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AFFECT DYNAMICS, BEREAVEMENT AND RESILIENCE TO LOSS

ABSTRACT. This investigation applied Zautra and colleagues' Dynamic Model of Affect (DMA; Zautra: 2003, Emotions, Stress and Health (Oxford University Press, New York); Reich et al.: 2003, Review of General Psychology 7(1), pp. 66–83) to help understand resilience among a sample of middle-aged participants coping with the recent death of a spouse or child. We replicated and extended this model by examining interaffect correlations (individual correlations between negative and positive affect over time) in resilient versus symptomatic bereaved people. As predicted by the DMA, resilient bereaved had weaker (or less negative) interaffect correlations than symptomatic bereaved even when controlling for self-reported distress. These findings suggest that resilient individuals possess a capacity for a more complex affective experience and that this capacity serves a salutary function in the aftermath of aversive life events.

KEY WORDS: affect, bereavement, resilience, stress

INTRODUCTION

The dedication with which investigators explore the nature of affective experience needs little justification. Our affective experience can both define and determine the richness and the impoverishment of our own world. It is also of no surprise that the study of the structure of affective experience has been intensely debated (e.g. Watson and Tellegan, 1985; Green et al., 1993; Diener et al., 1995; Cacioppo et al., 1999; Feldman Barrett and Russell, 1999; Rafaeli and Revelle, 2006) as accurately capturing affective experience may potentially reveal key aspects of personality, cognition, emotion regulation, and their

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concomitants in psychological and physiological disease (e.g. emotional disorders, chronic pain, auto-immune disease etc.) (e.g., Mischel and Shoda, 1995; Davidson, 1998; Zautra and Smith, 2001).

The study of affective experiences has unfolded in three significant but distinct lines of inquiry. One group of researchers has focused on understanding one of two valences of affective experience (positive and negative affect or activation; Watson et al., 1999) as it relates to pathology (e.g. negative affect and depression, Seidlitz et al., 2000) and/or coping (e.g. positive affect and stress, Folkman, 1997). Another group has focused on the dimensional aspects of affective experience by defining the structure of affect as either bi-variate or bi-polar (for a brief review see, Feldman Barrett and Russell, 1999). The third and most recent line of inquiry, has attempted to integrate aspects of the previous two, by expanding the investigative lens to isolate individual differences in the within-person structure of affect (e.g., Valence and arousal focus: Feldman, 1995; Feldman Barrett, 1998; Affective synchrony: Rafaeli et al., 2005) as well as dynamic processes and oscillatory mechanisms involving two or more affective dimensions and/or variables that can account for variations in affective structure (Zautra, 2003; Reich et al., 2003).

In the current investigation, we apply this third line of inquiry in the context of resilience and coping with bereavement. Specifically, we attempt to replicate and extend the model of affective dynamics put forth by Zautra and colleagues (Zautra, 2003; Reich et al., 2003) by examining how the inter-affect correlation (i.e., individual differences in the correlation of negative and positive affective states over time) measured during the early months of bereavement relates to individuals exhibiting a resilient outcome trajectory (Bonanno, 2004, 2005a).

THE DYNAMIC MODEL OF AFFECT

As noted above, seemingly disparate research traditions have tended to emphasize either independence between positive and negative affect (i.e., a bi-variate dimensional structure), or a

bipolar, inverse association of the two (i.e., subsuming positive and negative valence within a larger, and largely univariate, dimensional structure). Although both approaches capture aspects of affective experience, neither approach has been able to adequately explain the well-documented inconsistency in affective reporting that tends to emerge across studies, individuals, and time (e.g. Green et al., 1999; Rafaeli et al., 2005; Russell and Feldman Barrett, 1999).

In an effort to address this issue, Zautra and colleagues propose an integrative model, the Dynamic Model of Affect (DMA) (Zautra et al., 2002; Zautra, 2003; Reich et al., 2003; Davis et al., 2004; see also Pruchno and Meeks, 2004). Drawing from various disciplines, the DMA holds that during periods of stress, as cognitive resources become increasingly narrow and focused, affective space becomes more limited. As such, stressed individuals are consciously able to experience only limited dimensions of affective experience at a time (e.g. only negative versus only positive affect). When stress abates, people regain their capacity for a more complex affective experience and simultaneous closely contiguous awareness of both positive and negative affects (for detailed explication, see Zautra, 2003; Reich et al., 2003). It is important to note that this model does not suggest that stress necessarily changes the function of positive and negative *emotion* but it does appear to change the subjective experience of *affect*, shifting the individual's perception to experience affective states as bi-polar, as if on a continuum.

Evidence in support the DMA has been demonstrated in the context of chronic (e.g. Zautra et al., 2005), acute (e.g. Zautra et al., 2000) and daily life stress (e.g. Zautra et al., 2002). Moreover, Zautra and his colleagues have replicated this finding both in the laboratory as well as in naturalistic field research (e.g. Zautra et al., 2000). In each case the findings demonstrate that with increased stress, individuals exhibit highly inversely correlated (i.e. bi-polar) self-reports of negative and positive affect and with less stress, individuals exhibit less inversely correlated (i.e. bi-variate) self-reported affects, suggesting increased affective complexity and/or independence. Finally, the tenets of this model are consistent with previous evidence suggesting that

inter-affect dynamics shift with increased intensity (e.g. Diener and Iran-Nejad, 1986) and change of context (e.g. Beach et al., 1998; Larsen et al., 2001; Ferrer and Nesselroade, 2003).

AFFECT DYNAMICS, COPING AND RESILIENCE TO LOSS

The key idea behind the DMA, that positive and negative affective experiences show a different pattern of inter-relation with increased stress, suggests potentially important applications to the coping literature. For example, the DMA states that increased affective complexity is associated with decreased stress and this implies an association to improved adjustment following significant life events. However, although the evidence in support of the DMA is compelling, it has yet to be applied directly to understand coping processes and adjustment in the context of aversive life events. Most research using dynamic models similar to the DMA have focused primarily on their descriptive utility without attempting to apply them to inform our understanding of adjustment (e.g. Shifren et al., 1997; Hayes and Strauss, 1998; Jenkins and Oatley, 2000; Chow et al., 2005).

One notable exception is an investigation of bereavement by Bisconti et al. (2004) that suggested a pattern of results consistent with the predictions of the DMA. These investigators obtained reports of emotional well-being and depression from a small sample of widows each day during the first one to four months of bereavement. The explicit goal of this study was to test the idea that ''a stressful life event, such as the death of a spouse, perturbs the emotional well-being state of the individual away from equilibrium, contributing to emotional shifts that vacillate between negative and positive affect'' (p. 164). Thus, they predicted that the widows' daily well-being ratings would conform to a linear oscillator model that looks something like a ''pendulum with friction'' (p. 159). Because the death of a loved one often evokes acute reactions and severely disturbs normal self-regulation and equilibrium, the oscillations tend to be more frequent and extreme soon after a loss and then to gradually lessen or dampen across time.

These findings suggest relatively straight forward predictions about resilience to loss (Bonanno et al., 2001; Bonanno, 2004). Bonanno (2004) defined resilience as "the ability of adults *in otherwise normal circumstances* who are exposed to an isolated and potentially highly disruptive event such as the death of a close relation or a violent or life-threatening situation to maintain relatively stable, healthy levels of psychological and physical functioning ... as well as the capacity for generative experiences and positive emotions" (pp. 20–21). Inherent in this definition is the idea that the stable, low distress profile characteristic of resilience can be reliably distinguished from the more traditional pattern of recovery, characterized by initial elevations in symptom and distress that decline only gradually over the course of many months. This definition also includes the assumption that resilient individuals retain the capacity to embrace life and thrive even in the face of exposure to highly aversive life events. Although there appears to be heterogeneity among resilient individuals (Bonanno, 2005), as a group these individuals tend to exhibit the type of characteristics associated with unusual health or flourishing (Keyes, 2002).

Support for these distinctions in the context of coping with loss has been provided in recent prospective bereavement studies, each indicating that resilience is typically the most commonly observed outcome trajectory (for review see Bonanno, 2004, 2005). For example, in a prospective study of older adult widows and widowers, Bonanno and colleagues (Bonanno et al., 2002b) found that almost half of the bereaved participants (46%) had low levels of depression throughout the study, from pre-loss through 18 months of bereavement, and low levels of grief-specific symptoms (e.g., yearning) during bereavement. An examination of the pre-bereavement functioning of the resilient group also failed to reveal signs of maladjustment on any of the measures assessed in the study. A more recent study (Bonanno et al., 2005a) demonstrated resilience in approximately half of younger bereaved samples coping with either the death of a spouse, a child or a long-term romantic partner. Resilience in these studies was defined using multiple outcome measures, including self-reported adjustment, structured clinical interviews,

and anonymous ratings of participants' adjustment obtained from their close friends.

A key point suggested by this research is that although resilient individuals may experience an initial, brief spike in distress (Bonanno et al., 2005a) or may struggle for a short period to maintain self-regulatory equilibrium (e.g., several weeks of sporadic difficulty concentrating, intermittent sleeplessness, and daily variability in levels of well-being; Bisconti et al., 2006), they nonetheless still seem to continue functioning effectively at or near their normal levels. Resilience to loss has been associated, for example, with the ability to continue fulfilling personal and social responsibilities, with the capacity for positive emotions and generative experiences (Bonanno and Keltner, 1997; Keltner and Bonanno, 1997; Bonanno et al., 2002b; Tugade and Fredrickson, 2004; Bonanno et al., 2005a), and with greater ability to self-regulate affective experience (Bonanno et al., 1995; Coifman et al., 2005). In the context of the DMA, this evidence suggests that people who are resilient to loss should also experience more complex and more varied affect. Consequently, the DMA predicts that people who are resilient to loss will exhibit greater independence between positive and negative affect in the early months of bereavement than will more symptomatic bereaved people. But while the DMA predicts changes in the experience of affect as a function of situation (i.e., stressful vs. unstressful times), other models (e.g., Feldman, 1995; Feldman Barrett, 1998; Rafaeli et al., 2005) have addressed themselves more directly to individual differences in the representation and experience of affect, which may themselves be related to resilience and coping (e.g., Feldman Barrett et al., 2001). The present study follows both of these traditions – recognizing the role of severe stress (in this case, bereavement and distress) as well as that of individual differences in resilience.

A salient prediction derived from this evidence is that people who are resilient to loss will exhibit greater independence between affective dynamics and concurrent distress. There is a growing body of data linking a resilient outcome trajectory following extremely aversive events with stable personality characteristics (Bartone, 1999; Bonanno et al., 2005b). The relatively

large numbers of people who evidence resilient outcomes argues against a single resilient type and, rather, suggests that resilience is a heterogenous category associated with several different types of personality characteristics (Bonanno, 2005). At minimum, however, this evidence suggests that the enhanced ability to self-regulate emotion that characterizes resilient people is at least to some extent a product of long-standing enduring regulatory habits and skills. More formally, this idea leads to the prediction that bereaved people who are resilient to loss will show more complex (or less highly correlated) affect regardless of their current level of distress.

THE CURRENT INVESTIGATION

To examine these predictions, in the current investigation we examined the inter-correlation of positive and negative affect assessed repeatedly in a sample of recently bereaved middle aged adults during the course of a standardized laboratory stressor interview. The interviews took place approximately 4 months after the untimely loss of either their spouse or child and included segments in which participants spoke uninterrupted about their relationship to the deceased, their own experiences since the loss and their future goals, a recent negative event independent of the loss, and a recent positive event independent of the loss. The interaffect correlation was calculated from measures of self-reported positive and negative affective states, obtained after each interview segment.

Resilient and symptomatic bereaved individuals had been identified previously for this sample (Bonanno et al., 2005a) based on longitudinal data and normative comparisons with a matched nonbereaved control group. These categorizations were then validated by anonymous ratings made by close friends also at 4 and 18 months post-loss. Those individuals designated as resilient had low levels of psychiatric symptoms, as measured by objective structured clinical interviews, throughout bereavement and in fact did not differ in their levels of symptoms at any point from the symptom levels observed in the matched nonbereaved controls. The resilient bereaved group was also rated by

their close friends as equally well adjusted as the non-bereaved matched controls. Of particular note, however, the resilient bereaved group was also rated as better adjusted prior to the loss than even the nonbereaved group, and as possessing more positive traits (e.g., friendly, thoughtful, and honest) than the nonbereaved group. Thus, bereaved people who exhibited a resilient outcome trajectory appeared to normally exhibit inherently high levels of mental health and psychological well-being.

In the current study we examined the predictive utility of these categories in relation to the interaffect correlation while controlling for concurrent measures of self-reported distress and perceived health garnered from questionnaires pertaining to the previous month. We anticipated that resilient individuals would evidence more complex affective dynamics (i.e., less correlation between positive and negative affect), and that this association would still be apparent when we controlled for concurrent distress.

METHOD

Participants and Procedure

Bereaved participants were recruited as part of a larger research project (see Bonanno et al., 2005a) by disseminating information about the study and encouraging bereaved individuals interested in participating to contact the researchers (Penslar, 1993). Information about the study was made available to potential bereaved participants living in the Washington DC area by sending letters describing the study to (a) recently bereaved individuals who were listed as surviving parents or spouses in newspaper obituary notices and (b) individuals likely to have contact with bereaved individuals (e.g., medical and mental health professionals, clergy). The letters encouraged bereaved individuals under the age of 65 who met recruitment criteria, having lost either a spouse or child, to contact the researchers by phone or mail. The present study used a sub-sample of bereaved participants from the parent study (see Bonanno et al., 2005a) for whom usable physiological data during a semi-structured interview were available. The final sample consisted of 54 bereaved participants (conjugally, $n = 44$; parentally, $n = 10$).

Participants were on average 49.8 years old (SD = 8.2 years), primarily female (female = 33, male = 21) and Caucasian (Caucasian = 47, African-American = 4, Hispanic-American = 2, Other = 1). There were no significant differences in age, gender or racial/ethnic background between conjugally and parentally bereaved participants.

Interview and questionnaire data were collected at 4 months post-loss in order to maximize individual differences in affective experience and reporting. In the first months of bereavement, even the most resilient individuals will tend to experience intense emotion and intrusive preoccupation related to the loss (Bonanno et al., 2004a, b). However, after 4 months of bereavement, although considerable numbers of bereaved individuals are still actively coping with the upheaval of the loss, clear individual differences will generally have emerged (Bonanno and Kaltman, 2001; Bonanno, 2004). The assessment for the bereaved participants in this investigation included a packet of mail-in questionnaires and a semi-structured narrative interview (SSI) during which measures of autonomic activity and self-reported affect were taken. Participants were paid $60 for each interview session.

Questionnaire Measures of Distress and Health

Distress from psychological symptoms

Self-reported distress from psychological symptoms was measured using a combination of the Depression, Anxiety, and Hostility scales from the Symptom Check List (SCL-90-R; Derogatis, 1983). Items on this scale are rated based on the extent to which they have "distressed or bothered" the individual "during the past seven days" (0 = not at all; thru 4 = extremely). The 29 items from these scales were summed and averaged to form a Global Symptoms Index (GSI). Normative adult samples in the US have typically produced mean GSI scores between 0.30 and 0.50, with elevated or clinically-relevant levels of distress considered a score of 1.00 or greater (Todd et al., 1997). Internal consistency for the 29-item GSI was 0.94.

Perceived health

Brief self-report measures of perceived health have been found to predict long-term physical health problems (Ware and Karmos, 1976; Brook et al., 1979). Perceived health was measured using three self-report questions (e.g., "During the past month, did you feel physically healthy enough to carry out the things you like to do or had to do?") developed by the National Center for Health Services Research for the Health Insurance Study (Brook et al., 1979). Internal consistency for the 3-item perceived health score was 0.63.

Resilience versus Symptomatic Bereavement

The resilient and symptomatic categories were previously determined from longitudinal data from the parent sample that included the participants from this investigation (see Bonanno et al., 2005a). This distinction was determined from symptom scores assessed during two Structured Clinical Interviews for the DSM (SCID) at 4 and 18 months post-loss and validated by anonymous ratings of functioning made by close friends of each participant. Resilient individuals had relatively fewer symptoms overall and their symptom levels fell within the range normally found in the absence of loss. Accordingly, 46% ($n = 25$) of the bereaved participants in our subsample were categorized as resilient and the remaining 54% ($n = 29$) were categorized as symptomatic. Bonanno, Moskowitz and colleagues (2005a) found that those individuals designated as the "resilient" bereaved were rated equally well adjusted as a non-bereaved matched control group at two 4 and 18 months post-loss. Moreover, resilient bereaved were rated as better adjusted prior to the loss than that same nonbereaved control group and as possessing greater "positive" traits than the nonbereaved controls. Consistent with this finding, "symptomatic" bereaved were found to have significantly greater symptoms and were rated by close friends as significantly less well-adjusted than the resilient bereaved and nonbereaved controls. Differences between the resilient and symptomatic bereaved in age, gender, and bereavement type (conjugal versus parental) were not significant.

Semi-Structured Narrative Interview

Participants were seated in the lab prior to the interview so that physiological sensors could be attached. Physiological data was used in this investigation only to confirm the stressful nature of the pending interview task (for a detailed report of the physiological data, see Coifman et al., 2005). Participants were instructed to sit quietly and to relax for a few minutes. The baseline period lasted 5 min. After baseline, the interviewer reentered and read a script informing participants that they would be asked to speak in an open-ended manner about specified persons and aspects of their lives, that the interviewer would keep track of the time, that the best way to approach the task was to "try to relate as openly as possible to whatever comes to your mind," and that the interviewer would seldom speak other than to ask clarifying questions. To encourage spontaneous discourse, the interviewer stated that "if at any time you go blank, or run out of things to say, just relax and give yourself time to think about something else related to the topic." The specified topics were (A) *Spouse/Child*: their relationship with the deceased; (B) *Self*: their current coping and future outlook since the loss; (C) *Recent Negative*: to describe a recent negative event; and (D) *Recent Positive*: to describe a recent positive event. Interview topics A and B lasted 6 min each and topics C and D lasted 2 min each. These topics were chosen to allow for a variety of affective experiences. In particular, topics C and D were intended to manipulate participants' experience (i.e. C – more negative affect and D – more positive affect) towards both ends of the affective continuum.

Negative and positive affect

After each of the four interview topics of the SSI, participants were asked to rate "how often" during the segment (0 = *not at all* to 7 = *almost constantly*) they had experienced three negative affects (guilt, distress, and sadness) and three positive affects (enjoyment, amusement, and happiness). These self-ratings were then aggregated for overall negative (mean $\alpha = 0.74$, range 0.70–0.76) and overall positive (mean $\alpha = 0.84$, range 0.79–0.88) affect scores, one of each valence for each interview segment. In previous studies (e.g., Bonanno et al., 1995) this

measure has proven to be a reliable indicator of subjective emotional experience. Moreover, this methodology is similar to that reported in other investigations of the Dynamic Model of Affect using affect items varying in level of implied activation (e.g., Zautra et al., 2002).

Physiological arousal

Autonomic activity was measured during SSI interviews only using an Isolated Bioelectric Amplifier System (SA Instrumentation, Model CUA-07BA). EEG Sensors were placed on the right and left side of the participant's abdomen as well as to the palmar surface of the distal phalanges of the first and third fingers of the nondominant hand (strapped to a wooden platform to restrict movement) to index heart rate (HR) and skin conductance response rate (SCR), respectively. Both heart rate and skin conductance have been shown to reliably index autonomic response in the laboratory (e.g. Barger et al., 1997; Franz et al., 2003). Mean responses for each measure were determined by first averaging response rate during the 5 min baseline and then creating a second mean score encompassing autonomic activity throughout interview segments A thru D, a total of 16 min.

RESULTS

Manipulation Check for the SSI as a Stressful Task

To confirm the stressful nature of the SSI interview segments as a stressor task, we performed repeated measures ANOVA for both physiological indices $\times$ time. As expected, this analysis revealed main effects for both physiological measures across time; SCR: $M_{\text{baseline}} = 7.08$ SD $= 9.44$, $M_{\text{SSI}} = 17.57$ SD $= 11.25$, $F(1,47) = 49.45$, $p < 0.01$, HR: $M_{\text{baseline}} = 58.98$ SD $= 10.29$, $M_{\text{SSI}} = 62.61$ SD $= 10.46$, $F(1,40) = 18.38$, $p < 0.01$. These results confirmed that participants evidenced significant increases in sympathetic nervous system arousal on both indices during the SSI interview, thereby confirming the stressful nature of this laboratory task.

Negative and Positive Affect

Negative and positive affect summary scores were compiled by calculating each participant's mean score for each valence at each of the four segments of the interview: (A) Spouse/Child, (B) Self, (C) Recent Negative, (D) Recent Positive. As expected, a repeated measures ANOVA of valence × time revealed significant main effects for valence, $F(1, 54) = 8.35$, $p < 0.01$, and time, $F(3, 162) = 20.85$, $p < 0.01$, as well as a significant interaction, $F(3, 162) = 45.81$, $p < 0.01$. Mean affect scores (see Table 1) indicated the anticipated affective experience of bereaved participants across the different interview topics (e.g. increased negative affect in Segment C and increased positive affect in Segment D). Also as expected, mean negative and positive affect scores

TABLE 1
Summary of affect means, measures of distress and the interaffect correlation

SSI affect	Full sample		Resilient		Symptomatic		t_{rs}	d[a]
	M	SD	M_r	SD_r	M_s	SD_s		
A – Spouse/child								
Negative affect	3.03	1.32	2.76	1.19	3.25	1.40	t_{rs} (52) = −1.38	0.38
Positive affect	3.63	1.69	3.55	1.81	3.70	1.60	t_{rs} (52) = 0.33	0.09
B – Life								
Negative affect	2.73	1.48	1.99	0.89	3.37	1.60	t_{rs} (52) = −3.84**	1.07
Positive affect	2.71	1.46	2.71	1.32	2.71	1.57	t_{rs} (52) = −0.02	0.01
C – Negative								
Negative affect	2.94	1.56	2.23	1.27	3.56	1.54	t_{rs} (52) = −3.44**	0.96
Positive affect	1.81	1.24	1.87	1.33	1.76	1.18	t_{rs} (52) = 0.32	0.09
D – Positive								
Negative affect	1.69	1.11	1.16	0.35	2.15	1.33	t_{rs} (52) = −3.63**	1.01
Positive affect	4.53	1.58	4.39	1.47	4.64	1.68	t_{rs} (52) = −0.59	0.16
Questionnaire Measures								
G.S.I. (distress)	0.93	0.60	0.65	0.55	1.19	0.54	t_{rs} (50) = −3.55**	1.01
Perc'd health	2.68	0.71	2.83	0.80	2.54	0.59	t_{rs} (50) = 1.46	0.42
Interaffect Correlation								
Raw r	−0.45	0.54	−0.33	0.53	−0.55	0.54	t_{rs} (52) = 1.48	0.41
Fishers z	−0.71	0.98	−0.43	0.81	−0.95	1.06	t_{rs} (52) = 1.99*	0.56

* $p < 0.05$, ** $p < 0.01$.
[a]Cohen's d (Cohen, 1988).

were uncorrelated across the sample, $r = -0.20$, $p = 0.14$ (two-tailed).

Within Person Interaffect Correlations

Calculation of the interaffect score was achieved by standardizing each participant's mean negative and positive affect scores for each of the four interview segments and then calculating the raw correlation of these scores for each subject. The mean raw correlation (Raw r) for the sample was $M = -0.45$, SD = 0.54. We tested Raw r to confirm that there were no differences by gender, $t(52) = 1.54$, $p = 0.13$ nor by bereavement type (i.e. conjugal versus parental) $t(52) = 0.627$, $p = 0.53$.

Because of the widely skewed distribution of Raw r scores, we performed a Fisher z transformation to normalize the distribution (see Hays, 1973) and used the transformed interaffect scores, $M = -0.71$ SD = 0.98, in our remaining analyses. Accordingly, transformed r (Fisher z) and Raw r scores were highly correlated, $r = 0.95$, $p < 0.01$(two-tailed).

Affect Dynamics, Distress, and Resilience

Consistent with the prediction that bereaved people who evidenced resilience to loss would also exhibit greater affective complexity (i.e., less severe inverse correlation between positive and negative affect), the interaffect correlation (Fisher's z) was significantly weaker among resilient bereaved, $M = -0.43$, SD = 0.82, than among symptomatic bereaved, $M = -0.95$, SD = 1.06 $t(52) = 1.99$, $p = 0.05$, $d = 0.56$. To test the additional hypothesis that resilience would be associated with greater affective complexity regardless of concurrent distress, we repeated this analysis as a multivariate ANOVA and included concurrent measures of self-reported distress and perceived health as co-variates. The resilience vs. symptomatic effect was again significant, $F(1,48) = 4.10$, $p < 0.05$, $d = 0.32$. Thus, consistent with previous evidence associating resilience with stable patterns of emotion self-regulation, people showing a resilient outcome trajectory during bereavement had greater affective complexity regardless of their concurrent level of distress.

DISCUSSION

The proliferation of investigations focusing on defining and/or deconstructing affective experience reflects researchers' beliefs in the centrality of the subjective experience of emotion in psychological (and some physiological) disease. As such, investigations of individual differences in affective experience may allow researchers important opportunities for the development of effective interventions, particularly for those individuals struggling with a recent traumatic experience. This investigation of affective experience in the context of coping with bereavement extended a model of affect dynamics put forth by Zautra and colleagues (see Zautra, 2003; Reich et al., 2003) in two specific ways. First, we demonstrated that those individuals previously categorized as resilient (see Bonanno et al., 2005a) following the untimely loss of their spouse or child showed a greater capacity for affective complexity, namely the ability to experience negative and positive affect relatively independently, as compared to those individuals categorized as symptomatic. Second, consistent with previous evidence suggesting the characterological nature of resilience (e.g., Bonanno, 2004, 2005) as well as enduring individual differences in affective structure (Feldman 1995; Feldman Barrett, 1998; Feldman Barrett et al., 2001; Rafaeli et al., 2005), we found that the capacity for affective complexity demonstrated by resilient individuals was evident regardless of their level of concurrent distress or perceived health. This finding, in particular, suggests that the capacity for affective complexity may be an enduring trait, irrespective of subjective distress, that serves a salutary function in the aftermath of aversive life events.

Over the last several years, Zautra and his team have demonstrated repeatedly that affective dynamics (i.e. the experience of positive and negative affect in relation to each other) are highly dependent on context, and related in particular to the individual's subjective experience of distress. In contrast, a growing body of evidence suggests that there exists a large group of individuals who appear to function well in seemingly high stress environments or following potentially traumatic events (Bonanno, 2004, 2005). These resilient individuals are defined by their

ability to maintain healthy levels of functioning despite their exposure to potentially devastating events, such as the death of a spouse or child (Bonanno et al., 2005a) and proximity to a terrorist attack (Bonanno et al., 2005b, c). Recent conceptualizations have suggested that although resilience may be a relatively heterogeneous category that is potentially reachable by multiple pathways (i.e. through a variety of coping behaviors), it also appears to be influenced at least in part by stable personality characteristics. As such, it would hold that resilient individuals' affective experience is inherently different from others' and ostensibly that resilient individuals manage to effectively self-regulate their affective experience independently from the broader stressor context. This investigation was able to demonstrate precisely this point of difference and suggests the salutary benefits of affective complexity in the face of an aversive life event.

We can understand this ability as it relates to other aspects of emotion regulation, in particular the capacity to modulate affective experience and emotional displays in relation to adjustment. For example, a recent investigation of emotional expressiveness from our own research team (Bonanno et al., 2004a) showed that first year New York City college students who demonstrated the greatest *flexibility* in emotional expression (i.e. the ability to effectively suppress *and* express emotional expression when instructed to do so) in the months immediately following the September 11th terrorist attack had better adjustment over the ensuing 2 year period. As was this case with the above-mentioned investigation of expressive flexibility, our current investigation of affective complexity suggests an inherent flexibility in the capacity to hold negative *and* positive experiences independently. We can think of this capacity as the ability to adjust to the day-to day stresses in addition to the more emotional demands of a significant emotional event, by being able to see both sides of the coin, the negative and the positive of a given event or experience. As such, we can see how the findings from this investigation were also consistent with recent investigations demonstrating the benefits of experiencing positive emotion in the context of exceedingly difficult life

events. Evidence from individuals coping with childhood sexual abuse (e.g. Bonanno et al., 2002a), bereavement (Keltner and Bonanno, 1997; Bonanno and Keltner, 1997); terrorist attacks (e.g. Bonanno et al., 2005b) and chronic illness (e.g. Zautra et al., 2005) suggest an overall benefit to experiencing positive and negative emotions in consort.

On a broader scale, we can also begin to place the potential benefits of affective complexity in the context of the growing body of empirical evidence that identifies characteristic vulnerabilities in the development of emotional disorders. For example, there are now compelling data suggesting that biases in perception and/or appraisal may account for some vulnerability in mood and anxiety disorders such as the characteristic negative memory biases of depressives (for a review, see Mathews and Macleod, 2005). Although the evidence from our investigation does not speak to the relationship between affective complexity and a reduced vulnerability to emotional disorders, we suggest this as an area ripe for future investigation.

Limitations

Although the current investigation advanced research on affective experience and affect dynamics in the context of adversity in several ways, there were also a number of limitations to the study. Of greatest significance was the relatively small sample size which limited power for more in depth analyses that might have revealed more complex patterns of responding than we were able to detect. Moreover, our use of ratings of specific emotion terms as the measure for negative and positive affect was limited in its restricted range and the semantic variability/ecological validity of the terms. Other more diverse measures might have proven more sensitive in detecting relationships not just between negative and positively valenced terms but perhaps interactions with the degree of activation or arousal of groups of terms. In addition, future investigations would benefit from more repeated measures of affect, perhaps both in the laboratory as well as beyond, through the use of diary or other available methodology (see, e.g., Rafaeli et al., 2005). In particular, expanding the scope of the affect

assessments across contexts might detect additional differences between outcome trajectory groups and/or other significant individual differences related to coping with major life events.

CONCLUSION

Our study suggests that the capacity to experience affective complexity may function as a buffer from the detrimental effects of stress for particular individuals. However, this investigation represents the first attempt to empirically validate this idea and one of only a handful of studies that have attempted to identify the unique characteristics of the resilient population. The current investigation, in consort with the series of convincing investigations by Zautra, Reich and colleagues (see Reich et al., 2003) demands further replication, and suggests an imperative need for exploration of affect dynamics across other contexts and other significant life events. It is our hope that future investigations will follow, perhaps using similar methodology, to confirm and to continue to explore the benefits of affective complexity.

REFERENCES

Barger, S.D., J.C. Kircher and R.T. Croyle: 1997, 'The effects of social context and defensiveness on the physiological responses of repressive copers', Journal of Personality and Social Psychology 73(5), pp. 1118–1128.

Bartone, P.T.: 1999, 'Hardiness protects against war-related stress in army reserve forces', Counseling Psychology: Practice and Research 51, pp. 72–82.

Beach, S.R.H., A. Tesser, F.D. Fincham, D.J. Jones, D. Johnson and D.J. Whitaker: 1998, 'Pleasure and pain in doing well, together, an investigation of performance-related affect in close relationships', Journal of Personality and Social Psychology 74(4), pp. 923–938.

Bisconti, T.L., C.S. Bergman and S.M. Boker: 2004, 'Emotional well-being in recently bereaved widows: A dynamic systems approach', The Journals of Gerontology: Series B: Psychological sciences and social sciences 59B(4), pp. 158–168.

Bisconti, T.L., Bergeman, C.S. and Boker, S.M.: 2006, Social support as a predictor of variability: An examination of recent widows' adjustment trajectories. Psychology and Aging 21(3), pp. 590–599.

Bonanno, G.A.: 2004, 'Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events', American Psychologist 59, pp. 20–28.

Bonanno, G.A.: 2005, Adult resilience to potential trauma. Current Directions in Psychological Science 14(3), pp. 135–138.

Bonanno, G.A. and D. Keltner: 1997, 'Facial expression of emotion in the course of conjugal bereavement', Journal of Abnormal Psychology 106, pp. 126–137.

Bonanno, G.A., D. Keltner, A. Holen and M.J. Horowitz: 1995, 'When avoiding unpleasant emotions might not be such a bad thing: Verbal-autonomic response dissociation and midlife conjugal bereavement', Journal of Personality and Social Psychology 69(5), pp. 975–989.

Bonanno, G.A., D. Keltner, J.G. Noll, F.W. Putnam, P.K. Trickett and J. LeJeune: 2002, 'When the face reveals what words do not: Facial expressions of emotion, smiling, and the willingness to disclose childhood sexual abuse', Journal of Personality and Social Psychology 83(1), pp. 94–110.

Bonanno, G.A., J.T. Moskowitz, A. Papa and S. Folkman: 2005, 'Resilience to loss in bereaved spouses, bereaved parents and bereaved gay men', Journal of Personality and Social Psychology 88(5), pp. 827–843.

Bonanno, G.A., A. Papa, K.O. Lalande, M. Westphal and K. Coifman: 2004, 'The importance of being flexible; the ability to both enhance and suppress emotional expression predicts long-term adjustment', Psychological Science 15(7), pp. 482–487.

Bonanno, G.A., A. Papa and K. O'Neill: 2001, 'Loss and human resilience', Applied Preventive Psychology 10(3), pp. 193–206.

Bonanno, G.A., C. Rennicke and S. Dekel: 2005, 'Self-Enhancement among high-exposure survivors of the September 11th terrorist attack: Resilience of social maladjustment?', Journal of Personality and Social Psychology 88(6), pp. 984–998.

Bonanno, G.A., C.B. Wortman, D.R. Lehman, R.G. Tweed, M. Haring and J. Sonnega et al.: 2002, 'Resilience to loss and chronic grief: A prospective study from preloss to 18-months postloss', Journal of Personality Social Psychology 83(5), pp. 1150–1164.

Bonanno, G.A., Galea, S., Bucciarelli, A. and Vlahov, D.: 2006, Psychological resilience after disaster: New York City in the aftermath of the September 11th Terrorist attack. Psychological Science 17(3), pp. 181–186.

Bonanno, G.A., C.B. Wortman and R.M. Nesse: 2004, 'Prospective patterns of resilience and maladjustment during widowhood', Psychology and Aging 19(2), pp. 260–271.

Bonanno, G.A. and S. Kaltman: 2001, 'The varieties of grief experience', Clinical Psychology Review 21(5), pp. 705–734.

Brook, R.H., J.E. Ware, A. Davies-Avery, A.L. Stewart, C.A. Donald, W.H. Rogers, K.N. Williams and J.A. Johnson: 1979, 'Overview of adult health status measures fielded in Rand's Health Insurance Study', Medical Care 17, pp. 1–119.

Cacioppo, J.T., W.L. Gardner and G.G. Berntson: 1999, 'The affect system has parallel and integrative processing components: Form follows function', Journal of Personality and Social Psychology 76(5), pp. 839–855.

Chow, S., N. Ram, S.M. Boker, F. Fujita and G. Clore: 2005, 'Emotion as a thermostat: Representing emotion regulation using a damped oscillator model', Emotion 5(2), pp. 208–225.

Cohen, J.: 1988, Statistical Power Analysis for the Behavioral Sciences, 2nd ed. (Lawrence Earlbaum Associates, Hillsdale, NJ).

Coifman, K.G., Bonanno, G.A., Ray, R.D. and Gross, J.J.: 2005, Does repressive coping promote resilience? Affective-autonomic response discrepancy during bereavement. Manuscript under Review.

Davidson, R.J.: 1998, 'Affective style and affective disorders: Perspectives from affective neuroscience', Cognition and Emotion 12(3), pp. 307–330.

Davis, M.C., A.J. Zautra and B.W. Smith: 2004, 'Chronic pain, stress, and the dynamics of affective differentiation', Journal of Personality 72(6), pp. 1133–1160.

Derogatis, L.R.: 1983, SCL-90-R Administration, Scoring and Procedures Manual-II for the R (Revised) Version (Clinical Psychometric Research, Towson, MD).

Diener, E. and A. Iran-Nejad: 1986, 'The relationship in experience between various types of affect', Journal of Personality and Social Psychology 50(5), pp. 1031–1038.

Diener, E., H. Smith and F. Fujita: 1995, 'The personality structure of affect', Journal of Personality and Social Psychology 69(1), pp. 130–141.

Feldman, L.A.: 1995, 'Valence focus and arousal focus: Individual differences in the structure of affective experience', Journal of Personality and Social Psychology 69, pp. 153–166.

Feldman Barrett, L.A.: 1998, 'Discrete emotions or dimensions? The role of valence focus and arousal focus', Cognition Emotion 12, pp. 579–599.

Feldman Barrett, L., J. Gross, T. Christensen and M. Benvenuto: 2001, 'Knowing what you're feeling and knowing what to do about it: Mapping the relation between emotion differentiation and emotion regulation', Cognition and Emotion 15, pp. 713–724.

Feldman Barrett, L.F. and J.A. Russell: 1999, 'The structure of current affect: Controversies and emerging consensus', Current Directions in Psychological Science 8(1), pp. 10–14.

Ferrer, E. and J.R. Nesselroade: 2003, 'Modeling affective processes in dyadic relations via dynamic factor analysis', Emotion 3(4), pp. 344–360.

Folkman, S.: 1997, 'Positive psychological states and coping with severe stress', Social Science and Medicine 45(8), pp. 1207–1221.

Franz, M., R. Schaefer and C. Schneider: 2003, 'Psychophysiological response patterns of high and low alexithymics under mental and emotional load conditions', Journal of Psychophysiology 17, pp. 203–213.

Green, D.P., S.L. Goldman and P. Salovey: 1993, 'Measurement error masks bipolarity in affect ratings', Journal of Personality and Social Psychology 64(6), pp. 1029–1041.

Green, D.P., P. Salovey and K.M. Truax: 1999, 'Static, dynamic, and causative bipolarity of affect', Journal of Personality and Social Psychology 76(5), pp. 856–867.

Hays, W.L.: 1973, Statistics for the Social Sciences, 2nd ed. (Holt, Rinehart, and Winston, New York).

Hayes, A.M. and J.L. Strauss: 1998, 'Dynamic systems theory as a paradigm for the study of change in psychotherapy, an application to cognitive therapy for depression', Journal of Consulting and Clinical Psychology 66(6), pp. 939–947.

Jenkins, J.M. and K. Oatley: 2000, 'Psychopathology and short-term emotion: The balance of affects', Journal of Child Psychology and Psychiatry 41(4), pp. 463–472.

Keltner, D. and G.A. Bonanno: 1997, 'A study of laughter and dissociation: Distinct correlates of laughter and smiling in bereavement', Journal of Personality and Social Psychology 73(4), pp. 687–702.

Keyes, C.L.: 2002, 'The mental health continuum: From languishing to flourishing in life', Journal of Health and Social Research 43, pp. 207–222.

Larsen, J.T., A.P. McGraw and J.T. Cacioppo: 2001, 'Can people feel happy and sad at the same time?', Journal of Personality and Social Psychology 81(4), pp. 684–696.

Mathews, A. and C. MacLeod: 2005, 'Cognitive vulnerability to emotional disorders', Annual Review of Clinical Psychology 1(1), pp. 167–195.

Mischel, W. and Y. Shoda: 1995, 'A Cognitive-affective system theory of personality, reconceptualizing situations, dispositions, dynamics, and invariance in personality structure', Psychological Review 102(2), pp. 246–268.

Penslar, R.L.: 1993, Protecting human subjects: Institutional review board guidebook (Office for Human Research Protections, U.S. Department of Health and Human Services, Rockville, MD).

Pruchno, R.A. and S. Meeks: 2004, 'Health-related stress, affect, and depressive symptoms experienced by caregiving mothers of adults with a developmental disability', Psychology and Aging 19(3), pp. 394–401.

Rafaeli E. and Revelle W.: 2006, A premature consensus: Are happiness and sadness truly opposite affects? Motivation and Emotion 30, pp. 1–12.

Rafaeli E., Rogers G.M. and Revelle W.: 2005, Affective synchrony: Individual differences in mixed emotions. Manuscript under review.

Reich, J.W., A.J. Zautra and M. Davis: 2003, 'Dimensions of affect relationships: Models and their integrative implications', Review of General Psychology 7(1), pp. 66–83.

Russell, J.A. and L. Feldman Barrett: 1999, 'Core affect, prototypical emotional episodes and other things called emotion, dissecting the elephant', Journal of Personality and Social Psychology 76(5), pp. 805–819.

Seidlitz, L., F. Fujita and P.R. Duberstein: 2000, 'Emotional experience over time and self-reported depressive symptoms', Personality and Individual Differences 28, pp. 447–460.

Shifren, K., K. Hooker, P. Wood and P. Nesselroade: 1997, 'Structure and variation of mood in individuals with Parkinson's disease, A dynamic factor analysis', Psychology and Aging 12(2), pp. 328–339.

Todd, D.M., F.P. Deane and P.A. McKenna: 1997, 'Appropriateness of SCL-90-R adolescent and adult norms for outpatient and nonpatient college students', Journal of Counseling Psychology 44, pp. 294–301.

Tugade, M.M. and B.L. Fredrickson: 2004, 'Resilient individuals use positive emotions to bounce back from negative emotional experiences', Journal of Personality and Social Psychology 86(2), pp. 320–333.

Ware, J.E. and Karmos, A.H.: 1976, Development and Validation of Scales to Measure Patient Satisfaction with Health Care Services: Volume I of a Final Report (National Technical Information Services, Springfield, VA). NTIS Publ. Nos. PB 288-329/30.

Watson, D. and A. Tellegan: 1985, 'Toward a consensual structure of mood', Psychological Bulletin 98, pp. 219–235.

Watson, D., D. Wiese, J. Vaidya and A. Tellegen: 1999, 'The two general activation systems of affect: Structural findings, evolutionary considerations, and psychobiological evidence', Journal of Personality and Social Psychology 76, pp. 820–838.

Zautra, A.J.: 2003, Emotions, Stress and Health (Oxford University Press, New York).

Zautra, A.J., J. Berkhof and N.A. Nicolsen: 2002, 'Changes in affect interrelations as a function of stressful events', Cognition and Emotion 16(2), pp. 309–318.

Zautra, A.J., R. Fasman, J.W. Reich, P. Harakas, L.M. Johnson, M.E. Olmstead and M.C. Davis: 2005, 'Fibromyalgia: Evidence for deficits in positive affect regulation', Psychosomatic Medicine 67, pp. 147–155.

Zautra, A.J., J.W. Reich, M.C. Davis, P. Potter and N.A. Nicolson: 2000, 'The role of stressful events in the relationship between positive and negative affects: Evidence from field and experimental studies', Journal of Personality 68(5), pp. 927–951.

Zautra, A.J. and B.W. Smith: 2001, 'Depression and reactivity to stress in older women with rheumatoid arthritis and osteoarthritis', Psychosomatic Medicine 63, pp. 687–696.

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