

What Good Are Positive Emotions?

Barbara L. Fredrickson
University of Michigan

This article opens by noting that positive emotions do not fit existing models of emotions. Consequently, a new model is advanced to describe the form and function of a subset of positive emotions, including joy, interest, contentment, and love. This new model posits that these positive emotions serve to broaden an individual's momentary thought–action repertoire, which in turn has the effect of building that individual's physical, intellectual, and social resources. Empirical evidence to support this broaden-and-build model of positive emotions is reviewed, and implications for emotion regulation and health promotion are discussed.

Even though research on emotions has flourished in recent years, investigations that expressly target positive emotions remain few and far between. Any review of the psychological literature on emotions will show that psychologists have typically favored negative emotions in theory building and hypothesis testing. In so doing, psychologists have inadvertently marginalized the emotions, such as joy, interest, contentment, and love, that share a pleasant subjective feel. To date, then, psychology's knowledge base regarding positive emotions is so thin that satisfying answers to the question "What good are positive emotions?" have yet to be articulated. This is unfortunate. Experiences of positive emotion are central to human nature and contribute richly to the quality of people's lives (Diener & Larsen, 1993; Myers & Diener, 1995). But how? In which domains? Through what mechanisms? These are empirical questions that warrant study.

The purpose of this article is to introduce a new model of the form and function of a subset of discrete positive emotions. Empirical studies that provide both direct and indirect support for

this new perspective are featured. My hope is that this article will unlock scientific curiosity about positive emotions, not only to test the ideas presented here, but also to build other new models that might illuminate the nature and value of positive emotions. Psychology sorely needs more studies on positive emotions, not simply to level the uneven knowledge bases between negative and positive emotions, but more critically, to guide applications and interventions that might improve individual and collective functioning, psychological well-being, and physical health.

Why Have Positive Emotions Been Marginalized?

At this point, it might be useful to inspect some of the reasons positive emotions have been inadvertently sidelined. This effort can uncover relevant obstacles, and perhaps indicate better routes to understanding the value of positive emotions.

Positive Emotions Are Few and Less Differentiated

One reason why positive emotions may have garnered so little empirical attention is that, relative to negative emotions, positive emotions are few in number and rather diffuse (de Rivera, Possell, Verette, & Weiner, 1989; Ellsworth & Smith, 1988b). For instance, scientific taxonomies of discrete or basic emotions (Ekman, 1992; Izard, 1977; Tomkins, 1982) typically

I wish to express my gratitude to Jeff Chappell, Phoebe Ellsworth, Carroll Izard, Randy Nesse, and Erika Rosenberg, as well as to Christine Branigan, Roberta Mancuso, and Michele Tugade. The comments that these individuals offered on earlier versions of this article helped push my thinking further.

Correspondence concerning this article should be addressed to Barbara L. Fredrickson, Department of Psychology, University of Michigan, 525 East University Avenue, Ann Arbor, Michigan 48109-1109. Electronic mail may be sent to blf@umich.edu.

identify only one positive emotion for every three or four negative emotions (Ellsworth & Smith, 1988b), an imbalance also reflected in English-language emotion words (Averill, 1980).

Interestingly, the relative lack of differentiation among the positive emotions is evident across the various components of the emotion process. Looking to the facial component, for instance, specific negative emotions have been shown to have specific facial configurations that imbue them with unique and universally recognized signal value (Ekman et al., 1987). By contrast, according to Ekman (1992), specific positive emotions appear to have no unique signal value, but instead all share the *Duchenne smile* (i.e., raised lip corners accompanied by muscle contraction around the eyes). Further diluting the signal value of positive emotions, *non-Duchenne smiles* (i.e., those absent the muscle contraction around the eyes) are often indistinguishable from Duchenne smiles to untrained observers and appear in social circumstances replete with negative emotions or devoid of all emotion. Similarly, looking to the autonomic component, specificity in autonomic responding has been demonstrated between negative and positive emotions and, to some degree, among the negative emotions (Levenson, 1992; Levenson, Ekman, & Friesen, 1990; Cacioppo, Klein, Berntson & Hatfield, 1993). The positive emotions, by contrast, have not yielded distinguishable autonomic responses. In fact, with the exception of those positive emotions that evoke outright laughter (accompanied by sizable respiratory change), many positive emotions seem to be characterized by a relative lack of autonomic activation (Levenson et al., 1990). Looking to the experiential component reveals this asymmetry in distinctiveness yet again. When recalling past unpleasant experiences, people's self-reports of subjective experience yield differentiation among various negative emotion terms (Ellsworth & Smith, 1988a). By contrast, when recalling past pleasant experiences, people's self-reports of subjective experience show considerable intercorrelations among various positive emotion terms, reflecting a greater degree of blending (Ellsworth & Smith, 1988b). Moreover, the appraisal processes that initiate emotions also seem to be less differentiated for positive emotions than for negative emotions (Ellsworth & Smith, 1988b).

In speculating on the origins of these asymmetries, Nesse (1990) has suggested that "natural selection shapes emotions only for situations that contain threats or opportunities. There are more negative than positive emotions because there are more different kinds of threats than opportunities" (p. 280). Regarding the lesser differentiation evident among positive emotions, others have noted that the cost of failure to respond appropriately to a life threat could be death, whereas the cost of failure to respond appropriately to a life opportunity is not likely to be so dire (Pratto & John, 1991; Rozin & Fallon, 1987).

Problems Demand Attention

A second reason for the relative neglect of positive emotions is that, as a field, psychology gravitates toward problems and works to solve them. Not surprisingly, negative emotions pose a huge array of problems for individuals and for society, whereas positive emotions pose just a few. Anger and its management, for instance, have been implicated in the etiology of heart disease (Barefoot, Dahlstrom, & Williams, 1983; Fredrickson et al., 1998; Scheier & Bridges, 1995; Williams, Haney, Lee, Kong, Blumenthal, & Whalen, 1980) and some cancers (Eysenck, 1994; Greer & Morris, 1975), as well as in aggression and violence, especially in men and boys (Lemerise & Dodge, 1993). Relatedly, sexual jealousy has been implicated in domestic violence (Buss, 1994). Fear and anxiety fuel phobias and other anxiety disorders (Ohman, 1993). For some individuals, sadness and grief may swell into unipolar depression (Nolen-Hoeksema, Morrow, & Fredrickson, 1993), which is the single most common psychological disorder of the present time, affecting 17 percent of adults (based on life-time prevalence in a U.S. sample; 13% for male participants, 21% for female participants; Kessler et al., 1994), and a likely trigger of suicide (Chen & Dilsaver, 1996). Shame may be another route to depression (Fredrickson & Roberts, 1997; Lewis, 1971) and to eating disorders (Fredrickson & Roberts, 1997; Noll & Fredrickson, in press; Silberstein, Striegel-Moore, & Rodin, 1987) and sexual dysfunction (Fredrickson & Roberts, 1997). The list could go on. In contrast, positive emotions have been implicated in just a few problems: bipolar disorder is marked by experi-

ences of excessive mania or euphoria alternating with depression. Some theorists view unipolar depression as a deficit in positive affect (Davidson, 1993; Heller, 1990; Lewinsohn, 1974), and a subset of psychoactive drugs (e.g., heroin, cocaine, alcohol, marijuana, amphetamines) act on the neurochemical systems associated with positive emotions, in effect hijacking these systems and creating risks for addiction and substance abuse (Nesse & Berridge, 1997). Given the vast array of human suffering and loss that stems from excessive or inappropriately expressed negative emotions, the press to understand these emotions is immense. Arguably, efforts to understand positive emotion should take a backseat to solving these problems. The misfortune of this triage strategy, I argue, is that even though positive emotions may not spark problems of the same magnitude as negative emotions, they may in fact provide some important solutions to the problems negative emotions generate. I return to this point in a later section.

Models Built on Prototypes

A third reason that positive emotions have been marginalized is that, for the most part, emotion theorists have taken their mission to be to explain emotions in general. In pursuing this mission, theorists build their models of emotions to fit the specifications of prototypic emotions. Perhaps reflecting both the relatively diffuse nature of positive emotions and the strong press to understand negative emotions, emotions like fear and anger have most often served as the prototypes. The assumption underlying this strategy is that models of emotion fashioned around prototypic emotions will also provide a sufficient explanation for other, less prototypic emotions, including the positive emotions.

Take, for example, the following proposition that is central to many current theorists' models of emotions: emotions are, by definition, associated with urges to act in particular ways, urges that have been called *specific action tendencies* (Frijda, 1986; Frijda, Kuipers, & Schure, 1989; Lazarus, 1991; Levenson, 1994; Tooby & Cosmides, 1990). Anger, for instance, creates the urge to attack, fear the urge to escape, disgust the urge to expel, guilt the urge to make

amends, and so on. No theorist would argue that people invariably act out these urges when feeling particular emotions. But rather, people's ideas about possible courses of action narrow in on these specific urges. Whether these urges become actions depends on the complex interplay of intentions, impulse control, coping styles, and cultural norms, as well as the affordances of particular contexts (e.g., is a weapon or escape route available?).

A key element in these models is that specific action tendencies are not simply thoughts existing in the mind. They are embodied thoughts because specific action tendencies and organized physiological change go hand in hand. So, for example, when you have an urge to escape when feeling fear, your body reacts by mobilizing appropriate autonomic support for the possibility of running (e.g., increased blood flow to large muscle groups; Levenson, 1992). The main function of emotions, according to Levenson, is organization aimed at creating "the optimal physiological milieu to support the particular behavior that is called forth" (1994, p. 124). Through specific action tendencies, then, emotions prepare both mind and body to act in specific ways. As Lazarus put it, "an action tendency is what makes an emotion embodied" (1991, p. 285).

Models of emotion that highlight the role of specific action tendencies emphasize the functions of emotions and often cast emotions as evolved adaptations. The specific action tendencies that emotions spark represent those actions that worked best when human ancestors faced threats to life and limb. The adaptive value of emotions, according to this view, lies within their improbably good design for promoting quick and specific life-preserving actions in life-threatening situations that have been ancestrally recurrent (see Tooby & Cosmides, 1990).

In an earlier article with Levenson (Fredrickson & Levenson, 1998), I noted that pairing specific emotions with specific action tendencies seems easy enough when working within the subset of negative emotions, but fitting the positive emotions into this purportedly emotion-general model raises problems. In particular,

Frijda's (1986) descriptions of action tendencies . . . grow vague when emotions are positive: He pairs contentment with inactivity, and joy with "free activation," which he describes as an "aimless, unasked-for readiness to engage in whatever interaction presents itself" (Frijda, 1986, p.

89). Likewise, Lazarus (1991) concedes that the action tendency for happiness/joy is "hard to pin down," and that for pride "is difficult to specify with confidence." And although affection is linked with approach (Frijda, 1986) and relief with ceasing to be vigilant (Lazarus, 1991), one question to ask is approach and *do what?*—cease vigilance and *do what?* It appears that the specific action tendencies named for positive emotions are not nearly as specific as those named for negative emotions. At best they resemble generic orientations toward action or inaction, rather than urges to do something quite specific, like attack, flee, or spit. (Fredrickson & Levenson, 1998, p. 192)

To date, then, numerous theorists have argued that emotions (in general) evolved because they promoted specific actions in life-threatening circumstances and thereby increased the odds of the ancestors' survival. To be sure, models based on specific action tendencies provide sound and compelling descriptions of the form and function of many negative emotions. (Sadness may be the prime exception, which is typically linked with a generic urge to withdraw from action.) Even so, I would argue that many positive emotions do not fit such models. First of all, positive emotions do not typically arise in life-threatening circumstances, and perhaps by consequence, they do not seem to create well-defined urges to pursue a specific course of action. What good are positive emotions then? From a functional perspective, do positive emotions have any adaptive value? To my mind, existing emotion-general models hinder psychology's ability to answer these questions adequately.

To be fair, a few theorists have noted that fitting positive emotions into emotion-general models poses problems (Ekman, 1992; Lazarus, 1991). This acknowledgment, however, has not yet led to revision of, or qualifications to the models of emotion found in the current empirical literature. Instead, the difficulty inherent in "shoehorning" the positive emotions into emotion-general models merely tends to marginalize them further. Many theorists, for instance, minimize challenges to their models by maintaining their focus on the negative emotions, paying only lip service to the positive emotions.

Liberate Models of Positive Emotions

If many positive emotions do not share the hallmark feature with the negative emotions of promoting and supporting specific actions, then

what features might positive emotions share? Why does the capacity to experience positive emotions seem to be part of universal human nature?

My colleague and I argued elsewhere that it is not a good idea to assume that the adaptive value of positive emotions is simply isomorphic to the adaptive value of negative emotions (Fredrickson & Levenson, 1998). Instead, I believe emotion theorists and researchers need to question the predilection toward adopting a single general-purpose model of emotion. Why not, as Ekman (1994) has suggested, allow different theories for distinct emotions (e.g., a theory of anger, a theory of sadness)? Still another multiple-model landscape would allow one model to describe a subset of distinct negative emotions (e.g., anger, fear, disgust) and a separate model to describe a subset of distinct positive emotions (e.g., joy, contentment, interest, love). Traditional models centered on specific action tendencies, then, could be retained as suitable descriptions for these negative emotions while alternative models are developed for the positive emotions.

In building a more suitable model for this subset of positive emotions, I propose discarding two key presumptions. The first is the presumption that emotions must necessarily yield specific action tendencies. Although positive emotions do often produce urges to act, they appear to be less prescriptive than negative emotions about which particular actions should be taken. In a sense, positive emotions could be said to yield *nonspecific action tendencies*, perhaps best exemplified by the "free activation" that Frijda (1986) has linked with joy. The second presumption that I suggest should be discarded is that emotions must necessarily spark tendencies for *physical* action. Some positive emotions seem instead to spark changes primarily in cognitive activity, with changes in physical activity (if any) following from these cognitive changes. Interest and contentment are key examples of this, and will be discussed in more detail below. So, in place of action tendencies, I propose speaking of *thought-action tendencies*. Additionally, instead of presuming that these thought-action tendencies are specific, I propose discussing the relative breadth of the momentary thought-action repertoire.

Breadth of the Momentary Thought–Action Repertoire

Using this new terminology to paraphrase traditional action-oriented models, negative emotions function to narrow a person's momentary thought–action repertoire. They do so by calling to mind and body the time-tested, ancestrally adaptive actions represented by specific action tendencies. This function is without question adaptive in life-threatening situations that require quick and decisive action in order to survive.

But threats to life and limb are typically not at issue in circumstances that give rise to positive emotions (exceptions might include a subset of positively construed challenge situations). Absent such threat, quick and decisive action is often not required. It follows then, that the automatic narrowing of a person's momentary thought–action repertoire may not be common to all emotions, but instead may be more characteristic of certain negative emotions. By contrast, many positive emotions seem not to (and perhaps need not) narrow a person's momentary thought–action repertoire. Even so, changes in typical thought and behavior patterns do occur during positive emotions. I propose the alternative view that many positive emotions broaden a person's momentary thought–action repertoire. Accordingly, experiences of certain positive emotions prompt individuals to discard time-tested or automatic (everyday) behavioral scripts and to pursue novel, creative, and often unscripted paths of thought and action.

As I have already argued, the specific action tendencies that theorists have previously identified for the positive emotions are not particularly specific. My claim that positive emotions broaden the momentary thought–action repertoire rather than narrowing it can help make sense of the difficulty that positive emotions have posed for traditional models centered on specific action tendencies. This new perspective also illuminates why and how positive emotions might serve as effective tools for regulating negative emotions, an implication that I develop further in a later section.

Descriptions of Four Positive Emotions

At this point, I would like to consider in greater detail four different positive emotions:

joy, interest, contentment, and love. I chose these emotions for two reasons. First, they appear to be maximally distinct from one another (with the exception of love; see below). Second, although the evidence is more anecdotal than empirical, they appear to be recognizable, if not equally frequent, across cultures. In using these specific emotion terms, I rely on Ekman's (1992) notion of *emotion families*. For instance, the term *joy* does not necessarily represent a single affective state but rather a family of related states characterized by a common theme plus variations on that theme. Although members of an emotion family may vary mainly in intensity, such variations may be accompanied by slight alterations in associated thought–action tendencies. To reflect the concept of emotion families, as I describe each of these four positive emotions, I also note closely related emotion terms. Finally, for each of these emotions, I describe the circumstances that tend to elicit the emotion, apparent changes in the momentary thought–action repertoire, and the consequences or outcomes of these changes.

Joy

Joy is often used interchangeably with *happiness* (Lazarus, 1991) and shares conceptual space with other relatively high-arousal positive emotions such as amusement (sometimes called *exhilaration* or *mirth*; Ruch, 1993), elation, and gladness (de Riveria et al, 1989). Feelings of joy arise in contexts appraised as safe and familiar (Izard, 1977) and as requiring low effort (Ellsworth & Smith, 1988b) and, in some cases, by events construed as accomplishments or progress towards one's goals (Izard, 1977; Lazarus, 1991). Frijda (1986) offered the clearest statement on the action tendency associated with joy, which he termed *free activation*: “[it] is in part aimless, unasked-for readiness to engage in whatever interaction presents itself and in part readiness to engage in enjoyments” (p. 89). The paradigmatic case of joy, in Frijda's view, is a “young child jumping out of bed on a sunny morning, running around and seeking things to play with and to enjoy” (N.H. Frijda, personal communication, September 6, 1996). In other words, joy creates the urge

to play and be playful in the broadest sense of the word, encompassing not only physical and social play, but also intellectual and artistic play. Play, especially imaginative play, is to a large degree unscripted. It involves exploration, invention, and just plain fooling around. Pointing to no single set of actions, play takes many forms. To my mind, then, the urge to play represents a quite generic, nonspecific thought–action tendency. Joy and related positive emotions can thus be described as broadening an individual’s thought–action repertoire.

Even though play is often aimless, it does appear to have reliable outcomes. Ethologists have long argued that play promotes skill acquisition. Physical skills are developed and practiced in rough-and-tumble play, manipulative–cognitive skills are developed and practiced in object play, and social–affective skills are developed and practiced in social play (Boulton & Smith, 1992; Dolhinow & Bishop, 1970). Joy, then, not only broadens an individual’s momentary thought–action repertoire through the urge to play, but also, over time and as a product of recurrent play, joy can have the incidental effect of building an individual’s physical, intellectual, and social skills. Importantly, these new resources are durable and can be drawn on later, long after the instigating experience of joy has subsided.

Interest

Interest is sometimes used interchangeably with curiosity, intrigue, excitement, or wonder, and shares conceptual space with challenge and intrinsic motivation (Deci & Ryan, 1985). Also, to my mind, what Csikszentmihalyi (1990) calls *flow*, or the enjoyment experienced when a person’s perceived skills match the perceived challenges of a particular activity, represents a form of interest. While not all emotion theorists consider interest a basic emotion (e.g., Ekman, 1992; Lazarus, 1991), building on the work of Tomkins (1962), Izard (1977) made a compelling case for its inclusion. Interest, according to Izard (1977), is the emotion experienced most frequently. Interest arises in contexts appraised as safe and as offering novelty, change, and a sense of possibility (Izard, 1977) or mystery (Kaplan, 1992). These contexts also tend to be appraised as important and as requiring effort

and attention (Ellsworth & Smith, 1988b). Some theorists have posited that the momentary thought–action tendency of interest is simply to attend or orient (e.g., Frijda, 1986). But to my mind this stops short of fully describing the impact of interest. Instead, I favor Izard’s (1977) treatment of interest. The momentary thought–action tendency sparked by interest, according to Izard (1977), is *exploration*, explicitly and actively aimed at increasing knowledge of and experience with the target of interest. Interest generates “a feeling of wanting to investigate, become involved, or extend or expand the self by incorporating new information and having new experiences with the person or object that has stimulated the interest” (Izard, 1977, p. 216). Although interest may or may not be accompanied by overt physical action, it is nonetheless associated with feeling animated and enlivened (Izard, 1977). Importantly, the openness to new ideas, experiences, and actions is what characterizes the mindset of interest as broadened, rather than narrowed.

Although interested individuals explore for intrinsic reasons—to satisfy their own inner curiosity—such exploration has reliable outcomes. Most obviously, exploration increases an individual’s knowledge base. One example comes from evolutionary analyses of environmental aesthetics (S. Kaplan, 1992; Orians & Heerwagen, 1992). Studies have demonstrated that landscapes that are at once mysterious and easy-to-read reliably arouse people’s interest (for a review, see S. Kaplan, 1992). Being intrigued by such landscapes, S. Kaplan (1992) has argued, encouraged human ancestors to explore and seek new information, which in turn served to update and extend their cognitive maps. This expanded knowledge base could then be drawn on in later instances that threatened survival (e.g., finding water, food, escape routes, or hiding places). Interest, then, not only broadens an individual’s momentary thought–action repertoire as the individual is enticed to explore, but over time and as a product of sustained exploration, interest also builds the individual’s store of knowledge. Again, this store of knowledge becomes a durable resource that can be accessed in later moments. Pushing this idea further, Izard (1977), again building on Tomkins (1962),

wrote that interest is the primary instigator of personal growth, creative endeavor, and the development of intelligence.

Contentment

Contentment is often used interchangeably with other low-arousal positive-emotion terms such as *tranquillity* or *serenity* (Ellsworth & Smith, 1988b) and shares conceptual space with mild or receptive joy (Izard, 1977) and, to some degree, relief (Lazarus, 1991). Contentment, to my mind, should be distinguished from *pleasure*, the affective response to meeting bodily needs (e.g., for food, warmth, rest, or sex; see Cabanac, 1971). Contentment arises in situations appraised as safe and as having a high degree of certainty and a low degree of effort (Ellsworth & Smith, 1988b). At first blush, contentment appears to have no real action tendency, inasmuch as Frijda (1986) links contentment with inactivity, Ellsworth and Smith (1988b) link tranquility with “doing nothing” and Lazarus (1991) links relief with ceasing vigilance. It may be, however, that the changes sparked by contentment are more cognitive than physical. A closer look at theoretical writings on contentment and related positive emotions suggests that this emotion prompts individuals to savor their current life circumstances and recent successes, experience “oneness” with the world around them, and integrate recent events and achievements into their overall self-concept and world view (de Rivera et al., 1989; Izard, 1977). Contentment, one could argue then, is not simple passivity, but rather a mindful broadening of a person’s self-views and world views. Moreover, contentment appears to be the positive emotion that follows experiences that Csikszentmihalyi (1990) described as *flow* (described in connection with joy): “when the flow episode is over, one feels more ‘together’ than before, not only internally but also with respect to other people and to the world in general. . . . The self becomes complex as a result of experiencing flow” (1990, p. 41–42). Contentment, according to this analysis, creates the urge to savor and integrate recent events and experiences creating a new sense of self and a new world view. These links to integration, receptiveness, and increasing self-complexity characterize contentment as an

emotion that broadens individuals’ momentary thought–action repertoires and builds their personal resources.

Love

Most theorists acknowledge that love is not a single emotion and that people experience varieties of love (e.g., romantic or passionate love, companionate love, caregiver love, and attachment to caregivers; Hatfield & Rapson, 1993; Oatley & Jenkins, 1996). Certainly, love relationships and love experiences need to be distinguished (Lazarus, 1991); even so, it bears underscoring that love experiences are felt toward specific individuals (e.g., one’s mother, confidant, lover, or child), and therefore are necessarily contextualized by these relationships (Oatley & Jenkins, 1996). Following Izard (1977), I hold that love experiences are made up of many positive emotions, including interest, joy and contentment. As Izard put it, “acquaintances or friends renew your interest by revealing new aspects of themselves and the resulting increase in familiarity (deeper knowledge of the person) brings joy [and contentment]. In lasting friendships or love relationships this cycle is repeated endlessly” (1977, p. 243). Supporting the idea that love represents a fusion of other specific positive emotions, Ellsworth and Smith (1988b) found that love, interest, and playfulness (what I have been calling *joy*) were the least differentiated positive emotions they examined. So, to the extent that love triggers the more specific positive emotions of interest, contentment, and joy, it also broadens the momentary thought–action repertoire as people explore, savor, and play with the people they love.

In the moment, exploring, savoring, and being playful with loved ones seems to have no obvious aim other than intrinsic enjoyment. Over time, however, the interactions inspired by love no doubt help to build and strengthen social bonds and attachment. These social bonds are not only satisfying in and of themselves, but are also likely to be the locus of subsequent social support. In this sense, love and the various positive emotions experienced in love relationships (i.e., interest, joy, and contentment) build and solidify an individual’s social resources.

Like intellectual and physical resources, social resources can accumulate and be drawn on later.

Positive Emotions Broaden and Build

A parallelism is emerging here: Not only do the positive emotions of joy, interest, contentment, and love share the feature of broadening an individual's momentary thought–action repertoire, but they also appear to share the feature of building the individual's personal resources, ranging from physical resources to intellectual resources to social resources. Importantly, these resources are more durable than the transient emotional states that led to their acquisition. By consequence, then, the often incidental effect of experiencing a positive emotion is an increment in durable personal resources that can be drawn on later in other contexts and in other emotional states. I refer to this as the broaden-and-build model of positive emotions.

Empirical Support for the Broaden-and-Build Model of Positive Emotions

In discussing joy, interest, contentment, and love, I introduced the ideas that these positive emotions both broaden the individual's momentary thought–action repertoire, and in turn build the individual's enduring personal resources. In this section, I detail the existing empirical support for these propositions. Although we are faced with few empirical studies of discrete positive emotions, fruitful connections can be drawn from empirical work on other levels of affective phenomena, such as positive moods and positive affective traits (see Rosenberg, 1998, for a discussion of levels of affect).

Positive Emotions Broaden the Scope of Attention

Decades ago, Easterbrook (1959) proposed that negative emotional states—particularly high arousal ones like anxiety and fear—serve to narrow people's attentional focus. To date, this idea has received ample empirical support (for a review, see Derryberry & Tucker, 1994). People experiencing certain negative emotions, then, tend to miss the forest for the trees, or

perhaps more aptly, the assailant's garment type for the gun.

More recently, Derryberry and Tucker (1994) have proposed that positive emotions, even high-arousal positive emotions such as elation and mania, lead to an opposite effect: an expansion of attentional focus. To support this claim, they cite clinical research on manic cognition. Manic people, like creative artists, tend to use overinclusive categories (Andreason & Powers, 1975; see also Eysenck, 1995; Feist, in press; Jameson, 1993; Richards & Kinney, 1990). Moreover, the expansiveness of thinking evident among manic people varies with lithium treatment. Lithium not only evens out mood swings, but it also diminishes patients' creativity (Shaw, Mann, Stokes, & Manevitz, 1986), a factor that no doubt contributes to some patients' resistance to continuing lithium treatment.

Laboratory studies offer preliminary support for the idea that normal ranges of positive affect in nonclinical samples are also associated with a broadened attentional scope. These studies use global–local visual processing paradigms to assess biases in attentional focus. In one such task, research participants judge which of two comparison figures is more similar to a standard figure. One comparison figure resembles the standard in global configuration, and the other in local, detail elements (see Kimchi, 1992). Whereas negative emotional traits such as anxiety and depression predict a local bias consistent with a narrowed attentional focus, positive emotional traits such as subjective well-being and optimism predict a global bias consistent with a broadened attentional focus (Basso, Scheffé, Ris, & Dember, 1996). Using a similar task, other researchers have found that experimentally manipulated failure feedback produces a comparable local bias, whereas success feedback produces a global bias (Brandt, Derryberry, & Reed, 1992, cited in Derryberry & Tucker, 1994). An important feature missing from this work, however, is a neutral comparison group. Without this, one cannot know whether the relatively broader attentional focus following success or associated with positive emotional traits is in fact more expansive than is typical. This becomes especially critical because past research has shown that, all things being equal, normal individuals (under normal conditions) tend to show a global bias, processing

global features of stimuli before local details (Navon, 1977). Studies that experimentally manipulate the presence or absence of positive affect and compare the relative strength of the global processing bias under positive and neutral conditions are (to the best of my knowledge) yet to be conducted. This gap notwithstanding, the existing evidence is consistent with the view that traits and situations that promote positive emotions broaden individuals' attentional scope, allowing them to see both the forest and the trees.

Positive Emotions Broaden the Scope of Cognition

In the 1980s, Alice Isen began a program of research to investigate the influence of positive affect on cognition. Isen's work is exemplary for two reasons: First, she has not assumed that positive and negative affect are "opposites" and by consequence has consistently included neutral control groups to allow the independent effects of positive affect to be studied. Second, across studies, Isen and colleagues induce positive affect in multiple ways. Research participants (a) receive a small bag of candy, (b) read cartoons, (c) hear success feedback, (d) view a short comedy film, or (e) read a series of positive words. This diversity of affect inductions enhances the ability to generalize from this line of work.

Taken as a whole, Isen's research suggests that positive affect "gives rise to an enlarged cognitive context" (Isen, 1987, p. 222). For instance, in a classic series of studies, Isen and colleagues (Isen, Johnson, Mertz, & Robinson, 1985) found that, relative to individuals in a neutral control condition, individuals experiencing positive affect named more unusual associations to neutral words. Another series of studies showed that people experiencing positive affect used more inclusive categories (Isen & Daubman, 1984, Studies 1 and 2; see also Isen, Niedenthal, & Cantor, 1992). Compared to those in neutral control conditions, those experiencing positive affect more often saw fringe exemplars of a given category as included within the category (e.g., *elevator* and *camel* are weak exemplars of the category *vehicle*). In another study, those experiencing positive affect created more inclusive categories by sorting a set of 14 color chips into fewer categories than those in a

neutral control group (Isen & Daubman, 1984, Study 3). More recently, other researchers have found that people experiencing positive affect were more flexible categorizers than those in other emotional states, forming fewer categories when focusing on similarities and more categories when focusing on differences (Murray, Sujan, Hirt, & Sujan, 1990). These and other findings have led Isen to conclude that positive affect leads people to see relatedness and interconnections among thoughts and ideas and to process material in a more integrated and flexible fashion (Isen, 1987; Isen & Daubman, 1984). In addition, Isen (1987) has speculated that positive affect might lead to more extensive cognitive elaboration on ideas or concepts, and that this elaboration may be responsible for the finding that positive affect facilitates memory (see Isen, 1987, for a review). Others working at the interface of emotion and cognition provide compatible evidence that positive affect "loosens" information processing strategies (e.g., Fiedler, 1988; Schwarz & Bless, 1991).

In closely related experiments, Isen and colleagues have shown that positive affect also influences creative thinking. These studies often use written tests of creativity such as the Mednick's Remote Associates Test. This test asks respondents to think of a word that relates to each of three other words (e.g., for the given words *mower*, *atomic*, and *foreign* the correct answer is *power*; Mednick, Mednick, & Mednick, 1964, as cited in Isen, Daubman, & Nowicki, 1987). At least three experiments have shown that positive affect leads people to perform better on this test (Isen et al., 1987, Experiments 3 and 4; see also Fodor & Greenier, 1995). A similar study using Torrance's creativity test (1974; as cited in Ziv, 1976), in which participants are asked to generate unusual uses for everyday objects, has also shown that positive affect facilitates creative responding (Ziv, 1976). Results of these studies underscore that creative thinking is to some degree a state-like variable that can be increased during experiences of positive affect.

In sum, by showing that people experiencing positive affect (a) offer more unusual cognitive associations, (b) create and use more inclusive cognitive categories, and (c) perform better on standard tests of creative thinking, Isen's program of research provides empirical support

for the claim that positive emotions broaden the scope of cognition.

Positive Emotions Broaden the Scope of Action

Studies that show that positive affect broadens the scope of thinking can be taken as indirect evidence that positive affect will also broaden the scope of action. Even so, better evidence comes from studies that include dependent measures that tap actions, measured either as actual behavior or behavioral intentions. A number of Isen and colleagues' experiments on creativity, for instance, use Duncker's (1945, as cited in Isen et al., 1987) candle task, in which participants are presented with a box of tacks, a candle, and a book of matches and asked to attach the candle to the wall in such a way that it will burn without dripping wax on the table or floor. The problem is solved if participants broaden their ideas about the given objects and empty the box, tack it to the wall, and use it as a platform (candle holder) for the upright candle. Paralleling work based on verbal tests of creativity, these experiments showed that, compared to those in a neutral control condition, individuals experiencing positive affect more frequently enacted the correct (creative) solution by using the given objects in unusual ways (Isen et al., 1987, Experiments 1 and 2; see also, Greene & Noice, 1988, for a similar experiment with adolescents). Additional evidence to support the claim that positive emotions broaden the scope of action can be drawn from research on variety-seeking in adults and play in children. Kahn and Isen (1993) found that adults experiencing positive affect, relative to those in a neutral control condition, sought more variety when choosing among safe and enjoyable consumer products, such as crackers, soup, and snack foods. Renninger (1992) found that when play objects elicited interest, children showed (a) a wider range of types of play, (b) more variations of action within play types, and (c) longer play episodes. Although few in number, these studies demonstrate that positive affective states prompt unusual and more varied actions rather than typical, or consistent actions, providing preliminary support for the claim that positive emotions broaden the scope of action.

Positive Emotions Build Physical Resources

I have argued that joy and related high-energy positive emotions create the urge to play and be playful, which when acted on, can build personal resources. Rough-and-tumble play is a highly physical form of play that involves play fighting and play chasing with frequent role reversals. Although ethologists do not describe rough-and-tumble play as a product of joy, the smiles and laughter that accompany it (Pelligrini, 1987) support this connection. Having observed rough-and-tumble play in human children across cultures as well as in nonhuman mammals, ethologists have sought to explain its function (Boulton & Smith, 1992). The straightforward idea that physical play facilitates muscle growth and general physical and cardiovascular fitness was advanced a century ago (Groos, 1898, 1901). Beyond general physical fitness, however, some theorists have argued that rough-and-tumble play, though largely unscripted, serves to develop and practice specific physical skills, namely for hunting, predator avoidance, or fighting. Whereas the empirical evidence for the association between play and hunting skills is scant, that for the associations between play and predator avoidance and fighting are compelling (for a review, see Boulton & Smith, 1992). In this research tradition, ethologists detail similarities between actions evident in juveniles of a species during play and those evident in adults of the same species during life-threats.

Regarding predator avoidance, ethologists have noted a peculiar form of play chasing among juvenile African ground squirrels called "jinking play" (Ewer, 1966, as cited in Boulton & Smith, 1992). This involves running fast while changing directions frequently, sometimes by jumping straight up in the air, turning in mid-flight, landing, and then running off in the new direction. Adults of this species engage in similar maneuvers during emergency escapes, particularly from snakes. Another peculiar form of play is evident in patas monkeys (Dolhinow, 1987). In play, the young of this species run headlong into a flexible sapling or bush, catapult themselves in another direction, and then run off. Adults of this species use this same technique to escape predators. Such commonalities between play maneuvers and survival

maneuvers—especially peculiar ones—have led ethologists to conclude that play chasing serves to build specific locomotor skills that can be drawn on later during emergencies (Boulton & Smith, 1992; Symons, 1978). Notably, in ancestral times, escape from predators would have been equally relevant to male and female members of a species. Observational studies of humans have shown that, although on the whole, boys engage in more frequent and more vigorous rough-and-tumble play, girls and boys engage in comparable amounts of play chasing (Boulton & Smith, 1992).

Ethologists have also uncovered conspicuous similarities between specific forms of play fighting seen among juveniles of a species and aggressive fighting seen among adults (for a review, see Boulton & Smith, 1992). For instance, a study of elephant seals found that male pups play in a manner that resembles the fighting seen in adult males of the species, whereas female pups play in a manner resembling the fighting seen in adult females (Rasa, 1971, as cited in Boulton & Smith, 1992). Likewise, a study of mule deer found that although both male and female juveniles engaged in locomotor play, only the males engaged in head-butting, a tactic used in adulthood intraspecies fighting, but only between males and only during breeding season (Linsdale & Tomich, 1953). Finally, a study of rhesus monkeys found that the play fighting of juveniles is characterized by repeated biting while avoiding being bitten; these bites, however, are inhibited and therefore harmless. In adulthood fights, similar bites are not inhibited and are therefore harmful and at times deadly (Symons, 1978). The added observation that males engage in more vigorous and frequent play fighting is consistent with the evolutionary claim that fighting skills were more critical for male members of a species, especially with respect to establishing relative dominance and securing mates.

Although the vast majority of this evidence is correlational, a few controlled experiments have tested the causal relationship between play and physical resource building. For instance, in one experiment rats were either deprived of juvenile social play or not. Later testing showed that deprived rats were slower to learn a complex motor task, suggesting that play also fosters

overall behavioral flexibility (Einon, Morgan, & Kibbler, 1978).

Positive Emotions Build Intellectual Resources

A central notion of attachment theory (Bowlby, 1969) is that, for children whose attachment needs are met, mothers provide a secure base from which to explore. From this perspective, the early love relationship between infant and caregiver provides a foundation for interest-inspired exploration, which in turn can increase the child's cognitive or intellectual resources. Empirical evidence from the attachment tradition supports this claim. Children identified as securely attached (using the strange situation paradigm) have been shown to be more persistent, enthusiastic, and effective in problem solving than their peers (Matas, Arend, & Sroufe, 1978) as well as more flexible and resourceful (Arend, Gove, & Sroufe, 1979). Securely attached children have also been shown to engage in more independent exploration of a novel physical space, and in turn to develop superior cognitive maps of that space as indicated by their performance on tests of spatial knowledge (Hazen & Durrett, 1982). These findings suggest that interest is a fragile emotion, one that can be suppressed or even eliminated in children whose innate attachment needs are not reliably met.

Interest remains an important motivator for learning throughout childhood and continuing into adulthood. A long tradition of studies on intrinsic motivation suggests that learning motivated by intrinsic interest is more efficient than learning motivated by extrinsic rewards. Specifically, intrinsic interest in learning has also been linked to greater conceptual understanding, higher levels of academic achievement, lower drop-out rates, and greater psychological adjustment (for reviews, see Deci, Vallerand, Pelletier, & Ryan, 1991; Renninger, Hidi, & Krapp, 1992).

Experimental studies also provide support for the claim that positive emotions build intellectual resources through enhanced learning and performance. In one experiment, 4-year-old children were randomly assigned to recall an emotional or nonemotional experience from their lives before doing a learning task (Masters, Barden, & Ford, 1979). The experimental

manipulation crossed three levels of affect (positive, neutral, negative) with two levels of tempo (active and passive). The positive affect, active tempo condition resembled joy (“Can you remember something that happened to you that made you feel so happy that you just wanted to jump up and down?”), whereas the positive affect, passive tempo condition resembled contentment (“... so happy that you just wanted to sit and smile?”). Children were given 30 seconds to recall and think about their assigned memory before learning a shape discrimination task. Both passive and active positive emotion conditions produced significantly faster mastery of the task compared to all other conditions. Similar experimental studies have yielded comparable results among students ranging from elementary to high school, and for those with and without learning disabilities (Bryan & Bryan, 1991; Bryan, Mathur, & Sullivan, 1996; Yasutake & Bryan, 1995). Remarkably, simply asking students to think for less than 1 minute of a happy moment from their lives before learning or test taking produces significant increases in intellectual gains and performance. Related evidence can be drawn from Isen and colleagues. In one experiment, individuals who were given a small bag of candy as a gift were better able to comprehend a complex integrative bargaining task, and were also more likely to negotiate an optimal agreement (Carnevale & Isen, 1986). Isen (1987) suggested that positive affect promotes improved understanding of complex situations. Taken together, these experiments support the claim that positive emotions, though short lived, facilitate learning and mastery, the products of which can become part of the individual’s enduring intellectual resources.

Positive Emotions Build Social Resources

Enduring social relationships are critical to both individual and collective survival, particularly for infants, who rely almost exclusively on parents to care for their basic needs. While this fact of life is almost too obvious to elaborate, the significance of positive emotions in creating and sustaining social relationships is worth underscoring. Shared experiences of positive emotions—through mutual smiles or social play—create not only mutual enjoyment in the moment, but also enduring alliances, friendships

or family bonds. These social relationships become enduring resources that individuals can draw on later in times of need. The shared smile between caregiver and infant, for instance, is the reward that ensures that the caregiver will continue to attend to and sacrifice for the child (Tomkins, 1962). Studies of newborns suggest that the smile is an innate response, appearing even before the infant can perceive the contours of a human face (Emde, Gaensbauer, & Harmon, 1976; Izard, Huebner, Risser, McGinnes, & Dougherty, 1980). These early infant smiles, then, can initiate the rewarding affective interchanges that build attachment and infant-caregiver bonds (Oatley & Jenkins, 1996). The importance of the smile to relationship formation is perhaps most evident in its absence. For instance, individuals born with facial paralysis (Mobius syndrome) and therefore unable to partake in mutual smiling report great difficulty in developing and maintaining even casual personal relationships (Ekman, 1992).

A long tradition of research in social psychology also suggests that experiencing positive affect increases the likelihood that an individual will help others who are in need (for a review, see Isen, 1987). Such altruism, in turn, can engender the positive emotion of gratitude in the person who receives help. Experiences of gratitude, in turn, often create the urge to reciprocate and thus form the base for a continuing cooperative relationship (Oatley & Jenkins, 1996). Ethologists have also noted that cooperation and turn taking are common and seemingly critical features of social play, and have argued that these practices serve to build enduring social relationships (Boulton & Smith, 1992). These relationships in turn become a reliable source not only of future play and enjoyment but also of social support.

Are Positive Emotions Evolved Adaptations?

Looking across this collection of empirical work, the emerging evidence provides preliminary support for the proposal that positive emotions broaden attention, thinking, and action and build physical, intellectual, and social resources. Even so, this empirical base remains thin, and direct tests of hypotheses derived from the broaden-and-build model of positive emotion are needed, especially experimental tests

that can establish causality. But even this limited amount of empirical support raises the “why?” question: Why might positive emotions have been designed to broaden people’s thought–action repertoires? To address this question, I explore whether and how positive emotions might be considered evolved psychological adaptations.

One route to arguing that a particular psychological phenomenon is an evolved adaptation is to take a *form-to-function* approach (Tooby & Cosmides, 1992). This functional analysis

begins with noting the existence of a complexly articulated and recurrent phenotypic pattern . . . [then,] one dissects the environment and the requirements for reproduction to find out whether they compose a well-defined adaptive problem for which the reliable outcomes of the design constitute a well-engineered solution. (Tooby & Cosmides, 1992, p. 76)

In other words, presuming for the moment that my description of positive emotions is accurate and thinking back to hunter–gatherer societies of the Pleistocene, what sort of adaptive problem might the outcomes of positive emotional states have reliably solved? What would make up an evolutionary functional analysis of positive emotions?

At a descriptive level, I have proposed that the positive emotions of joy, interest, contentment, and love broaden an individual’s momentary thought–action repertoire, encouraging the individual to pursue a wider range of thoughts or actions than is typical. I have also reviewed initial, indirect evidence to support the derived hypotheses that positive emotions broaden the scope of attention, thinking, and action. To take this descriptive analysis to an evolutionary functional analysis, a first step is to describe the ancestral environmental circumstances in which positive emotions occurred. Perceived *safety and satiation*, or freedom from harm and bodily need, is common to circumstances that elicit joy, interest, contentment, and love. Perhaps to an even greater degree than people’s current environment, the ancestral environment of hunter–gatherers was no doubt characterized by moment-to-moment fluctuations in safety and satiation, especially as these early hunter–gatherers made their way across land. Abilities to recognize and take advantage of the opportunities inherent in safe and satiated moments would have thus been important. Of all the

things a hunter–gatherer could do in such a moment—sleep, sit around, continue to run, attack, expel, or be vigilant—why might thought–action sequences promoted by positive emotions (play, explore, savor) have led to a reproductive advantage?

Perhaps most critical from an evolutionary perspective is the connection positive emotions have to what I call *resource building*. In broadening an individual’s momentary thought–action repertoires, whether through play, exploration, or savoring and integrating, positive emotions promote discovery of novel and creative ideas and actions, which in turn expand the individual’s personal resources, whether they be physical resources (e.g., the ability to outmaneuver a predator), intellectual resources (e.g., a detailed cognitive map for way finding), or social resources (e.g., someone to turn to for help or compassion). In other words, over time and through the processes of learning and social connection, the broadened momentary thought–action repertoires sparked by positive emotions also build up an individual’s store of physical, intellectual, and social resources. Importantly, these resources are durable and can be drawn on in later moments. As such, the adaptive value of positive emotions for human ancestors was not necessarily direct and immediate as was the adaptive value of negative emotions. Rather, human ancestors would have benefited from resource building in the long run. Although it is obvious that human ancestors needed at least one social relationship to reproduce, I propose that resource building had an even greater impact on differential rates of survival. Those ancestors who succumbed to the urges sparked by positive emotional states (i.e., to play, explore, savor, and integrate) would have by consequence accrued more physical, intellectual, and social resources. When these same ancestors later faced inevitable threats to life and limb, these resources would have translated into increased odds of survival and, in turn, increased odds of living long enough to reproduce. To the extent that the capacity to experience positive emotions is genetically encoded, this capacity, through the process of natural selection, is likely to have become part of universal human nature.

Importantly, this evolutionary functional analysis does not suggest that experiences of positive emotions lead to adaptive advantages in

present day circumstances, nor that individuals pursue circumstances that produce positive emotions in order to maximize their odds of survival, reproduction, or inclusive fitness. Indeed, in present day circumstances, positive emotions may serve a wide range of purposes in people's lives, and the "pursuit of happiness" may often reflect little more than the fact that positive emotions are hedonically pleasant and therefore inherently rewarding. Instead, the adaptationist account I offer makes the more modest claim that the structure and effects of positive emotions evident in present day humans have been shaped by the recurrent conditions faced by human ancestors over the course of evolution. (See Tooby & Cosmides, 1990, for a detailed discussion of the difference between adaptationist and correspondence approaches to the concept of function in evolutionary theory.)

To summarize, then, the adaptive problem that human ancestors faced that appears to have been solved by positive emotions is, when and how should individuals build resources for survival? The answer is to build resources during safe and satiated moments by playing, exploring, or savoring and integrating.

Implications of the Broaden-and-Build Model of Positive Emotions

In this section I highlight two implications that the broaden-and-build model of positive emotions might have for present day humans in contemporary society.

Positive Emotions May Undo the Aftereffects of Negative Emotions

If the broaden-and-build model is accurate in describing positive emotions as expanding an individual's momentary thought-action repertoire, then positive emotions ought to function as efficient *antidotes* for the lingering effects of negative emotions, which serve to narrow an individual's thought-action repertoire. The idea that positive emotions might "correct," "restore," or "undo" the aftereffects of negative emotions has been developed by a handful of emotion theorists (e.g., Cabanac, 1971; Fredrickson & Levenson, 1998; Lazarus, Kanner, & Folkman, 1980; Solomon, 1980). In an earlier article coauthored with Levenson, I suggested that one effect of positive emotions may be to

loosen the hold that (no-longer-relevant) negative emotions gain on an individual's mind and body by dismantling or undoing the psychological and physiological preparation for specific action (Fredrickson & Levenson, 1998).

One facet of this *undoing hypothesis* predicts that positive emotions restore autonomic quiescence following negative emotional arousal. A switch from a negative emotion to a positive emotion may in effect rid individuals of the physiological sequelae of action readiness. Levenson and I tested this facet of the undoing hypothesis in a series of studies. In one experiment (Fredrickson & Levenson, 1998, Study 1) we first induced negative emotional arousal by having participants view a short film that reliably elicited self-reports of fear and heightened cardiovascular activity. Into this context of negative emotional arousal, my coauthor and I randomly assigned participants to view one of four secondary films. In one positive emotion condition we elicited contentment, and in a second positive emotion condition we elicited mild amusement. In a negative emotion control condition we elicited sadness, and in a neutral control condition my coauthor and I elicited no emotion by showing an abstract visual display. All participants showed comparable levels of cardiovascular activation to the initial fear film. But participants who viewed either of the two positive films exhibited faster recovery from their initial negative emotional arousal, returning to their own baseline levels of cardiovascular activation within 20 seconds, compared to roughly 40 and 60 seconds for those who viewed the neutral and sad films, respectively. This pattern of results represents what I call the *undoing effect* of positive emotions. It has also been observed in subsequent experiments using the same secondary films, but in which the initial negative emotional arousal was induced using an anxiety-provoking speech-preparation task (Fredrickson, Mancuso, Branigan & Tugade, 1998).

Another study tested the undoing effect using a naturalistic union of negative and positive emotions (Fredrickson & Levenson, 1998, Study 2). My colleague and I examined the effects of spontaneous smiling during negative emotional arousal. We induced negative emotional arousal by having participants view a short film that reliably elicits sadness and heightened cardiovascular activity. Behavioral

coding revealed that, for whatever reasons, two thirds of the sample smiled at least once during the film. Although those who smiled and those who never smiled did not differ in their reports of negative affect or in the magnitude of cardiovascular arousal during the film, smilers, on average, recovered from this arousal about 20 seconds faster than nonsmilers.

These studies provide empirical support for the facet of the undoing hypothesis that predicts that positive emotions have a unique capacity to restore autonomic quiescence following negative emotions. Positive emotions, elicited by films or marked by smiles, sped recovery from the cardiovascular aftereffects of fear, anxiety, and sadness. These results in turn provide indirect evidence for the broaden-and-build model of positive emotions. Assuming (as most emotion theorists do) that the cardiovascular activation that accompanies negative emotions serves to prepare the body for specific action, it may be that by quelling this cardiovascular activation, positive emotions help the body efficiently trade a (no-longer-useful) narrow thought-action repertoire for a broader one, allowing the individual to pursue a wider array of thoughts and actions.

A second facet of the undoing hypothesis predicts that positive emotions also restore flexible thinking following lingering negative emotional experiences. To the best of my knowledge, no experiments have yet directly tested this prediction. Even so, indirect evidence consistent with the prediction can be drawn from a collection of correlational studies that show that laughter and a coping style marked by the use of humor are associated with the ability to distance oneself from distressing events (for reviews, see Martin, Kuiper, Olinger, & Dance, 1993, and Keltner & Bonanno, 1997). For instance, Keltner & Bonanno (1997), coded the facial behavior of bereaved adults and found that Duchenne laughter, which involves a laugh plus muscle action around the eyes as well as the mouth, correlated with reduced awareness of distress (as measured by a verbal-autonomic dissociation score). Relatedly, Martin and colleagues have found that individuals with higher levels of humor responded to a stressful academic exam with more problem-focused coping and greater emotional distance (Martin et al., 1993). Correlational studies like these are consistent with the proposition that positive

emotions loosen the grip that negative emotions can gain on people's thinking, a distancing that can prompt them to explore avenues of thought and action other than those prompted by the initial negative emotion.

Positive Emotions May Protect Health

The observation that positive emotions can undo the aftereffects of negative emotions raises the possibility that positive emotions may protect health. Earlier I noted that negative emotions have been implicated in a number of societal problems. Chief among these are physical health problems, most notably coronary heart disease and some cancers. The mechanisms by which negative emotions impact physical health are just beginning to be understood. Landmark work by Kaplan and colleagues, for instance, randomly assigned cynomolgus monkeys to experience a recurrent combination of negative emotions by repeatedly disrupting the social dominance hierarchies of monkeys in the experimental groups. All other aspects of the monkeys' lives were held constant. The disrupted monkeys showed both heightened cardiovascular reactivity and more advanced coronary heart disease, as indexed by atherosclerotic lesions of the coronary arteries, vasomotor abnormalities, and endothelial injury in the thoracic aorta (for a review, see J. R. Kaplan, Manuck, Williams, & Strawn, 1993). These data strongly suggest that the frequent and prolonged cardiovascular reactivity occasioned by negative emotions takes a toll on cardiovascular health.

If positive emotions can serve to undo the lingering cardiovascular reactivity sparked by negative emotions, positive emotions may also interrupt or cut short the damaging impact that this reactivity has on the cardiovascular system. Indirect evidence for the health benefits of positive emotions comes from studies in behavioral medicine that have documented the effectiveness of relaxation therapies for treating cardiovascular disorders (Blumenthal, 1985). Relaxation techniques vary greatly, and although they are not typically discussed in terms of positive emotions, some techniques expressly direct people to conjure up positive images (e.g., sunbathing at the beach, being in a favorite spot in nature), and thus perhaps capitalize on the undoing effects of contentment. Another link

between positive affective states and health has been recently documented in studies that track changes in moods, physical symptoms, and immune system indices on a daily basis. This work has found within-subject correlations between positive mood and immune system functioning (Stone, Cox, Valdimarsdottir, & Jandorf, 1987; Stone, Neale, Cox, & Napoli, 1994). These findings raise the possibility that people might increase control over their own physical health by cultivating experiences of positive emotion. Given the individual and societal costs associated with physical disease and illness, this possibility alone justifies continued investigations of the nature and effects of positive emotions.

Summary

In this article, I have argued that existing "emotion-general" models of emotion built on the concept of specific action tendencies provide a suitable description of the form and function of certain negative emotions but fail as descriptions of many positive emotions. For this and other reasons, positive emotions have to date remained undertheorized, understudied, and to my mind, underappreciated. To remedy this imbalance, I offer a new model for understanding the form and function of a subset of positive emotions, including joy, interest, contentment, and love. Specifically, I propose that these positive emotions broaden (rather than narrow) an individual's thought-action repertoire, with joy creating the urge to play, interest the urge to explore, contentment the urge to savor and integrate, and love a recurrent cycle of each of these urges. In turn, these broadened thought-action repertoires can have the often incidental effect of building an individual's personal resources, including physical resources, intellectual resources, and social resources. I call this the *broaden-and-build model* of positive emotions and suggest that it can explain why the propensity to experience positive emotions has evolved to be a ubiquitous feature of human nature and how, in contemporary society, positive emotions might be tapped to promote individual and collective well-being and health. My hope is that this new model might spark readers' interest and thereby prompt further empirical exploration of positive emotions and related affective phenomena.

References

- Andreason, N. J. C., & Powers, P. S. (1975). Creativity and psychosis: An examination of conceptual style. *Archives of General Psychiatry*, 32, 70-73.
- 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.
- Averill, J. R. (1980). On the paucity of positive emotions. In K. R. Blankstein, P. Pliner, & J. Polivy (Eds.), *Advances in the study of communication and affect: Vol. 6: Assessment and modification of emotional behavior* (pp. 7-45). New York: Plenum.
- Barefoot, J. C., Dahlstrom, W. G., & Williams, R. B., Jr. (1983). Hostility, CHD incidence, and total mortality: A 25-year follow-up study of 255 physicians. *Psychosomatic Medicine*, 45, 59-63.
- Basso, M. R., Scheff, B. K., Ris, M. D., & Dember, W. N. (1996). Mood and global-local visual processing. *Journal of the International Neuropsychological Society*, 2, 249-255.
- Blumenthal, J. A. (1985). Relaxation therapy, biofeedback and behavioral medicine. *Psychotherapy*, 22, 516-530.
- Bowlby, J. (1969). *Attachment and loss: Vol. 1: Attachment*. New York: Basic Books.
- 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.
- 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.
- Buss, D. M. (1994). *The evolution of desire: Strategies of human mating*. New York: Basic Books.
- Cabanac, M. (1971). Physiological role of pleasure. *Science*, 173, 1103-1107.
- Cacioppo, J. T., Klein, D. J., Berntson, G. G., & Hatfield, E. (1993). The psychophysiology of emotion. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotion* (pp. 119-142). New York: Guilford Press.
- Carnevale, P. J. D., & Isen, A. M. (1986). The influence of positive affect and visual access on the discovery of integrative solutions in bilateral negotiation. *Organizational Behavior and Human Decision Processes*, 37, 1-13.

- Chen, Y., & Dilsaver, C. C. (1996). Lifetime rates of suicide attempts among subjects with bipolar and unipolar disorders relative to subjects without Axis I disorders. *Biological Psychiatry*, *39*, 896–899.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: HarperPerennial.
- Davidson, R. J. (1993). The neuropsychology of emotion and affective style. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotion* (pp. 143–154). New York: Guilford Press.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist*, *26*, 325–346.
- De Rivera, J., Possel, L., Verette, J. A., & Weiner, B. (1989). Distinguishing elation, gladness, and joy. *Journal of Personality and Social Psychology*, *57*, 1015–1023.
- Derryberry, D., & Tucker, D. M. (1994). Motivating the focus of attention. In P. M. Neiderthal & S. Kitayama (Eds.), *The heart's eye: Emotional influences in perception and attention* (pp. 167–196). San Diego, CA: Academic Press.
- Diener, E., & Larsen, R. J. (1993). The experience of emotional well-being. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 405–415). New York: Guilford Press.
- 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.
- Dolhinow, P. J., & Bishop, N. (1970). The development of motor skills and social relationships among primates through play. In J. P. Hill (Ed.), *Minnesota Symposia on Child Psychology* (Vol. 4, pp. 141–198). Minneapolis: University of Minnesota Press.
- Easterbrook, J. A. (1959). The effect of emotion on cue utilization and the organization of behavior. *Psychological Review*, *66*, 183–201.
- 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.
- Ekman, P. (1994). Are these basic emotions? In P. Ekman & R. J. Davidson (Eds.), *The nature of emotions: Fundamental questions*. Oxford, England: Oxford University Press.
- Ekman, P., Friesen, W. V., O'Sullivan, M., Chan, A., Diacyoyanni-Tarlatzis, I., Heider, K., Krause, R., LeCompre, W. A., Ritcain, T., Ricci-Bitti, P. E., Scherer, K., Tomita, M., & Tzavras, A. (1987). Universals and cultural differences in the judgments of facial expressions of emotions. *Journal of Personality and Social Psychology*, *53*, 712–717.
- Ellsworth, P. C., & Smith, C. A. (1988a). From appraisal to emotion: Differences among unpleasant feelings. *Motivation and Emotion*, *2*, 271–302.
- Ellsworth, P. C., & Smith, C. A. (1988b). Shades of joy: Patterns of appraisal differentiating pleasant emotions. *Cognition and Emotion*, *2*, 301–331.
- Emde, R. N., Gaensbauer, T., & Harmon, R. J. (1976). *Emotional expression in infancy: A biobehavioral study*. New York: International University Press.
- Eysenck, H. J. (1994). Cancer, personality and stress: Predictions and prevention. *Advances in Behavioral Research and Therapy*, *16*, 167–215.
- Eysenck, H. J. (1995). *Genius: The natural history of creativity*. Cambridge, England: Cambridge University Press.
- Feist, G. J. (in press). Affective states and traits in creativity: Evidence for non-linear relationships. In M. A. Runco (Ed.), *Creativity research handbook* (Vol. 2). Cresskill, NJ: Hampton Press.
- Fielder, K. (1988). Emotional mood, cognitive style, and behavior regulation. In K. Fielder & J. P. Forgas (Eds.), *Affect, cognition and social behavior*. Toronto, Canada: Hogrefe.
- Foder, E. M., & Greenier, K. D. (1995). The power motive, self-affect, and creativity. *Journal of Research in Personality*, *29*, 242–252.
- 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., Mancuso, R. A., Branigan, C., & Tugade, M. (1998). *The undoing effect of positive emotions*. Manuscript in preparation.
- Fredrickson, B. L., Maynard, K. E., Helms, M. J., Haney, T. L., Siegler, I. C., & Barefoot, J. C. (1998). *Hostility predicts magnitude and duration of blood pressure response to anger*. Manuscript under review.
- Fredrickson, B. L., & Roberts, T. (1997). Objectification theory: Towards understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, *21*, 173–206.
- Frijda, N. H. (1986). *The emotions*. Cambridge, England: Cambridge 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.
- Greene, T. R., & Noice, H. (1988). Influence of positive affect upon creative thinking and problem solving in children. *Psychological Reports*, *63*, 895–898.
- Greer, S., & Morris, T. (1975). Psychological attributes of women who develop breast cancer: A controlled study. *Journal of Psychosomatic Research*, *19*, 147–153.

- Groos, K. (1898). *The play of animals*. New York: Appleton.
- Groos, K. (1901). *The play of man*. London: Heinemann.
- Hatfield, E., & Rapson, R. (1993). Love and attachment processes. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotion* (pp. 595–604). New York: Guilford Press
- Hazen, N. L., & Durrett, M. E. (1982). Relationship of security of attachment and cognitive mapping abilities in 2-year-olds. *Development Psychology*, 18, 751–759.
- Heller, W. (1990). Neuropsychology and emotion: Developmental patterns and implications for psychopathology. In N. L. Stein, B. Leventhal, & T. Trabasso (Eds.), *Psychological and biological approaches to emotion* (pp. 167–211). Hillsdale, NJ: Erlbaum.
- Isen, A. M. (1987). Positive affect, cognitive processes, and social behavior. *Advances in Experimental Social Psychology*, 20, 203–253.
- 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.
- Isen, A. M., Niedenthal, P., & Cantor, N. (1992). The influence of positive affect on social categorization. *Motivation and Emotion*, 16, 65–78.
- Izard, C. E. (1977). *Human emotions*. New York: Plenum Press.
- Izard, C. E., Huebner, R. R., Risser, D., McGinnes, G. C., & Dougherty, L. M. (1980). The young infant's ability to produce discrete emotion expressions. *Developmental Psychology*, 16, 132–140.
- Jameson, K. R. (1993). *Touched with fire: Manic-depressive illness and the artistic temperament*. New York: The Free Press.
- 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.
- Kaplan, J. R., Manuck, S. B., Williams, J. K., & Strawn, W. (1993). Psychosocial influences on atherosclerosis: Evidence for effects and mechanisms in nonhuman primates. In J. Blascovich & E. Katkin (Eds.), *Cardiovascular reactivity to psychological stress and disease* (pp. 3–26). Washington, DC: American Psychological Association.
- Kaplan, S. (1992). Environmental preference in a knowledge-seeking, knowledge-using organism. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 581–598). New York: Oxford University Press.
- 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.
- Kessler, R. C., McGongle, K. A., Zhao, S., Nelson, C. B., Hughes, M., Eshleman, S., Wittchen, H., & Kendler, K. S. (1994). Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States. *Archives of General Psychiatry*, 51, 8–19.
- Kimchi, R. (1992). Primacy of wholistic processing and global/local paradigm. A critical review. *Psychological Bulletin*, 112, 24–38.
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Lazarus, R. S., Kanner, A. D., & Folkman, S. (1980). Emotions: A cognitive-phenomenological analysis. In R. Plutchik & H. Kellerman (Eds.), *Emotion: Theory, research and experience: Vol. 1. Theories of emotion* (pp. 189–217). New York: Academic Press.
- Lemerise, E. A., & Dodge, K. A. (1993). The development of anger and hostile interactions. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 537–546). New York: Guilford Press.
- Levenson, R. W. (1992). Autonomic nervous system differences among emotions. *Psychological Science*, 3, 23–27.
- 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.
- Levenson, R. W., Ekman, P., & Friesen, W. V. (1990). Voluntary facial action generates emotion-specific autonomic nervous system activity. *Psychophysiology*, 27, 363–384.
- Lewinsohn, P. M. (1974). A behavioral approach to depression. In R. J. Friedman & M. M. Katz (Eds.), *The psychology of depression: Contemporary theory and research*. Washington, DC: Winston-Wiley.
- Lewis, H. B. (1971). *Shame and guilt in neurosis*. New York: International Press.
- Linsdale, J. M., & Tomich, P. Q. (1953). *A herd of mule deer*. Berkeley: University of California Press.
- Martin, R. A., Kuiper, N. A., Olinger, J., & Dance, K. A. (1993). Humor, coping with stress, self-concept, and psychological well-being. *Humor*, 6, 89–104.

- 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.
- Murray, N., Sujan, H., Hirt, E. R., & Sujan, M. (1990). The influence of mood on categorization: A cognitive flexibility interpretation. *Journal of Personality and Social Psychology*, *59*, 411–425.
- Myers, D. G., & Diener, E. (1995). Who is happy? *Psychological Science*, *6*, 10–19.
- Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology*, *9*, 353–383.
- Nesse, R. M. (1990). Evolutionary explanations of emotions. *Human Nature*, *1*, 261–289.
- Nesse, R. M., & Berridge, K. C. (1997). Psychoactive drug use in evolutionary perspective. *Science*, *278*, 63–66.
- Nolen-Hoeksema, S., Morrow, J., & Fredrickson, B. L. (1993). Response styles and the duration of episodes of depressed mood. *Journal of Abnormal Psychology*, *102*, 20–28.
- Noll, S. M., & Fredrickson, B. L. (in press). A mediational model linking self-objectification, body shame and disordered eating. *Psychology of Women Quarterly*.
- Oatley, K., & Jenkins, J. M. (1996). *Understanding emotions*. Cambridge, MA: Blackwell.
- Ohman, A. (1993). Fear and anxiety as emotional phenomena: Clinical phenomenology, evolutionary perspectives, and information-processing mechanisms. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 511–536). New York: Guilford Press.
- Orians, G. H., & Heerwagen, J. H. (1992). Evolved responses to landscapes. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 555–579). New York: Oxford University Press.
- Pellegrini, A. D. (1987). Rough-and-tumble play: Developmental and educational significance. *Educational Psychologist*, *22*, 23–43.
- Pratto, F., & John, O. P. (1991). Automatic vigilance: The attention-grabbing power of negative social information. *Journal of Personality and Social Psychology*, *61*, 380–391.
- Renninger, K. A. (1992). Individual interest and development: Implications for theory and practice. In K. A. Renninger, S. Hidi, & A. Krapp (Eds.), *The role of interest in learning and development* (pp. 361–395). Hillsdale, NJ: Erlbaum.
- Renninger, K. A., Hidi, S., & Krapp, A. (Eds.). (1992). *The role of interest in learning and development*. Hillsdale, NJ: Erlbaum.
- Richards, R., & Kinney, D. K. (1990). Mood swings and creativity. *Creativity Research Journal*, *3*, 202–217.
- Rosenberg (1998). Levels of analysis and the organization of affect. *Review of General Psychology*, *2*, 247–270.
- Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review*, *94*, 23–41.
- Ruch, W. (1993). Exhilaration and humor. In M. Lewis & J. M. Haviland (Eds.), *Handbook of emotions* (pp. 605–616). New York: Guilford Press.
- Scheier, M. F., & Bridge, M. W. (1995). Person variables and health: Personality predispositions and acute psychological states as shared determinants of disease. *Psychosomatic Medicine*, *57*, 255–268.
- Schwarz, N., & Bless, H. (1991). Happy and mindless, but sad and smart? The impact of affective states on analytic reasoning. In J. P. Forgas (Ed.), *Emotion and social judgment* (pp. 55–71). Oxford, England: Pergamon Press.
- Shaw, E. D., Mann, J. T., Stokes, P. E., & Manevitz, A. Z. (1986). Effects of lithium carbonate on associative productivity and idiosyncrasy in bipolar patients. *American Journal of Psychiatry*, *143*, 1166–1169.
- Silberstein, L. R., Striegel-Moore, R., & Rodin, J. (1987). Feeling fat: A woman's shame. In H. B. Lewis (Ed.), *The role of shame in symptom formation* (89–108). Hillsdale, NJ: Erlbaum.
- Solomon, R. L. (1980). The opponent-process theory of acquired motivation: The costs of pleasure and benefits of pain. *American Psychologist*, *35*, 691–712.
- Stone, A. A., Cox, D. S., Valdimarsdottir, H., & Jandorf, L. (1987). Evidence that secretory IgA antibody is associated with daily mood. *Journal of Personality and Social Psychology*, *52*, 988–993.
- Stone, A. A., Neale, J. M., Cox, D. S., & Napoli, A. (1994). Daily events are associated with a secretory immune response to an oral antigen in men. *Health Psychology*, *13*, 440–418.
- Symons, D. A. (1978). *Play and aggression: A study of rhesus monkeys*. New York: Columbia University Press.
- Tomkins, S. S. (1962). *Affect, imagery, consciousness, Vol. 1: The positive affects*. New York: Springer.
- Tomkins, S. S. (1982). Affect theory. In P. Ekman (Ed.), *Emotions in the human face* (2nd ed., pp. 353–395). New York: Cambridge University Press.

- Tooby, J., & Cosmides, L. (1990). The past explains the present: Emotional adaptations and the structure of ancestral environments. *Ethology and Sociobiology, 11*, 375-424.
- Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19-136). New York: Oxford University Press.
- Williams, R. B., Jr., Haney, L. T., Lee, K. L., Kong, Y., Blumenthal, J., & Whalen, R. (1980). Type A behavior, hostility, and coronary atherosclerosis. *Psychosomatic Medicine, 42*, 539-549.
- Yasutake, D., & Bryan, T. (1995). The influence of induced positive affect on middle school children with and without learning disabilities. *Learning Disabilities Research and Practice, 10*, 38-45.
- Ziv, A. (1976). Facilitating effects of humor on creativity. *Journal of Educational Psychology, 68*, 318-322.

Received November 3, 1997

Revision received March 25, 1998

Accepted April 22, 1998 ■