two lags (days) later. In sum, our findings suggest that the capacity to effectively inhibit prolonged psychological distress may represent a key pathway through which resilient individuals are able to successfully recover from stressful life encounters.

Protective Social Relationships

Studies of resilient children and adults have repeatedly underscored the significance of quality social relationships (Masten & Obradovic, 2006; Ryff & Singer, 2000). In her synthesis of resilience research across five decades, Luthar (2006) concluded that “resilience rests, fundamentally, on relationships” (p. 780). Reviewing the adult literature, Ryff and

Singer (2000) added, “Advancing the science of positive human health requires linking critical goods in life, such as quality social relationships, to biology” (p. 37). The question of how *social connectedness*, defined as having quality social ties to others (Ryff & Singer, 2001), is linked to biological and emotional resilience is of particular importance for older adults, given the stability and centrality of interpersonal relationships in late life (Carstensen, 1992; Lang & Carstensen, 1994).

Social Connectedness and Biological Resilience—Our first evidence that having quality social ties contributes to resilience in the face of life challenges came from a daily process study of older adults, who participated in a 60-day diary assessment of emotions and cardiovascular functioning (Ong & Allaire, 2005). Our major hypothesis was that, compared with those low in social connectedness, socially connected individuals would show diminished cardiovascular reactivity and more rapid recovery following negative emotional arousal. We found strong support for this hypothesis; socially connected individuals displayed less systolic and diastolic blood pressure reactivity on days characterized by high negative emotional arousal. Importantly, these relations were not limited to concurrent effects, but extended to influence each other as much as 2 days later. In particular, individuals who reported lower levels of social connectedness were more likely to have difficulty modulating the intensity of negative emotion once it had been triggered. Conversely, those high in social connectedness showed greater ability to inhibit the detrimental impact of negative emotion on subsequent cardiovascular responses. These findings remained significant when controlling for other methodological factors known to predict cardiovascular changes (e.g., time of day, trait affect, age, gender, marital status).

Social Support and Adjustment to Widowhood—A central focus of our research on bereavement has been to explore the nature of resilience within the context of broad social influences. Here we have used dynamic systems analysis as an investigative tool to study the adjustment patterns of widows following conjugal loss. In our early work (Bisconti, Bergeman, & Boker, 2004), we examined the day-to-day variability in emotional well-being following partner loss using a *damped linear oscillator model* (see Figure 1). The equation for a damped linear oscillator can be expressed as a linear regression formula in which the acceleration, or second derivative, is the outcome variable (i.e., the change in the slope in emotional well-being) and the displacement from equilibrium (i.e., the value of emotional well-being relative to the point around which it is oscillating) and velocity (i.e., change in emotional well-being) are the predictor variables (Boker, 2001; Boker & Bisconti, 2006).

Figure 1 illustrates the prototypic patterns of change implied by the damped linear oscillator model. The displacement from equilibrium is represented by the distance from the trend line at each occasion of measurement and the velocity is the first derivative, or slope, of the trajectory at each occasion. Note that the slope of the trajectory changes from one occasion to the next. The acceleration is the second derivative, or curvature, of the trajectory (i.e., the change in the slope) at each occasion. As depicted in Figure 1, the covariance between the second derivative, first derivative, and displacement remains constant in a curve. These four parameters—(a) damping, (b) frequency, (c) amplitude, and (d) trend—constitute a dynamical system in which the relationships between parameters define a central tendency of a family of trajectories.

The results of our research on bereavement processes indicated that the trajectory of emotion regulation following conjugal loss resembled a damped linear oscillator. In particular, the frequency parameter indicated that the mean frequency of the oscillations that characterized the emotional well-being of widows was relatively slow, with a single cycle lasting on average approximately 47 days. In addition, the damping parameter was also significant and negative, suggesting that oscillations in well-being following the death of a spouse

evidenced significant reduction across a 98-day period. This research provided us with initial empirical “guideposts” for understanding the process by which widows typically adjust to conjugal loss (Bisconti & Bergeman, 2007; Bisconti et al., 2004).

In a subsequent study (Bisconti, Bergeman, & Boker, 2006), we examined how social support predicted individual differences in adjustment trajectories. Of particular interest to us were the structural components of support from family and friends (i.e., quantity and frequency of support), perceived control over supportive relationships (psychosocial resources), and emotional- and instrumental-support-seeking behaviors (coping responses). Because emotional well-being and the regulation of emotional states are intimately tied to social interactions (Carstensen, 1992; Charles & Carstensen, 1999), we hypothesized that the structural and functional aspects of social support would represent two important pathways by which emotion regulation is established and maintained throughout the grieving process. Our results partially supported this prediction. Overall, 47% of the variance was explained by our social support constructs as predictors in the model. In comparison with structural support (i.e., quantity and frequency of support provided by both family and friends), our findings suggested that the functional components of support figured more prominently in predicting adjustment to loss. Specifically, we found that engagement in emotional-support-seeking behaviors was related to a quicker return to equilibrium and a more positive trend in overall adjustment. In contrast, instrumental support seeking significantly predicted a slower damping rate and weaker overall adjustment. When viewed together, our results suggest that differential utilization of support seeking for emotional versus instrumental needs early in the bereavement process may help to distinguish different pathways of later functioning.

Our findings also joined with past research (e.g., Bonanno, Moskowitz, Papa, & Folkman, 2005) by identifying groups of widows who follow different outcome trajectories over time. As an illustration, Figure 2 represents the trajectories of two women from our widowhood study that correspond to the prototypical *resilience* and *chronic* distress outcome trajectories identified by Bonanno (2004). Importantly, our research uncovered important factors that might explain divergent reactions in the early months following the loss of a spouse. Widow 1 primarily utilized emotional support seeking and had a trajectory similar to the prototypical resilience trajectory, characterized by an initial brief influx of day-to-day lability in emotional responses, followed by a high level of positive and stable emotional well-being. Conversely, Widow 2 relied on instrumental support seeking and had a trajectory similar to the prototypical chronic distress trajectory, characterized both by low levels of well-being and high levels of emotional oscillation across the duration of the study. Taken together, these findings suggest that the soothing power of social connection depends on our ability to select engagements that both preserve emotional well-being and bolster coping efficacy.

Understanding Underlying Mechanisms

A major objective of our research with older adults has been on identifying underlying mechanisms implicated in the effects of salient protective factors (Luthar et al., 2000; Rutter, 1987). Here our research has focused on the role of positive emotions as one important mechanism underlying resilient adaptation. Our efforts to date have largely explored the degree to which positive emotions might serve as a bulwark against the normative disruptions and setbacks in later adulthood. Concretely, such efforts have involved mapping innovative methodological approaches onto increasingly complex process-oriented models of resilience.

Protective Benefits of Positive Emotions—More than two 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 had been depleted by stress. Since then, 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 (Isen, Daubman, & Nowicki, 1987), counteract the physiological effects of negative emotions (Fredrickson & Levenson, 1998), facilitate adaptive coping (Folkman & Moskowitz, 2000), build enduring social resources (Keltner & Bonanno, 1997), and spark enhanced well-being (Fredrickson & Joiner, 2002).

In terms of underlying mechanisms, our work has examined a conceptual model in which the effect of trait resilience is mediated through positive emotions (Ong, Bergeman, et al., 2006). We hypothesized that the effect of trait resilience on adjustment to daily stress is transmitted, at least partially, through the experience of daily positive emotions. Specifically, we predicted that positive emotions would afford protective benefits by contributing to the ability of high-resilient individuals to recover more effectively from daily stressful encounters. In the context of our daily process studies, this hypothesis implies a process of *mediated moderation* (Muller, Judd, & Yzerbyt, 2005), whereby the magnitude of daily stress recovery is moderated by trait resilience, and day-to-day variation in positive emotions is responsible for this moderating effect. To test for mediated moderation, lagged coefficients from our HLMs were analyzed as a function of trait resilience. Replicating findings from our earlier work (e.g., Ong & Bergeman, 2004a), these analyses found that the effect of stress on next day's negative emotion was moderated by trait resilience. Every unit increase in trait resilience was associated with a 0.29 unit decrease in the lagged stress-negative emotion slope. Consistent with our main prediction, our analyses revealed that when positive emotion was included, the moderation of the residual direct effect of trait resilience was reduced to nonsignificance, suggesting that positive emotion mediates the moderating relationship of trait resilience and stress on next day's negative mood. That this effect was evident even after controlling for neuroticism is noteworthy.

Although findings from this study helped to establish the adaptational significance of trait resilience and positive emotions, a number of methodological features limited the generality of our results. Foremost, our initial study was limited to relatively minor stressors, and as such, examining the generality of these findings to major life events was necessary (Luthar et al., 2000). Here again we turned to our research on widowhood for clues about the protective benefits of positive emotions.

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 indicates that a substantial minority of bereaved individuals experience and express positive emotions far more frequently than might have been previously anticipated (Folkman, 1997; Ong, Bergeman, & Bisconti, 2004). We, thus, examined whether the mediating findings observed in our initial study could also be observed in our study of bereaved widows. We predicted that among widows high in trait resilience, positive emotions would contribute to effective emotional recovery from stress. Our results confirmed this prediction. After controlling for individual differences in neuroticism, our analyses found that the lagged effect of stress on negative emotion was moderated by trait resilience. In support of main hypothesis, our analyses also revealed that when positive emotion was included, the moderation of the

residual direct effect of trait resilience was reduced to nonsignificance. Taken together, our findings suggest that the experience of daily positive emotions serves to aid resilient individuals in the ability to bounce back from major life stressors.

Positive Emotions and the Resilience Cascade—Given that positive emotions appear key to what it means to be “resilient” (Ong, Bergeman, et al., 2006; Tugade & Fredrickson, 2004; Tugade et al., 2004), what are the salient pathways implicated in this association? Of particular relevance to researchers interested in compensatory models of resilience (e.g., Fergusson & Horwood, 2003; Sameroff et al., 2003) is the critical question of *how* trait resilience contributes to the experience of positive emotion. In our research with older adults, we have explored this question from a daily process perspective. Our recent research in this area builds on the seminal work of Suls and Martin (2005), who examined the scientific underpinnings of vulnerability to neuroticism. From their analyses of the affective dynamics of neuroticism, Suls and Martin identified five fundamental ways in which individual differences in neuroticism could influence psychological distress: (a) hyperreactivity to minor hassles, (b) greater exposure to negative events, (c) appraisal of events as more harmful, (d) mood negative spillover, and (e) inability to adjust to recurring problems. Because these five elements appeared to represent integral components of a coordinated response to stress, Suls and Martin referred to them as the “neurotic cascade.”

Our recent research extends various aspects of Suls and Martin’s (2005) framework by including positive dimensions of daily experience and their relationship to trait resilience. In doing so, we have adopted terminology from previous research in an effort to capture the potential processes that may underlie daily positive experiences. Following recommendations by Zautra, Affleck, Tennen, Reich, and Davis (2005), we use the terms *differential engagement* and *responsiveness* to characterize daily positive events. Finally, in place of negative mood spillover, we examine the extent of positive mood *savoring* in response to daily positive events (Bryant, 2003; Bryant & Veroff, 2007).

Recent diary data on a sample of 300 older adults between the ages of 60 and 90 ($M = 68.3$ years, $SD = 5.3$ years) allowed us to explore potential mechanisms underlying the effects of trait resilience on daily positive mood. Prior to the diary phase of the study, participants completed a battery of questionnaires that included measures of trait resilience and neuroticism. The ego-resilience scale (J. Block & Kremen, 1996) was used to assess trait resilience. The scale consists of 12 items, each responded to on a 4-point Likert scale, ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Sample items include “I often feel inferior to others,” and “I enjoy dealing with new and unusual situations.” For this sample, the Cronbach’s alpha reliability was .85. Neuroticism was measured with the NEO (Costa & McCrae, 1991). 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 rarely feel lonely or blue.” For this sample, the Cronbach’s alpha reliability was .89.

In addition to completing measures of trait resilience and neuroticism, participants’ daily positive emotions were measured using the daily form of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Respondents were asked to indicate the extent to which they had experienced a range of positive 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 positive activation subscale (active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong). In addition to these items, we included four additional low-arousal items (cheerful, satisfied, relaxed, self-assured) from selected octants of the mood circumplex (Feldman, 1995). Within-person estimates of reliability were computed using three-level models in which

items were nested within days, which were nested within participants (Bryk & Raudenbush, 1992, pp. 191–196). Using this procedure, the estimated day-level reliability of our 14-item positive affect scale was .87.

Finally, daily positive events were measured using items from the Inventory of Small Life Events (ISLE; Zautra, Guarnaccia, & Dohrenwend, 1986). The ISLE assesses a wide coverage of everyday positive events in both interpersonal (spouse or significant others, family members, friends) and noninterpersonal life domains (health and finance). In this study, we adapted items from the ISLE to assess the frequency of 32 discrete daily positive life events. Sample items include “I made a new friend or acquaintance” and “I was praised by a family member.” The scores were averaged across the five domains, yielding a daily index of positive events. Internal consistency reliability was not computed because the ISLE items were designed to capture nonoverlapping domains of everyday stressful life events, such that stress in one domain is not necessarily indicative of stress in other domains (see Zautra et al., 1986).

Previous investigations (e.g., Bolger & Zuckerman, 1995; Suls & Martin, 2005) have identified daily correlates of neuroticism. Our major aim was to see whether individuals high in trait resilience (compared to those low on the trait) would (a) engage more strongly with positive events, (b) show elevated responsiveness to positive events, and (c) exhibit greater positive mood savoring. To examine within-day relations, we specified hierarchical models that included prior positive mood, prior positive events (yes, no), and current positive events (yes, no) to predict current positive mood. Trait resilience was included as a main effect term and allowed to interact with the positive event predictors (e.g., trait resilience \times prior positive events). Finally, we controlled for the main effect of neuroticism in all analyses.

Our findings supported each of our main predictions. Specifically, our first hypothesis was that high-resilient individuals would report greater engagement in positive events. In order to appropriately estimate models in this analyses, we specified our HLM with application to dichotomous data using a logit-link function (Raudenbush, Bryk, Cheong, & Congdon, 2004). These models are analogous to logistic regression in terms of estimating the log likelihood of an outcome. Our results revealed that for each one unit increase in trait resilience, the log-odds of occurrence of a positive event on an average day was .872, which corresponds to an odds ratio of $e^{.872} = 2.39$ and a probability of $1/(1 + e^{-(.872)}) = .71$, a finding consistent with the *differential engagement hypothesis*.

Next we examined the current and lagged effects of positive events on positive mood (while adjusting for prior mood), whether differences in trait resilience moderated the event-mood relationship, and whether positive mood savoring (the influence of prior mood on present-day mood) mainly applied to high-resilient individuals. Consistent with expectation, higher levels of positive mood were positively associated with trait resilience ($b = .18, t = 3.84, p < .01$), and with positive event occurrence ($b = 1.08, t = 8.21, p < .001$). More importantly, trait resilience moderated the positive event-mood association: Persons higher in trait resilience were more responsive to positive events when they occurred, a result that supports our *differential responsiveness hypothesis*. Finally, trait resilience moderated the strength of the time-lagged effect of positive mood ($b = .085, t = 2.09, p < .05$): High-resilient individuals were more likely to continue to be in a positive mood as long as two lags (days) later, a finding consistent with our *differential savoring hypothesis*.

To summarize, our findings suggest that trait resilience is generative of other assets, catalyzing or setting into motion a *cascade* of positive daily experiences. Compared to those low in trait resilience, high-resilient individuals exhibited greater engagement in,

responsiveness to, and savoring of daily positive events. Taken together, these elements of daily experience may account for the robust effects of trait resilience on positive mood reported in prior research (Ong, Bergeman, et al., 2006; Tugade & Fredrickson, 2004; Tugade et al., 2004).

SUMMARY AND IMPLICATIONS

In this article, we have described a program of research on adulthood resilience from a daily process perspective. This research has yielded important clues about the nature of resilience as it unfolds in daily life. We have argued that resilient adaptation to daily stress is likely to be multiply determined by various protective pathways. At the affective level, our research suggests that positive emotions may have demonstrably beneficial effects when present during times of stress. Overall, our findings dovetail with past research (e.g., Fredrickson & Levenson, 1998; Lazarus et al., 1980; Zautra, Johnson, & Davis, 2005) in demonstrating that positive emotions may function in the service of well-being not only by interrupting the ongoing experience of daily stress, but also by averting delays in adaptation to subsequent stressors. Additionally, our findings link up with prior research (e.g., Fredrickson et al., 2003; Tugade & Fredrickson, 2004) in demonstrating positive emotions' enduring connection to personality. Our data suggest that individual differences in trait resilience (i.e., personality hardiness and ego resilience) may constitute an important route to understanding differential resistance to and recovery from daily stress in later adulthood. In particular, trait resilience may contribute to positive adaptation by helping older adults sustain access to daily positive emotions, which, in turn, may lead to adaptive recovery from stress. Finally, our research suggests that resilient qualities do not emerge without the scaffolding of quality social supports (e.g., Rutter, 2002; Ryff & Singer, 2000).

Taken together, we have outlined a program of research that demonstrates the value of integrating affective, psychological, and social processes to illuminate the unique challenges and opportunities associated with investigations of resilience in later life. The consequences of these processes increase the need to translate our understanding of basic research into effective interventions that target not just older adults themselves, but also their families and surrounding communities. We underscore that it is critical that future studies examine the extent to which these factors are relevant to the specific risk condition examined (Luthar et al., 2000). In addition, our research program has focused on minor daily problems as sources of stress. Other researchers have studied major life events (Pillow, Zautra, & Sandler, 1996; Turner & Wheaton, 1997) and chronic difficulties (Eckenrode, 1984; Evans, Hygge, & Bullinger, 1995). Currently, little is known about the combined impact of major, chronic, and daily stressors on psychological well-being among high-resilient individuals in later adulthood. Compelling developmental evidence suggests the effects of individual childhood resources cannot override the effects of multiple social risks (Sameroff et al., 2003; Sameroff & Rosenblum, 2006). It is worth seriously considering the possibility that adulthood resilience is also inherently bounded by accumulated environmental challenge. Finally, our analyses of daily stress and emotion relied heavily on self-reports from respondents. Future investigations should take a multimethod approach to stress assessment by including not only self-reports from respondents, but also physiological outcomes, biochemical assessments, and behavioral measures of stress. Detailed analyses of these and other variables will surely deepen our understanding of the resilience process.

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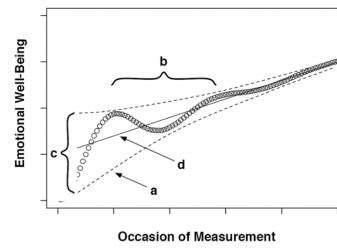


Figure 1.

A damped linear oscillator model with parameters (a) damping, (b) 1/frequency (days/cycle, which is sometimes called the period of the cycle or the wavelength), (c) amplitude, and (d) trend.

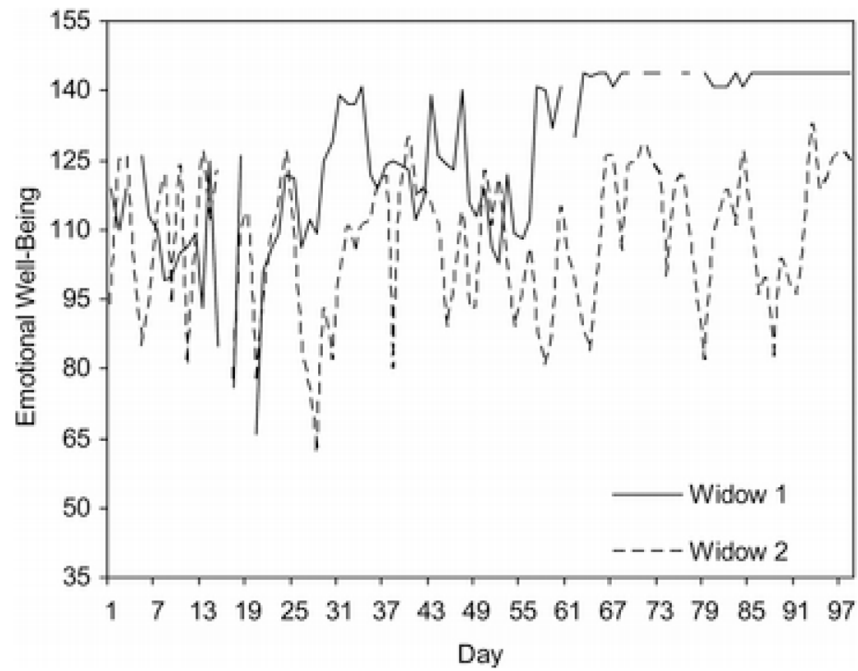


Figure 2. Emotional well-being of two widows in which a higher score indicates better well-being. Widow 1 scored high on emotional support seeking and low on instrumental support seeking; Widow 2 scored low on emotional support seeking and high on instrumental support seeking.