

The Broadening, Building, Buffering Effects of Positive Emotions

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Why do we feel good? Is there a reason for our positive emotions, or are they simply byproducts of our actions and reactions, with no real effect on what we do? Aristotle believed that happiness was the byproduct of leading a virtuous life, and said that positive emotions existed merely to motivate us to live well—our “carrot on a stick,” as it were. Pop songs don’t appear to have moved far beyond this idea: as Tina Turner sings, “What’s love but a second-hand emotion?”

It is easy to think of positive emotions such as joy, serenity, gratitude, or love as purely hedonistic—their only purpose is to feel good, and indulging in them feels selfish. In contrast, few people, and certainly few psychologists, would argue that negative emotions are without psychological worth. Decades of research have provided support for the idea that negative emotions cause us to behave in very specific, self-protective ways that were evolutionarily adaptive. When you feel fear, adrenaline rushes through your body and you’re ready to run or fight to stay alive. When someone attacks you, you become angry and devote all your energies to fighting back and protecting yourself. When something unfortunate happens to you, you become sad; you go somewhere quiet and remain still to recuperate. All of these evolutionarily adaptive responses help you to stay safe, protect yourself, and conserve your energy in response to negative life events. You don’t simply feel angry, or frightened, or sad, and do nothing; your feelings cause you to act in certain narrowly-defined ways in response to the situation.

It is more difficult to think of specific actions triggered by positive emotions. The emotion of joy is defined as a nonspecific urge to act—when you feel joyful, you want to do anything: dance, sing, hug people, read a novel, paint, or laugh. On the other hand, when you feel serene, you don’t

want to do anything. People who feel serene tend to sit back and savor the moment, paying attention to the details of their surroundings, relishing each one. With such a wide range of possible responses to each positive emotion, and with the responses being so subtle (it can be hard to tell if a person is savoring, and the urge to “do anything” is a subjective experience impossible to observe), it has been extremely difficult to tell what positive emotions do, or whether they had an evolutionary purpose. Was it useful to simply sit back and enjoy a beautiful sunset, or to feel the urge to play an instrument, sing, and dance all at once? How did these urges, borne out of positive emotions, help our primitive ancestors to avoid predators, find food and shelter, win mates, and raise their young?

For many years, there was no answer. Theories of “emotions” generally focused on negative feelings, and when scientists said that they could explain the evolutionary function of emotions, they really meant that they could explain *negative* emotions. One theory that attempts to explain both positive and negative emotions is Carver and Scheier’s control-process view of the origins and functions of emotions (1990). Carver and Scheier present the perspective that all emotions, both positive and negative, exist to notify people of progress toward goals. A negative emotion is a way of signaling that no progress toward a goal is being made, or that the goal is moving even farther away. A positive emotion lets a person know that progress is being made toward a desirable goal. Gradations of these emotions, from less to more intense, indicate the rate of positive or negative progress. Mixed emotions, like laughing through tears, are due to the fact that human beings hold multiple goals simultaneously, and these goals can sometimes conflict or progress in different directions at the same time. Carver and Scheier’s theory of emotions is tied up in their overall conceptualization of human psychology as primarily motivational: people are motivated to work toward certain goals, and our actions, reactions, thoughts, and feelings are in response to the goals we choose and the progress we make toward them.

While Carver and Scheier explain emotions from a motivational perspective, their ideas do not rule out other explanations from an evolutionary perspective. Research on negative emotions provides evidence that negative emotions are adaptive not only as motivational markers but because they induce specific action tendencies: if you’re frightened, you want to run; if you’re angry, you want to fight; and so on. Not only can emotions indicate whether you’re making progress toward your goals, but they also can prepare you to take certain actions. These specific action tendencies are embodied thoughts: they not only affect the mind by causing you to think nervously or aggressively, but they also ready the body to complete certain actions. If, at this moment, you saw danger looming and were experiencing fear, you would not only experience an overwhelming urge to flee to safety, but also within milliseconds your cardiovascular system would have switched gears to redirect oxygenated blood to large muscles so that you’d be physically ready to run away.

While the concept of specific action tendencies is extremely useful for explaining the evolutionary significance of negative emotions, and while it

contributes to our understanding of how emotions affect both the mind and body, it fares less well in attempting to explain the effects of positive emotions. How can the body ready itself for a specific action when joy causes a person to want to do ... anything at all? Can the “doing nothing” associated with serenity really be called a specific action tendency? It seems that positive emotions operate via different processes than negative emotions. This idea is supported by research indicating that over large periods of time, positive and negative emotions are independent: the amount of positive emotion a person feels does not affect the amount of negative emotion experienced, and vice versa. Just because it’s your birthday and you’re feeling incredibly happy doesn’t prevent you from feeling incredibly sad later that day when you come across a framed picture of your beloved Uncle Morty, who passed away last month. Positive and negative emotions can change independently, so you can feel both at the same time. Specific action tendencies explain the usefulness of the negative dimension. The “broaden-and-build” theory, proposed by Barbara Fredrickson (e.g., Fredrickson & Branigan, 2005) provides an evolutionary explanation for the utility of positive emotions.

EARLY WORK ON POSITIVE EMOTIONS

Research by Alice Isen on creativity laid some of the groundwork for Fredrickson’s later work on positive emotions. Isen found that when individuals experienced positive emotions due to a small gift of candy or watching a short comedic film, they were more creative in a wide variety of measures than individuals who experienced neutral or negative emotions. Individuals who experienced positive emotions were more likely to make unusual word associations in a word-association task, to find novel ways of solving problems, and to create and use more inclusive categories when grouping objects. Isen and her colleagues believed that these effects were the result of changes in cognitive organization caused by positive emotions (Isen, Daubman, & Nowicki, 1987). In other words, when people were experiencing a positive emotion, the way they thought about problems and organized their knowledge changed, making it easier for them to make associations or connections between unrelated objects.

This flexible thinking increases problem-solving ability, an important survival trait for both our evolutionary ancestors and for us. An example of one of Isen’s creativity tasks should help to illustrate this adaptive benefit of positive emotions. Isen asked participants to complete what is called the “candle task.” Participants are seated at a table holding a candle, a box of matches, and a thumbtack. A corkboard is on the wall next to the table. The participants are given the task of attaching the candle to the corkboard “in such a way that it will burn without dripping wax onto the table or the floor beneath it” (Isen, Daubman & Nowicki, 1987, p. 1123).

Can you think of how to accomplish this task? The usual solution is to take the tray out of the matchbox and attach it to the corkboard with the thumbtack, thus forming a shelf on which to set the candle. In Isen’s study, 75% of the participants who watched a short positive emotion-inducing

film before they sat down were able to solve the problem and complete the task. Meanwhile, only 20% of the participants in the neutral film condition, and 13% of the participants in the negative film condition were able to complete the task. While the ability to “MacGyver” a candle to a corkboard will probably never be the lynchpin upon which an individual’s survival rests, the flexible thinking required to see alternative uses in everyday objects would have been fundamental to the survival of primitive humans and is still of vital use today.

THE BROADEN-AND-BUILD THEORY OF POSITIVE EMOTIONS

The broaden-and-build theory of positive emotions generalizes from these effects on creativity to make a statement about the effect of positive emotions on human cognition and behavior in general. This theory holds that, unlike negative emotions, which narrow people’s ideas about possible actions (through specific action tendencies), positive emotions broaden people’s ideas about possible actions, opening their awareness to a wider range of thoughts and actions than is typical for them.

Whereas the narrowed mindsets sparked by negative emotions were adaptive in instances that threatened survival in some way, the broadened mindsets sparked by positive emotions were adaptive in different ways and over longer time frames: Broadened mindsets were adaptive because over time such expansive awareness served to build our human ancestor’s resources, spurring on their development, and equipping them to better handle subsequent and inevitable threats to survival.

As an example, consider the playful mindset we associated previously with joy. Ethological research documents that as complex organisms play with their age-mates, they forge social alliances, otherwise known as friendships, thus gaining social resources. These social resources increase the odds of survival and, in certain circumstances, might spell the difference between life and death. Consider also the contemplative mindset associated with our description of serenity. One of the hallmarks of human beings is the ability to learn from experience. Without the reflective, integrative thinking that occurs when one is feeling serene and savoring one’s current experiences, this learning could be seriously impeded. The gains in knowledge and perspective that come from connecting one’s current experiences to one’s past might, once again, make the difference in a life or death situation.

The broaden-and-build theory states that positive emotions were adaptive to our human ancestors because, over time, positive states and their associated broadened mindsets could accumulate and compound in ways that transformed individuals for the better, leaving them with more social, psychological, intellectual, and physical resources than they would have otherwise had. When these ancestors later faced inevitable threats to life and limb, their greater resources would have translated into better odds of survival, and of living long enough to reproduce. To the extent that the capacity to experience positive emotions was genetically encoded, this capacity would have been shaped by natural selection in ways that explain

the form and function of the positive emotions we modern-day humans experience.

The broaden-and-build theory posits that positive emotions have different effects over the short and long terms. Over the short term, positive emotions widen the repertoire of people’s possible actions, resulting in creativity and in direct contrast to the narrowing of the range of likely actions that occurs when people experience negative emotions. Positive emotions also widen the scope of attention, causing people to notice more of their environment and to be more aware of what is going on around them. Positive emotions also create openness to new experiences, whereas negative emotions cause people to narrow their focus and reject new experiences in favor of the safe and familiar. Essentially, while negative emotions narrow a person’s repertoire of thoughts, actions, and interests, positive emotions broaden it.

To better conceptualize these effects, imagine Abby, who is going out for a night on the town with her friends. She’s just had a nasty fight with her boyfriend, and is feeling very angry. As the group drives into town, Abby changes lanes and nearly hits another car. She claims that it “came out of nowhere!” though her friends all insist the other driver had done nothing unusual. Abby’s friends want to go to a new club in town, but Abby refuses. She decides to go leave the group and go to her usual diner, where she orders her usual soda. Abby’s focus on fighting, her lack of attention to the environment around her and her lack of interest in new experiences are hallmarks of the short-term narrowing effects of her feelings of anger.

In contrast, imagine Claire, who is also going out for an evening on the town with her friends. Claire is in a great mood; she’s feeling joyful and up for anything. As they drive downtown, Claire rolls down the windows and takes a deep breath of the spring air, noticing the complex potpourri of scents coming from the local arboretum. Though she has never gone to the arboretum before, she is suddenly seized with the desire to go explore it. Claire’s free-floating desire to do anything, her attention to minor details in her environment and her interest in trying something new are all related to the short-term broadening effects of her feelings of joy.

Positive emotions also have effects on people over longer time spans. The broaden-and-build theory posits that the long-term psychological effects of positive emotions may result from the build-up of benefits from many short-term experiences of broadening. Short-term increases in creativity, problem-solving ability, attentional scope, and openness to experience lead to making healthier, wiser life choices, which have the effect of building a person’s social, psychological, intellectual, and physical resources. This increase in resources is demonstrated by better coping in adversity, increased relationship closeness and mindfulness, and improved immune functioning.

To illustrate the different long-term effects of negative and positive emotions, let us return to Abby and Claire. When we first met Abby she was angry. This is a typical mood for her; she is goal-driven, impatient, and frequently stressed. As a result, she is driving away many of her friends, and

has trouble keeping a boyfriend. The anger also keeps her levels of stress and adrenaline high, taking a toll on her health. Because she spends so much time feeling angry, she doesn't always see the best options when making decisions and tends to be more interested in being quick than being right. Because Abby is so driven, being sick increases her stress level and she tends to stay ill for long periods of time. Abby's rough social demeanor, bad decision-making, and frequent ill health prevent her from connecting with other people and enjoying opportunities she might otherwise have had. This makes her more angry, which leads to even more social isolation and poorer health and decision-making. When tough times come, Abby has few, if any, resources left to support her and she has trouble bouncing back.

Claire's joyful mood also was fairly characteristic of her approach to life. Since Claire is usually in a good mood, her friends enjoy spending time with her. This creates strong friendships with people who support her when times get tough, helping her to bounce back from adversity. Claire's cheerfulness also helps her to counteract stress, letting her focus on the sources of her problems without feeling overwhelmed by negative emotions. She solves problems creatively, which helps her get ahead at work and avoid trouble before it starts. Claire tries to meet even illness with perspective, and since she doesn't spend all her energy fretting about being sick, she gets better that much faster. Over time, the resources she accumulates—good health, good friends, good problem-solving skills—add up, and help her not only cope with problems as they come, but avoid problems in the future. This leads her to feel even more positive, because her cheerful outlook on the world has led to good results. When positive emotions lead to increased resources, which in turn lead to more positive emotions, it is called an “upward spiral.” The result of this spiral is a bank of long-term resources that increase resilience in the face of trouble and make life richer and more meaningful.

SCIENTIFIC EVIDENCE FOR BROADEN-AND-BUILD

So how did we come to discover the ways that positive emotions work? The answer lies in a body of psychological research conducted over many years in laboratories and in the field. Through rigorous application of the scientific method, the predictions of the broaden-and-build theory were tested using the principle of random assignment to conditions. Experimenters investigated the effects of positive emotions on individuals from college students to older adults from many different walks of life. In many studies, experimenters induced positive emotions in some participants, neutral feelings in others, and negative emotions in others, in order to tease out the different effects of these feelings. In studies where emotions were induced, either by watching videos, reading passages, or other methods, participants were randomly assigned to conditions. This means that each person was equally likely to experience a positive, negative, or neutral emotion in the course of the study.

The purpose of randomly assigning participants to conditions is to ensure that all groups are equivalent to one another, so that the results of the study cannot be attributed to factors such as personality traits, gender, culture, etc. In other words, each group has a similar balance of egocentric people, compassionate people, women, men, the well-to-do, introverted or extroverted people, and so on—the groups are basically the same, for the purpose of the study. The only difference among them is what experimental treatment each group received (for example, which type of video each group is shown in a study).

BROADENING

According to the broaden-and-build theory, positive emotions broaden our scope of attention and expand the array of thoughts and actions that come to mind, also known as our “thought-action repertoire.” The studies described in this section illustrate how the scientific method was used to test the predictions of the broadening element of the theory. These studies allow us to say that the broadening effect of positive emotions appears to be a real, reliable phenomenon, supported by data as well as by common sense.

Broadened Attention

Let us return to Abby to illustrate the benefits of thinking broadly. After school, Abby and her friends usually hang out until dinner. Some days Abby and her friends decide to play checkers. When Abby feels upbeat, she finds it easier to keep track of the board as a whole, therefore allowing her to make smarter decisions about what piece to play next. In contrast, when Abby feels sad, frustrated or just neutral, she finds it more difficult to keep track of the entire board at once. She finds herself focusing on only segments of the board instead of the big picture, and her game suffers. The influence of emotions on our attentional scope was found in a study by Fredrickson and Branigan (2005). Participants were randomly assigned to watch film clips that elicited positive, negative, or neutral emotions. A film clip featuring penguins slipping and sliding on ice elicited amusement; a film clip featuring nature scenes such as mountains, streams and meadows elicited contentment; a film clip featuring a mountain-climbing accident elicited fear; a film clip featuring a group of men taunting others elicited anger and disgust; and a film clip featuring a computer screensaver elicited no emotion. After participants watched the film clips, they were asked to report which of two geometric figures was more similar to a “standard geometric figure.” Neither choice was right or wrong, but one of the geometric figures looked like the standard geometric figure in a global arrangement, and the other in local, detailed parts (see Figure 1.1 for an illustration of the geometric figures participants in the study saw). The participants who watched either of the two positive emotion film clips were more likely to choose the geometric figure in a global arrangement, in

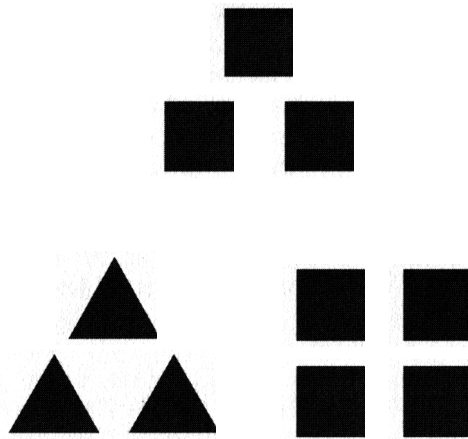


Figure 1.1. Global-Local Visual Processing

comparison to the participants who watched neutral or negative emotion film clips. Positive emotions *broadened* people's scope of visual attention.

It is easy to imagine several ways in which the influence of positive emotions on our scope of attention affects our everyday lives. Consider the activity of driving a car. In driving school, we were warned that the key to good driving is to attend broadly to the road, rather than focusing narrowly on an object in the environment outside, such as the immediate car ahead of us. Focusing broadly means that we are aware of the wide expanse of the road ahead of us—the vehicles to the left and right of us and far ahead—and as a result, we are better drivers. The broaden-and-build theory predicts that feeling positive emotions benefits us during activities that demand broadened attention such as playing checkers or driving through traffic. When feeling content or tranquil, we may be more likely to be aware of the big picture on the road or on the checkerboard in its entirety. This tendency would be reversed, however, when feeling negative or neutral emotions.

Broadened Thought-Action Repertoires

In addition to broadening the scope of our attention, positive emotions expand the array of thoughts and actions that come to mind. Consider the high school student Claire and her friends, also hanging out after school. On days Claire and her friends feel indifferent or downhearted, they find it difficult to come up with things they would like to do. On days in which Claire and her friends feel content or joyful, they find it easier to come up with a number of interesting possible activities. Fredrickson and Branigan (2005) explored how emotions influence our behavioral choices. After participants watched film clips that elicited either positive, negative, or neutral emotions, they were asked to imagine themselves in a situation in which the emotion they experienced from the film clip would arise. For instance, participants who experienced amusement imagined themselves in a

situation in which they would experience amusement. Keeping this feeling in mind, they were asked to make a list of all of the things they'd like to do. The participants who watched positive emotion film clips were more likely to come up with a longer and more varied list of things they'd like to do, in comparison to the participants who watched neutral or negative emotion film clips. That is, positive emotions "broadened" people's personal inventory of actions they would like to engage in. The influence of emotions on the range of actions we'd like to engage in may provide one reason why people act more adventurously while on vacation. Our elevated mood elicited by a beautiful location may contribute to our willingness to hang-glide for the first time or eat new and exotic foods we would otherwise not try.

Broadening and Perceiving Others

Positive emotions' effects on cognitive broadening also change the ways in which we perceive others. Johnson and Fredrickson (2005), for instance, tested whether positive emotions improved face recognition for viewing faces of another race. They were interested in this issue because humans share a tendency to be *less* able to distinguish between people of a different race. So for people who are white, the ability to tell black faces apart is usually poorer than the ability to tell apart other whites. The psychological term for this tendency is the *own-race bias* in facial recognition.

Johnson and Fredrickson put together a two-phase study to investigate whether positive emotions changed Whites' ability to recognize Black faces. First, White participants were presented with a series of White and Black faces to learn (the learning phase). They were then presented with twice as many White and Black faces to test their ability to distinguish between the old faces they saw in the learning phase and the new faces (the testing phase). Either before the learning phase or after it, experimenters induced different emotions in the participants. Participants either watched a film clip of a stand-up comedian that elicited joy, a film clip featuring a succession of everyday items that elicited neutral emotions, or a film clip of a horror film that elicited fear. Compared to participants who experienced neutral or negative emotions, participants who experienced positive emotions before either the learning or the testing phases no longer showed the own-race bias. That is, the experience of positive emotions improved Whites' ability to recognize people of a different race.

Exactly *why* the own-race bias disappears after experiencing positive emotions is not completely known. The scientists who carried out the study describe two possible explanations, both supported by previous work on positive emotions. As we typically process faces of our own race as wholes, broadening the scope of our attention through positive emotions may improve our recognition of other-race faces. This would only be true to the extent that we typically notice specific features of other-race faces rather than the whole face. Another possible reason is that positive emotions may broaden our identities to include members of other social groups. That is,

positive emotions may diminish the differences we perceive between ourselves and members of another group, because positive emotions encourage us to think of ourselves and those around us as “all of us” rather than “us” (my racial group) versus “them.”

In line with the finding that positive emotions eliminate racial group differences in face recognition, positive emotions may reduce distinctions between the self and others in additional ways. Specifically, positive emotions increase the amount of connection people experience between themselves and other individuals. This connection is sometimes conceptualized as including the “other” in the “self,” whether the other is a friend or a stranger (Aron, Aron, Tudor & Nelson, 1991). A shorthand way to refer to this connection is “self-other overlap.” Imagining the overlap between our self-concept and another person’s self-concept is certainly an abstract task and probably is not something we normally do. For the sake of illustration, imagine yourself and your best friend. Assuming you have a good relationship with him or her, you probably perceive your self-concept and your best friend’s self-concept as overlapping substantially. You define yourself partially as “my best friend’s friend,” and share many traits and preferences. Now, imagine yourself and your physician. Assuming you are not close friends with your physician, it is likely that your self-concept and your physician’s self-concept do not overlap as much. You have less in common and are less likely to claim that your identity as “my physician’s patient” plays a significant part in your self-concept.

The extent to which your self-concept overlaps with another’s may have consequences for your relationship with that person. If the self-other overlap is great, you likely empathize with the other person more and act responsively to their needs. Conversely, if the self-other overlap is low, you may show little, if any concern, for the other person and his or her well-being.

Waugh and Fredrickson (2006) were interested in how positive emotions may affect our self-other overlap with new college roommates. New college freshman answered questions about their emotions, personality, and self-other overlap with their roommates one week into the semester and then again four weeks later. Additionally, participants answered questions about their emotions everyday between these two time periods. Waugh and Fredrickson found that one week into the semester, college freshman who reported higher positive emotions also reported increased self-other overlap with their new roommates. Also, college freshman who experienced a high ratio of positive to negative emotions throughout the first month of college reported a greater increase in self-other overlap than freshman with a low positivity ratio. The findings of Waugh and Fredrickson point to another way positive emotions lead to broadening. Positive emotions not only expand our visual attention and the thoughts and actions we bring to mind, but also broaden our self-concept to include others. That is, the invisible boundary that exists between ourselves and others becomes less distinct and we feel more socially connected. The implications that greater self-other overlap has for social relationships are covered later, when we discuss how positive emotions help to build social resources.

Broadening and Creativity

The tendency for positive emotions to produce cognitive broadening is associated with thinking that is more flexible and creative. There are a variety of tasks which demand creative thinking—thinking that integrates seemingly dissimilar ideas in a reasonable but original way—in our everyday lives (Isen, Daubman, & Nowicki, 1987). Consider the process of decorating one’s new apartment on a budget and owning an old mismatched wooden coffee table with only \$10 to spare. A creative approach would be to use the \$10 to buy a can of spray paint and stencils in order to turn the table into a contemporary piece of living room furniture. A less creative approach would be to search for a new coffee table that cost \$10.

We mentioned the influence of positive emotions on creativity previously, when we described Isen et al.’s (1987) candle task. However, the effect of positive emotions on creativity is not limited to solving creative brainteasers involving tangible objects. Creative thinking also aids us being able to integrate seemingly dissimilar elements in a useful, yet original manner. Consider the task of writing a poem about one of the four seasons. In order to do so and not bore our readers, we would have to utilize our creative skills. In the 19th century, John Keats wrote the poem “To Autumn.” He described autumn as:

*Season of mists and mellow fruitfulness,
Close bosom-friend of the maturing sun;
Conspiring with him how to load and bless
With fruit the vines that round the thatch-eves run*
(Keats, 1994, p. 193)

Depicting the season as a friend of the sun who schemes about ways to ripen fruit on the trees is certainly far more creative than an explanation one might find in a dictionary. For example, a more mundane description would state that autumn occurs between summer and winter, specifically from the September equinox to the December solstice in the Northern Hemisphere, and that the leaves usually change color at that time and the weather cools. This description, however, fails to elicit the true sense of what it is to experience autumn. The popular board game Taboo presents another opportunity for looking at the world in a creative manner. During each round, a player from one of the teams reads a card with the target word (e.g., felt) and a list of words (e.g., material, fabric, art projects, etc.) he or she cannot use in prompting the target word from his or her team members. A common tactic to succeed in the game is to think of the target word in an unconventional manner. For example, instead of trying to prompt the word “felt” with words that relate to its definition as a kind of material, a player could try to prompt the word “felt” with words that related to its definition as the past tense verb “to feel.”

The effect of positive emotions on our creativity also was explored in another of Isen’s 1987 studies. After some participants were given a bag of candy to elicit positive emotions and others were given nothing, all participants were asked to complete a Mednick Remote Associates Test, which

asks people to think of a word that relates to a group of three other words. For example, given the group of words *sore*, *shoulder*, and *sweat*, people are asked to think of one word that is associated with each of the three words in the group. The correct answer in this example is *cold*. One can imagine a “cold sore,” “a cold shoulder,” and a “cold sweat.” At first glance, however, the three words appear to be completely unrelated. Thus, coming up with a word that conceptually links all three of the words together requires flexible, creative thinking. In the experiment, participants who received the bag of candy, and as a result felt more positive emotions, came up with more correct answers on the test, in comparison to the participants who watched neutral emotion film clips. That is, the experience of positive emotions broadened people’s cognition, leading to more creative thinking.

BUILDING

The broaden-and-build theory describes building as coming from many short moments of broadening. Broadened thought-action repertoires result in different patterns of actions and decision-making than narrowed repertoires, leading to increased investment in the physical, intellectual and social realms. Over time, this investment can “add up” and create long-term physical, intellectual, and social resources, even if the positive emotions that begin the process are generated in a lab. These resources manifest in various ways such as health, understanding of the world, and strong relationships with others. Research on building culminates in controlled, scientific studies in the laboratory, but it began with observations rooted in the natural world.

Building Physical Resources

Support for the idea that positive emotions build physical resources over time comes from research on animals, heart health, and the immune system. Scientists who study positive emotions are sometimes inspired by animal behavior, specifically animal play. While the fact that animals play is not evidence that animals feel emotions, or the same emotions that humans do, play behavior is sometimes used as a substitute for positive emotions when observing animals in the lab, such as in the work we discuss here.

Young animals at play show behaviors that are similar to the actions taken by adult animals of the same species when escaping from predators or fighting for territory or resources. An example of these behaviors is the “jinking play” of juvenile African ground squirrels, in which the young squirrels run from tree to tree, jumping straight up in the air and then taking off in a new direction (Ewer, 1966). Adult squirrels use this pattern of behavior when making emergency escapes from predators. The spontaneous play of the juvenile squirrels may be a way for them to hone these escape skills with peers in a non-threatening environment before they are needed for survival. While there are many differences between a person and an African ground squirrel, observing the ways that juvenile play helps to

prepare animals for adult activities provides a starting point to theorize about the role of play, and the positive emotions associated with play, in human beings.

In a more general mode, the rough-and-tumble play that takes place among the young of many species, and which is often accompanied by positive emotions in humans, is a way to develop important physical skills such as hand-eye coordination and motor control, as well as build muscular strength and endurance (Boulton & Smith, 1992). The endless chasing game that children engage in at the playground are good not only for working off excess youthful high spirits, but also for building endurance, coordination, and strength, all resources that are vital for healthy physical development.

In addition to physical coordination, a healthy heart is another important physical resource. Research shows that positive emotions play a role in regulating cardiovascular reactivity, or the way heart rate changes in response to changes in the environment. In what Fredrickson and Levenson (1998) call the “undoing effect,” participants who watched videos of a puppy at play or waves washing along the beach after watching a frightening film showed a faster return to resting, or baseline, heart rate than participants who watched an abstract or sadness-inducing video. In addition, participants who smiled spontaneously while watching a sad film showed a faster return to baseline heart rate after the film than participants who did not spontaneously smile. In other words, the heart rates of participants who saw a positive-emotion inducing stimulus or showed facial expressions consistent with feeling positive emotion slowed faster than those of other participants. Faster cardiovascular recovery from negative, or just unexpected, events is related to cardiovascular health, as stress to the heart is lessened.

To understand why heart health, as affected by rapid cardiovascular recovery, is useful, imagine the following scenario. You walk into your house, open the door to your bedroom and something leaps out at you! Immediately, your heart begins to race. You may gasp in surprise, pulling extra oxygen into your lungs. Blood speeds to all the muscles in your body, readying you to fight or run away. However, your heart is not designed to beat very quickly for long periods of time. Your body is prepared to remove the threat as fast as possible, and then to return to its resting state. When your heart continues to beat quickly long after the frightening or startling stimulus is removed, your entire body experiences unnecessary wear and tear—which may well decrease heart health and increase the risk of heart attacks.

Positive emotions promote heart health by shortening the amount of time that the heart beats quickly in situations where the fight-or-flight response is no longer useful: for example, when your friends leap out at you and yell “Surprise!” on your birthday. When you feel positive emotions such as contentment or amusement, your heart rate returns to a slower, resting rate more quickly than if you are not experiencing positive emotions. Just as, over time, the amount of stress from extended cardiovascular reactivity can accumulate to damage the heart, the “undoing effect” may well help, over time, to prevent cardiovascular damage, leading to a healthier heart.

Along with leading to a healthier heart, experiencing positive emotions may help keep you from catching a cold. Cohen, Doyle, Turner, Alper, and Skoner (2003) conducted a very interesting study to determine whether people who typically experience more positive emotions have a greater resistance to minor diseases (such as colds) than people who typically experience fewer positive emotions. First, Cohen et al. asked participants about their feelings on the day before the interview, in order to determine how many positive and negative emotions participants typically experienced. Participants were then put in quarantine for six days, isolated from any free-floating viruses that might cause them to spontaneously get sick. On the first day, the participants' health was evaluated. Then, on day two, the experimenters placed solutions containing one of two cold viruses in participants' noses. For days three through six of the experiment, participants remained in quarantine and the experimenters recorded which of the participants got sick. After analyzing the data, Cohen et al. found that participants in the study who were high in positive emotional style developed fewer colds than participants who were low in positive emotional style. In other words, having a lot of positive feelings each day might help to keep you healthy.

Why might positive emotions help you to avoid colds? Davidson et al. (2003) found that experiencing positive emotions was related to increased immune function, making the body better able to fight off disease. In a study comparing individuals who performed mindfulness meditation for eight weeks to individuals who did not meditate, participants who meditated showed more brain activity characteristic of positive emotions, and this emotion-related brain activity predicted increases in immune function. In other words, experiencing positive emotions may regularly keep you healthy by making the body better able to fight off infections, decreasing your likelihood of getting sick.

With all of these benefits to your body, heart, and immune system, it is not surprising that several longitudinal studies which followed individuals over long periods of time found that positive affect is correlated with living longer. The most well-known of these longitudinal studies is referred to as the Nun Study (Danner, Snowdon & Friesen, 2001). In this study, researchers analyzed the autobiographies of 180 Catholic nuns, written when each nun was about to take her final vows to join the convent. The average age of these nuns at the time that they were writing was 22. When the autobiographies were analyzed for emotional content almost 60 years later, researchers found that the amount of positive emotion expressed in a nun's autobiography was correlated with how long she had lived. In the sample, nuns who expressed the most positive emotion in their writing lived an average of 6.9 years longer than nuns who expressed the least amount of positive emotion.

These nuns lived in the same type of environment and were from similar backgrounds with similar educational levels, so it is unlikely that this large difference in longevity is due to environmental factors. It seems that, for the nuns, experiencing more positive emotion was strongly related to having longer lives. This effect also was found in a number of other studies

using different populations (not just nuns), with similarly large effects (Levy, Slade, Kunkel, & Kasl, 2002; Moskowitz, 2003; Ostir, Markides, Black, & Goodwin, 2000). It appears that experiencing more positive emotions forecasts a longer life, an effect that may be due to the fact that individuals who experience more positive emotion tend to have more resources (physical, intellectual, and social) with which to respond to events in their lives.

Building Intellectual Resources

Remember Claire? She is a college student now, on her way to her first class. As she walks into class, the students already sitting in the classroom burst out laughing. Claire doesn't know anyone here, and she isn't sure why they are laughing. Claire isn't sure what to do. Should she ask someone to let her in on the joke? Or should she pretend she doesn't hear anything in case the joke is on her? If Claire asks about the joke, she is showing approach behavior, seeking more information about her environment. If Claire decides not to ask, she is showing avoidance behavior, trying to keep from looking stupid or learning something bad. Research shows that the option which Claire chooses—to approach or avoid the situation—is related to how she was feeling before she arrived at the classroom. Negative emotions lead to avoidance behavior, whereas positive emotions promote approach behavior (Fazio, Eiser, & Shook, 2004). So if Claire was feeling fairly happy, she would be more likely to ask why people are laughing, and if she was feeling fairly unhappy, she would be more likely to stay quiet.

Both approach and avoidance behaviors are useful. Avoidance behavior helps individuals keep away from situations, objects, or people they consider dangerous, and is important for survival. We wouldn't get very far if we didn't learn to avoid putting our hands on hot stove burners or walking on the highway in the middle of rush hour. In this example, Claire's classmate actually might be laughing at her, which would make Claire very unhappy if she knew.

On the other hand, approach behavior helps individuals to gather information about their environment. This rich store of information becomes a resource on which people can draw to make better decisions. Claire's classmate might be laughing because she has toilet paper stuck to the bottom of her shoe—a very useful thing to know! The avoidance orientation induced by negative emotions is extremely useful for preventing people from actively harming themselves, but it makes it extremely difficult to learn new information about ambiguous stimuli. When a person avoids something, he or she can't learn more about it, and so incorrect ideas go uncorrected. On the other hand, when a person approaches ambiguous situations, he or she gains more information about them and is better able to gauge how best to react.

Here is an example of how the relationship between positive emotions and approach motivation described above can result in increased intellectual

resources. This time, let's think about Abby. In ninth grade, long before she became such a grouch, Abby enrolled in a Spanish class. As she took the required class, she discovered that her interest in learning the language was greater than that of most students. She genuinely enjoyed learning about the mechanics of a different language. Her interest, a positive emotion, fueled her motivation to study for hours without a second thought, seek unassigned texts, and begin volunteering in a bilingual elementary school. The result is knowledge of Spanish that is greater and more thorough than any of her fellow students. Each year, her knowledge grows and her language skills eventually will become a valuable asset when applying for jobs. Abby's positive emotional reaction to learning Spanish activated a natural impulse to explore the material further, continue learning, and inevitably gain even more knowledge. That is, her positive emotions triggered a series of actions that ultimately resulted in building her intellectual resources.

Building Social Resources

Positive emotions also help to build social resources, such as friendships. To return to the animal play example mentioned previously, juvenile animals at play are not only building physical resources—they also are creating and reinforcing social bonds of mutual benefit and support. This works similarly for humans: when play is a social activity, we create and confirm positive connections with the people with whom we play, who associate us with positive emotions and shared positive experiences. In a different way, think of a teacher whose class you really enjoyed. As a result of your enjoyment of the course, you formed a good relationship with that teacher. This relationship is a resource, which you could probably draw on for references or letters of recommendation in the future.

To return to the example of play and positive emotions, children at the playground do more than simply make friends. They also develop social skills. As children play, they learn important skills related to compromising, sharing, and perspective-taking. These skills help children to make friends and work with others as they grow older. In addition, since emotions spur people to action, individuals who feel positive are more likely to go out and interact with others, making more friends. Sophisticated social skills and broad friendship networks are valuable social resources that individuals can draw on throughout their lives.

The study by Waugh and Fredrickson (2006) mentioned earlier provides an example of the way that positive emotions build social resources. We discussed how freshman college students' tendency to experience positive emotions in general was correlated with feeling more connected to their new college roommate one week after the beginning of classes. Another result of this study was that the feeling of connection was in turn related to a more complex understanding of their roommates. In other words, it appears that people who experience more positive emotion develop closer relationships and a more thorough understanding of the people they

interact with. While some of this effect may be due to the fact that others like to spend time with cheerful people, and thus cheerful people are more likely to make friends quickly, the development of complex understanding suggests that more is going on. It seems that people who experience more positive emotions are also, in some way, better able to parse the information they receive from the social interactions they experience, building a richer store of information and understanding concerning the people they know.

CONCLUSION

Why do positive emotions matter? The broaden-and-build theory describes positive emotions as adaptive mechanisms that help people to think creatively, flexibly, and globally, which leads to increased physical, social and intellectual resources. These resources, in turn, may help individuals lead longer, richer lives. Positive emotions are not, as Tina Turner's song says, "second-hand emotions," good for nothing, simply signaling when life is good or bad. Just as negative emotions provided strong evolutionary advantage for our ancestors by promoting self-protective responses to aversive circumstances, positive emotions helped and still help us to explore and understand our environments. The beneficial effects of positive emotions may be part of what drives us to explore, understand and develop ourselves and our world, changing our lives and the lives of those around us for the better.

PERSONAL MINI-EXPERIMENTS

Your Turn to Broaden, Build, and Buffer

Understanding Your Adventures: Write a list of 10 adventurous or out-of-the-ordinary things you have done that were not planned. Your list might include things such as going waterskiing for the first time, eating an exotic new cuisine like snails, painting your room a bright color, or dancing on stage in a dance club. Then, describe the situation you were in and how you felt when you decided to do these things. Notice the type of emotions you were experiencing prior to your adventures.

Inducing Positive Emotions to Aid Creativity: The next time you are engaging in a task that demands creativity (e.g., coming up with an essay topic, decorating your room) and experience frustration, take a break and do something that elicits positive emotions. Then, return to the task and try again. Chances are you will be more likely to succeed with the task than before.

Greater Self-Other Overlap after Experiencing Positive Emotions: Before you watch a comedic television show or movie with friends, ask them to draw themselves and another person as two circles that may overlap on a piece of paper. After you all watch the comedy, ask them to draw themselves and the same person as two circles again. Compare the two sets of drawings among your friends. Do you notice greater self-other overlap after they watch the comedy?

Building Resources: Once each day for a week, try to do an ordinary task differently than you would normally: take a different route home, eat something new for lunch, etc. After a week, write down any changes in your life that have resulted from these small variations from the routine. How many of these changes are increases in your physical resources such as health and stamina; intellectual resources, such as discovering a new restaurant, or acquiring a better mental map of your area; social resources, such as meeting new friends, or gaining a different perspective on old friends? What do you think would happen if you continued to do old things in a new way for longer than a week?

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