CHAPTER 48

Positive Emotions

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Positive emotions have attracted increased scientific attention in the past decade. They have long been studied as markers of people's overall well-being or happiness (Diener & Seligman, 2004; Kahneman, Kreuger, & Schkade, 2004), but looking at positive emotions as outcomes is just the beginning. In large, well-controlled studies, positive emotions and experiences have been found to predict or contribute to many different life outcomes (Lyubomirsky, King, & Diener, 2005), as well as increased longevity (Danner, Snowdon, & Friesen, 2001; Levy, Slade, & Kunkel, 2002; Moskowitz, 2003; Ostir, Markides, & Black, 2000); improved immune function (Cohen, Doyle, & Turner, 2003); and less pain, impairment, and mortality in people with chronic disease (Gil et al., 2004; Cohen & Pressman, 2006). The "broaden-and-build" theory of positive emotions (Fredrickson, 1998, 2001) encompasses this great variety of empirical results, and this chapter uses this theory as a framework for organizing and interrelating past findings and current questions about positive emotions. Through this synthesis, we hope to explain the central paradox of positive emotions: How is it that fleeting experiences of joy, interest, or love—which can be so easily squelched or dismissed—produce lasting gains in strengths and well-being?

OUTLINE OF THE CHAPTER

We begin the chapter with a general definition of positive emotions and discuss some of the issues involved in studying them. We then briefly lay out our broaden-and-build theory, which we use as a framework for organizing research on positive emotions throughout the chapter. The broaden-and-build theory begins with the immediate effects of positive emotions, which serve to broaden attention, cognition, and behavioral repertoires. These lead to the long-term effects of frequent positive emotions, which serve to build resources that make lasting contributions to survival, health, and happiness. Finally, we take stock of what is known about positive emotions, what questions remain, and how the study of positive emotions

can contribute to the field of positive psychology more generally.

DEFINING POSITIVE EMOTIONS

The theories of emotions that dominated psychology for most of its history proved fruitful for studying negative emotions, but were often unsuitable for the study of positive emotions (Fredrickson, 1998). In the past 10 years, positive emotions have come into their own. The renaissance in positive emotions research stems from two sources: a growing interest in the psychology of the "good life" (Ryff & Singer, 1998; Fredrickson, 1998; Csikszentmihalyi & Csikszentmihalyi, 2006); and several research programs that have sought to build an empirical, bottom-up model of positive emotions, rather than shoehorning them into older models that were constructed primarily for the negative emotions. Below we review these findings—refining what makes an emotion or other state "positive," determining what differentiates a positive emotion from other pleasant affective states, and investigating some of the challenges unique to the study of positive emotions.

Positive Emotions versus Other Positive Affective States

The distinctions between positive emotions and other closely related affective states, such as sensory pleasure and positive mood, have often been blurry. Although working definitions of emotions vary somewhat across researchers, a consensus is emerging that emotions (both positive and negative) are best conceptualized as multicomponent response tendencies—incorporating muscle tension, hormone release, cardiovascular changes, facial expression, attention, and cognition, among other changes—that unfold over a relatively short time span. Typically, emotions begin with an individual's assessment of the personal meaning of some antecedent event—what Lazarus (1991) called the "person–environment relationship" or "adaptational encounter." Either conscious or unconscious, this appraisal process triggers a cascade of responses incorporating mental, physical, and subjective changes.

Sensory pleasure includes such experiences as sexual gratification, satiation of hunger or thirst, and the remedying of unpleasant states (e.g., cold, pain, or excessive noise). Cabanac (1971) suggested that sensory pleasure arises whenever a stimulus "corrects an internal trouble" (e.g., cooling down when overheated, eating when hungry). Sensory pleasure shares with positive emotions a pleasant subjective feel and may include physiological changes, but an emotion also requires an appraisal of some stimulus or an assessment of its meaning. Emotion and sensation often co-occur: A good meal satisfies hunger, and can also lead to feelings of contentment; sex provides pleasant sensations, and may also lead to gratitude or love toward one's partner. Positive emotions can also occur without a physical stimulus (e.g., joy at receiving good news, or interest in a new idea). Berridge (Berridge & Robinson, 2003, Peciña, Smith, & Berridge, 2006) finds evidence for perhaps a similar distinction at the neurological level: Positive affect includes a passive "liking" component, mediated by opioid receptors, and a motivational "wanting" component, mediated by dopamine.

Positive emotions also resemble positive moods. Yet emotions differ from moods, in that emotions are *about* some personally meaningful circumstance (i.e., they have an object), are typically short-lived, and occupy the foreground of consciousness. In contrast, moods are typically free-floating or objectless, are more long-lasting, and occupy the background of consciousness (Oatley & Jenkins, 1996; Rosenberg, 1998). These distinctions between emotions and moods, however, are made more often at theoretical than at empirical levels. In research practice, virtually identical techniques are used for inducing positive moods and positive emotions (e.g., giving gifts, viewing comedies). Many experimental techniques involve presenting a positive stimulus in order to lead a participant to respond to an unrelated task with a generally positive mindset. In this case, multiple forms of positive mood or emotion may lead to the same results. However, research on the tendencies linked to specific emotions (e.g., gratitude, pride, awe), or on positive states with more specific meaning (e.g., optimism, confidence, enjoyment), requires a more careful distinction between mood and emotion.

Links to Urges to Approach or Continue

Most commonly, the function common to all positive emotions has been conceptualized as facilitating approach behavior (Cacioppo,

Priester, & Berntson, 1993; Davidson, 1993; Frijda, 1994) or continued action (Carver & Scheier, 1990; Clore, 1994). From this perspective, experiences of positive emotions prompt individuals to engage with their environments and take part in activities, many of which are evolutionarily adaptive for the individuals, their species, or both. This link between positive emotions and activity engagement provides an explanation for the often-documented "positivity offset," or the tendency for individuals to experience mild positive affect frequently, even in neutral contexts (Diener & Diener, 1996; Ito & Cacioppo, 1999). Without such an offset, individuals most often would be unmotivated to engage with their environments. Yet with such an offset, individuals exhibit the adaptive bias to approach and explore novel objects, people, or situations.

However, other positive affective states share these effects. Sensory pleasure, for instance, motivates people to approach and continue consuming whatever stimulus is (or appears) biologically useful at the moment (Cabanac, 1971). Free-floating positive moods motivate people to continue along any line of thinking or action that they have initiated (Clore, 1994). Thus the approach model can be seen as a lowest common denominator underlying subjectively pleasant states, but it is not sufficient to define or capture the effects of the class of positive emotions. Furthermore, positive emotions such as relief can be conceptualized as approaching a desired state by avoiding an undesired one, but "approach" is by itself a poor description of the associated elicitors or behavioral tendencies. Clearly, positive emotions can arise from a variety of approach- and avoidance-related situations.

Core Appraisal Dimensions

Theorists differ as to whether emotions are best modeled as points on a two-dimensional plane (Russell, Weiss, & Mendelson, 1989), points in a higher-dimensional space (Smith & Ellsworth, 1985), or separately evolved modules (Tooby & Cosmides, Chapter 8, this volume). However, there is general agreement that a primary characteristic of every emotion is valence on a bipolar continuum from highly unpleasant to highly pleasant (reviewed in Smith & Ellsworth, 1985). Indeed, this pleasantness rating may be one of the earliest determinations we make when processing sensory input from our environment (Chen & Bargh, 1999). An appraisal of pleasantness can arise when a stimulus fulfills a biological need (e.g., Cabanac, 1971), when it contributes to a personally relevant goal, or when it remedies a noxious or goal-inconsistent state. Others have argued that an appraisal of pleasantness is based on a favorable comparison between our actual rate of goal attainment and our expected rate (Carver, 2003). This distinction may relate to the distinction between sensations and emotions: Anything that we recognize as progress toward a goal should elicit an immediately pleasant response, but when appraised in the context of our expectations or other considerations, it may or may not give rise to a pleasant (positive) emotion.

The pleasantness dimension of emotions is separate from and orthogonal to other aspects of emotional experience. Consider, for example, the emotions of joy (high arousal) versus contentment (low arousal), or gratitude (low personal control) versus pride (high control). Past emotion measures have often conflated pleasantness with either high arousal or high personal control, even though pleasant emotions can span the range of these dimensions. For example, one prominent scale, the Positive and Negative Activation Schedule[1] (PANAS; Watson, Wiese, Vaidya, & Tellegen, 1999), deliberately focuses on high-arousal positive emotions for psychometric reasons. This PANAS has been effective in the past, perhaps because different positive emotions tend to correlate, or because Americans tend to value high-arousal positive emotions more highly than low-arousal ones (Tsai, Knutson, & Fung, 2006). There are two reasons to favor measures with greater distinction between positive emotions. First, the fact that different positive emotions co-occur does not mean that do not have distinct effects. Low-arousal positive emotions are likely to have different thought–action tendencies from high-arousal ones, and ignoring these emotions impedes our ability to make specific predictions about emotions and behavior. Second, looking at only a subset of positive emotions can tell us whether a person is generally having a positive experience, but it is less helpful in quantitatively measuring the person's level of positive emotion. Increasing evidence suggests that a person's ratio of positive to negative emotions is an important predictor of psychological and social outcomes (Fredrickson & Losada, 2005; Gottman, 1994).

These quantitative measures are best assembled when the participant rates a more inclusive set of positive emotions. Therefore, positive emotion measures perhaps work best when they cast the widest possible net.

Additional Appraisal Dimensions

Appraisal-based emotion theories have generally found that positive emotions are less cognitively distinct than negative ones (Smith & Ellsworth, 1985; Ellsworth & Smith, 1988; Fredrickson & Branigan, 2001). This dovetails with experience-sampling research showing that experiences of various positive emotions covary more strongly than experiences of negative emotions (i.e., people are more likely to feel multiple positive emotions at one time than multiple negative ones; Barrett, Gross, Christensen, & Benvenuto, 2001). Because negative emotions are adapted for specific, survival-critical situations (see the description of the broaden-and-build theory later in this chapter), it is plausible that negative situations would evoke only one emotion, or a closely related cluster. Positive emotions initiate a broader range of thoughts and actions, so it is more likely that—for example—an experience of contentment could lead to thoughts about new challenges to take on, leading quickly to experiences of pride or excitement.

However, there is also evidence that our past research methods have been restrictive. Tong (2007) proposed new appraisal dimensions based on research on individual positive emotions, and found evidence of several higher-order dimensions—each associated with several discrete positive emotions—that made the positive emotions appear just as distinct from one another as the negative emotions. Whereas the negative emotions seem to be differentiated from each other by appraisals of threat, personal responsibility, and self-efficacy, the positive emotions require additional dimensions, such as interpersonal relationship, mastery, and spiritual experience. Similarly, Shiota, Keltner, and John (2006) found that the Big Five personality traits predict dispositions toward different positive emotions, beyond the well-documented association between extraversion and positive affect more generally. Thus recent results suggest that the antecedents, effects, and subjective dimensions of such emotions as contentment, compassion, and amusement are just as different as those of any negative emotions. Finally, individuals show different levels of ability in noting fine distinctions between emotions (lexithymia), with higher levels predicting lower correlations among the experiences of different positive emotions (Tugade, Fredrickson, & Barrett, 2004).

ISSUES IN THE STUDY OF POSITIVE EMOTIONS

Qualitatively Distinct from Negative Emotions

Historically, emotion research has focused on negative emotions. The most general reason is that psychology as a whole tends to focus on understanding and ameliorating psychological problems (Seligman & Csikszentmihalyi, 2000). Negative emotions—when extreme, prolonged, or contextually inappropriate—are implicated in many grave problems, including anxiety disorders, aggression and violence, eating disorders and self-injury, and depression and suicide. Medicine and health psychology have also focused on negative emotions, which contribute to problems ranging from sexual dysfunction to life-threatening immune disorders (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002). Although positive emotions can contribute to problems (e.g., mania, drug addiction), negative emotions are more prominent in psychopathology and thus have captured the majority of research attention. Studies of positive functioning and strengths have only recently begun to catch up, concomitantly raising interest in the contributions of positive emotions. We also argue later in the chapter that even the study of pathology has been hindered by overlooking positive emotions, which play a critical role in recovering from adversity and developing compensatory strengths.

The study of positive emotions has also suffered from the long-running effort to create a single, general theory of emotion. Such models are typically built with the more attention-grabbing negative emotions (e.g., fear and anger) as prototypes, with positive emotions squeezed in later. For instance, many theories of emotions associate each emotion with a *specific action tendency* (Frijda, 1986; Frijda, Kuipers, & Schure, 1989; Lazarus, 1991; Levenson, 1994; Oatley & Jenkins, 1996; Tooby & Cosmides, 1990). Fear, for example, is linked with the urge to escape, anger with the urge to attack, disgust with the urge to expel, and so on. No theorist argues that these are ir-

resistible compulsions, but rather that people's ideas about possible courses of action narrow in on a specific set of behavioral options. Often the specific action tendency is linked to the emotion's evolutionary adaptive value. Its action tendencies are presumed to incline people toward behaviors that helped get early humans out of life-or-death situations. Another key idea is that specific action tendencies and physiological changes go hand in hand: For example, when you feel fear your thoughts will tend toward escape, and your autonomic nervous system will change in ways that would help you run or climb.

Although specific action tendencies were invoked to describe the form and function of positive emotions as well, these tendencies were notably vague and underspecified (Fredrickson & Levenson, 1998). Joy, for instance, was linked with aimless activation, interest with attending, and contentment with inactivity (Frijda, 1986). These tendencies seem far too general to be called specific; nor do they present the same obvious adaptive value as negative emotions' action tendencies (Fredrickson, 1998). Although a few theorists noted that fitting positive emotions into emotion-general models posed problems (Ekman, 1992; Lazarus, 1991), this acknowledgment was not accompanied by any new or revised models to better accommodate the positive emotions. Instead, the difficulty of shoehorning the positive emotions into emotion-general models merely tended to marginalize them further. The prevailing models were successful for studying the negative emotions, so researchers pursued that work and often neglected the positive emotions—either because it was more difficult to make progress, or because the positive emotions challenged the validity of the model.

Challenging to Measure and Evoke

Another reason why positive emotions may have been featured in less past research is simply that they are harder to study. Negative emotions, as we have discussed, lead to a focus on a single, clear action tendency. In the lab, this translates into clear, reliable results. The results of positive emotions are more diffuse and generally less urgent, making them more difficult to operationalize or observe.

Empirical evidence from many areas of psychology (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001; Cacioppo, Gardner, & Berntson, 1999) and economics (Tversky & Kahneman, 1981) suggests that negative emotions command more attention than positive ones, and that negative events evoke a stronger response than positive events of the same magnitude. The observed health effects of prolonged negative emotions also contribute to the impression that negative emotions are more significant. In addition, psychologists have a wide range of established protocols for evoking fear, disgust, and anger, but fewer for evoking joy, contentment, or love.

Thus scientists who wish to study positive emotions face procedural difficulties, less obvious dependent variables, and smaller effect sizes. However, this should not be taken to mean that positive emotions are less important! Negative emotions appear strongly in the moment because they were sculpted by evolution to mobilize immediate action; positive emotions exert their power over the long term, and are critical to building a healthy and fruitful life (Fredrickson & Losada, 2005; Lyubomirsky et al., 2005). We will return to this asymmetry repeatedly: Negative emotions help us respond to a single, immediate threat; positive emotions help us take advantage of life's numerous opportunities.

Widely, but Not Universally, Appropriate

Some critics have suggested that researchers who study the benefits of positive emotions pathologize negative emotions, ignore situations where feeling good is inappropriate, or tacitly endorse an unsophisticated hedonism or a Pollyanna-like disregard for life's difficulties (Lazarus, 2003; see also Fineman, 2006). We recognize the critical role of negative emotions and their associated physiological responses in dealing with threatening situations, as well as in appropriately marking the emotional importance of serious losses. We also acknowledge that extremes of positive emotion can be disruptive, especially in high-performance states, which are often marked by an overall lack of self-focus (Csikszentmihalyi, 1990).

The emerging picture is not that people should experience high levels of positive emotion at all times and in all situations, or that positive emotions are a panacea for all of life's challenges. Rather, it appears beneficial for people to cultivate positive emotions as a general backdrop to their emotional lives, while still responding positively or negatively to emotionally meaningful events as they occur. It may

also be natural: Recall the evidence for a pervasive and cross-cultural "positivity offset" (Diener & Diener, 1996; Ito & Cacioppo, 1999), suggesting that people usually feel a little better than neutral. This is appropriate if they are usually in a position to amass resources, rather than responding to an immediate threat. Negative emotions help people achieve survival and short-term material ends, while positive emotions help them build toward a more widely construed "good life" (Ryff & Singer, 1998; Keyes & Haidt, 2003).

THE BROADEN-AND-BUILD THEORY OF POSITIVE EMOTIONS

The broaden-and-build theory (Fredrickson, 1998) arose from a desire to move beyond negative-emotion-based models of emotion, and capture the unique effects of positive emotions. Fredrickson's broaden-and-build theory of positive emotions holds that positive emotions *broaden* people's momentary thought–action repertoires and lead to actions that *build* enduring personal resources (Fredrickson, 1998, 2001).

The specific action tendencies described by traditional models are appropriate descriptions of the function of negative emotions: They are the outcomes of thought–action repertoires that *narrow* individuals' urges and perceived affordances so that they are likely to act in a specific way (e.g., escape, attack, expel). In a life-threatening situation, a narrowed thought–action repertoire promotes quick and decisive action that carries direct and immediate benefit.[2] The various negative emotions available to humans comprise the thought–action repertoires that worked best to save their ancestors' lives and limbs (or genes) in similar situations.

Positive emotions, in contrast, seldom occur in response to life-threatening situations. Thus there is less need for them to evoke specific, focused response tendencies. Instead, positive emotions lead to *broadened* and *more flexible* response tendencies, widening the array of the thoughts and actions that come to mind (Fredrickson, 1998). Joy, for instance, creates the urge to play, push the limits, and be creative—urges evident not only in social and physical behavior, but also in intellectual and artistic behavior. Interest, a phenomenologically distinct positive emotion, creates the urge to explore, take in new information and experiences, and expand the self in the process. Contentment, a third distinct positive emotion, creates the urge to sit back and savor current life circumstances, and to integrate these circumstances into new views of self and of the world. And love—which we view as an amalgam of distinct positive emotions (e.g., joy, interest, and contentment) experienced within contexts of safe, close relationships—creates recurring cycles of urges to play with, explore, and savor loved ones. The appraisal dimensions that are unique to positive emotions, such as interpersonal relationship, mastery, and spirituality (Tong, 2007), can also be seen as different domains in which various thought–action tendencies (to play, to explore, or to savor and integrate) broaden habitual modes of thinking or acting.

In contrast to negative emotions, which were shaped by evolution to provide direct and immediate adaptive benefits when survival is threatened, the broadened thought–action repertoires triggered by positive emotions evolved because of their indirect and long-term adaptive benefits. Broadening *builds* enduring personal resources.

Take play as an example. Specific forms of chasing play evident in juveniles of a species—such as running into a flexible sapling or branch and catapulting oneself in an unexpected direction—are reenacted in adults of that species exclusively during predator avoidance (Dolhinow, 1987). Such correspondences between juvenile play maneuvers and adult survival maneuvers suggest that juvenile play builds enduring physical resources (Boulton & Smith, 1992; Caro, 1988). Social play also builds enduring social resources. Laughter appears to function as a social signal of openness to new, friendly interactions (broadening), which can lead to lasting social bonds and attachments (building; Gervais & Wilson, 2005). Shared amusement and smiles have many of the same effects (Lee, 1983; Simons, McCluskey-Fawcett, & Papini, 1986; Keltner & Bonanno, 1997). Childhood play also builds enduring intellectual resources, by increasing levels of creativity (Sherrod & Singer, 1989) and fueling brain development (Panksepp, 1998). Similarly, the exploration prompted by the positive emotion of interest creates knowledge and intellectual complexity, and the savoring prompted by contentment produces self-insight and alters world views. So these phenomenologically distinct positive emotions all

share the feature of augmenting individuals' personal resources, ranging from physical and social resources to intellectual and psychological ones (for more detailed reviews, see Fredrickson, 1998, 2001; Fredrickson & Branigan, 2001).

Importantly, the personal resources accrued during states of positive emotions are durable. They outlast the transient emotional states that led to their acquisition. These resources can be drawn on in subsequent moments and in different emotional states. So through experiences of positive emotions, people *transform* themselves—becoming more creative, knowledgeable, resilient, socially integrated, and healthy individuals. Figure 48.1 represents these three sequential effects of positive emotions (broadening, building, transforming). It also suggests that initial experiences of positive emotions produce upward spirals toward further experiences of positive emotions—a point we have begun to investigate empirically (Fredrickson & Joiner, 2002; see the following section for more details).

In short, the broaden-and-build theory describes the form of positive emotions in terms of broadened thought–action repertoires, and describes their function in terms of building enduring personal resources. The theory explains the evolved adaptive significance of positive emotions. Those of our ancestors who succumbed to the urges sparked by positive emotions—to play, explore, and so on—would have by consequence accrued more personal resources. When these same ancestors later faced inevitable threats to life and limb, their greater personal resources would have translated into greater odds of survival, and in turn greater odds of living long enough to reproduce. To the extent that the capacity to experience positive emotions is innate and heritable, natural selection would have driven it to become a basic trait shared by our entire species (for early evidence that the broaden effect of positive emotions is indeed cross-cultural, see Waugh, Hejmadi, Otake, & Fredrickson, 2006).

SHORT-TERM AND LONG-TERM EFFECTS OF POSITIVE EMOTIONS

Our empirical investigation of the broaden-and-build theory has rested on two hypotheses: the "broaden hypothesis," which targets the ways people change while experiencing a positive emotion, and the "build hypothesis," which targets the lasting changes that follow repeated positive emotional experiences over time.

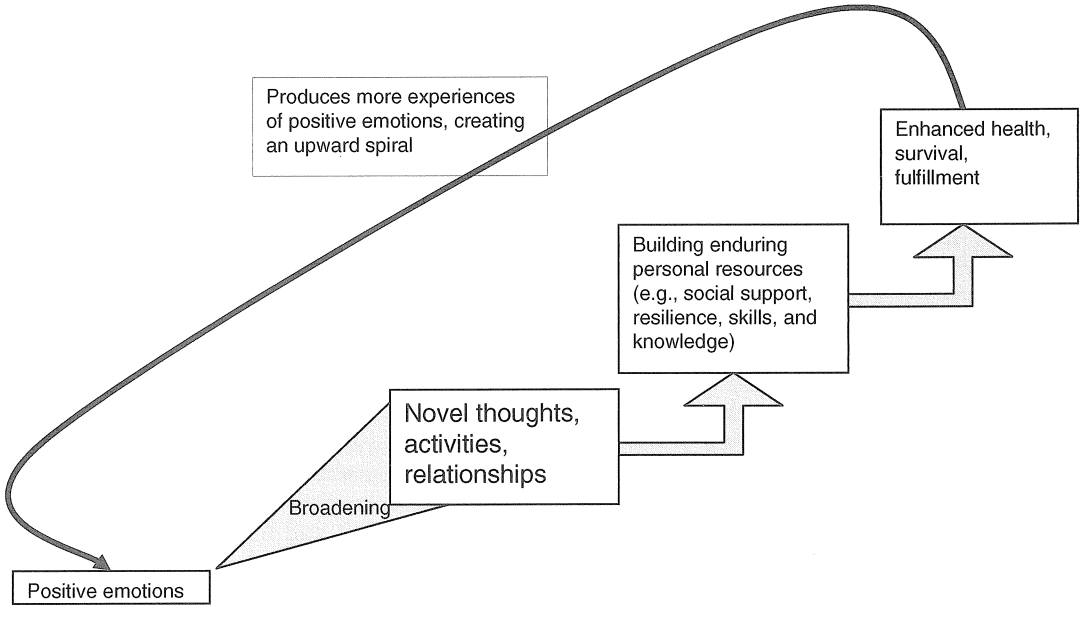

FIGURE 48.1. The broaden-and-build theory of positive emotions.

The Broaden Hypothesis

The first central claim of the broaden-and-build theory is that experiences of positive emotions broaden a person's momentary thought–action repertoire. We call this the "broaden hypothesis," and have found evidence for it across a range of domains, from visual attention to self-construal and social group perception.

Visual Attention

The most cognitively basic form of broadening we have examined appears in global–local visual processing tasks. Participants are asked to make a choice about a figure that can be judged on the basis of either its global, overall shape or its local detail elements (see Figure 48.2a for an example). Positive emotions, with their broadened focus, produce a preference for the global level, whereas negative emotions often produce a preference for the details. This pattern holds both for emotionally relevant traits like optimism and anxiety (Basso, Schefft, Ris, & Dember, 1996), and for emotional states induced through a variety of means (Brandt, Derryberry, & Reed, 1992, cited in Derryberry & Tucker, 1994; Fredrickson & Branigan, 2005; Johnson & Fredrickson, 2005). Wadlinger and Isacowitz (2006) tracked participants' eye movements, and found that induced positive emotion broadened visual search patterns, leading to increased attention to peripheral stimuli.

Our lab's work with the global–local visual processing paradigm was the first to introduce a neutral control condition, and to demonstrate that positive emotions broaden attention relative to a nonemotional baseline (Fredrickson & Branigan, 2005). We also tested distinct emotions in each valence type (e.g., contentment and joy; anxiety and anger), to build the case that the broaden effect was linked to positive emotions in general, and not to arousal level or another specific property of the emotions tested.

Cognition and Behavior

Emotions affect both the focus and the process of cognition, and many long-standing findings on the effects of positive affect on cognition and behavior are consistent with the broaden hypothesis. For instance, Isen and colleagues tested the effects of positive states on a wide range of cognitive outcomes, ranging from creativity puzzles to simulations of complex, life-or-death work situations (Estrada, Isen, & Young, 1997). Their work demonstrates that positive emotions produce patterns of thought that are notably unusual (Isen, Johnson, Mertz, & Robinson, 1985), flexible and inclusive (Isen & Daubman, 1984), creative (Isen, Daubman, & Nowicki, 1987), and receptive to new information (Estrada et al., 1997). Confirming an interpretation of these results in terms of the broaden effect, Rowe, Hirsch, and Anderson (2007) replicated Isen et al.'s (1987) findings of improved performance on the verbal Remote Associates Test (Figure 48.2b), and found that this improvement was correlated with *decreased* performance on a visual task that required participants to ignore peripheral cues (i.e., a task that required attentional narrowing).

In the domain of more personally relevant behavior, we (Fredrickson & Branigan, 2005) induced positive, negative, or no emotions, and asked participants to step away from the specifics of the induction and list all the things they felt like doing. Participants induced to feel positive emotions listed *more* and *more varied* potential actions, relative to the neutral group; participants induced to feel negative emotions listed fewer potential actions than the neutral group. Similar research has shown that positive emotions produce more creative (Isen et al., 1987) and variable (Kahn & Isen, 1993) actions. (See also Isen, Chapter 34, this volume.)

Another perspective on positive affect and cognition comes from the mood-as-information theorists. Their view resembles the broaden hypothesis in suggesting that positive emotions lead to creative, unusual, or integrative thinking, but it differs in predicting a concomitant reduction in attention to detail and negative feedback, sometimes leading to an overreliance on heuristics or stereotypes. There is substantial empirical support for this view (for a review, see the volume by Martin & Clore, 2001). However, other work suggests that people in positive emotional states are *more* likely to incorporate challenging evidence (Trope & Pomerantz, 1998) and carefully consider difficult problems (for reviews, see Aspinwall, 1998, and Abele, 1992; see also the work by Isen et al. cited above).

It is unlikely that either of these bodies of evidence is entirely spurious, or that either the mood-as-information or the mood-as-resource model will be entirely disproven by future evi-

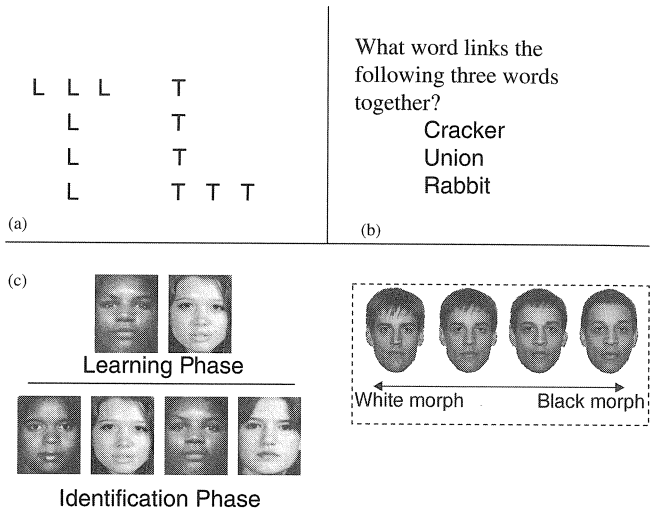

FIGURE 48.2. Three forms of broadened attention. (a) The participant is instructed to find the letter T as quickly as possible. It is present in both figures, but finding the first is facilitated by a broadened visual focus, while finding the second is facilitated by a narrowed (detail-oriented) focus (Johnson, 2005; Fredrickson & Branigan, 2005). (b) In this item from the Remote Associates Test, the participant is asked to find a word that ties the three stimulus words together. Participants are more likely to find the answer ("jack") when experiencing a positive emotion (Isen, Daubman, & Nowicki, 1987). (c) White individuals are typically *poor* at distinguishing one black face from another (solid box) and *good* at determining where a morphed series crosses from "more white" to "more black." Positive emotions improve face recognition (Johnson & Fredrickson, 2005) and impair racial categorization (Johnson, 2005).

dence. The broaden-and-build model as it currently stands is not specific enough to offer a priori guidance: The general term "broadening" could apply to either vague, heuristic thinking or thorough, nondefensive exploration, and little has been done to reconcile these opposing interpretations. What work there is suggests that *flexibility* and *openness* are important attributes of positive emotions' cognitive effects (Dreisbach & Goschke, 2004; Bless et al., 1996). Properties of the particular situation may well determine whether these attributes are beneficial or harmful. We are continuing this work, considering variables such as method of emotion induction, level of intrinsic motivation, social and personal relevance, and amount of mental set switching involved, to determine when the thought–action tendencies associated with positive emotions are beneficial to problem solving and when they are detrimental.

Social Cognition

Broadening in the social domain takes the form of enhanced attention to others and reduced distinctions between self and other, or between different groups. Participants experiencing positive emotions report more overlap between their concept of themselves and their concept of their best friend (Waugh & Fredrickson, 2006; Waugh et al., 2006), and they become more imaginative and attentive regarding things they could do for friends, relative to things friends could do for them (Otake, Waugh, & Fredrickson, 2007). When a close relationship does not yet exist, induced positive emotions can increase trust (Dunn & Schweitzer, 2005), and may underlie the creation of a wide variety of bonds and interdependence opportunities (Cohn & Fredrickson, 2006; Gable, Reis, Impett, & Asher, 2004).

Positive emotions also broaden social group concepts and break down an essentialized sense of "us versus them" (Dovidio, Gaertner, Isen, Rust, & Guerra, 1995). We have discovered the same result in a racial context: When we induce positive emotions in participants, people become better at remembering the faces of individuals of other races,[3] and simultaneously *worse* at perceiving physical differences between races (Figure 48.2c) (Johnson, 2005; Johnson & Fredrickson, 2005).

The studies we have discussed demonstrate variety in the broaden effect, but more impor-

tantly, the outcomes they involve can make a substantive difference in how people act. These changes can then lead to differences in their circumstances, abilities, resources, and relationships in the future. In other words, these *broadened* mindsets can lead people to *build* enduring resources.

The Build Hypothesis

The second central claim of the broaden-and-build theory is that *temporary and transient* experiences of positive emotions, by encouraging a broadened range of actions, over time build *enduring* personal resources. It is now established that positive emotions function as causes, results, and concomitants of success in life. A large meta-analysis by Lyubomirsky et al. (2005) reviews the links between positive affect and outcomes ranging from satisfaction at work and in relationships, to physical health and effective problem solving. We refer interested readers to their excellent review for specifics. In this section we review a selection of research that helps fill in the missing pieces necessary to test our overarching model: that positive emotions lead to broader thought–action repertoires, and that these broadened mindsets enable people to build resources over time.

Correlational and experimental studies of humans and animals help us link positive traits, positive states, and behaviors linked with positive states (e.g., play) to increases in physical, intellectual, and social resources. As previously mentioned, ethologists who have observed nonhuman mammals have associated juvenile play with the development of specific survival maneuvers evident in both predator avoidance and aggressive fighting (Boulton & Smith, 1992; Caro, 1988), suggesting that play builds enduring physical resources. In laboratory experiments, rats deprived of juvenile social play were slower to learn a complex motor task than nondeprived controls were (Einon, Morgan, & Kibbler, 1978).

Evidence suggesting that positive emotions build intellectual resources can be drawn from studies on individual differences in attachment styles. Securely attached children—those who experience the most consistent caregiver love—are more persistent, flexible, and resourceful problem solvers than their peers (Arend, Gove, & Sroufe, 1979; Matas, Arend, & Sroufe, 1978). They also engage in more independent exploration of novel places, and, as a consequence, develop superior cognitive maps of those spaces (Hazen & Durrett, 1982). The intellectual resources associated with secure attachment also appear to last into adulthood. Securely attached adults are more curious and open to information than their insecurely attached peers (Mikulincer, 1997). Experiments with children ranging from preschool to high school age reinforce the claim that positive emotions build intellectual resources by showing that induced positive states—in comparison to neutral and negative states—produce faster learning and improved intellectual performance (Bryan & Bryan, 1991; Bryan, Mathur, & Sullivan, 1996; Masters, Barden, & Ford, 1979). Finally, correlational studies with both humans and nonhuman mammals suggest that social play builds enduring social relationships (Boulton & Smith, 1992; Lee, 1983; Martineau, 1972). Research from our lab has shown that positive emotions, experienced over the course of a month, predict whether a new acquaintance becomes a friend (Waugh & Fredrickson, 2006). Mutually supportive social relationships in turn predict longevity (Brown, Nesse, & Vinokur, 2003), and in times of need they can directly influence survival.

In a direct test of the build hypothesis, we randomly assigned working adults to an intervention to increase daily experiences of positive emotions over the course of 8 weeks. Participants in the experimental group were trained in loving-kindness meditation—a practice that is similar to mindfulness meditation (Davidson et al., 2003; Kabat-Zinn, 2005), but that focuses on deliberately generating broadened mindsets and the positive emotions of compassion and love. They were compared to those assigned to a wait list for the same meditation workshop. All participants in this study reported daily on their experience of several discrete positive and negative emotions, and filled out pre- and postintervention batteries to assess psychological, social, mental, and physical resources, plus their life satisfaction.

After 3 weeks of practice, participants in the meditation group began experiencing higher daily levels of various positive emotions than those in the wait-list control group. After 8 weeks, these participants also showed increases in a number of personal resources, including physical wellness, agency for achieving important goals, ability to savor positive experiences, and quality of close relationships. These gains were mediated by increased positive emotion.

Finally, meditators showed an increase relative to the control group in life satisfaction, and this gain was mediated by the increase in resources (see Figure 48.3). These results provide strong and specific evidence for the build hypothesis: Positive emotions led people to build a variety of important resources, and these resources proved valuable in increasing their life satisfaction and functioning in general (Fredrickson, Cohn, Coffey, Pek, & Finkel, 2008).

Positive Emotions and Stress

Researchers have also examined the ways in which positive emotions affect coping with chronic stressors. Prolonged negative situations such as bereavement or joblessness evoke negative emotions, but cannot be solved by the kind of immediate, narrowly defined action that negative emotions encourage. Consistent with this view, studies have shown that people who experienced some level of positive emotions during bereavement (alongside their negative emotions) showed greater psychological well-being a year or more later, and that this occurred partly because positive emotions were associated with the ability to take a longer view and develop plans and goals for the future (Stein, Folkman, Trabasso, & Richards, 1997; Moskowitz, Folkman, & Acree, 2003). Similarly, we performed a longitudinal assessment of college students' emotions and mental health before and after the terrorists attacks of September 11, 2001 (Fredrickson, Tugade, Waugh, & Larkin, 2003). We found that precrisis trait resilience predicted psychological growth and reduced risk of depression, but that this difference was fully mediated by experiences of positive emotion in the wake of the attacks. Resilient participants fared better, and this was because they were more likely than nonresilient participants to experience positive emotions. Resilient participants were not devoid of negative emotions—they felt fear and grief, much as their less resilient peers did—but finding occasional opportunities to feel positive emotions seems to have alleviated some of the negative effects of a prolonged narrowed mindset. It may be difficult to find positive emotions that are fully appropriate while in a prolonged negative situation; perhaps this is why people who can feel a wider variety of finely differentiated positive emotions show greater psychological resilience (Tugade, Fredrickson, & Barrett, 2004).

These results contradict common-sense criticisms that positive emotions are unhelpful or inappropriate for people in negative circumstances: Even adults dealing with suicidal thoughts (Joiner, Pettit, Perez, & Burns, 2001) or disclosure of childhood sexual abuse (Bonanno et al., 2002) showed better coping when some degree of positivity accompanied their painful feelings. In a longitudinal study of college students coping with ordinary life problems (Fredrickson & Joiner, 2002), we found that state positive emotions correlated with the use of creative and broad-minded coping strategies, and that use of these strategies in turn predicted increased positive emotions 5 weeks

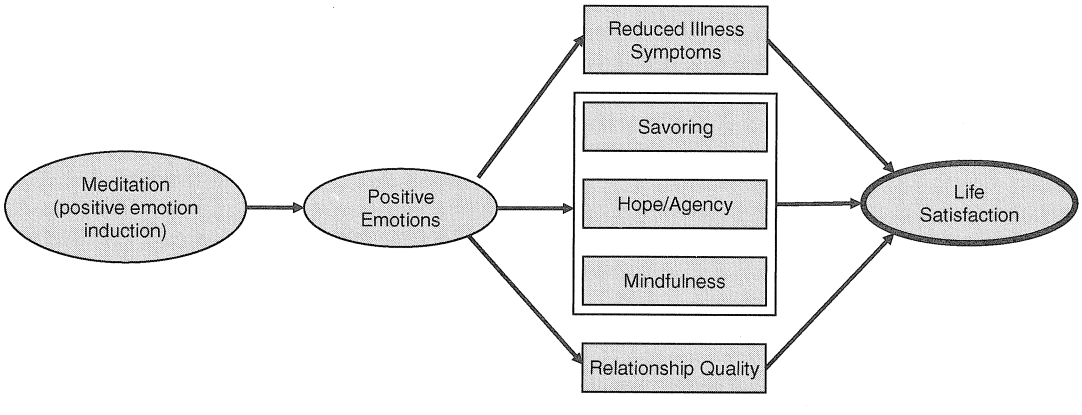

FIGURE 48.3. Results from a positive emotions intervention study. The intervention increased daily positive emotions, which led to building physical resources (top box), psychological resources (middle box), and social resources (bottom box). Resource building, in turn, led to increased life satisfaction.

later (above and beyond initial level of positive emotion).

The literature on depression has long documented a downward spiral in which depressed mood and the narrowed, pessimistic thinking it engenders feed into one another, leading to ever-worsening moods and even clinical levels of depression (Peterson & Seligman, 1984). The findings we have reviewed suggest that positive emotions can disrupt the spiral, and in some cases even initiate a comparable upward spiral: Positive emotions make people feel good in the present moment, which broadens their mindsets, which allows them to build resources that increase their likelihood of feeling good in the future. The upward spiral effect is represented by the feedback loop in Figure 48.1.

Positive Emotions and Health

One of the newest frontiers in positive emotions research is evidence linking positive emotions to physiology. People who experience high levels of positive emotions tend to experience less pain and disability related to chronic health conditions (Gil et al., 2004), to fight off illness and disease more successfully (Cohen & Pressman, 2006; Ong & Allaire, 2005), and even to live longer (Danner et al., 2001; Levy et al., 2002; Moskowitz, 2003; Ostir et al., 2000). We believe that these findings may be explained by the ability of positive emotions to lift people out of stressed, narrowed states. It is already established that the physiological changes accompanying negative emotions are beneficial for decisive, short-term action, but detrimental to long-term health. If biochemicals such as cortisol and epinephrine remain elevated for too long, they can lead to physical deterioration and immune dysregulation (Sapolsky, 1999). In line with this, individuals whose biological stress markers take longer to return to baseline following a stressor show poorer health than those who return to baseline quickly (McEwen & Seeman, 1999). Thus we have explored whether positive emotions play a role in physiological as well as psychological well-being.

The basic observation that positive and negative emotions (or key components of them) are to some extent incompatible has a long lineage in work on anxiety disorders (e.g., systematic desensitization—Wolpe, 1958), motivation (e.g., opponent-process theory; Solomon & Corbit, 1974), and aggression (e.g., the principle of incompatible responses; Baron, 1976).[4] Even so, the mechanism ultimately responsible for this incompatibility has not been adequately identified. The broaden effect may turn out to be the mechanism. Negative emotions are linked to preparation for a specific action, and if a positive emotion dissipates that focus, then the negative emotion loses its hold.

Because negative emotions were shaped by evolution to deal with pressing threats, we would not expect them to be easily neutralized; this may be the basis for the "bad-is-stronger-than-good" effect referenced earlier (Baumeister et al., 2001; Rozin & Royzman, 2001; Tversky & Kahneman, 1981). Instead, we have hypothesized that the "undo effect" may function when the threat is no longer apparent, but the narrowed focus and biochemical response to threat nonetheless linger.

Our laboratory has tested this by first inducing a high-arousal negative emotion in all participants, removing the negative stimulus, and then immediately inducing a randomly assigned emotion by showing a short, emotionally evocative film clip. Participants in the two positive emotion conditions (mild joy and contentment) exhibited faster cardiovascular recovery than those in the neutral control condition, who recovered more quickly than those in the sadness condition (Fredrickson, Mancuso, Branigan, & Tugade, 2000, Study 1; see also Fredrickson & Levenson, 1998). When participants viewed the positive films without a preceding stressor, they had no cardiovascular effects of any kind (Fredrickson et al., 2000, Study 2). In other words, the positive and neutral films did not differ in what they *did* to the cardiovascular system, but they differed in what they could *undo* within this system.

In subsequent work, we discovered that self-reported levels of psychological resilience (Block & Kremen, 1996) correlate with speed of cardiovascular recovery, and that this relationship is mediated by self-generated levels of positive emotions during recovery (Tugade & Fredrickson, 2004). Resilient individuals seem to be experts at harnessing the undo effect of positive emotions on their own.

We take these laboratory experiments as a microcosm for the influence of emotions on coping, and of coping on health. Imagine that some individuals typically seek positive emotions to help them bounce back quickly from life's stressors, while others spend more time remaining physiologically activated and prepared

to react, even after the threat is gone. Over time, the latter group will accumulate more physiological wear and tear, and will be more vulnerable to a wide range of stress-related illnesses (McEwen & Seeman, 1999; Kiecolt-Glaser et al., 2002). Whether the undo effect of positive emotions factors into long-term health in this way is a challenging but deeply important question for future research.

DIRECTIONS FOR FUTURE RESEARCH

There is growing evidence that the broaden-and-build theory describes the most basic form and function of positive emotions, but there is also much yet to learn. In this section, we describe some critical directions for future research.

Physiological and Neurological Connections

We are eager to see empirical findings on positive emotions embedded in a broader physiological context. We know that positive emotions such as liking and intimacy can lead to closer relationships (Waugh & Fredrickson, 2006; Aron, Normal, Aron, McKenna, & Heyman, 2000). Recent work suggests that these emotions are linked to heightened levels of the hormones oxytocin (Zak, Kurzban, & Matzner, 2005; Gonzaga, Turner, Keltner, Campos, & Altemus, 2006) and progesterone (Schultheiss, Wirth, & Stanton, 2004), and that exogenous oxytocin can induce positive social feelings (Kosfelt, Heinrichs, & Zak, 2005). Further research on this relationship will allow us to bring the human research on relationship formation and the predominantly nonhuman research on hormone release and behavior to bear on each other, and to expand our understanding of the antecedents and consequences of relationship-relevant emotions.

The broaden effect is also amenable to physiological exploration. A review by Ashby, Isen, and Turken (1999) suggests that the broaden effect may be associated with release of mesolimbic dopamine, which enhances cognitive flexibility, set switching, and proactive curiosity. Notably, this is the same neurological system Berridge and Robinson (2003) associate with the motivational component of positive affect. It is also the mesolimbic dopamine system that is impaired by older antipsychotic drugs, which lead to notable cognitive narrowing and rigidity (Berger et al., 1989). There is no doubt that the neurological substrate of the broaden effect will turn out to be more complex than a single neurotransmitter or neuronal system, but Ashby et al.'s observations help pave the way for future investigation.

Scattered results linking neurology and positive emotional effects are emerging in other areas. Haidt (2005) has early but suggestive evidence linking elevation and other moral emotions to changes in vagal tone. Results from neuroimaging studies demonstrate heightened left-hemispheric activation both in persons experiencing short-term positive emotions, and tonically in individuals with higher trait positive emotionality (Davidson, 2004). Our work on the undo effect (Fredrickson & Levenson, 1998; Fredrickson et al., 2000) demonstrates that positive emotions can reduce the duration of cardiovascular response evoked by a stressor. We are currently undertaking work to examine relationships between psychophysiological measures and meditation outcomes, and among positive emotions, affiliation-related hormones, and relationship formation.

Interventions

Our loving-kindness meditation intervention was the first to investigate the effects of positive emotions in light of the broaden-and-build theory, but other investigators have also found ways to create relatively lasting increases in positive emotions. Emmons and McCullough (2003) designed an intervention based on counting blessings; Sheldon and Lyubomirsky (2006) combined counting blessings with visualizing one's best possible self; and Seligman, Steen, and Park (2005) had participants count blessings, express gratitude, and practice using their signature strengths. Practitioners of cognitive-behavioral therapy also have a stable of techniques for generating positive emotions (Beck, 1995), although these are usually tested only among depressed individuals.

These early efforts might best be seen as proof of the concepts that positive emotions can be reliably evoked and that they have significant effects beyond momentary hedonic satisfaction. Next, positive emotion interventions need to become more mature: We can determine how best to deliver them, which interventions function for different populations, and

how to maximize their effectiveness while minimizing their cost and time commitment. Also, larger studies could test long-term health outcomes, relationships with others, and school or work outcomes, in addition to the personal outcomes already investigated. Unlike interventions that focus on specific problems and therefore address only a specific group of people (e.g., those with depression, drug dependence, or extreme aggression), interventions that teach how to generate positive emotions could be of value to nearly anyone, in any situation. Therefore, they pose a wider variety of theoretical challenges, and possibly offer greater potential benefits as well.

Properties of Specific Emotions

So far, the empirical evidence suggests that the broaden effect is common to many positive emotions, and may describe their most general shared effect on cognition and attention. However, different positive emotions should also have distinct thought–action repertoires, subjective components, and physiological effects. For example, Tiedens and Linton (2001) compared the cognitive effects of contentment and pleasant surprise along a certainty–uncertainty continuum, and Gonzaga et al. (2006) studied cognitive, behavioral, and biological distinctions among romantic love, friendship, and sexual desire. Tong (2007) found that distinguishing different positive emotions may require attention to dimensions of experience that we have not previously thought of as inherent to emotion, such as social connection and spiritual experience.

However, most work on discrete positive emotions remains inconclusive (Barrett, 2006). We have suggested, for example, that joy is designed to encourage physical play and exploration, and so has a physiological arousal component (Fredrickson, 1998). Gratitude seems to encourage reflection and reconceptualization of one's experiences, targeted toward encouraging reciprocal behavior in the future (McCullough, Kilpatrick, Emmons, & Larson, 2001; Bartlett & DeSteno, 2006), and may differ from the related negative emotion of indebtedness by involving more insight into the perspective and desires of the benefactor (F. Flynn, personal communication, April 2006; Fredrickson, 2004). Keltner and Haidt (2003) suggest that awe functions to facilitate a Piagetian process of "accommodation," in which our mental structures enlarge to incorporate an important and wholly new experience; Haidt (2003) has suggested that there is a phenomenologically distinct and generally recognized emotion called "elevation," which causes people to attend to and emulate other people who show skillful or morally excellent behavior (i.e., people broaden their self-concept to incorporate the others' good example). Empirical tests of these proposals are not difficult to imagine, and at present the field is wide open for exploration.

Models

The broaden-and-build theory provides a description of the short-term effects of positive emotions and a plausible mechanism for long-term growth, but at a very general level. There is much more to learn about how the broaden effect works and what it does in specific situations. How does a broad mindset affect perceived familiarity with and interest in a new relationship partner? In a learning situation, is it likely to increase interest in the topic at hand, or increase the tendency to switch between topics? In what situations does it lead to use of heuristics versus careful processing?

Similarly, the build effect is difficult to observe directly. We have demonstrated that positive emotions lead people to build personal resources, but what specific actions lead to this growth? What situational or personal characteristics beyond positive emotions encourage behavior that leads to new resources? Because positive emotions encourage novel, divergent behavior that leads to long-term benefits, we may find that traditional methods based on a single manipulation and a single, clear outcome are inadequate to capture all their effects. Instead, we may need analytical methods that take into account individuals' specific resources, their adaptation to their situation, and the opportunities they can detect in their environment. Our lab has collaborated with Marcial Losada, who has used nonlinear dynamic models (similar to those used to analyze highly complex systems, such as weather and stock market fluctuations) to represent moment-by-moment interactions within high- and low-performing business teams. People experiencing positive emotions and teams achieving high performance show patterns characteristic of complex, multiply determined systems, whereas people experiencing fewer positive emotions and teams with lower performance

are characterized by less complex, more predictable patterns (Schuldberg & Gottlieb, 2002; Losada & Heaphy, 2004). Our analysis suggests that the shift to novel behavior and resource building may begin precipitously when the ratio between positive and negative emotions exceeds a critical threshold of about 3:1 (Fredrickson & Losada, 2005), and early evidence supports this view (Cohn et al., 2007; Waugh & Fredrickson, 2006). Using these methods, we may be able to look more closely at the dynamics of resource building within a single observation session, or to recognize the course that the build effect takes over time, even when we are limited to a few discrete assessments within a longitudinal study.

Limitations of Positive Emotions

Most of the research we have surveyed discusses benefits of positive emotions, but a full scientific understanding should include pitfalls and boundary conditions of these benefits. For example, although more securely attached infants show faster cognitive development, insecure attachment may be an appropriate response to threatening or unreliable family circumstances. Positive emotions help undo the lingering cardiovascular effects of stressors, but people in particularly dangerous circumstances may have good reason to remain ready to act, even when a threat appears to be gone. Additionally, there is some suggestion that extremely high levels of positive emotions, untempered by sufficient negative emotions, can degrade performance (Diener, 2004; Fredrickson & Losada, 2005). We would like to develop a nuanced understanding of when positive emotions can help resolve a negative situation (as in Stein et al., 1997; Moskowitz et al., 2003; Fredrickson et al., 2003), and when they might be dangerous, excessive, or unacceptably costly.

Regardless of these caveats, we believe that there is good reason to celebrate and encourage positive emotions. Research on critical ratios of positivity to negativity (Fredrickson & Losada, 2005; Gottman, 1994) suggests that nearly all individuals and groups have low ratios. There are important questions about when and how to experience positive emotions, and which emotions are appropriate in different situations—but few of us are fortunate enough to have the problem of simply experiencing too much joy, interest, contentment, and love.

CONCLUSION

At the most general level, the broaden-and-build theory offers three new avenues for exploration:

1. For researchers on positive emotions, it provides an empirical framework for investigating the dynamics of such emotions and more clearly specifying their effects. Whether the theory is corroborated "as is" or whether it undergoes substantial changes, it is currently the best starting point for learning more.
2. For emotion theorists, the broaden-and-build theory suggests that the action tendencies model be expanded to include not just the narrowed repertoires associated with negative emotions, but also the broadened, less predictable repertoires associated with positive emotions. Psychology's understanding of emotion will be hampered if we deal exclusively with resource-consuming emotions that operate in a short time frame, and not with resource-building emotions that show their adaptive effects over longer periods.
3. Finally, the broaden-and-build theory suggests that positive emotions are fruitful targets for basic and applied research in any field that deals with personal growth, change, learning, social coordination, or physical health. As we have seen, positive emotions are more than just desirable endpoints; they also affect a wide variety of cognitive, social, and biological processes, and can help people to build a variety of personal resources. Right now we have a basic scheme for learning more about how positive emotions work and how they affect other areas of life; we look forward to broadening and building on it as research continues.

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NOTES

1. The PANAS was formerly the Positive and Negative *Affect* Schedule. The authors renamed it to indicate that it actually measures valence mostly for high-activation states (Watson et al., 1999).
2. Note that a life-saving response need not involve action per se. For example, evolutionary research sug-

gests that sadness may be adaptive because it *prevents* action, thus conserving resources at times when prospects are so poor that no available action would be worth the risk and/or calories it requires (Keller & Nesse, 2005).

3. There is strong evidence that face recognition typically relies on a holistic (broad) representation of the face, and that impaired other-race face recognition results partly from a focus on narrowly construed racial features (Johnson & Fredrickson, 2005).
4. We previously reviewed studies in which frightened or grieving individuals reported both positive and negative emotions. The incompatibility of positive and negative emotions relates to feelings in a single moment, whereas the participants in bereavement studies were surveyed about their emotions over a long period of time, which can encompass many individual episodes of different emotions.

REFERENCES

Abele, A. (1992). Positive versus negative mood influences on problem solving. *Polish Psychological Bulletin, 23*, 187–202.

Arend, R., Gove, F. L., & Sroufe, L. A. (1979). Continuity of individual adaptation from infancy to kindergarten: A predictive study of ego-resiliency and curiosity in preschoolers. *Child Development, 50*, 950–959.

Aron, A., Norman, C. C., Aron, E. N., McKenna, C., & Heyman, R. (2000). Couples shared participation in novel and arousing activities and experienced relationship quality. *Journal of Personality and Social Psychology, 78*, 273–283.

Ashby, F. G., Isen, A. M., & Turken, U. (1999). A neuropsychological theory of positive affect and its influence on cognition. *Psychological Review, 106*, 529–550.

Aspinwall, L. (1998). Rethinking the role of positive affect in self-regulation. *Motivation and Emotion, 22*(1), 1–32.

Baron, R. A. (1976). The reduction of human aggression: A field study of the influence of incompatible reactions. *Journal of Applied Social Psychology, 6*, 260–274.

Barrett, L. F. (2006). Emotions as natural kinds? *Perspectives on Psychological Science, 1*, 28–58.

Barrett, L. F., Gross, J., Christensen, T. C., & Benvenuto, M. (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*, 713–724.

Bartlett, M. Y., & Desteno, D. (2006). Gratitude and prosocial behavior: Helping when it costs you. *Psychological Science, 17*, 319–325.

Basso, M. R., Schefft, B. K., Ris, M. D., & Dember, W. N. (1996). Mood and global–local visual processing. *Journal of the International Neuropsychological Society, 2*, 249–255.

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology, 5*, 323–370.

Beck, J. S. (1995). *Cognitive therapy: Basics and beyond.* New York: Guilford Press.

Berger, H. J. C., van Hoof J. J. M., van Spaendonck, K. P. M., Horstink, M. W. I., van den Bercken, J. H. L., Jaspers, R., et al. (1989). Haloperidol and cognitive shifting. *Neuropsychologia, 27*, 629–639.

Berridge, K. C., & Robinson, T. E. (2003). Parsing reward. *Trends in Neuroscience, 26*, 507–513.

Bless, H., Clore, G., Schwarz, N., Golisano, V., Rabe, C., & Wölk, M. (1996). Mood and the use of scripts: Does a happy mood really lead to mindlessness? *Journal of Personality and Social Psychology, 71*(4), 665–679.

Block, J., & Kremen, A. M. (1996). IQ and ego-resilience: Conceptual and empirical connections and separateness. *Journal of Personality and Social Psychology, 70*, 349–361.

Bonanno, G. A., Keltner, D., Noll, J. G., Putnam, F. W., Trickett, P. K., LeJune, J., et al. (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*, 94–110.

Boulton, M. J., & Smith, P. K. (1992). The social nature of play fighting and play chasing: Mechanisms and strategies underlying cooperation and compromise. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 429–444). New York: Oxford University Press.

Brown, S. L., Nesse, R. M., Vinokur, A. D., & Smith, D. M. (2003). Providing social support may be more beneficial than receiving it: Results from a prospective study of mortality. *Psychological Science, 14*, 320–327.

Bryan, T., & Bryan, J. (1991). Positive mood and math performance. *Journal of Learning Disabilities, 24*, 490–494.

Bryan, T., Mathur, S., & Sullivan, K. (1996). The impact of positive mood on learning. *Learning Disabilities Quarterly, 19*, 153–162.

Cabanac, M. (1971). Physiological role of pleasure. *Science, 173*, 1103–1107.

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology, 76*, 839–855.

Cacioppo, J. T., Priester, J. R., & Berntson, G. G. (1993). Rudimentary determinants of attitudes: II. Arm flexion and extension have differential effects on attitudes. *Journal of Personality and Social Psychology, 65*, 5–17.

Caro, T. M. (1988). Adaptive significance of play: Are we getting closer? *Tree, 3*, 50–54.

Carver, C. S. (2003). Pleasure as a sign you can attend to

something else: Placing positive feelings within a general model of affect. *Cognition and Emotion, 17*, 241–261.

Carver, C. S., & Scheier, M. F. (1990). Origins and functions of positive and negative affect: A control-process view. *Psychological Review, 97*, 19–35.

Chen, M., & Bargh, J. (1999). Consequences of automatic evaluation: Immediate behavioral dispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25*(2) 215–224.

Clore, G. L. (1994). Why emotions are felt. In P. Ekman & R. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 103–111). New York: Oxford University Press.

Cohen, S., Doyle, W. J., & Turner, R. B. (2003). Emotional style and susceptibility to the common cold. *Psychosomatic Medicine, 65*, 652–657.

Cohen, S., & Pressman, S. D. (2006). Positive affect and health. *Current Directions in Psychological Science, 15*, 122–125.

Cohn, M. A., & Fredrickson, B. L. (2006). Beyond the moment, beyond the self: Shared ground between selective investment theory and the broaden-and-build theory of positive emotion. *Psychological Inquiry, 17*, 39–44.

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. (2007). *Happiness unpacked: Positive emotions increase life satisfaction by building resilience*. Manuscript in preparation.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.

Csikszentmihalyi, M., & Csikszentmihalyi, I. (2006). *A life worth living: Contributions to positive psychology*. New York: Oxford University Press.

Danner, D., Snowdon, D. A., & Friesen, W. V. (2001). Positive emotions in early life and longevity: Findings from the nun study. *Journal of Personality and Social Psychology, 80*, 804–813.

Davidson, R. J. (1993). The neuropsychology of emotion and affective style. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 143–154). New York: Guilford Press.

Davidson, R. J. (2004). What does the prefrontal cortex 'do' in affect?: Perspectives on frontal EEG asymmetry research. *Biological Psychiatry, 67*, 219–233.

Davidson, R. J., Kabat-Zinn, J., Schumacher, J., Rosenkrantz, M., Muller, D., Santorelli, S. F., et al. (2003). Alterations in brain and immune function produced by mindfulness meditation. *Psychosomatic Medicine, 65*, 564–570.

Derryberry, D., & Tucker, D. M. (1994). Motivating the focus of attention. In P. M. Niedenthal & S. Kitayama (Eds.), *The heart's eye: Emotional influences in perception and attention* (pp. 167–196). San Diego, CA: Academic Press.

Diener, E. (2004, February). "Was Pollyanna right? Determining when positive affect will be beneficial." Talk presented at the meeting of the Society for Personality and Social Psychology, Austin TX.

Diener, E., & Diener, C. (1996). Most people are happy. *Psychological Science, 7*, 181–185.

Diener, E., & Seligman, M. E. P. (2004). Beyond money: Toward an economy of well-being. *Psychological Science in the Public Interest, 5*, 1–31.

Dolhinow, P. J. (1987). At play in the fields. In H. Topoff (Ed.), *The natural history reader in animal behavior* (pp. 229–237). New York: Columbia University Press.

Dovidio, J., Gaertner, S., Isen, A., Rust, M., & Guerra, P. (1995). Positive affect and the reduction of intergroup bias. In C. Sedikides, J. Schopler, & C. A. Insko (Eds.), *Intergroup cognition and intergroup behavior* (pp. 337–366). Mahwah, NJ: Erlbaum.

Dreisbach, G., & Goschke, T. (2004). How positive affect modulates cognitive control: Reduced perseveration at the cost of increased distractibility. *Journal of Experimental Psychology: Memory and Cognition, 30*, 343–353.

Dunn, J. R., & Schweitzer, M. E. (2005). Feeling and Believing: The influence of emotion on trust. *Journal of Personality and Social Psychology, 88*, 736–748.

Einon, D. F., Morgan, M. J., & Kibbler, C. C. (1978). Brief periods of socialization and later behavior in the rat. *Developmental Psychobiology, 11*, 213–225.

Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion, 6*, 169–200.

Ellsworth, P. C., & Smith, C. A. (1988). Shades of joy: Patterns of appraisal differentiating pleasant emotions. *Cognition and Emotion, 2*, 301–331.

Emmons, R. A., & McCullough, M. E. (2003). Counting blessings vs. burdens: An experimental investigation of gratitude and subjective well-being in daily life. *Journal of Personality and Social Psychology, 84*, 377–389.

Estrada, C. A., Isen, A. M., & Young, M. J. (1997). Positive affect facilitates integration of information and decreases anchoring in reasoning among physicians. *Organizational Behavior and Human Decision Processes, 72*, 117–135.

Fineman, S. (2006). On being positive: Concerns and counterpoints. *Academy of Management Review, 31*, 270–91.

Fredrickson, B. L. (1998). What good are positive emotions? *Review of General Psychology, 2*, 300–319.

Fredrickson, B. L. (2000). Cultivating positive emotions to optimize health and well-being. *Prevention and Treatment, 3*. Article 0001a. Retrieved from *content.apa.org/journals/pre/3/1/1a.html*

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist, 56*, 218–226.

Fredrickson, B. L. (2004). Gratitude, like other positive emotions, broadens and builds. In R. A. Emmons & M. E. McCullough (Eds.), *The psychology of gratitude* (pp. 145–166). New York: Oxford University Press.

Fredrickson, B. L., & Branigan, C. (2001) Positive emotions. In T. J. Mayne & G. A. Bonnano (Eds.), *Emo-*

tions: Current issues and future directions. New York: Guilford Press.

Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden thought–action repertoires: Evidence for the broaden-and-build model. *Cogntion and Emotion, 19*, 313–332.

Fredrickson, B. L., Cohn, M. A., Coffey, K. A., Pek, J., & Finkel, S. M. (2008). *Open hearts build lives: Positive emotions, induced through loving-kindness meditation, meditation, build consequential personal resources*. Manuscript under review.

Fredrickson, B. L., & Joiner, T. (2000). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science, 13*, 172–175.

Fredrickson, B. L., & Levenson, R. W. (1998). Positive emotions speed recovery from the cardiovascular sequelae of negative emotions. *Cognition and Emotion, 12*, 191–220.

Fredrickson, B. L., & Losada, M. F. (2005). Positive affect and the complex dynamics of human flourishing. *American Psychologist, 60*, 678–686.

Fredrickson, B. L., Mancuso, R. A., Branigan, C., & Tugade, M. (2000). The undoing effect of positive emotions. *Motivation and Emotion, 24*(4), 237–258.

Fredrickson, B. L., Tugade, M. M., Waugh, C. E., & Larkin, G. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks on the United States on September 11, 2001. *Journal of Personality and Social Psychology, 84*, 365–376.

Frijda, N. H. (1986). *The emotions*. Cambridge, UK: Cambridge University Press.

Frijda, N. H. (1994). Emotions are functional, most of the time. In P. Ekman & R. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 112–122). New York: Oxford University Press.

Frijda, N. H., Kuipers, P., & Schure, E. (1989). Relations among emotion, appraisal, and emotional action readiness. *Journal of Personality and Social Psychology, 57*, 212–228.

Gable, S. L., Reis, H. T., Impett, E. A., & Asher, E. R. (2004). What do you do when things go right?: The intrapersonal and interpersonal benefits of sharing positive events. *Journal of Personality and Social Psychology, 87*, 228–245.

Gervais, M., & Wilson, D. S. (2005). The evolution and functions of laughter and humor: A synthetic approach. *Quarterly Review of Biology, 80*, 395–451.

Gil, K. M., Carson, J. W., Porter, L. S., Scipio, C., Bediako, S. M., & Orringer, E. (2004). Daily mood and stress predict pain, health care use, and work activity in African American adults with sickle-cell disease. *Health Psychology, 23*, 267–274.

Gonzaga, G. C., Turner, R. A., Keltner, D., Campos, B., & Altemus, M. (2006). Romantic love and sexual desire in close relationships. *Emotion, 6*, 163–179.

Gottman, J. M. (1994). *What predicts divorce?: The relationship between marital processes and marital outcomes*. Hillsdale, NJ: Erlbaum.

Haidt, J. (2003). Elevation and the positive psychology of morality. In C. L. M. Keyes & J. Haidt (Eds.), *Flourishing: Positive psychology and the life well-lived* (pp. 275–289). Washington, DC: American Psychological Association.

Haidt, J. (2005). *The happiness hypothesis: Finding the modern truth in ancient wisdom*. New York: Basic Books.

Hazen, N. L., & Durrett, M. E. (1982). Relationship of security of attachment and cognitive mapping abilities in 2-year-olds. *Developmental Psychology, 18*, 751–759.

Isen, A. M., & Daubman, K. A. (1984). The influence of affect on categorization. *Journal of Personality and Social Psychology, 47*, 1206–1217.

Isen, A. M., Daubman, K. A., & Nowicki, G. P. (1987). Positive affect facilitates creative problem solving. *Journal of Personality and Social Psychology, 52*, 1122–1131.

Isen, A. M., Johnson, M. M. S., Mertz, E., & Robinson, G. F. (1985). The influence of positive affect on the unusualness of word associations. *Journal of Personality and Social Psychology, 48*, 1413–1426.

Ito, T. A., & Cacioppo, J. T. (1999). The psychophysiology of utility appraisals. In D. Kahneman, E. Diener, & N. Schwartz (Eds.), *Well-being: Foundations of hedonic psychology* (pp. 470–488). New York: Russell Sage Foundation.

Johnson, K. J. (2005). *We all look the same to me: Positive emotions eliminate the own-race bias in face recognition*. Unpublished doctoral dissertation, University of Michigan.

Johnson, K. J., & Fredrickson, B. L. (2005). "We all look the same to me:" Positive emotions eliminate the own-race bias in face recognition. *Psychological Science, 16*, 875–881.

Joiner, T. E., Pettit, J. W., Perez, M., & Burns, A. B. (2001). Can positive emotion influence problem-solving among suicidal adults? *Professional Psychology: Research and Practice, 32*, 507–512.

Kabat-Zinn, J. (2005). *Full catastrophe living: Using the wisdom of your body and mind to face stress, pain, and illness* (15th anniversary ed.). New York: Bantam.

Kahn, B. E., & Isen, A. M. (1993). The influence of positive affect on variety seeking among safe, enjoyable products. *Journal of Consumer Research, 20*, 257–270.

Kahneman, D., Kreuger, A. B., & Schkade, D. A. (2004). A survey method for characterizing daily life experience: The day reconstruction method. *Science, 306*, 1776–1780.

Keller, M. C., & Nesse, R. M. (2005). Is low mood an adaptation?: Evidence for subtypes with symptoms that match precipitants. *Journal of Affective Disorders, 86*, 27–35.

Keltner, D., & Bonanno, G. A. (1997). A study of laughter and dissociation: Distinct correlates of laughter

and smiling during bereavement. *Journal of Personality and Social Psychology, 73*, 687–702.

Keltner, D., & Haidt, J. (2003). Approaching awe, a moral, spiritual, and aesthetic emotion. *Cognition and Emotion, 17*, 297–314.

Keyes, C. L. M., & Haidt, J. (Eds.). (2003). *Flourishing: Positive psychology and the life well-lived.* Washington, DC: American Psychological Association.

Kiecolt-Glaser, J. K., McGuire, L., Robles, T. F., & Glaser, R. (2002). Emotions, morbidity, and mortality. *Annual Review of Psychology, 53*, 83–107.

Kosfelt, M., Heinrichs, M., & Zak, P. J. (2005). Oxytocin increases trust in humans. *Nature, 435*, 673–676.

Lazarus, R. S. (1991). *Emotion and adaptation.* New York: Oxford University Press.

Lazarus, R. S. (2003). Does the positive psychology movement have legs? *Psychological Inquiry, 14*, 93–109.

Lee, P. C. (1983). Play as a means for developing relationships. In R. A. Hinde (Ed.), *Primate social relationships* (pp. 82–89). Oxford, UK: Blackwell.

Levenson, R. W. (1994). Human emotions: A functional view. In P. Ekman & R. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 123–126). New York: Oxford University Press.

Levy, B. R., Slade, M. D., & Kunkel, S. R. (2002). Longevity increased by positive self-perceptions of aging. *Journal of Personality and Social Psychology, 83*, 261–270.

Losada, M., & Heaphy, E. (2004). The role of positivity and connectivity in the performance of business teams: A nonlinear dynamics model. *American Behavioral Scientist, 47*(6), 740–765.

Lyubomirsky, S. L., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin, 131*, 803–855.

Martin, L. L., & Clore, G. (Eds.). (2001). *Theories of mood and cognition: A user's guidebook.* Mahwah, NJ: Erlbaum.

Martineau, W. H. (1972). A model of the social functions of humor. In J. H. Goldstein & P. E. McGee (Eds.), *The psychology of humor: Theoretical perspectives and empirical issues* (pp. 101–128). New York: Academic Press.

Masters, J. C., Barden, R. C., & Ford, M. E. (1979). Affective states, expressive behavior, and learning in children. *Journal of Personality and Social Psychology, 37*, 380–390.

Matas, L., Arend, R. A., & Sroufe, L. A. (1978). Continuity of adaptation in the second year: The relationship between quality of attachment and later competence. *Child Development, 49*, 547–556.

McCullough, M. E., Kirkpatrick, S. D., Emmons, R. A., & Larson, D. B. (2001). Is gratitude a moral affect? *Psychological Bulletin, 127*, 249–266.

McEwen, B. S., & Seeman, T. (1999). Protective and damaging effects of mediators of stress: Concepts of allostasis and allostatic load. *Annals of the New York Academy of Sciences, 896*, 30–47.

Mikulincer, M. (1997). Adult attachment style and information processing: Individual differences in curiosity and cognitive closure. *Journal of Personality and Social Psychology, 72*, 1217–1230.

Moskowitz, J. T. (2003). Positive affect predicts lower risk of AIDS mortality. *Psychosomatic Medicine, 65*, 620–626.

Moskowitz, J. T., Folkman, S., & Acree, M. (2003). Do positive psychological states shed light on recovery from bereavement?: Findings from a 3-year longitudinal study. *Death Studies, 27*, 471–500.

Oatley, K., & Jenkins, J. M. (1996). *Understanding emotions.* Cambridge, MA: Blackwell.

Ong, A. D., & Allaire, J. C. (2005). Cardiovascular intraindividual variability in later life: The influence of social connectedness and positive emotions. *Psychology and Aging, 20*, 476–485.

Ostir, G. V., Markides, K. S., & Black, S. A. (2000). Emotional well-being predicts subsequent functional independence and survival. *Journal of the American Geriatrics Society, 48*, 473–78.

Otake, K., Waugh, C. E., & Fredrickson, B. L. (2007). *Positive emotions unlock other-focused thinking.* Manuscript in preparation.

Panksepp, J. (1998). Attention deficit hyperactivity disorders, psychostimulants, and intolerance of childhood playfulness: A tragedy in the making? *Current Directions in Psychological Science, 7*, 91–98.

Peciña, S., Smith, K. S., & Berridge, K. C. (2006). Hedonic hot spots in the brain. *Neuroscientist, 12*, 500–511.

Peterson, C., & Seligman, M. E. P. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review, 91*, 347–374.

Rosenberg, E. L. (1998). Levels of analysis and the organization of affect. *Review of General Psychology, 2*, 247–270.

Rowe, G., Hirsch, J., & Anderson, A. K. (2007). Positive affect increases the "breadth" of attentional selection. *Proceedings of the National Academy of Sciences of the USA, 104*, 338–383.

Rozin, P., & Royzman, E. B. (2001). Negativity bias, negativity dominance, and contagion. *Personality and Social Psychology Review, 5*, 296–320.

Russell, J. A., Weiss, A., & Mendelsohn, G. A. (1989). Affect Grid: A single-item scale of pleasure and arousal. *Journal of Personality and Social Psychology, 57*, 493–502.

Ryff, C. D., & Singer, B. (1998). The contours of positive human health. *Psychological Inquiry, 9*, 1–28.

Sapolsky, R. M. (1999). The physiology and pathophysiology of unhappiness. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 453–469). New York: Russell Sage Foundation.

Schuldberg, D., & Gottlieb, J. (2002). Dynamics and correlates of microscopic changes in affect. *Nonlin-*

ear Dynamics, Psychology, and Life Sciences, 6, 231–257.

Schultheiss, O. C., Wirth, M. M., & Stanton, S. J. (2004). Effects of affiliation and power motivation arousal on salivary progesterone and testosterone. *Hormones and Behavior, 46*, 592–599.

Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55*, 5–14.

Seligman, M. E. P., Steen, T. A., & Park, N. (2005). Positive psychology progress: Empirical validation of interventions. *American Psychologist, 60*, 410–421.

Sheldon, K. M., & Lyubomirsky, S. (2006). How to increase and sustain positive emotion: The effects of expressing gratitude and visualizing best possible selves. *Journal of Positive Psychology, 1*, 73–82.

Sherrod, L. R., & Singer, J. L. (1989). The development of make-believe play. In J. Goldstein (Ed.), *Sports, games and play* (pp. 1–38). Hillsdale, NJ: Erlbaum.

Shiota, M. N., Keltner, D., & John, O. P. (2006). Positive emotion dispositions differentially associated with Big Five personality and attachment style. *Journal of Positive Psychology, 1*, 61–71.

Simons, C. J. R., McCluskey-Fawcett, K. A., & Papini, D. R. (1986). Theoretical and functional perspective on the development of humor during infancy, childhood, and adolescence. In L. Nahemow, K. A. McCluskey-Fawcett, & P. E. McGhee (Eds.), *Humor and aging* (pp. 53–77). Orlando, FL: Academic Press.

Smith, C. A., & Ellsworth, P. C. (1985). Patterns of cognitive appraisal in emotion. *Journal of Personality and Social Psychology, 48*, 813–838.

Solomon, R. L., & Corbit, J. D. (1974). An opponent-process theory of motivation: I. Temporal dynamics of affect. *Psychological Review, 81*, 119–145.

Stein, N. L., Folkman, S., Trabasso, T., & Richards, T. A. (1997). Appraisal and goal processes as predictors of psychological well-being in bereaved caregivers. *Journal of Personality and Social Psychology, 72*, 872–884.

Tiedens, L. Z., & Linton, S. (2001). Judgment under emotional certainty and uncertainty: The effects of specific emotions on information processing. *Journal of Personality and Social Psychology, 81*, 973–988.

Tong, E. M. W. (2007). Appraisal processes in emotional experiences. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 67*, 4161.

Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology, 11*, 375–424.

Trope, Y., & Pomerantz, E. (1998). Resolving conflicts among self-evaluative motives: Positive experiences as a resource for overcoming defensiveness. *Motivation and Emotion, 22*(1), 53–72.

Tsai, J. L., Knutson, B., & Fung, H. H. (2006). Cultural variation in affect valuation. *Journal of Personality and Social Psychology, 90*, 288–307.

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

Tugade, M. M., Fredrickson, B. L., & Barrett, L. F. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality, 72*, 1161–1190.

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science, 211*, 453–458.

Wadlinger, H. A., & Isaacowitz, D. M. (2006). Positive mood broadens visual attention to positive stimuli. *Motivation and Emotion.*

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

Waugh, C. E., & Fredrickson, B. L. (2006). Nice to know you: Positive emotions, self–other overlap, and complex understanding in the formation of a new relationship. *Journal of Positive Psychology, 1*, 93–106.

Waugh, C. E., Hejmadi, A., Otake, K., & Fredrickson, B. L. (2006). Cross-cultural evidence that positive emotions broaden views of self to include close others. Unpublished raw data.

Wolpe, J. (1958). *Psychotherapy by reciprocal inhibition.* Stanford, CA: Stanford University Press.

Zak, P. J., Kurzban, R., & Matzner, W. T. (2005). Oxytocin is associated with human trustworthiness. *Hormones and Behavior, 48*, 522–527.