

Psychological Resilience and Positive Emotional Granularity: Examining the Benefits of Positive Emotions on Coping and Health

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ABSTRACT For centuries, folk theory has promoted the idea that positive emotions are good for your health. Accumulating empirical evidence is providing support for this anecdotal wisdom. We use the *broaden-and-build theory* of positive emotions (Fredrickson, 1998; 2001) as a framework to demonstrate that positive emotions contribute to psychological and physical well-being via more effective coping. We argue that the health benefits advanced by positive emotions may be instantiated in

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certain traits that are characterized by the experience of positive emotion. Towards this end, we examine individual differences in *psychological resilience* (the ability to bounce back from negative events by using positive emotions to cope) and *positive emotional granularity* (the tendency to represent experiences of positive emotion with precision and specificity). Individual differences in these traits are examined in two studies, one using psychophysiological evidence, the second using evidence from experience sampling, to demonstrate that positive emotions play a crucial role in enhancing coping resources in the face of negative events. Implications for research on coping and health are discussed.

Cheerfulness is the best promoter of health, and is as friendly to the mind as to the body.

—Joseph Addison (English essayist, poet, and dramatist; 1672–1719)

For centuries, folk wisdom has promoted the idea that positive emotions are good for your health: “*A good laugh makes you healthy*” (Swedish proverb); “*The joyfulness of man prolongeth his days*” (Bible, Ecclesiasticus. 30:22); “*Mirth and merriment . . . bars a thousand harms and lengthens life*” (Shakespeare). Oftentimes in science, empirical evidence emerges to refute anecdotal wisdom. In the case of positive emotions and health, however, accumulating evidence is providing empirical support for such folk theories. Research shows that positive emotions serve a buffering function and provide a useful antidote to the problems associated with negative emotions and ill health (Fredrickson, 2000).

In this article, we first highlight important areas of physical and psychological health affected by positive emotions. Next, we introduce the *broaden-and-build theory* (Fredrickson, 1998; 2001) as a framework to demonstrate the functional utility of positive emotions in health. We then propose that the health benefits produced by positive emotions may be instantiated in traits characterized by positive emotional experience. Finally, we describe two studies that examine such traits (psychological resilience and positive emotional granularity) and demonstrate that positive emotions help people overcome negative emotions faster and are related to coping styles important for resource building. As a result, our findings support the idea that positive emotions play a critical role in contributing to psychological and physical well-being.

Health Benefits Associated With Positive Emotions

There is accumulating evidence that positive emotions are associated with advantageous physical and psychological health outcomes. Below, we highlight some of the important findings linking positive emotions to health.

Laughter and humor. Laughter is good medicine. Laughter generates increases in positive emotion (Bachorowski & Owren, 2001) and produces self-reported improvements in immune system functioning (Mahoney, Burroughs, & Lippman, 2002). Importantly, the effect of laughter on the self-reports of immune system functioning is mediated by subjective experiences of positive emotion, especially for older adults (Mahoney et al., 2002). This suggests that positive emotions produced by the behavior of laughing may be important in predicting healthy outcomes for the immune system.

Positive emotions mediate the effects of coping with humor and immune system functioning (Dillon, Minchoff, & Baker, 1985–1986). Laughter (a behavior) is often associated with humor (a cognitive construct). Individuals vary in the extent to which they use humor to cope with stressful situations. Those with greater tendencies to cope with humor report greater daily positive mood (Dillon et al., 1985–1986; for a review, see Lefcourt, 2001). Consequently, in response to stress, those with greater propensities to cope with humor show increases in levels of salivary immunoglobulin A (S-IgA), a vital immune system protein, which is the body's first line of defense against respiratory illnesses (Dillon et al., 1985–1986). Corroborating work in an experience-sampling study shows that self-reported positive emotions (vs. negative emotions) predict increases in S-IgA levels, thereby enhancing immune functioning (Stone, Valdimarsdottir, Jandorf, Cox, & Neale, 1987). These findings indicate that persons who are able to regain and maintain positive emotional states when faced with a stressful life experience (e.g., via laughter, coping with humor) can show improvements in immune function. (For a review of less-consistent findings between humor, laughter, and health, see Martin, 2001).

Heart disease. Positive emotions have also been shown to benefit individuals with cardiovascular disease. For example, elderly patients with cardiovascular disease who reported greater happiness for 90

days after hospital release had lower readmission rates to the hospital. Reports of positive emotions predicted readmission over and above other factors like health status at initial release, length of initial stay in the hospital, and personal adjustment (Middleton & Byrd, 1996).

Cardiovascular health benefits associated with positive emotions are further suggested by research on optimism, a dispositional attribute characterized by chronic experiences of positive emotion (Carver & Scheier, 2002a,b). Optimists evidence better physical recovery immediately after coronary artery bypass surgery and up to 6 months post-surgery (Carver & Scheier, 1993). In a study on male war veterans, optimists (compared to pessimists) were less likely to suffer from angina and heart attacks (Kubzansky, Sparrow, Vokonas, & Kawachi, 2001), and they evidenced higher levels of pulmonary function and slower rates of pulmonary function decline, a protective effect that is independent of smoking (Kubzansky, Wright, Cohen, Weiss, Rosner, & Sparrow, 2002). Therefore, optimism is linked with less incidence and better recovery, perhaps in part due to the chronic positive emotional states that optimists experience. Recent theorizing, however, has noted that many of the health effects of dispositional optimism parallel those predicted by the positive emotion of hope (Aspinwall & Leaf, 2002). As such, researchers are beginning to consider whether positive emotion, especially hope, may uniquely contribute to the health benefits accrued by dispositional optimists.

Positive emotional disclosure. Interventions that promote positive emotions are beneficial to health. To illustrate, in one study, participants were assigned to one of three groups: (1) count your blessings, (2) list daily hassles or (3) control. People who “counted their blessings” weekly for 10 weeks by listing things for which they were grateful or thankful evidenced better subjective health outcomes, including fewer physical complaints, more time exercising, more hours of sleep, and better sleep quality. Notably, the subjective experience of gratitude (over and above general positive affect) mediated the effects of the “count your blessings” intervention on health outcomes (Emmons & McCullough, 2003).

In related research, several studies demonstrate that emotional disclosure can produce significantly enhanced health functioning (Pennebaker, 1993; Pennebaker, Kiecolt-Glaser, and Glaser, 1988), especially when positive emotional content is evident in the disclosures (Pennebaker & Francis, 1996). For instance, the use of more

positive emotion words when writing about a mild stressor (e.g., transition to college) resulted in fewer illness-related physician visits over the following 2 months, compared to control participants (Pennebaker & Francis, 1996). As well, compared to a control condition, individuals who were instructed to write about perceived benefits associated with a trauma (including positive emotional experiences) produces superior health outcomes, including fewer health center visits (King & Miner, 2000). The use of relatively more positive-emotion words has also been shown to benefit individuals facing traumas and other severe stressors. Caregivers whose partners recently died of AIDS provided spoken narratives at three time points: 2 weeks, 1 month, and 1 year post-bereavement (Stein, Folkman, Trabasso, & Richards, 1997). Those who used a greater proportion of positive-emotion (vs. negative-emotion) words showed greater positive morale and less depressed mood. Together, these studies suggest that writing about positive emotions can have important implications for health.

Longevity. Research shows that the advantages associated with positive emotional disclosure not only provide short-term health benefits, but, importantly, these benefits can endure for a lifetime. For example, the positive emotional content in the autobiographies of nuns in early adulthood predicted the likelihood of being alive 6 decades later (Danner, Snowdon, & Friesen, 2001). Relatedly, positive emotions in elderly adults protect against physical debility in old age (e.g., less incidents of stroke) (Ostir, Markides, Peek, & Goodwin, 2001). Finally, research on HIV+ men shows that positive affect predicts lower risk of AIDS mortality, even when controlling for other measures of disease progression (Moskowitz, 2003). In all, these findings suggest that positive emotions may be valuable tools, not only for immediate health concerns, but also for establishing long-term beneficial outcomes.

Psychological health. In addition to promoting physical health, cultivating positive emotions is associated with psychological health (cf. Fredrickson, 2000). For instance, coping strategies related to the occurrence and maintenance of positive emotions (e.g., positive reappraisal, problem-focused coping, infusing ordinary events with positive meaning) help buffer against stress (Folkman & Moskowitz, 2000) and depressed mood (Davis, Nolen-Hoeksema, & Larson,

1998). These strategies help individuals emerge from crises with new coping skills, closer relationships, and a richer appreciation for life, all of which predict increases in psychological well-being.

Empirical support for the prediction that positive emotions facilitate adaptive coping and adjustment to acute and chronic stress is documented in number of studies (for a review, see Folkman & Moskowitz, 2000). For instance, men who were able to find positive meaning when caring for their partners with AIDS were found to cope more effectively with the distress associated with caregiving and bereavement (Folkman & Moskowitz, 2000). Similarly, women who found benefits despite hazardous child delivery and prolonged hospitalization post-delivery evidenced greater well-being, which extended to the developmental well-being of their children (Affleck & Tennen, 1996). The occurrence of positive emotions amid adversity may provide the necessary psychological rest to help buffer against stress, replenish, and restore further coping efforts.

The Broaden-and-Build Theory of Positive Emotions

Now that a link between positive emotional experience and health seems clear, it is important to consider how and why positive emotions contribute to beneficial health outcomes. The broaden-and-build theory of positive emotions (Fredrickson, 1998; 2001) provides a valuable framework with which to understand the functional significance of positive emotions in health. Whereas negative emotions heighten one's sympathetic activity and narrow one's attention to support specific action tendencies (e.g., attack, escape), positive emotions have the potential to quell autonomic arousal generated by negative emotions and broaden one's attention, thinking, and behavioral repertoires.

Supportive evidence for the broaden-and-build theory comes from research demonstrating that positive emotions produce patterns of thought that are notably unusual, flexible, creative, integrative, open to information, and efficient (for a review, see Isen, 1993, 1999). As well, induced positive emotions increase one's preferences for variety and broaden one's arrays of acceptable behavioral options. These cognitive effects of positive emotions have been linked to increases in dopamine levels in the anterior cingulate cortex, thereby enhancing one's ability to *switch set*, or modify and adjust efforts, rather than perseverate on a particular decision rule (Ashby, Isen, & Turken,

1999). Corroborating research shows that relative to neutral states and negative emotions, low- and high-activation, positive emotions (e.g., contentment, joy) broaden the scope of an individual's visual attention as well as his or her momentary thought-action repertoires (Fredrickson & Branigan, 2003). Together, these studies provide evidence for cognitive broadening associated with positive emotions.

Why is cognitive broadening important to health? According to the broaden-and-build theory, positive emotions can momentarily broaden one's scopes of thought and allow for flexible attention, which, in turn, can improve one's well-being. Over time, and with repeated experiences of positive emotions, this broadened mindset might become habitual. By consequence, then, the often-incidental effect of experiencing a positive emotion is an increase in one's personal resources. Importantly, the arsenal of personal resources produced by positive emotions can be drawn on in times of need and used to plan for future outcomes, which may be valuable in facilitating healthy behavioral practices (Fredrickson, 2000).

Undoing Effect of Positive Emotions

The broadening effects of positive emotions have clear implications for the strategies that people use to regulate their negative experiences, which, in turn, should affect physical and psychological health. Negative emotions narrow one's momentary thoughts and actions and produce autonomic nervous system activation that prepares the body for specific action. In contrast, to the extent that positive emotions broaden one's thought-action repertoire, they should serve a homeostatic role by "undoing" the lingering aftereffects of negative emotional reactivity, returning an individual to cardiovascular equilibrium. This is called the *undoing hypothesis*.

The undoing hypothesis was tested in a series of three experiments (Fredrickson & Levenson, 1998; Fredrickson, Mancuso, Branigan, & Tugade, 2000). Each investigation experimentally induced a high-arousal, negative emotion, which produces increases in sympathetic reactivity (e.g., increases in heart rate, vasoconstriction, and blood pressure). Immediately following negative emotional arousal, participants were randomly assigned to view an emotionally evocative film that induced joy, contentment, neutrality, or sadness. In three independent samples, participants in both high- and low-activation, positive-emotion conditions (joy, contentment) exhibited faster

cardiovascular recovery from negative emotional arousal, compared to those in the neutral or sad film conditions. Thus, in line with the broaden-and-build theory, positive emotions appear to have a unique ability to physiologically down-regulate lingering negative emotions (Fredrickson & Levenson, 1998; Fredrickson, et al., 2000).

Traits Associated With Positive Emotional Experience

Many of the advantages of positive emotions on health may be instantiated in certain traits characterized by positive emotional experience. We focus our discussion on two such traits: *psychological resilience* and *positive emotional granularity*. We posit that the broaden-and-build theory (Fredrickson, 1998; 2001) might provide a framework with which to understand the physical and psychological health advantages that benefit these individuals.

Psychological resilience is defined by flexibility in response to changing situational demands, and the ability to bounce back from negative emotional experiences (J. H. Block & Block, 1980; Block & Kremen, 1996; Lazarus, 1993). Notably, trait-resilient individuals experience positive emotions even in the midst of stressful events, which may explain their ability to rebound successfully despite adversity. This suggests that trait-resilient people may understand the benefits associated with positive emotions and use this knowledge to their advantage when coping with negative emotional events (Tugade & Fredrickson, 2002; 2004). One way to examine a person's use of positive emotion knowledge is to examine individual differences in *positive emotional granularity*, or the tendency to represent positive emotional experiences with precision and specificity (rather than as global pleasant states). We examine research that demonstrates that discriminating between positive emotional experiences is related to coping. In examining psychological resilience and positive emotional granularity, we argue that the experience of positive emotions allows for improvements in physical and psychological health and well-being for these individuals.

Overview of Studies

As we have shown in this brief review of the literature, positive emotions appear to serve an important function in promoting advantages to health. In this article, we review multimethod studies that examine two characteristics (psychological resilience, positive

emotional granularity) that allow individuals to capitalize on their positive emotional experiences to benefit physical and psychological health. Study 1 reported on a study that used psychophysiological methods to demonstrate that psychologically resilient people rebound from negative emotional arousal through their experiences of positive emotion. Study 2 used an experience-sampling study to demonstrate that positive emotional granularity is related to self-reports of coping. Together, these studies provide two examples of how the broadening and building functions of positive emotions can be examined to understand adaptive personality characteristics.

Study 1

Positive Emotions and Psychological Resilience

A host of studies report a robust relation between positive emotions and psychological resilience. Multiple methodologies (e.g., self-report, observation, longitudinal studies) have been used to demonstrate that individuals who report resilience are characterized by positive emotionality: They have zestful and energetic approaches to life, and they are curious and open to new experiences (Block & Block, 1981; Klohnen, 1996; Masten, 2001; Werner & Smith, 1992; Wolin & Wolin, 1993). They also use positive emotions to achieve effective coping outcomes by using humor (Masten, 2001; Werner & Smith, 1992; Wolin & Wolin, 1993), creative exploration (Cohler, 1987), relaxation (Anthony, 1987), and optimistic thinking (for a review, see Masten & Reed, 2002) as ways of coping. Moreover, resilient individuals not only cultivate positive emotions in themselves, but they are also skilled at eliciting positive emotions in close others (i.e., caregivers early in life and companions later on), which creates a supportive social network to aid in the coping process (Demos, 1989; Kumpfer, 1999; Werner & Smith, 1992). Despite this converging evidence, however, few have yet to explore specifically *why* positive emotions are useful. We argue that positive emotions are not merely byproducts of psychological resilience. Rather, they serve an important function in the ability of resilient individuals to rebound from stressful encounters.

Theoretical descriptions of psychological resilience indicate that resilient people are able to “bounce back” from stressful experiences quickly and efficiently (Carver, 1998). Accordingly, resilient

individuals should exhibit faster cardiovascular recovery from negative emotional arousal, compared to their less-resilient counterparts. Together with work on the undoing hypothesis (Fredrickson & Levenson, 1998; Fredrickson et al., 2000), the broaden-and-build theory suggests that this ability to “bounce back” to cardiovascular baseline may be fueled by experiences of positive emotion.

We examined the role of positive emotions in helping trait-resilient individuals rebound from negative emotional situations (cf., Tugade & Fredrickson, 2004). We argued that, if resilient individuals indeed have the psychological capacity to rebound despite adverse encounters or stress (e.g., J. H. Block & Block, 1980; Carver, 1998; Lazarus, 1993), then this ability to “bounce back” should be reflected physiologically as well. We predicted that high-resilient individuals would evidence faster cardiovascular recovery from a stressor, relative to low-resilient participants. Furthermore, we predicted that faster cardiovascular recovery from negative emotional arousal would be attributable, in part, to experiences of positive emotion.

To test these hypotheses, Tugade and Fredrickson (2004) collected continuous measures of cardiovascular responding from all participants ($N = 57$) at a sampling rate of 1000 Hz. Six indices of cardiovascular responding were collected, including (1) heart rate (HR), (2) finger pulse amplitude (FPA), (3) pulse transmission times to the finger (PTF), (4) pulse transmission time to the ear (PTE), (5) diastolic blood pressure (DBP), and (6) systolic blood pressure (SBP). After a resting baseline, anxiety was experimentally induced by telling participants that they would have 60 sec to mentally prepare a speech on a self-relevant topic. Following the 60-sec, speech-preparation task, there was a 3-min recovery period. Participants also completed self-reports of subjective emotional experience, ambient positive and negative mood (PANAS; Watson, Clark, & Tellegen, 1989), and trait resilience (Block & Kremen, 1996).

Findings indicated that, across all participants, the speech preparation task produced subjective experiences of anxiety and increases in cardiovascular reactivity from baseline (see Table 1). These changes reflect task-induced, cardiovascular arousal, which includes heart rate acceleration, increased blood pressure, and peripheral vasoconstriction. Importantly, cardiovascular levels during baseline and reactivity during the speech-preparation task did not differ by sex or trait resilience. Taken together, self-report and physiological data indicate that the speech-preparation task induced anxiety and

Table 1
Study 1: Cardiovascular Reactivity during Pre-Task Baseline and Speech Preparation Task

Variable	Pre-task Baseline		Speech Preparation Task	
	Mean	SD	Mean	SD
HR	79.37	14.18	94.52	15.92***
FPA	1.98	0.42	1.62	0.56***
PTF	0.240	0.017	0.236	0.019**
PTE	0.19	0.024	0.18	0.022***
DBP	57.56	14.32	61.74	13.65*
SBP	134.30	23.76	151.61	25.63***

Note. Reproduced with permission from the APA. HR = heart rate in beats per min; FPA = finger pulse amplitude in mv; PTF = pulse transmission time to the finger and PTE = pulse transmission time to the ear, each in msec; DBP = diastolic blood pressure and SBP = systolic blood pressure, each in mmHg. Asterices indicate changes significantly different from baseline measures by within-subject *t*-tests (df = 55).

*** $p < .001$.

** $p < .01$.

* $p < .05$.

cardiovascular reactivity that was significantly different from baseline levels; these variables did not vary based on sex and trait resilience.

Our first prediction was that trait resilience would predict subjective reports of positive emotionality. Results revealed support for this prediction: Trait resilience was positively associated with positive mood as assessed by the PANAS (Watson et al., 1988) ($r = .38$, $p < .01$), (but not associated with negative mood). Adding further support to our first prediction, we found that higher trait resilience was associated with more happiness ($r = .47$, $p < .01$) and more interest ($r = .33$, $p < .01$) during the speech preparation task. To quantify positive emotionality in a single measure, we created a composite index by summing the standardized scores of positive mood and standardized emotion reports of happiness in response to the speech preparation task.¹ As predicted, trait resilience was positively related to the positive emotionality composite index ($r = .46$, $p < .001$).

1. A principal components factor analysis of the ego-resiliency scale was conducted across the three samples reported here. From the factor analysis, an "interest" factor emerged. Because subjective emotion reports of "interest" might

Our second prediction was that psychological resilience would be negatively related with duration of cardiovascular reactivity. We calculated an aggregate index of duration of cardiovascular reactivity (time to return to baseline levels) for each participant by computing the mean duration score across the six cardiovascular indices (for a detailed description of this data-reduction technique, see Fredrickson & Levenson, 1998). As predicted, findings demonstrated that trait resilience was negatively correlated to duration of cardiovascular reactivity ($r = -.26, p < .05$), indicating that those with higher trait resilience evidenced faster cardiovascular recovery from negative emotional arousal.

Our final prediction stated that positive emotions would mediate the effect of resilience on duration of cardiovascular reactivity following the speech-preparation task. The statistical analysis framework suggested by Baron and Kenny (1986) was used to test for mediation effects. Findings revealed support for our final prediction: Data indicated that the effect of trait resilience on duration of cardiovascular reactivity was no longer significant when controlling for positive emotionality ($Beta = -.15, t < 1, ns$) (for full details of the test of mediation, please refer to Tugade & Fredrickson, 2004).

DISCUSSION

Theoretical writings on resilience have indicated that resilient individuals are characterized by high positive emotionality (e.g., Block & Kremen, 1996; Klohnen, 1996; Wolin & Wolin, 1993) and by the capacity to rebound from negative circumstances despite threats to the individual (e.g., J. H. Block & Block, 1980; Lazarus, 1993; Masten, 2001). This study demonstrates the utility of positive emotions in the coping process. Though not directly tested here, these findings may also have an impact on health outcomes.

In Study 1, those who rated themselves as having the ability to rebound effectively from stressful encounters also demonstrated this

overlap with the "interest" items from the ego-resiliency measure (Block & Kremen, 1989), we did not include subjective emotion reports of "interest" (from the emotion reports and the positive mood scale) in the composite positive emotionality indices reported throughout. For further details about the factor analysis, please contact the first author.

quality physiologically, by quickly returning to baseline levels of physiological responding after negative emotional arousal. This suggests that resilience may not be just a psychological phenomenon. One's self-perception of resilience may be reflected in one's bodily responses to stressful stimuli, which has strong implications for research in health psychology. Health researchers, for example, might consider examining subjective reports of psychological resilience as a way to understand or predict one's physiological response to stress. The physiological embodiment of psychological resilience might be used as a further demonstration of how psychological constructs may positively affect physical health.

For trait-resilient individuals, the experience of positive emotions is related to accelerated speed in rebounding from the cardiovascular activation generated by negative emotions (Tugade & Fredrickson, 2004). It is possible that this quick recovery provides the body with restoration time to toughen it up in preparation for additional stressors should they arise (Dienstbier, 1989). Positive emotions may also enhance coping outcomes beyond the physiological level. By helping to speed cardiovascular recovery from negative emotions, a valuable byproduct of positive emotions is that they should broaden arrays of subsequent thoughts and actions (Fredrickson, 2000) and provide the opportunity for resilient people to explore other coping possibilities.

Given that resilient individuals are characterized by positive emotionality (e.g., Block & Kremen, 1996; Klohnen, 1996; Wolin & Wolin, 1993), the benefits of positive emotional experience can accrue and accumulate. In line with the broaden-and-build theory, research has shown that positive emotions and broadened thinking influence one another reciprocally, leading to appreciable increases in functioning and well-being. In one study, for example, affective experiences and broad-minded coping (e.g., considering multiple courses of action to manage problems) were examined across two assessment periods, 5 weeks apart (Fredrickson & Joiner, 2001). Over this period, the relations between positive emotions and broad-minded coping became stronger, creating an upward spiral towards enhanced well-being. Positive emotions predicted improvements in broad-minded coping, which in turn, predicted increases in subsequent experiences of positive emotions. And again, new experiences of positive emotions were related to increases in broad-minded coping, and so forth.

In line with this conceptualization, in another study, positive emotions appeared to aid resilient individuals in their ability to build psychological resources that are essential for coping effectively with large-scale tragedy, such as the September 11th attacks on the United States. As part of our ongoing research on positive emotions and resilience, we studied a sample of students prior to September 11th. This afforded us the opportunity to make a prospective assessment of the benefits of positive emotions in this crisis. Those characterized by high trait resilience reported greater post-crisis experiences of positive emotions (gratitude, interest, love) in the midst of the negative emotions (anger, sadness, fear) they experienced after the attacks. In addition, higher resilience was linked to post-crisis growth (indexed by increases in optimism, subjective well-being, tranquility). In line with the broaden-and-build theory (Fredrickson, 1998; 2001), post-crisis experiences of positive emotions fully mediated the relation between the effect of trait resilience on psychological growth after the attacks (Fredrickson, Tugade, Waugh, & Larkin, 2003).

Together with these findings, the results of Study 1 show that the positive emotions experienced by trait-resilient people may serve as protective factors useful in promoting short-term health benefits as well as long-term advantages for coping in the future. Given that positive emotions may serve important health-promoting functions, it is possible that certain individuals who have a greater tendency to harness positive emotions to their advantage in times of stress may reap beneficial consequences in the coping process. The existing data would suggest that resilient individuals may have a fine-tuned understanding about the benefits that positive emotions can offer, especially during times of stress (Tugade & Fredrickson, 2002). The evidence, however, is far from definitive.

The ways that individuals represent their emotional experiences may provide insight into the information that they derive from emotions to direct coping behavior. Towards this end, the aim of Study 2 was to investigate another trait characterized by positive emotional experience, namely *positive emotional granularity*. Positive emotional granularity reflects individual differences in the tendency to represent positive emotional experience precisely (rather than globally). By representing positive emotional experiences with precision, one may derive important information from discrete emotion concepts. Such information may be more beneficial to an individual than more general information provided by global moods. Given the health

benefits associated with positive emotions and the informational value provided by discrete positive emotion concepts, higher positive emotional granularity should be associated with healthier outcomes.

Study 2

Positive Emotional Granularity and Coping

The representation of an emotional experience conveys important information to an individual, playing a crucial role in directing and maintaining human action (Clore, Gasper, & Garvin, 2001; Clore & Tamir, 2002; Feldman Barrett & Gross, 2001; Feldman Barrett, Gross, Christensen, & Benvenuto, 2001; Schwarz & Clore, 1983). The available evidence suggests that there may be individual differences in how people verbally report their affective experiences, allowing some to manage their emotions more effectively during stressful situations (Feldman Barrett & Gross, 2001; Salovey, Hsee & Mayer, 1993). An emerging literature suggests that people represent emotional experiences discretely or globally to varying degrees (Carstensen, Pasupathi, & Mayr, 1999; & Nesselroade, 2000; Feldman Barrett, 1998, 2004; Lane, Quinlan, Schwartz, Walker, & Zeitlin, 1990; Lane & Schwartz, 1987; Lane, Sechrest, Reidel, Welton, Kaszniak, & Schwartz, 1996; Larsen & Cutler, 1996).

Individual differences in how one uses emotion words to represent emotional experience are termed *emotional granularity* (Feldman, 1995; Feldman Barrett, 1998, 2004; Feldman Barrett & Gross, 2001). Highly granular individuals report their emotional experience in differentiated terms with discrete emotion labels (happy, content, sad, angry, etc.) to capture their distinctiveness. For instance, at a given moment, an individual with high emotional granularity would report feeling joy (but not contentment or interest) to represent a distinct subjective experience. Individuals with less granularity report their experience using discrete emotion labels to communicate only their core affect, typically valence (for reviews of core affect, see Russell, 2003; Russell & Feldman Barrett, 1999). For instance, at a given moment, an individual with low emotional granularity would report feeling joy, but *would also* report feeling contentment and interest, thereby representing a general feeling of pleasantness.

Research provides support for the hypothesis that emotional granularity should be associated with coping outcomes. For example,

an experience-sampling study found that greater emotional granularity (especially discriminating among negative emotions) was associated with larger repertoires of emotion-regulation strategies. This finding indicates that the ability to recognize and utilize information from discrete, negative emotion concepts can have beneficial effects on emotion regulation (Feldman Barrett, Gross, Christensen, & Benvenuto, 2001).

The effects of *positive emotional granularity* have yet to be examined. Rather than grouping all positive emotions together as previously done in early emotions research, current emotion theories indicate that positive emotions can be uniquely classified based on their form and function (e.g., Fredrickson, 1998; 2001; Keltner & Shiota, 2003; Shiota & Keltner, 2002). For instance, positive emotions can be differentiated on the basis of social relevance, be they interpersonal (e.g., love) or noninterpersonal (e.g., contentment) (Storm & Storm, 1987). More recent theories indicate that they can be distinctly categorized based on appraisal themes, behavior, and subjective experience (Shiota & Keltner, 2002). Moreover, recent work has shown that, beyond traditional behavioral channels often used to discriminate between emotions (e.g., facial actions), positive emotions such as amusement, desire, happiness, love, and interest are associated with distinct behavioral displays like posture, voice, touch, and gaze (Keltner & Shiota, 2003). Furthermore, the broaden-and-build theory indicates that positive emotions serve to broaden an individual's thought-action repertoire; notably, distinct positive emotions broaden and build in different ways (Fredrickson, 1998; 2001).

We argue that representing positive affective states with precision or granularity should exert important influences on coping. This hypothesis stems from research indicating that, in self-relevant situations that are motivationally significant (such as coping), positive emotions facilitate flexible problem solving that is careful, effortful, and thorough, making these strategies quite responsive to situational demands (e.g., Isen, 1993; 1999; 2001). These cognitive processes associated with positive emotions are shown to be important for strengthening and improving one's coping ability (Aspinwall, 1998; Trope & Neter, 1994; Trope & Pomerantz, 1998). Variations on these cognitive effects of coping can be shown across discrete positive emotions. To illustrate with a few examples, *contentment* involves present awareness or mindfulness (Fredrickson, 2000), which

assists self-regulation by prompting greater attention to one's needs and increases receptiveness to various behavioral options in order to fulfill those needs (e.g., Brown & Ryan, 2003); *interest* diversifies knowledge, cognitive skills, and experiences, thereby cultivating competencies useful for problem solving (Izard, 1977; Silvia, 2001); and *hope* allows one to stay open to new information and motivates sustained effort in the face of adversity (for a review, see Snyder, 2001). Given the important informational value provided by discrete positive emotions and the beneficial effects associated with them, it is plausible that positive emotional granularity should be associated with useful coping styles to manage stress.

To test this hypothesis, participants ($N = 130$, 53 % female) took part in an experience-sampling study. Participants were issued palmtop computers (HP 360 LX) to report on their emotional experience at randomly chosen periods, 10 per day for a total of 28 days (potentially resulting in a maximum of 280 measurement moments per participant). The palmtop computers run custom software (Experience Sampling Program, ESP; Barrett & Feldman Barrett, 2000). ESP presents 29 affect terms for each sampling occasion. Participants indicate how they feel at that moment according to a 7-point scale (0 = *not at all*, 3 = *a moderate amount*, 6 = *a great deal*). Participants were told to respond as quickly as possible without compromising their accuracy. Participants were beeped for 10 times daily between the hours of 8 am to 11 pm, and they were asked to respond to a series of questions intended to assess their emotional experience. Specifically, participants were first asked, "Are you experiencing an emotion?" After responding "yes" or "no," participants were asked to rate the extent to which they felt different affective terms. Emotional granularity indices were derived from the experience-sampling ratings.²

In addition to the experience-sampling procedure, participants completed self-report measures of coping. We administered the brief *COPE* (Carver, 1997), which is a short form (28 items) of the original *COPE* inventory (Carver, Scheier, & Weintraub, 1989). The *COPE* is a multidimensional inventory used to assess the different ways in which people generally respond to stress. The *COPE* is parsed into

2. Participants visited the laboratory weekly to upload their data. During the weekly laboratory visits, participants also completed laboratory tasks, which are not the focus of this paper, and are reported elsewhere.

14 subscales that describe different coping strategies: acceptance, active coping, behavioral disengagement, denial, emotional support, humor, instrumental support, planning, positive reframing, religion, self-blame, self-distraction, substance use, and venting.

Participants also completed the *Rational-Experiential Inventory* (REI; Epstein, Pacini, Denes-Raj, & Heier, 1996), which is a self-report measure of individual differences in intuitive-experiential and analytical-rational thinking styles. The rational system is said to operate primarily at the conscious level and is intentional and analytic. In contrast, the experiential system is assumed to be automatic and preconscious. The REI has been used to map the relation between automatic/controlled processing and coping. Previous research indicates that rational (controlled) processing may be more critical for effective coping; more experiential (automatic) processing can at times be adaptive, but, generally, it is ill-suited for coping, which involves solving problems that require logical analysis and an understanding of abstract relations (Epstein et al., 1996).

Emotional granularity. Emotional granularity was computed from experience-sampling ratings. Average intraclass correlations (ICCs) (cf., Shrout & Fleiss, 1979) with absolute agreement between emotion markers across the period of observation were calculated for each participant. These intraclass correlations reflect the agreement among self-reported emotional states for each measurement moment over time. Large intraclass correlations indicate that different emotion terms are being used to describe felt experience in the same way (i.e., low emotional granularity), while smaller intraclass correlations indicate that different emotion terms are being used to describe felt experience in distinct ways (i.e., high emotional granularity). For ease of interpretation, ICCs were transformed, such that higher ICCs reflect higher emotional granularity (and lower ICCs reflect lower granularity).

To calculate positive emotional granularity, average ICCs from five positive emotion markers (amusement, happiness, interest, joy, pride) were computed for each participant. These emotions were chosen because they represent a broad range of prototypical pleasant emotional states. Across all participants, average ICCs for positive emotions ranged from $ICC = .22$ to $ICC = .90$, with a mean of $ICC = 0.66$ ($SD = 0.14$). There were no sex or ethnic differences in average ICCs for positive emotions.

Emotional granularity and coping. We next examined the relations between positive emotional granularity and self-reported indices of coping. Important relations between positive emotional granularity and the COPE subscales emerged. Findings indicated that positive emotional granularity was negatively correlated with scores on the COPE mental self-distraction scale ($r = -.26, p < .01$), suggesting less cognitive diversion. Positive emotional granularity was also associated with increased behavioral disengagement ($r = .20, p < .05$), which suggests taking a momentary pause before attempting coping efforts (Carver et al., 1989).

Interesting relations also emerged between positive emotional granularity and the REI scales. Positive emotional granularity was negatively correlated with automatic coping styles, based on the REI experiential ability ($r = -.18, p < .05$) and experiential engagement scales ($r = -.18, p < .05$). These findings suggest that those with higher positive emotional granularity perceive themselves as less likely to use heuristics to guide coping behavior; rather, they give careful and thorough consideration for various behavioral options to respond to the situation at hand (Epstein et al., 1996). The correlations between positive emotional granularity and self-report indices of coping are presented in Table 2.

Taken together, these findings indicate that, in a coping context, those with higher positive emotional granularity perceive themselves as being more attentive to the situation at hand, as more likely to scan coping options thoroughly, and as less likely to respond spontaneously.

DISCUSSION

Individual differences in the propensity to label positive emotional experiences with precision were associated with important coping styles. Specifically, those with higher positive emotional granularity reported that they are less likely to mentally self-distract during stressful times, that they are more engaged in the coping process, that they are less automatic in their responding, and that they are more likely to think through their behavioral options before acting. Thus, while coping is traditionally seen as “reactive” or something that occurs temporarily after a stressful event, the approaches to coping reported by individuals with positive emotional granularity seem “proactive” and future-oriented, in that the individual takes

Table 2
Study 2: Correlations Between Positive/Negative Emotional Granularity and Global Measures of Coping ($N = 130$)

Coping Scales	Positive Emotional Granularity
	<i>r</i>
COPE	
Acceptance	.05
Active coping	-.16
Behavioral disengagement	.20*
Denial	.16
Emotional support	.00
Humor	-.07
Instrumental support	-.12
Planning	-.13
Positive reframing	.01
Religion	-.11
Self-blame	-.07
Mental disengagement (self-distraction)	-.26**
Substance use	.00
Venting	-.07
REI	
Experiential ability	-.18*
Experiential engagement	-.18*
Rational ability	.00
Rational engagement	.01

Note: For ease of interpretation, intraclass correlations (ICCs) have been transformed, such that higher ICCs reflect higher emotional granularity.

** $p < .01$.

* $p < .05$.

preparatory steps before acting on stress (Aspinwall & Taylor, 1997; Gross, 1998). Thus, by prompting one to scan one's array of coping options, positive emotional granularity may afford an individual with the ability to stretch capacities for regulating negative emotional experiences.

These findings may reflect a domain of coping shown to be related to adjustment and the strengthening of coping capital: *thorough information processing* (Epstein et al., 1996; for a review, see Isen, 1999). Thorough information processing involves fully scanning an

existing store of resources before acting, thereby broadening one's options for possible action. This coping style might bring to mind a vast array of coping possibilities and allow new strategies to be considered. After they examine the situation and their resources carefully, it is possible that those with higher positive emotional granularity may be able to mobilize their efforts appropriately and effectively. In time and with repeated use, they may learn the effectiveness of particular strategies, which consequently should strengthen one's coping repertoire (Tugade, Feldman Barrett, Gross, Hristic, & Lebo, under review).

Importantly, thorough information processing has been shown to facilitate health-promoting practices (e.g., Aspinwall & Brunhart, 1996; Isen, 2001). Deliberate and effortful coping and the scanning of coping options before quickly responding have been shown to be associated with a number of health-promoting outcomes, including making more effective medical decisions (Isen, 2001), better adjustment in cancer patients (Lepore, 2001), and less rapid declines in CD4T cell levels and lower rates of AIDS-related mortality in bereaved AIDS-seropositive men (Bower, Kemeny, Taylor, & Fahey, 1998). Furthermore, thorough cognitive processing induced via disclosure is associated with fewer health center visits (Pennebaker & Beall, 1986; Pennebaker, Colder, & Sharp, 1990), positive changes in indexes of autonomic activity (Pennebaker, Hughes, & O'Heeron, 1987), and positive changes in the immune system (Pennebaker et al., 1988; Petrie, Booth, Pennebaker, Davison, & Thomas, 1995).

The present study contributes to the literature in a number of important ways. First, it replicates previous studies indicating that there is great variability in the representation of emotional experiences as discrete (Feldman, 1995; Feldman Barrett, 1998, 2004; Feldman Barrett et al., 2001). As we found, some individuals demonstrated a greater propensity toward finer-grained discriminations of positive emotion representations. Second, this study verifies that positive emotional variation is associated with other aspects of emotional life. To date, no research to our knowledge, has explored the role of positive emotional differentiation or granularity on properties of coping. Third, it introduces novel methodology for examining the complexity with which individuals represent their positive emotional experience over time. Other studies examining emotional complexity or emotional awareness tend to utilize self-report measures or ask participants to respond based on hypothetical situations.

Experience-sampling methods may be a valuable tool for investigating emotional experience and the complexities of one's representation of that experience as it unfolds through time. Indeed, experience-sampling methods have been useful in examining important links between psychological and physical health (for reviews, see, Conner, Tugade, & Feldman Barrett, 2004; Stone, Shiffman & DeVries, 1999).

There are limitations to the present study, however. The reported links between positive emotional granularity and coping should be interpreted with caution, as indices of coping were based on participants' self-reports of general coping. Examining the relations between positive emotional granularity and behavioral aspects of coping over time would be an important extension of this work. It would also be important to examine the contexts in which positive emotional granularity would be most beneficial. Indeed, recent research indicates that positive emotional granularity may be most effective in low-stress contexts, where there is no immediate press to respond with quick and decisive action (Tugade et al., under review). It may be that under these low-stress contexts, positive emotional granularity is especially important in achieving the broadening-and-building effects on coping. Future empirical research will be needed to build upon the relations found here.

GENERAL DISCUSSION

The notion that positive emotions are good for health is a popular idea that is gaining empirical support. The broaden-and-build theory (Fredrickson, 1998; 2001) proposes that positive emotions are useful to health in many ways. They facilitate healthy behavior in the present, by accelerating cardiovascular recovery from negative emotional arousal. This sets the stage for creative and innovative pursuits when faced with negative situations. As well, positive emotional granularity can be useful in building personal resources, which serve as protective factors useful in promoting good health in the future.

We reported that positive emotions are related to speeded-up recovery from cardiovascular reactivity generated by negative emotions for resilient individuals (Study 1). In line with the undoing effect of positive emotions (Fredrickson & Levenson, 1998; Fredrickson et al., 2000), the experience of positive emotions may be

important in helping resilient individuals recover quickly from the cardiovascular activation associated with negative emotions, partially contributing to their abilities to regulate negative emotions in other domains as well. Findings from Study 1 may be especially important in examining the health-promoting qualities associated with positive emotions. A host of empirical work exists on the role that cardiovascular reactivity, occasioned by negative emotional states of hostility, anger, and anxiety, plays in the etiology of cardiovascular diseases, such as coronary heart disease and essential hypertension (for reviews, see Blascovich & Katkin, 1993). Sustained experiences of negative emotional arousal have been shown to be associated with long-term cardiovascular illness and disease. In line with the present findings, then, it appears especially useful to understand how positive emotions contribute to the prevention of cardiovascular disease.

We also examined individuals' representations of positive emotional experience in daily life by investigating the relations between positive emotional granularity and coping in Study 2. We found that positive emotional granularity is associated with self-reported coping styles that may be important for building one's coping repertoire. These findings suggest that those characterized by positive emotional granularity may more likely engage in thorough and complex consideration of information, rather than superficial, careless cognition. These processes may be fruitful in developing new coping skills and enhancing one's current store of coping resources.

Although we discussed psychological resilience and positive emotional granularity as separate individual difference constructs throughout this investigation, there is a strong likelihood that they may, in fact, be related. Resilient individuals may possess complex understandings of their positive emotions (reflecting higher positive emotional granularity) and use this knowledge to flexibly and resourcefully adapt in response to negative circumstances. When individuals represent complex emotional responses in themselves and in others, they should have a broader repertoire of behavioral and coping responses available to them, allowing them greater flexibility to utilize such responses effectively (Feldman Barrett & Gross, 2001). Building on these findings, the complexity of positive emotions provides important informational value in the service of coping. Positive emotional granularity, then, may be a mechanism by which resilient people achieve superior coping abilities. We are in the

process of addressing these issues, which should add depth and richness to our understanding of resilience and coping.

In conclusion, positive emotions can be an important factor that buffers individuals against maladaptive health outcomes. Emerging research indicates that finding ways to cultivate meaningful positive emotions is a critical necessity for optimal physical and psychological functioning. Indeed, positive emotions are good for your health. With increasing research, we continue to substantiate empirically age-old folk theories about positive emotions and health that have persisted through time.

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