



FG Trade/E+/Getty Images

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Emotions, Stress, and Health (Modules 36–40)

No one needs to tell you that feelings add color to your life, or that in times of stress they can disrupt your life, or save it. Fear, anger, sadness, joy, and love are psychological states that also entail physical reactions. Nervous about an important encounter, we feel stomach butterflies. Anxious over public speaking, we frequent the bathroom. Smoldering over a family conflict, we get a splitting headache.

You can surely recall a time when emotion overwhelmed you. I [DM] retain a flashbulb memory of the day I went to a huge store and brought along Peter, my toddler first-born child. As I set Peter down on his feet for a moment to do some paperwork, a passerby warned, “You’d better be careful or you’ll lose

that boy!” Not more than a few breaths later, I turned and found no Peter beside me.

With mild anxiety, I looked around one end of the customer service counter. No Peter in sight. With slightly more anxiety, I peered around the other side. No Peter there, either. Now, with my heart accelerating, I circled the neighboring counters. Still no Peter anywhere. As anxiety turned to panic, I began racing up and down the store aisles. He was nowhere to be found. The alerted store manager used the intercom to ask customers to assist in looking for a missing child. Soon after, I passed the customer who had warned me. “I told you that you were going to lose him!” he now scolded. With visions of kidnapping (strangers routinely adored that beautiful child), I braced for the

unthinkable possibility that my negligence had caused me to lose what I loved above all else, and that I might have to return home and face my wife without our only child.

But then, as I passed the customer service counter yet again, there he was, having been found and returned by some obliging customer. In an instant, the arousal of terror spilled into ecstasy. Clutching my son, with tears suddenly flowing, I found myself unable to speak my thanks and stumbled out of the store awash in grateful joy.

Emotions are subjective. But they are real. As researcher Lisa Feldman Barrett (2012, 2013) noted, “My experience of anger is not an illusion. When I’m angry, I feel angry. That’s real.” Where do our emotions come from? Why do we have them? What are they made of?

Emotions are an adaptive response—“our body’s way of ensuring we do what is best for us,” noted primate researcher Frans de Waal

(2019). Anger can elicit a concession. Gratitude strengthens relationships. Pride motivates hard work (Weidman & Kross, 2021). When we face challenges, emotions focus our attention and energize our actions (Cyders & Smith, 2008). Our heart races. Our pace quickens. All our senses go on high alert. By integrating data from our environment, our body, and our experiences, we feel emotional stress (Francis, 2018).

Emotions can also be positive. Receiving unexpected good news, we may find our eyes tearing up. We raise our hands triumphantly. We feel exuberance and a newfound confidence. Yet negative and prolonged emotions can harm our health.

In Modules 36, 37, and 38, we explore how psychologists think about and study our emotional expression and experiences. In Modules 39 and 40, we take a close look at the challenges of stress and some ways of coping that help us meet those challenges.



Courtesy of David Myers

MODULE

36 Introduction to Emotion

Like most psychological phenomena—vision, sleep, memory, sex—emotion can be approached in three ways: physiologically, behaviorally, and cognitively. Researchers explore these manifestations of emotion and their interactions.

Emotion: Arousal, Behavior, and Cognition

LEARNING OBJECTIVE QUESTION **LOQ** 36-1 How do arousal, expressive behavior, and cognition interact in emotion?

As my [DM’s] panicked search for Peter illustrates, **emotions** are a mix of

- *bodily arousal* (heart pounding),
- *expressive behaviors* (quicken pace), and
- *conscious experience* (Is this a kidnapping?) *and feelings* (panic, fear, joy).

The puzzle for psychologists is fitting these three pieces together. To do that, the first researchers of emotion considered two big questions:

1. A chicken-and-egg debate: Does your bodily arousal come *before* or *after* your emotional feelings? (Did I first notice my racing heart and faster step, and then feel terror about losing Peter? Or did my sense of fear come first, stirring my heart and legs to respond?)
2. How do *thinking* (cognition) and *feeling* interact? Does cognition always come before emotion? (Did I think about a kidnapping threat before I reacted emotionally?)

The psychological study of emotion began with the first question: How do bodily responses relate to emotions? Two of the earliest emotion theories offered different answers.

emotion a response of the whole organism, involving (1) physiological arousal, (2) expressive behaviors, and, most importantly, (3) conscious experience resulting from one’s interpretations.





MATT SULLIVAN/REUTERS/Newscom

Joy expressed According to the James-Lange theory, we don't just smile because we share our teammates' joy. We also share the joy because we are smiling with them.

James-Lange Theory: Arousal Comes Before Emotion

Common sense tells most of us that we cry because we are sad, lash out because we are angry, tremble because we are afraid. But to pioneering psychologist William James, this commonsense view of emotion had things backward. Rather, “We feel sorry because we cry, angry because we strike, afraid because we tremble” (1890, p. 1066). To James, emotions result from attention to our bodily activity. James' idea was also proposed by Danish physiologist Carl Lange, and so is called the **James-Lange theory**. James and Lange would have guessed that I noticed my racing heart and then, shaking with fright, felt the whoosh of emotion—that my feeling of fear *followed* my body's response.

Cannon-Bard Theory: Arousal and Emotion Occur Simultaneously

Physiologist Walter Cannon (1871–1945) disagreed with the James-Lange theory. Does a racing heart signal fear or anger or love? The body's responses—heart rate, perspiration, and body temperature—are too similar, and they change too slowly, to *cause* the different emotions, said Cannon. He, and later another physiologist, Philip Bard, concluded that our bodily responses and experienced emotions occur separately but simultaneously. So, according to the **Cannon-Bard theory**, my heart began pounding as I experienced fear. The emotion-triggering stimulus traveled to my sympathetic nervous system, causing my body's arousal. *At the same time*, it traveled to my brain's cortex, causing my awareness of my emotion. My pounding heart did not cause my feeling of fear, nor did my feeling of fear cause my pounding heart.

But are they really independent of each other? Countering the Cannon-Bard theory are studies of people with severed spinal cords, including a survey of 25 World War II soldiers (Hohmann, 1966). Those with *lower-spine injuries*, who had lost sensation only in their legs, reported little change in their emotions' intensity. Those with *high spinal cord injury*, who could feel nothing below the neck, did report changes: Some of their reactions were much less intense than before the injuries. Anger, one man with this injury type revealed, “just doesn't have the heat to it that it used to. It's a mental kind of anger.” Other emotions, those expressed mostly in body areas above the neck, were felt *more* intensely. These men reported increases in weeping, lumps in the throat, and getting choked up when saying good-bye, worshiping, or watching a touching movie. Such evidence has led some researchers to view feelings as “mostly shadows” of our bodily responses and behaviors (Damasio, 2003).

But our emotions also involve cognition (Averill, 1993; Feldman Barrett, 2006, 2017). Here we arrive at psychology's second big emotion question: How do thinking and feeling interact? Whether we fear the person behind us on a dark street depends entirely on whether or not we interpret them as threatening.

RETRIEVAL PRACTICE

RP-1 According to the Cannon-Bard theory, (a) our *physiological response* to a stimulus (for example, a pounding heart), and (b) the *emotion we experience* (for example, fear) occur _____ (simultaneously/sequentially). According to the James-Lange theory, (a) and (b) occur _____ (simultaneously/sequentially).

ANSWERS IN APPENDIX E

→ **James-Lange theory** the theory that our experience of emotion occurs when we become aware of our physiological responses to an emotion-arousing stimulus.

Cannon-Bard theory the theory that an emotion-arousing stimulus simultaneously triggers (1) physiological responses and (2) the subjective experience of emotion.

two-factor theory the Schachter-Singer theory that to experience emotion one must (1) be physically aroused and (2) cognitively label the arousal.

Schachter-Singer Two-Factor Theory: Arousal + Label = Emotion

LOQ 36-2 To experience emotions, must we consciously interpret and label them?

Stanley Schachter and Jerome Singer (1962) demonstrated that how we *appraise* (interpret) our experiences also matters. Our physical reactions *and our thoughts* (perceptions, memories, and interpretations) together create emotion. In their **two-factor theory**, emotions have two ingredients: physical arousal and cognitive appraisal. An emotional experience, they argued, requires a conscious interpretation of arousal.

Consider how arousal spills over from one event to the next. Imagine completing an intense session at the gym and then receiving a message that you got your dream job. With arousal lingering from the workout, would you feel more elated than if you heard this news after staying awake all night studying?

To explore this *spillover effect*, Schachter and Singer injected college men with the hormone epinephrine, which triggers feelings of arousal. One group of men was told to expect feelings of arousal from the injection. Others were told by the trickster researchers that it would help test their eyesight. Picture yourself as a participant: After receiving the injection, you go to a waiting room, where you find yourself with another person (actually an accomplice of the experimenters) who is acting either euphoric or irritated. As you observe this person, you begin to feel your heart race, your skin flush, and your breathing become more rapid. What would you feel if you had been in the group told to expect these effects from the injection?

In the experiment, these volunteers felt little emotion—because they correctly attributed their arousal to the drug. But if you had been told the injection would help assess your eyesight, what would you feel? Perhaps you would react as this group of participants did. They “caught” the apparent emotion of the other person in the waiting room. They became happy if the accomplice was acting euphoric, and testy if the accomplice was acting irritated.

This discovery—that a stirred-up state can be experienced as one emotion or another, depending on how we interpret and label it—has been replicated in dozens of experiments and continues to influence modern emotion research (MacCormack & Lindquist, 2016; Reisenzein, 1983; Sinclair et al., 1994). *The point to remember:* Arousal fuels emotion; cognition channels it.

RETRIEVAL PRACTICE

RP-2 According to Schachter and Singer, two factors lead to our experience of an emotion: (a) physiological arousal and (b) _____ appraisal.

ANSWERS IN APPENDIX E

Zajonc, LeDoux, and Lazarus: Does Cognition Always Precede Emotion?

But is the heart always subject to the mind? Must we *always* interpret our arousal before we can experience an emotion? Robert Zajonc [ZI-yence] (1923–2008) didn’t think so. He contended that we actually have many emotional reactions apart from, or even before, our conscious interpretation of a situation (1980, 1984). Perhaps you can recall liking (or disliking) something or someone immediately, without knowing why.

Thanks to the *mere exposure effect* (see the Social Psychology modules), we come to like what is familiar. Even when people repeatedly view stimuli flashed too briefly for them to interpret, they come to prefer those stimuli (Kunst-Wilson & Zajonc, 1980). Unaware of having previously seen them, they nevertheless like them. We also have an acutely sensitive automatic radar for emotionally significant information; even a subliminally flashed stimulus can prime us to feel better or worse about a follow-up stimulus (Murphy et al., 1995; Zeelenberg et al., 2006).

Neuroscientists are charting the neural pathways of emotions (Ochsner et al., 2009). Our emotional responses can follow two different brain pathways. Some emotions (especially more complex feelings like hatred and love) travel a “high road.” A stimulus following this path would travel (by way of the thalamus) to the brain’s cortex (FIGURE 36.1). There, it would be analyzed and labeled before the response command is sent out, via the amygdala (an emotion-control center).

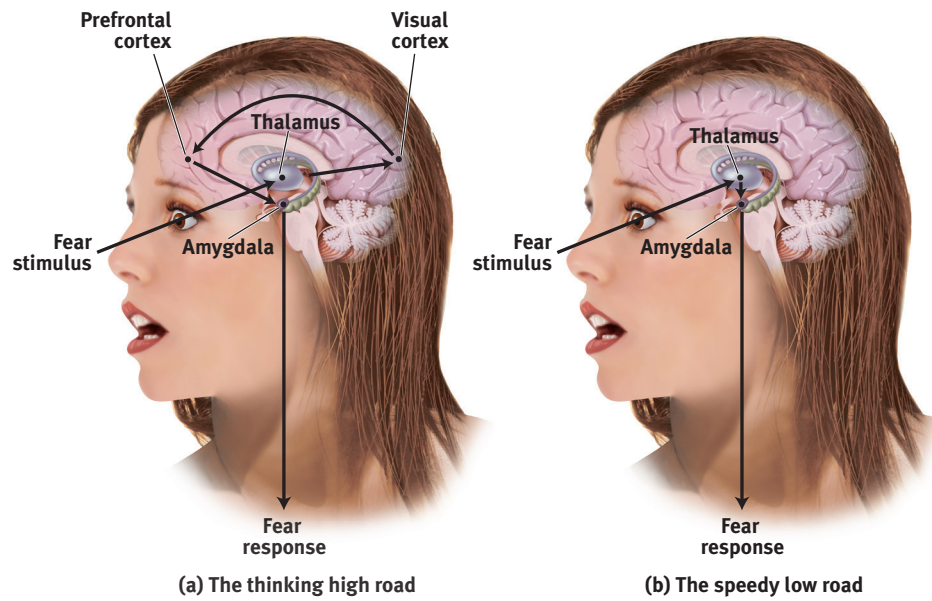
But sometimes our emotions (especially simple likes, dislikes, and fears) take what Joseph LeDoux (2002, 2015) has called the more direct “low road,” a neural shortcut that bypasses the cortex. Following the low road, a fear-provoking stimulus would travel from the eye or ear (again via the thalamus) directly to the amygdala (Figure 36.1b). This shortcut enables our lightning-quick emotional response before our intellect intervenes. Like speedy reflexes (that also operate separately from the brain’s thinking cortex),



The spillover effect Arousal from a soccer match can fuel anger, which can descend into rioting or other violent confrontations.

➔ **FIGURE 36.1**

The brain's pathways for emotions In the two-track brain, sensory input may be routed (a) to the cortex (via the thalamus) for analysis and then transmission to the amygdala; or (b) directly to the amygdala (via the thalamus) for an instant emotional reaction.



the amygdala's reactions are so fast that we may be unaware of what's transpired (Dimberg et al., 2000). A conscious fear experience then occurs as we become aware that our brain has detected danger (LeDoux & Brown, 2017).

The amygdala sends more neural projections up to the cortex than it receives back, which makes it easier for our feelings to hijack our thinking than for our thinking to rule our feelings (LeDoux & Armony, 1999). Thus, in the forest, we can jump at the sound of rustling bushes nearby, leaving it to our cortex to decide later whether the sound was made by a snake or by the wind. Such experiences support Zajonc's and LeDoux's belief that some of our emotional reactions involve no deliberate thinking.

Emotion researcher Richard Lazarus (1991, 1998) agreed that our brain processes vast amounts of information without our conscious awareness, and that some emotional responses do not require conscious thinking. Much of our emotional life operates via the automatic, speedy low road. But he further wondered: How would we know what we are reacting to if we did not in some way appraise the situation? The appraisal may be effortless and unconscious, but it is still a mental function. To know whether a stimulus is good or bad, the brain must have some idea of what it is (Storbeck et al., 2006). Thus, said Lazarus, emotions arise when we appraise an event as harmless or dangerous. We appraise the sound of the rustling bushes as the presence of a threat. Then we realize that it was "just the wind."

So, let's sum up (see also TABLE 36.1). As Zajonc and LeDoux have demonstrated, some simple emotional responses involve no conscious thinking. When I [ND] see a big spider trapped behind glass, I experience fear, even though I know the spider can't

TABLE 36.1 Summary of Emotion Theories

Theory	Explanation of Emotions	Example
<i>James-Lange</i>	Emotions arise from our awareness of our specific bodily responses to emotion-arousing stimuli.	We observe our heart racing after a threat and then feel afraid.
<i>Cannon-Bard</i>	Emotion-arousing stimuli trigger our bodily responses and simultaneous subjective experience.	Our heart races at the same time that we feel afraid.
<i>Schachter-Singer</i>	Our experience of emotion depends on two factors: general arousal and a conscious cognitive label.	We may interpret our arousal as fear or excitement, depending on the context.
<i>Zajonc; LeDoux</i>	Some embodied responses happen instantly, without conscious appraisal.	We automatically feel startled by a sound in the forest before labeling it as a threat.
<i>Lazarus</i>	Cognitive appraisal ("Is it dangerous or not?")—sometimes without our awareness—defines emotion.	We feel frightened when we believe the rustling in the bushes signals a wild animal; we feel relieved when we realize it's just the wind.

hurt me. Such responses are difficult to alter by changing our thinking. Within a fraction of a second, we may perceive one person as more likable or trustworthy than another (Willis & Todorov, 2006). This instant appeal can even influence our political decisions if we vote (as many people do) for the candidate we like over the candidate who expresses positions closer to our own (Westen, 2007).

But other emotions—including depressive moods and complex feelings—are greatly affected by our conscious and unconscious information processing: our memories, expectations, and interpretations. For these emotions, we have more conscious control. When we feel emotionally overwhelmed, we can change our interpretations (Gross, 2013). Such *reappraisal* often reduces distress and the corresponding amygdala response (Ford & Troy, 2019; Liu et al., 2019). Reappraisal not only reduces stress, it also helps students achieve better school performance (Borman et al., 2019). So don't stress about your stress. Embrace it, and approach your next exam with this mindset, "Stress evolved to help maintain my focus and solve problems." Although the emotional low road functions automatically, the thinking high road allows us to retake some control over our emotional life. *The bottom line:* Together, automatic emotion and conscious thinking weave the fabric of our emotional lives.

RETRIEVAL PRACTICE

RP-3 Emotion researchers have disagreed about whether emotional responses occur in the absence of cognitive processing. How would you characterize the approach of each of the following researchers: Zajonc, LeDoux, Lazarus, Schachter, and Singer?

ANSWERS IN APPENDIX E

Embodied Emotion

Whether you are falling in love or grieving a death, you need little convincing that emotions involve the body. Feeling without a body is like breathing without lungs. Some physical responses are easy to notice. Other emotional responses we experience without awareness.

Emotions and the Autonomic Nervous System

LOQ 36-3 What is the link between emotional arousal and the autonomic nervous system?

In a crisis, the *sympathetic division* of your *autonomic nervous system* (ANS) mobilizes your body for action (**FIGURE 36.2**). It directs your adrenal glands to release the stress hormones epinephrine (adrenaline) and norepinephrine (noradrenaline). To provide energy, your liver pours extra sugar (glucose) into your bloodstream. To help burn the sugar, your respiration increases to supply needed oxygen. Your heart rate and blood pressure increase. Your digestion slows, diverting blood from your internal organs to your muscles. With blood sugar driven into the large muscles, action becomes easier. Your pupils dilate, letting in more light. To cool your stirred-up body, you perspire. If wounded, your blood would clot more quickly.

When the crisis passes, the *parasympathetic division* of your ANS gradually calms your body, as stress hormones slowly leave your bloodstream. After your next crisis, think of this: Without any conscious effort, your body's response to danger is wonderfully coordinated and adaptive—preparing you to *fight* or *flee*. So, do the different emotions have distinct arousal fingerprints?

"Fear lends wings to his feet." —Virgil, *Aeneid*,
19 B.C.E.

ASK YOURSELF

Can you think of a time when you noticed your body's reactions to an emotionally charged situation, such as a tense social setting, or perhaps before an important test or performance? How would you describe your sympathetic nervous system's responses?



FIGURE 36.2
Emotional arousal Like a crisis management center, the autonomic nervous system arouses the body in a crisis and calms it when danger passes.

Autonomic Nervous System Controls Physiological Arousal

Sympathetic division (arousing)		Parasympathetic division (calming)
Pupils dilate	EYES	Pupils contract
Decreases	SALIVATION	Increases
Perspires	SKIN	Dries
Increases	RESPIRATION	Decreases
Accelerates	HEART	Slows
Inhibits	DIGESTION	Activates
Secrete stress hormones	ADRENAL GLANDS	Decrease secretion of stress hormones
Reduced	IMMUNE SYSTEM FUNCTIONING	Enhanced



“No one ever told me that grief felt so much like fear. I am not afraid, but the sensation is like being afraid. The same fluttering in the stomach, the same restlessness, the yawning. I keep on swallowing.” — C. S. Lewis, *A Grief Observed*, 1961

Scary thrills Elated excitement and panicky fear involve similar physiological arousal. This allows us to flip rapidly between the two emotions.



Jacob Lund/Shutterstock

The Physiology of Emotions

LOQ 36-4 How do emotions activate different physiological and brain-pattern responses?

Imagine conducting an experiment measuring the physiological responses of different emotions. In each room, participants watch one of four movies: a horror film, an anger-provoking film, a sexually arousing film, or an utterly boring film. From the control center, you monitor participants’ perspiration, pupil size, breathing, and heart rate. Could you tell who is frightened? Who is angry? Who is sexually aroused? Who is bored?

With training, you could probably pick out the bored viewer. But discerning physiological differences among fear, anger, and sexual arousal is much more difficult (Siegel et al., 2018). Different emotions can share common biological signatures.

A single brain region can also serve as the seat of seemingly different emotions. Consider the broad emotional portfolio of the *insula*, a neural center deep inside the brain. The insula is activated when we experience various negative social emotions, such as lusting after another’s partner, pridefulness, and disgust. In brain scans, it becomes active when people bite into some disgusting food, smell disgusting food, think about biting into a disgusting cockroach, or feel moral disgust over a sleazy businessperson exploiting a saintly widow (Sapolsky, 2010). Similar multitasking regions are found in other brain areas.

Yet our varying emotions *feel* different to us, and they often *look* different to others. We may appear “paralyzed with fear” or “ready to explode.” Fear and joy prompt a similar increased heart rate, but they stimulate different facial muscles. When fearful, your brow muscles tense. When joyful, muscles in your cheeks and under your eyes pull into a smile (Witvliet & Vrana, 1995). When guppies get ready to attack, their eye color changes from silver to black (Heathcote et al., 2018).

Some of our emotions also have distinct brain circuits (Dixon et al., 2017; Panksepp, 2007). Observers watching fearful faces show more amygdala activity than do other observers who view angry faces (Whalen et al., 2001). Emotions also activate different areas of the brain’s cortex. When you experience a negative emotion such as disgust, your right prefrontal cortex tends to be more active than the left. Depression-prone people, and those with generally negative perspectives, have also shown more right frontal lobe activity (Harmon-Jones et al., 2002).

Positive moods tend to trigger more left frontal lobe activity. People with positive personalities—from exuberant infants to alert, energized, and persistently goal-directed adults—have also shown more activity in the left frontal lobe than in the right (Davidson et al., 2000; Urry et al.,

Thinking Critically About: Lie Detection

LOQ 36-5 How effective are polygraphs in using body states to detect lies?

Polygraphs are not actually lie detectors, but rather arousal detectors. They measure emotion-linked changes in breathing, heart rate, and perspiration. Can we use these results to detect lies?

In the last 20 years, have you ever taken something that didn't belong to you?

No!

Did you ever steal anything from your previous employer?

Uh, no.

EEG

Many people tell a little white lie in response to this *control question*, prompting elevated arousal readings that give the examiner a baseline for comparing responses to other questions.

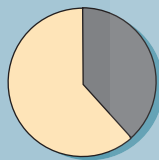
EEG

This person shows greater arousal in response to the *critical question* than she did to the control question, so the examiner may infer she is lying.

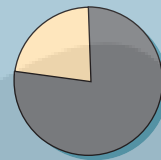
But is it true that *only a thief becomes nervous when denying a theft*?

1. We have similar bodily arousal in response to anxiety, irritation, and guilt. So, is she really guilty, or just anxious?
2. Many innocent people do get tense and nervous when accused of a bad act. (Many of those sexually assaulted, for example, have “failed” these tests because they had strong emotional reactions while telling the truth about the event.¹)

About one-third of the time, polygraph test results are **just wrong**.²



Innocent people



Guilty people

○ Judged innocent by polygraph ● Judged guilty by polygraph

If these polygraph experts had been the judges, more than one-third of the innocent would have been declared guilty, and nearly one-fourth of the guilty would have gone free.

The CIA and other U.S. agencies have spent millions of dollars testing tens of thousands of employees. Yet the U.S. National Academy of Sciences (2002) has reported that “no spy has ever been caught [by] using the polygraph.”

The Concealed Information Test is more effective. Innocent people are seldom wrongly judged to be lying.

Questions focus on specific crime-scene details known only to the police and the guilty person.³ (If a camera and computer had been stolen, for example, only a guilty person should react strongly to the brand names of the stolen items. A slow response time may also indicate a lie. It typically takes less time to tell the truth than to make up a lie.⁴)

1. Lykken, 1991. 2. Kleinmuntz & Szucko, 1984. 3. Ben-Shakhar & Elaad, 2003; Verschuere & Meijer, 2014; Vrij & Fisher, 2016. 4. Suchotzki et al., 2017.

2004). Indeed, the more a person's baseline frontal lobe activity tilts left—or is made to tilt left by perceptual activity—the more upbeat the person typically is (Drake & Myers, 2006).

To sum up, we can't easily see differences in emotions from tracking heart rate, breathing, and perspiration. But facial expressions and brain activity can vary with the emotion. So, do we, like Pinocchio, give off telltale signs when we lie? (For more on that question, see Thinking Critically About: Lie Detection.)

polygraph a machine used in attempts to detect lies; measures emotion-linked changes in perspiration, heart rate, and breathing.

RETRIEVAL PRACTICE

RP-4 What roles do the two divisions of the autonomic nervous system play in our emotional responses?

ANSWERS IN APPENDIX E

MODULE

36 REVIEW Introduction to Emotion

LEARNING OBJECTIVES

Test Yourself Answer these repeated Learning Objective Questions on your own (before “showing” the answers here, or checking the answers in Appendix D) to improve your retention of the concepts (McDaniel et al., 2009, 2015).

LOQ 36-1 How do arousal, expressive behavior, and cognition interact in emotion?

LOQ 36-2 To experience emotions, must we consciously interpret and label them?

LOQ 36-3 What is the link between emotional arousal and the autonomic nervous system?

LOQ 36-4 How do emotions activate different physiological and brain-pattern responses?

LOQ 36-5 How effective are polygraphs in using body states to detect lies?

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Paul Ekman, Ph.D./Paul Ekman Group, LLC.

FIGURE 37.1
Experience influences how we perceive emotions Viewing the morphed middle face, evenly mixing anger with fear, children who had been physically abused were more likely than other children to perceive the face as angry.

whether one person is attracted to another (Place et al., 2009). Observing *thin slices* of behavior (brief samples) revealed that the intensity of women's high school yearbook smiles predicted their well-being and marital satisfaction up to 30 years later (Harker & Keltner, 2001). More cheerful smiles in kindergarteners' class photos reflected warmer family relationships (Oveis et al., 2009). Even brief smiles convey more than meets the eye.

Signs of status are also easy to spot. When shown someone with arms raised, chest expanded, and a downward head tilt, people from diverse cultures—including Fijian villagers, Canadian undergraduates, and Indigenous peoples of Nicaragua—perceive that person as experiencing pride and having dominant status (Tracy et al., 2013; Witkower et al., 2022). Even a fleeting tenth-of-a-second glimpse of a face has enabled viewers to judge people's trustworthiness, or to rate politicians' competence and predict their voter support (Willis & Todorov, 2006). "First impressions . . . occur with astonishing speed," noted Christopher Olivola and Alexander Todorov (2010).

We also excel at quickly detecting nonverbal threats. An angry face can "pop out" of a crowd (Öhman et al., 2001; Stjepanovic & LaBar, 2018). Even children as young as 2 years old attend to angry faces, suggesting that we instinctively detect threats (Burris et al., 2019).

Experience sensitizes us to particular emotions, as shown by experiments using a series of faces (like those in **FIGURE 37.1**) that morph from anger to fear (or sadness). Shown a face that is 50 percent fear and 50 percent anger, children who have been physically abused are more likely than other children to perceive anger (Pollak & Kistler, 2002; Pollak & Tolley-Schell, 2003). Their perceptions become attuned to swiftly spotting glimmers of danger.

Hard-to-control facial muscles can reveal signs of emotions you may be trying to conceal. Lifting just the inner part of your eyebrows, which few people do consciously, reveals distress or worry. Eyebrows raised and pulled together signal fear. Raised cheeks and activated muscles under the eyes suggest a natural smile, called a *Duchenne* smile (in honor of the French physician who described it). These authentic smiles reveal our honest positive emotions (Sheldon et al., 2021). While a fake smile—such as one we make for a photographer—is often frozen in place for several seconds, then suddenly switched off, genuine happy smiles tend to be briefer but to fade less abruptly (Ekman et al., 1990) (**FIGURE 37.2**). True smiles cause others to perceive us as trustworthy, authentic, and attractive (Gunnery & Ruben, 2016). When smiling, we can fake it, but our facial muscles won't make it.

Despite our brain's emotion-detecting skill, we find it difficult to discern deceit. Computer algorithms outperform humans when detecting deception, because liars' and truth-tellers' behavioral differences are often too minute for the human eye (Hartwig & Bond, 2011; Monaro et al., 2022). One digest of 206 studies found that people were just 54 percent accurate in discerning truth from lies—barely better than a coin toss (Bond & DePaulo, 2006). Virtually no one—except perhaps police professionals in high-stakes situations—beats chance by much, not even when detecting children's lies (Gongola et al., 2017; O'Sullivan et al., 2009; ten Brinke et al., 2016).

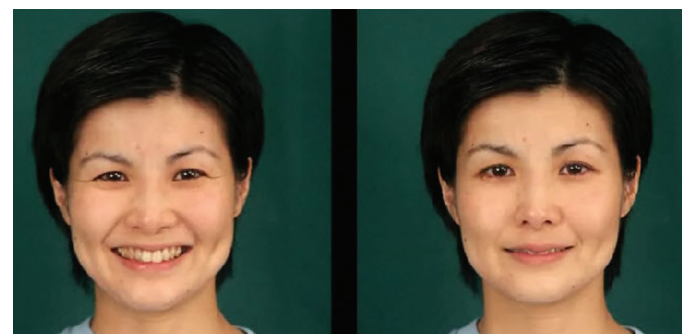
Gestures, facial expressions, and vocal tones, which are absent in written communication, convey important information.



Zohair Hussain/Getty Images

A silent language of emotion Hindu classic dance uses the face and body to effectively convey 10 different emotions (Hejmadi et al., 2000).

FIGURE 37.2
Which smile is natural, which is feigned?
 Smile (a) engages the facial muscles of a natural smile.



David Matsumoto/Humintell

(a)

(b)

The difference was clear when study participants in one group heard 30-second recordings of people describing their marital separations. Participants in the other group read a transcript of the recording. Compared with those who had read it, participants who *heard* the description were better able to predict the people’s current and future adjustment (Mason et al., 2010). Just hearing a stranger say “hello” is enough to give listeners some clue to the speaker’s personality.

Our texts, emails, and other online communications lack vocal and facial emotional nuances. Without the usual expressive cues, we run the risk of what developmental psychologist Jean Piaget called *egocentrism*—difficulty taking another’s point of view. We may, for example, fail to perceive how others interpret our “just kidding” message (Kruger et al., 2005). So, to help people understand our personality and whether our online comment is serious, kidding, or sarcastic, we may insert emojis (Kaye et al., 2017). 😊

Gender, Emotion, and Nonverbal Behavior

LOQ 37-2 How do men and women differ in nonverbal communication?

Do women have greater sensitivity than men to nonverbal cues? An analysis led by Judith Hall (2016) of 176 thin slice studies indicated that women outperformed men at emotion detection. This advantage emerges early in infancy (McClure, 2000). Women’s nonverbal sensitivity might explain their greater emotional literacy.

When invited to describe how they would feel in certain situations, men tend to describe simpler emotional reactions (Barrett et al., 2000). You might like to try this yourself: Ask some people how they might feel when saying good-bye to friends after graduation. Research suggests men are more likely to say, simply, “I’ll feel bad,” and women to express more complex emotions: “It will be bittersweet; I’ll feel both happy and sad.”

Women’s skill at decoding others’ emotions may also contribute to their greater emotional responsiveness and expressiveness, especially for positive emotions (Fischer & LaFrance, 2015; McDuff et al., 2017). In studies of 23,000 people from 26 cultures, women more than men reported themselves open to feelings (Costa et al., 2001). Girls tend to express stronger emotions than boys do, hence the extremely strong perception that emotionality is “more true of women”—a perception expressed by nearly 100 percent of U.S. 18- to 29-year-olds (Chaplin & Aldao, 2013; Newport, 2001). In conversation, young girls and their parents—more than young boys and their parents—tend to discuss emotions and use more emotion-related words (Fivush et al., 2000).

One exception: Quickly—imagine an angry face. What gender is the person? If you’re like 3 in 4 Arizona State University students, you imagined a man (Becker et al., 2007). The same researchers also manipulated a computer-generated, gender-neutral face to display different emotions. People were more likely to perceive the face as male when it wore an angry expression and as female when it wore a smile (Becker et al., 2007). Anger strikes most people as a more masculine emotion. Women who express “male-typed” anger pay a penalty in the workplace, such as being labeled “out of control” (Brescoll & Uhlmann, 2008).

The perception of women’s emotionality also feeds—and is fed by—people’s attributing women’s emotionality to their disposition and men’s to their circumstances: “She’s emotional” versus “He’s having a bad day” (Feldman Barrett & Bliss-Moreau, 2009). Nevertheless, there are some gender differences in descriptions of emotional experiences. When surveyed, women are far more likely than men to describe themselves as empathic (Benenson et al., 2021). If you have *empathy*, you identify with others and imagine being in their skin. You appraise a situation as they do, rejoicing with those who rejoice and weeping with those who weep (Wondra & Ellsworth, 2015). Fiction readers, who immerse themselves in others’ lives, report higher empathy levels (Mar et al., 2009).

Women are also more likely to *express* empathy—to display more emotion when observing others’ emotions (Depow et al., 2021). This gender difference was clear when college students watched film clips that were sad (children with a dying parent), happy (slapstick comedy), or frightening (a man nearly falling off the ledge of a tall building) (Kring & Gordon, 1998; Vigil, 2009).

You may wonder: Are gender differences in empathy the result of nature or nurture? As we have seen repeatedly, nature and nurture often interact. Evolutionary biologists

“Empathy’s most important role . . . is to inspire kindness: our tendency to help each other, even at a cost to ourselves.”

—Jamil Zaki, *The War for Kindness*, 2019

and neuroscientists note that similar female-male empathy differences occur in non-human animals (Christov-Moore et al., 2014). To these researchers, biology powerfully predicts empathy. But cultural learning also matters. People with high power and privilege are less motivated to empathize (Dietze & Knowles, 2021; Kraus et al., 2012). Those lower in power, as women historically have been, may feel a strong motivation to understand others' emotions (Dietze & Knowles, 2016).

RETRIEVAL PRACTICE

RP-1 _____ (Women/Men) report experiencing emotions more deeply, and they tend to be more adept at reading nonverbal behavior.

ANSWERS IN APPENDIX E

Culture and Emotional Expression

LOQ 37-3 How are gestures and facial expressions understood within and across cultures?

Where you live, do people often smile when passing a stranger on an otherwise empty sidewalk? Where your authors live—in the U.S. Midwest [DM], the Rocky Mountains [JG], and the U.S. South [ND]—that's the norm. Elsewhere, making eye contact and smiling at a stranger might seem strange, or even suspicious (Niedenthal, et al., 2019). Culture matters.

The meaning of *gestures* also varies from culture to culture. In 1968, North Korea publicized photos of supposedly happy officers from a captured U.S. Navy spy ship. In the photo, three men had raised their middle finger, telling their captors it was a “Hawaiian good luck sign” (Fleming & Scott, 1991). I [ND] have taught my young children the thumbs-up gesture so they can let me know that something is good. But I will also teach them not to make that gesture if we travel to certain West African and Middle Eastern countries, where it can mean “up yours!” (Koerner, 2003).

Do *facial expressions* also have different meanings in different cultures? To find out, researchers have traveled the world, showing people photos of different posed faces and asking them to guess the emotion (Ekman & Friesen, 1975; Izard, 1994; Mesquita, 2022). You can try one such task yourself by labeling the emotions in **FIGURE 37.3**.



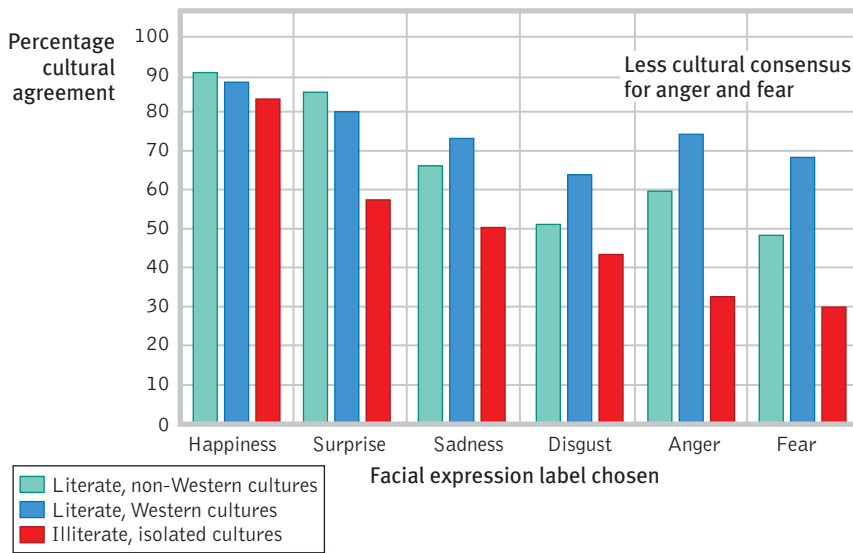
Rotman Institute of Philosophy

Emotion construction Pioneering emotion researcher Lisa Feldman Barrett is exploring how people construct emotions based on their body, brain, and culture.



FIGURE 37.3
Culture-specific or culturally universal expressions? Which face expresses disgust? Anger? Fear? Happiness? Sadness? Surprise?¹

¹(a) happiness, (b) surprise, (c) fear, (d) sadness, (e) anger, (f) disgust.



Roman Samborski/Alamy Stock Photo

FIGURE 37.4
Cultural consensus in question In global studies, most people agree that a smiling face represents happiness. Other expressions, such as in the face shown here, have offered less cross-cultural consensus (Nelson et al., 2013). What emotion do you see in this face?

You probably labeled the smiling face as “happiness”—and so would most people worldwide. One analysis of 6 million videos from 144 countries found reliable associations between facial expressions and social contexts (Cowen et al., 2021). Across humanity, expressions conveying amusement occurred in videos with practical jokes, pained expressions with weight training, and triumphant expressions with sports.

But people also differ in some expressions, especially anger and fear, even when matching exaggerated poses to a limited set of emotion words (Crivelli et al., 2016a; FIGURE 37.4). We’re also better at judging faces from our own culture; it’s as if we learn a local emotional dialect (Crivelli et al., 2016b; Elfenbein & Ambady, 2002; Laukka & Elfenbein, 2021).

Some emotion categories are clear universals: A smile’s a smile the world around. The same with laughter: People everywhere can discriminate real from fake laughs (Bryant et al., 2018). Even people blind from birth spontaneously exhibit the common facial expressions associated with such emotions as joy, sadness, fear, anger, and pride (Galati et al., 1997; Tracy & Matsumoto, 2008).

Such results would not have surprised evolutionary theorist Charles Darwin (1809–1882), who argued that before our prehistoric ancestors communicated in words, they communicated threats, greetings, and submission with facial expressions. These shared expressions helped them survive (Hess & Thibault, 2009). In confrontations, for example, a human sneer retains elements of an animal baring its teeth in a snarl (FIGURE 37.5). Emotional expressions may enhance our survival in other ways, too. Surprise raises the eyebrows and widens the eyes, enabling us to take in more information. Disgust wrinkles the nose and sticks out the tongue, reducing intake of foul odors or foods.

Yet facial expressions are not crystal balls to our emotions. We routinely control our faces to fit in with, influence, or deceive others. Euphoric Olympic gold-medal winners typically don’t smile when they are waiting alone for their award ceremony. But they wear broad grins when interacting with officials and when facing the crowd and cameras (Fernández-Dols & Ruiz-Belda, 1995). Depending on the situation, the same expression may also convey different messages (Feldman Barrett et al., 2019). When worn by a villain, a smile may be terrifying. A fearful face set in a painful situation looks pained (Carroll & Russell, 1996). Film directors harness this phenomenon by creating scenes and soundtracks that amplify our perceptions of particular emotions.

Facial expressions are also cultural occurrences, with *display rules* guiding when to express an emotion, which emotion is appropriate, and how much of an emotion to express. Compared with job applicants in Hong Kong, where calmness is emphasized, European American applicants use excited smiles and words more frequently. Likewise, European American leaders showed broad smiles six times more frequently in their official photos (Bencharit et al., 2019; FIGURE 37.6).

“For news of the heart, ask the face.”
 —Guinean proverb

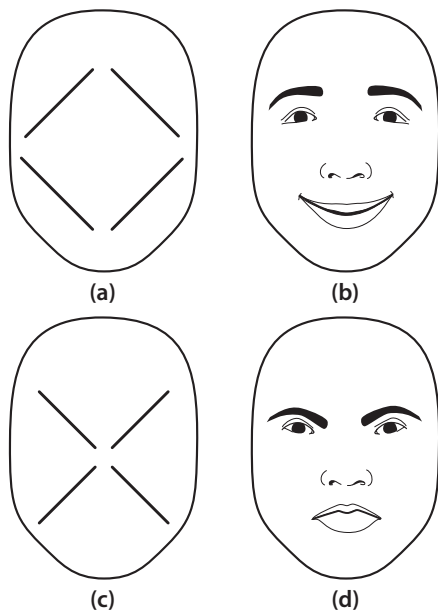
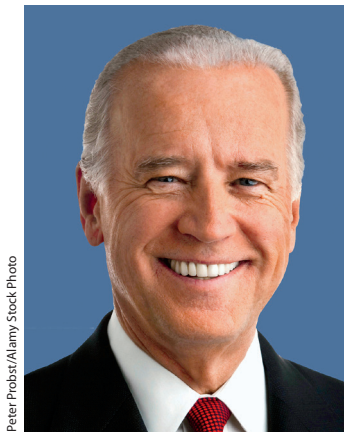


FIGURE 37.5
Anger expressed Cover up faces (c) and (d) and ask a friend if they would select image (a) or image (b) as the angry one. Even without the obvious facial cues, most people choose (b) (Franklin et al., 2019).



Peter Probst/Alamy Stock Photo



AP Photo

FIGURE 37.6
Culture and smiling
 U.S. President Joe Biden's broad smile and Chinese President Xi Jinping's more reserved one illustrate a cultural difference in facial expressiveness. (Stimuli from Tsai et al., 2016.)

In cultures that encourage individuality and personal influence, as in Western Europe, Australia, New Zealand, and North America, people prefer high-intensity positive emotions (Tsai, 2007). Cultures that encourage collectivism with a focus on others, as in Japan, China, and Korea, often value less intense emotional displays (Cordaro et al., 2018; Matsumoto et al., 2009). Moreover, in Japan, the mouth—often so expressive in North Americans—conveys less emotion than do the telltale eyes (Masuda et al., 2008; Yuki et al., 2007). If we're happy and we know it, our culture will teach us how to show it.

Cultural differences also exist *within* nations. Irish people and their Irish American descendants have tended to be more expressive than Scandinavian people and their Scandinavian American descendants, even though both groups share a common nationality (Tsai & Chentsova-Dutton, 2003). And that reminds us of a familiar lesson: Like most psychological events, facial expressions are best understood not only as biological and cognitive phenomena, but also as social-cultural phenomena.

RETRIEVAL PRACTICE

RP-2 How are facial expressions rooted in biology and culture?

ANSWERS IN APPENDIX E

The Effects of Facial Expressions

LOQ 37-4 How do our external facial expressions influence our internal feelings?

As William James (1890) struggled with feelings of depression and grief, he came to believe that we can control emotions by going “through the outward movements” of any emotion we want to experience. “To feel cheerful,” he advised, “sit up cheerfully, look



Masashi Hara/Getty Images

(a)



Elis/Getty Images

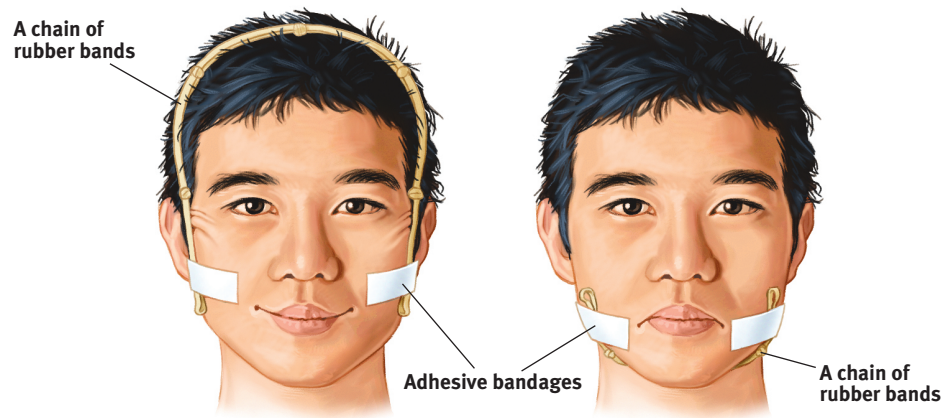
(b)

Display rules differ Soccer players from more collectivist cultures, such as Japanese Yū Kobayashi, tend to celebrate a goal with fellow players in a way that deflects attention from themselves (a). Those from more individualist cultures, such as American Megan Rapinoe—shown here after scoring at the 2019 Women's World Cup—are more comfortable making themselves distinct (b).

➔ **FIGURE 37.7**

How to make people smile without telling them to smile

Do as Kazuo Mori and Hideko Mori (2009) did with students in Japan: Attach rubber bands to the sides of the face with adhesive bandages, and then run them either over the head or under the chin.



around cheerfully, and act as if cheerfulness were already there.” In *The Expression of the Emotions in Man and Animals*, Charles Darwin (1872) contended that “the free expression by outward signs of an emotion intensifies it. . . . He who gives way to violent gestures will increase his rage.”

Were they right? You can test their hypothesis: Fake a big grin. Now scowl. Can you feel the “smile therapy” difference? Participants in dozens of experiments have felt a difference. Researchers subtly induced students to make a frowning expression by asking them to contract certain muscles and pull their brows together (supposedly to help the researchers attach facial electrodes) (Laird, 1974, 1984; Laird & Lacasse, 2014). The results? The students reported feeling a little angry, as do people naturally frowning (by squinting) when facing the Sun (Marzoli et al., 2013). So, too, for other basic emotions. For example, people reported feeling more fear than anger, disgust, or sadness when made to construct a fearful expression: “Raise your eyebrows. And open your eyes wide. Move your whole head back, so that your chin is tucked in a little bit, and let your mouth relax and hang open a little” (Duclos et al., 1989).

James and Darwin had it right: Expressions not only communicate emotion, they also amplify and regulate it. This **facial feedback effect** has been found many times, in many places, for many basic emotions (Coles et al., 2019; see **FIGURE 37.7**). We’re just a little happier when smiling, angrier when scowling, and sadder when frowning. Merely activating one of the smiling muscles by holding a pen in the teeth (rather than gently between the lips, which produces a neutral expression) makes stressful situations less upsetting (Kraft & Pressman, 2012). A hearty smile—made not just with the mouth but with raised cheeks that crinkle the eyes—enhances positive feelings even more when you are reacting to something pleasant or funny (Soussignan, 2001). When happy we smile, and when smiling we become happier, unless we’re distracted by being videotaped (Marsh et al., 2019; Noah et al., 2018; Strack, 2016). In a saying often attributed to Vietnamese Buddhist monk Thích Nhất Hạnh, “Sometimes your joy is the source of your smile, but sometimes your smile can be the source of your joy.”

So, your face is more than a billboard that displays your feelings; it also fuels your feelings. Scowl and the whole world scowls back. No wonder some people with depression or borderline personality disorder have reported feeling better after Botox injections paralyzed their facial frowning muscles (Kruger et al., 2022; Schultze et al., 2021). However, Botox paralysis of the frowning muscles also slows activity in emotion-related brain circuits and weakens emotional experiences (Davis et al., 2010; Hennenlotter et al., 2008). The opposite happens when Botox paralyzes laughter muscles: People feel worse (Lewis, 2018).

Researchers have also observed a broader **behavior feedback effect** (Carney et al., 2015; Flack, 2006). You can duplicate the participants’ experience: Walk for a few minutes with short, shuffling steps, keeping your eyes downcast. Now walk around taking long strides, with your arms swinging and your eyes looking straight ahead. Can you feel your mood shift? Or when angry, lean back in a reclined sitting position and feel the anger lessen (Krahé et al., 2018). Going through the motions awakens the emotions. The next time you’re angry or stressed, lean back and take a few deep breaths.

A request from your authors: Smile often as you read this book.

➔ **facial feedback effect** the tendency of facial muscle activation, alone, to trigger corresponding feelings such as fear, anger, or happiness.

behavior feedback effect the tendency of behavior to influence our own and others’ thoughts, feelings, and actions.

You can use your understanding of feedback effects to become more empathic: Let your own face mimic another person's expression. Acting as another acts helps us feel what another feels (Hess & Fischer, 2016; Iacoboni, 2009). Losing this ability to mimic others can leave us struggling to make emotional connections, as social worker Kathleen Bogart, who has Moebius syndrome (a rare facial paralysis disorder), discovered while working with Hurricane Katrina refugees: When people made a sad expression, "I wasn't able to return it. I tried to do so with words and tone of voice, but it was no use. Stripped of the facial expression, the emotion just dies there, unshared" (Carey, 2010).

ASK YOURSELF

Imagine a situation in which you would like to change the way you feel. How could you do so by altering your facial expressions or the way you carry yourself? In what other settings could you apply your knowledge of these feedback effects?

RETRIEVAL PRACTICE

RP-3 (a) Based on the *facial feedback effect*, how might students report feeling when the rubber bands raise their cheeks as though in a smile? (b) How might students report feeling when the rubber bands pull their cheeks downward?

ANSWERS IN APPENDIX E

MODULE

37 REVIEW Expressing Emotion

LEARNING OBJECTIVES

Test Yourself Answer these repeated Learning Objective Questions on your own (before "showing" the answers here, or checking the answers in Appendix D) to improve your retention of the concepts (McDaniel et al., 2009, 2015).

- LOQ 37-1** How do we communicate emotions nonverbally?
- LOQ 37-2** How do men and women differ in nonverbal communication?
- LOQ 37-3** How are gestures and facial expressions understood within and across cultures?
- LOQ 37-4** How do our external facial expressions influence our internal feelings?

TERMS AND CONCEPTS TO REMEMBER

Test Yourself Write down the definition in your own words, then check your answer.

facial feedback effect , p. 430 behavior feedback effect , p. 430

MODULE TEST

Test Yourself Answer the following questions on your own first, then "show" the answers here, or check your answers in Appendix E.

1. When people are induced to assume a fearful expression, they often report feeling some fear. This result is known as the _____ effect.
2. Aiden has a bad cold and finds himself shuffling to class with his head down. How might his posture, as well as his cold, affect his emotional well-being?

MODULE

38 Experiencing Emotion

- LOQ 38-1** What are some of the basic emotions?

How many distinct emotions are there? When surveyed, most emotion scientists agreed on five basic emotions: anger, fear, disgust, sadness, and happiness (Ekman, 2016). Carroll Izard (1977) isolated 10: joy, interest-excitement, surprise, sadness, anger, disgust, contempt, fear, shame, and guilt, most present in infancy (**FIGURE 38.1**). Others recognize as many as 28, including different flavors of happiness like awe, love, and pride (Cowen & Keltner, 2020).

FIGURE 38.1
Some naturally occurring infant emotions To identify the emotions generally present in infancy, Carroll Izard analyzed the facial expressions of infants.

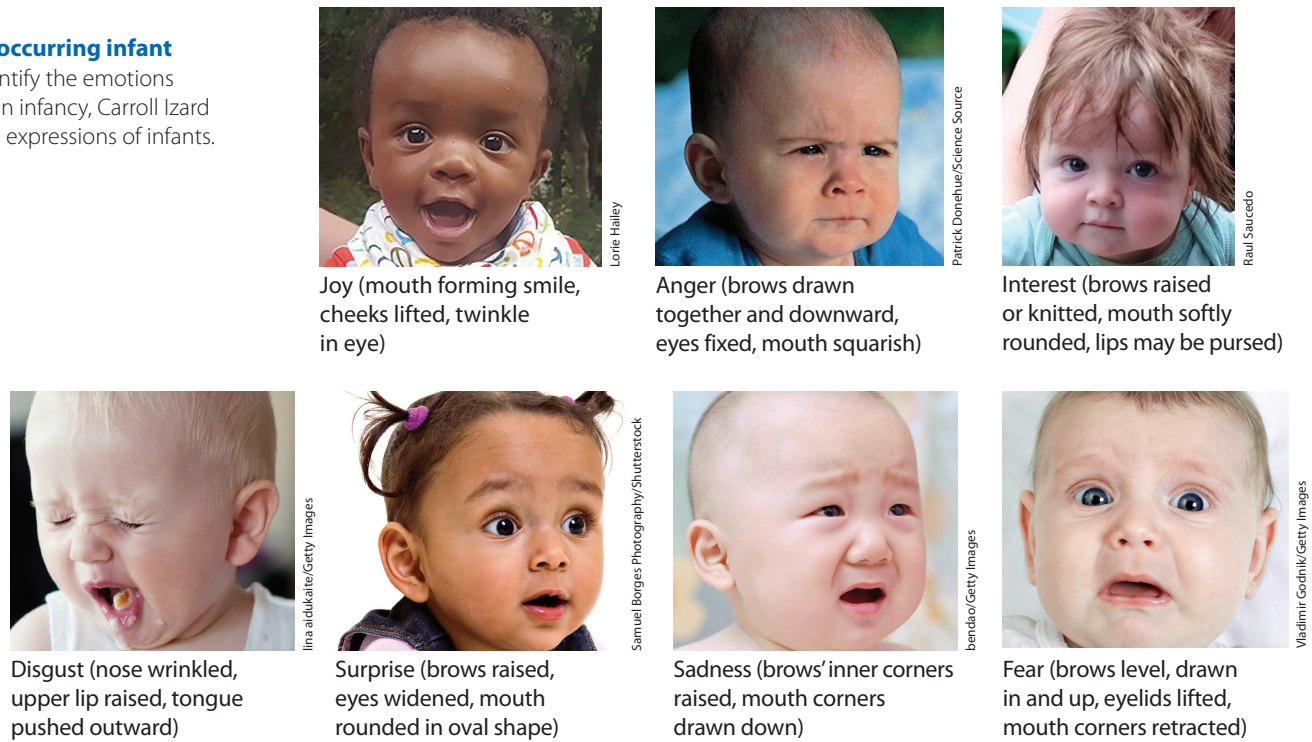
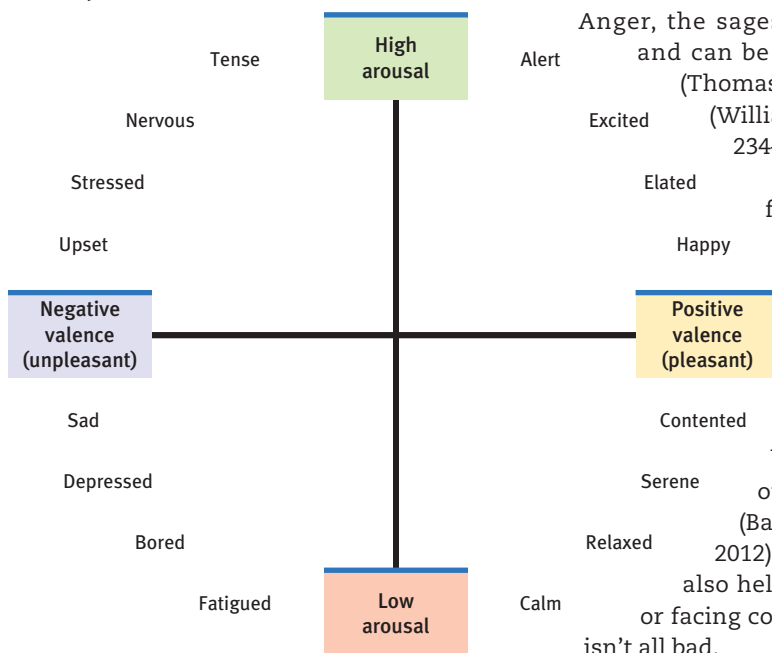


FIGURE 38.2
A tale of two emotional dimensions You can feel good with little arousal (the calmness that often accompanies meditation) or lots of arousal (excitement at seeing friends). Likewise, negative feelings can involve low arousal (boredom during a long-winded lecture) or high arousal (nervousness before a job interview).



Emotions are categorized along two dimensions: *valence* (positive versus negative) and *arousal* (low versus high) (Feldman Barrett & Russell, 1998; Tsai et al., 2006; **FIGURE 38.2**). But are emotions biologically distinct? Does our body, for example, know the difference between fear and anger? Can our brain distinguish happiness from interest?

Let's take a closer look at anger and happiness. What functions do they serve? What influences our experience of each?

Anger

LOQ 38-2 What are the causes and consequences of anger?

Anger, the sages have said, “carries the mind away” (Virgil, 70–19 B.C.E.) and can be “many times more hurtful than the injury that caused it” (Thomas Fuller, 1654–1734). But they have also said that “noble anger” (William Shakespeare, 1564–1616) “makes any coward brave” (Cato, 234–149 B.C.E.) and “brings back . . . strength” (Virgil).

What makes us angry? When we face a threat or challenge, fear triggers flight but anger triggers fight—each at times an adaptive behavior. Sometimes anger is a response to someone’s perceived misdeeds, especially when the person’s act seems willful, unjustified, and avoidable (Averill, 1983). But small hassles and blameless annoyances—foul odors, high temperatures, a traffic jam, aches and pains, stressful interactions—can also make us angry.

Anger can harm us, especially when it is chronic. Anger boosts our heart rate, increases *inflammation*—weakening our defenses against disease—and increases our testosterone (Barlow et al., 2019; Herrero et al., 2010; Peterson & Harmon-Jones, 2012). Anger can fuel aggression and prime prejudice. But anger can also help us in some situations, such as playing a competitive game or facing confrontations in daily life (Kim et al., 2015; Tamir, 2009). Anger isn’t all bad.

How do we manage our anger? Individualist cultures encourage people to vent their rage. The Western vent-your-anger advice presumes that aggression enables emotional release, or *catharsis*. Joining others in venting shared angry feelings can increase our feelings of closeness, intimacy, and attachment (Fischer & Roseman, 2007). But does this venting calm us (Bushman, 2002)? Researchers report that *sometimes* when people retaliate against a provoker, they may calm down if they direct their counterattack toward the provoker, their retaliation seems justifiable, and their target is not intimidating. Expressing anger can be temporarily calming if it does not leave us feeling guilty or anxious (Geen & Quanty, 1977; Hokanson & Edelman, 1966; Verona & Sullivan, 2008). However, acting angry more often makes us *feel* angrier (Flack, 2006; Snodgrass et al., 1986). Anger's backfire potential appeared in a study of people asked to wallop a punching bag while ruminating about a person who had recently angered them (Bushman, 2002). Had the opportunity to "drain off" their anger reduced it? Quite the contrary. Later, when given a chance for revenge, those who had vented their anger became even more aggressive.

Advice to release anger is seldom heard in cultures where people's identity is centered more on "we" than "me." People who keenly sense their *interdependence* see anger as a threat to group harmony (Markus & Kitayama, 1991). In Tahiti, for instance, people learn to be considerate and gentle. In Japan, from infancy on, angry expressions are less common than in Western cultures.

What are some healthy ways to manage your anger? Experts offer these suggestions:

- **Wait.** Doing so will reduce your physiological arousal. "What goes up must come down," noted Carol Tavris (1982). "Any emotional arousal will simmer down if you just wait long enough."
- **Think about the situation differently.** Reappraisal—thinking about things in a different way—can reduce anger and help us tolerate frustration (Szasz et al., 2011). The next time you're angry about something, consider: In the long run, will this matter? Is there another side to the story?
- **Find a healthy distraction or support instead of ruminating.** Calm yourself by exercising, reading, or talking things through with a friend. Brain scans show that ruminating inwardly about why you are angry increases blood flow to the brain's anger-processing amygdala (Fabiansson et al., 2012).
- **Distance yourself.** Try to move away from the situation mentally, as if you are watching it unfold from a distance or the future. Self-distancing reduces rumination, anger, and aggression (Kross & Ayduk, 2011; Mischkowski et al., 2012; White et al., 2015).

Used wisely, anger communicates strength and competence (Tiedens, 2001). Anger also motivates people to act courageously and achieve goals (Aarts & Custers, 2012; Halmburger et al., 2015). Controlled expressions of anger are more adaptive than either hostile outbursts or pent-up angry feelings. Civility means not only keeping silent about trivial irritations but also communicating important ones clearly and assertively. A nonjudgmental statement of feeling—perhaps letting a roommate know that "I feel upset when I have to clean up your dirty dishes"—can help resolve conflicts. Anger that expresses a grievance in ways that promote reconciliation and cooperation rather than retaliation can benefit a relationship (Van Kleef & Côté, 2007).

What if someone's behavior really hurts you, and you cannot resolve the conflict? Research commends the age-old response of forgiveness (Worthington & Wade, 2019). Without letting the offender off the hook or inviting further harm (sometimes we need to distance ourselves from an abusive person), forgiveness may release anger and calm the body. Forgiveness doesn't just apply to other people: We also benefit from forgiving ourselves (Webb et al., 2017). One summary of 17 studies reported that self-forgiveness predicted less suicidal ideation and self-harm (Cleare et al., 2019).

RETRIEVAL PRACTICE

RP-1 Which one of the following is an effective strategy for reducing angry feelings?

- | | |
|--------------------------------------|-----------------------------------|
| a. Retaliate verbally or physically. | c. Express anger in our behavior. |
| b. Wait or "simmer down." | d. Review the grievance silently. |

ANSWERS IN APPENDIX E



When anger is all the rage Fans seem to experience a *temporary* release while cheering at World Cup soccer matches, such as this one in South Africa. My [DM's] daughter, a resident, noted, "Every time I got angry at Uruguay, blowing that vuvuzela and joining the chorus of dissent released something in me."

"Anger will never disappear so long as thoughts of resentment are cherished in the mind." —The Buddha, 500 B.C.E.

➔ **happiness** an enduring prevalence of positive emotions.

feel-good, do-good phenomenon our tendency to be helpful when in a good mood.

positive psychology the scientific study of human flourishing, with the goals of discovering and promoting strengths and virtues that help individuals and communities to thrive.

subjective well-being self-perceived satisfaction with life. Used along with measures of objective well-being (for example, physical and economic indicators) to judge our quality of life.

Happiness and Well-Being

LOQ 38-3 What is happiness? Why does happiness matter?

The Greek philosopher Aristotle (350 B.C.E.) believed that “happiness is the meaning and the purpose of life, the whole aim and end of human existence.” The psychologist William James (1902) called happiness “the secret for all [we] do.” The Dalai Lama (2009) agreed: “The very purpose of our life is to seek happiness.”

Happiness (our having more positive than negative feelings) matters in our daily lives. Our happiness or unhappiness colors our thoughts and our actions. Happy people perceive the world as safer (Cunningham & Kirkland, 2014). They also smile more, and act more playfully (Gardiner et al., 2022). Their eyes are drawn toward emotionally positive images (Raila et al., 2015). Positive feelings enhance our memory of positive facts and pleasant times (Bower, 1981; Isen et al., 1978). Happy feelings also “broaden and build” our thinking, allowing us to relax, become more creative, and connect more easily with others (Fredrickson, 2013; Shiota et al., 2017).

Happiness also promotes a flourishing life. Happy babies tend to become successful adults, and happier adults experience more career success (Coffey, 2020; Walsh et al., 2018). Happier adults also live healthier and more satisfied lives (Boehm et al., 2015; Kushlev et al., 2020; Willroth et al., 2020). When researchers surveyed thousands of U.S. college students in 1976 and restudied them 2 decades later, happy students had gone on to earn significantly more money than their less-happy-than-average peers (Diener et al., 2002). When we are happy, our relationships, self-image, and hopes for the future also seem more promising.

Happiness benefits society, too. Happy people not only feel good, they also do good. This **feel-good, do-good phenomenon** is one of psychology’s most consistent findings (Salovey, 1990). Happier people are more helpful and kind to others (Kushlev et al., 2022). A mood-boosting experience (finding money, succeeding on a challenging task, recalling a happy event) has made people more likely to give money, pick up someone’s dropped papers, and volunteer time (Isen & Levin, 1972).

The reverse is also true: Doing good also promotes good feeling. Spending money on others, rather than on ourselves, increases happiness (Aknin et al., 2020). Young children also show more positive emotion when they give, rather than receive, gifts (Aknin et al., 2015). In a Spanish corporate workplace, employees who helped their co-workers experienced greater well-being, and those they helped also became happier and more helpful (Chancellor et al., 2018). Even donating a kidney, despite the pain, leaves donors feeling good (Brethel-Haurwitz & Marsh, 2014). The benefits of helping are not limited to exceptional altruists. People with a history of criminal behavior also feel good when they do good (Hanniball et al., 2019). *The bottom line:* Helping others helps us all feel happy.

Why does doing good feel so good? One reason is that it strengthens our social relationships (Aknin & Human, 2015; Yamaguchi et al., 2015). Some happiness coaches assign people to perform a daily “random act of kindness” and to record the results.

Positive Psychology

Psychologist William James was writing about the importance of happiness (“the secret motive for all [we] do”) as early as 1902. By the 1960s, the *humanistic psychologists* were interested in advancing human fulfillment. In the twenty-first century, under the leadership of American Psychological Association past-president Martin Seligman, **positive psychology** is using scientific methods to study human flourishing. This rapidly growing subfield includes studies of **subjective well-being**. One ongoing longitudinal study is following 240,000 people in 24 countries to understand the key elements in human experience that help us thrive and feel a greater sense of purpose and meaning (VanderWeele, 2021).

Taken together, satisfaction with the past, happiness with the present, and optimism about the future define the positive psychology movement’s first pillar: *positive well-being*.

Positive psychology is about building not just a pleasant life, says Seligman, but also a good life that engages one’s skills, and a meaningful life that points beyond oneself.

Martin E. P. Seligman “The main purpose of a positive psychology is to measure, understand, and then build the human strengths and the civic virtues.”



Courtesy of Martin Seligman

Thus, the second pillar, *positive traits*, focuses on exploring and enhancing creativity, courage, compassion, integrity, self-control, leadership, wisdom, and spirituality. Happiness is a by-product of a pleasant, engaged, and meaningful life.

The third pillar, *positive groups, communities, and cultures*, seeks to foster a positive social world. This includes healthy families, supportive neighborhoods, effective schools, socially responsible media, and civil dialogue.

“Positive psychology,” Seligman and colleagues have said (2005), “is an umbrella term for the study of positive emotions, positive character traits, and enabling institutions.” Its focus differs from psychology’s traditional interests in understanding and alleviating negative states—abuse and anxiety, depression and disease, prejudice and poverty. (Psychology articles published since 1887 mentioning “depression” still outnumber those mentioning “happiness” by about 16 to 1.) The positive psychology movement has gained strength, with supporters in more than 100 countries (IPPA, 2022). Worldwide, centers such as the Greater Good Science Center in Berkeley, California, support the science of thriving and happiness.

When Are We Happiest?

LOQ 38-4 How do time, wealth, adaptation, and comparison affect our happiness levels?

So, happiness matters. But what factors influence when people are happiest? For example, are some days of the week happier than others? One social psychologist (Kramer, 2010) did a *naturalistic observation* of emotion words in billions (!) of Facebook posts. He tracked the frequency of people’s positive and negative emotion words by day of the week. The days with the most positive moods? Friday and Saturday (FIGURE 38.3). Similar analyses of questionnaire responses and 59 million Twitter messages found Friday, Saturday, and Sunday to be the week’s happiest days (Golder & Macy, 2011; Helliwell & Wang, 2015; Young & Lim, 2014). For you, too?

Positive emotions also tend to rise in the early to middle part of most days, and they tend to decline later in the day (Kahneman et al., 2004; Watson, 2000). So, too, with day-to-day moods. A stressor—an argument, a bad test grade, a car problem—triggers a bad mood. No surprise there. But by the next day, the gloom nearly always lifts (Affleck et al., 1994; Bolger et al., 1989; Stone & Neale, 1984). Our overall judgments of our lives often show lingering effects of good or bad events, but our daily moods typically rebound (Luhmann et al., 2012). If anything, people tend to bounce back from a bad day to a *better-than-usual* good mood the following day. Sadness helps us appreciate happiness. The surprising reality: *We overestimate the duration of our emotions and underestimate our resiliency and capacity to adapt.* (As one who inherited hearing loss with a trajectory toward that of my mother, who spent the last 13 years of her life completely deaf, I [DM] take heart from these findings.)

Our current happiness is also shaped by our recent experience. Psychologist Harry Helson (1898–1977) identified this **adaptation-level phenomenon**: We judge new events by comparing them with our past experiences. Our past experiences define neutral levels—sounds that seem neither loud nor soft, temperatures that seem neither hot nor cold, events that seem neither pleasant nor unpleasant. We then notice and react to variations up or down from these levels. Have you noticed how a chilly fall day, after summer, feels colder than the same temperature in late winter?

People who have experienced a recent windfall—from the lottery, an inheritance, or a surging economy—typically feel joy and satisfaction (Diener & Oishi, 2000; Gardner & Oswald, 2007; Lindqvist et al., 2020). You would, too, if you woke up tomorrow with all your wishes granted—perhaps a world with no bills, no ills, and perfect grades? But eventually, you would adapt to this new normal. Before long, you would again sometimes feel joy and satisfaction (when events exceed your expectations), sometimes feel let down (when they fall below), and sometimes feel neither up nor down. *The point to remember*: Feelings of satisfaction and dissatisfaction, success and failure are based partly on expectations formed by our recent experience (Rutledge et al., 2014).

adaptation-level phenomenon our tendency to form judgments (of sounds, of lights, of income) relative to a neutral level defined by our prior experience.

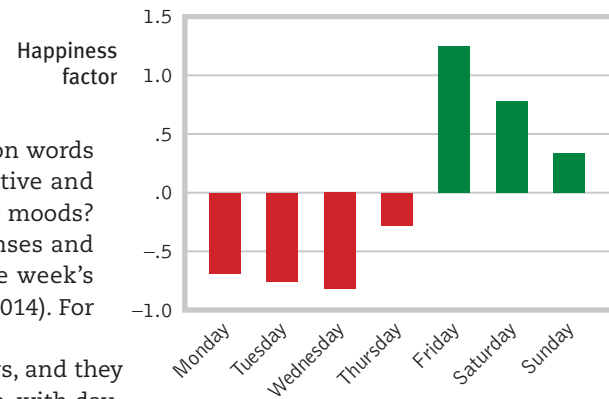


FIGURE 38.3 **Emotion notification** A pattern emerged in tracked positive and negative emotion words in many “billions” (the exact number is proprietary information) of status updates of U.S. Facebook users over a 3-year period (Kramer, 2010).



Caitlin Cass/Cartoon Stock

What Predicts Happiness?

LOQ 38-5 What predicts happiness, and how can we be happier?

Happy people share many characteristics (TABLE 38.1). But what makes one person filled with joy, day after day, while others seem dark or aloof? Here, as in so many other areas, the answer is found in the interplay between nature and nurture.

Genes matter. In one analysis of over 55,000 identical and fraternal twins, 36 percent of the differences among people’s happiness ratings was heritable—attributable to genes (Bartels, 2015). Even identical twins raised apart have similar happiness levels. The challenging quest for specific genes that influence happiness confirms a familiar lesson: Human traits are influenced by many genes having small effects (Røysamb & Nes, 2019).

But our personal history and our culture matter, too. Values vary; one group’s recipe for happiness might differ from another group’s. Self-esteem matters more in Western cultures, which value individualism. Social acceptance and harmony matter more in communal cultures, such as Japan, that stress family and community (Diener et al., 2003; Fulmer et al., 2010; Uchida & Kitayama, 2009). In East Asia, most people prefer a “calm” to an “exciting” life (Crabtree & Lai, 2021).

Depending on our genes, outlook, and recent experiences, our happiness seems to fluctuate around a “happiness set point,” which disposes some people to be more upbeat and others, more negative. Even so, our satisfaction with life can change (Sheldon & Lyubomirsky, 2021). Happiness rises and falls, and we can control some of what makes us more or less happy on a given day or in a given situation.

Your happiness, like your cholesterol level, is partially shaped by genetics. Yet as cholesterol is also influenced by diet and exercise, some of your happiness is under your personal control (Nes, 2010; Sin & Lyubomirsky, 2009). See TABLE 38.2 for some research-based suggestions to build your personal strengths and increase your happiness and well-being.

If we can enhance our happiness on an individual level, could we use happiness research to refocus our collective priorities? Psychologists believe we could. Thanks to information resources such as the Gallup World Poll, researchers can track human happiness and misery over time (2021 was the unhappiest year of the past two decades). Many political leaders are also making use of such research: 43 nations have begun measuring their citizens’ well-being, and many have undertaken interventions to boost national well-being (Diener et al., 2015, 2019). Britain’s Annual Population Survey, for example, asks its citizens how satisfied they are with their lives, how worthwhile they judge their lives, and how happy and how anxious they felt yesterday (ONS, 2018).



“Have you ever tried buying lots of stuff?”

TABLE 38.1 Happiness Is . . .

Researchers have found that happy people tend to	However, happiness seems not much related to other factors, such as
Be older.	Gender (women often self-report more joy, but also more depression).
Have high self-esteem (in individualist countries).	Physical attractiveness.
Be optimistic, outgoing, and agreeable, and have a humorous outlook.	
Have close, positive, and lasting relationships.	
Have work and leisure that engage their skills.	
Have an active religious faith (especially in more religious cultures).	
Sleep well and exercise.	
Experience awe and wonder.	

Information from Anglim et al., 2020; Bai et al., 2021; Batz-Barbarich et al., 2018; Carstensen et al., 2011; De Neve & Cooper, 1998; Diener et al., 2003, 2011; Headey et al., 2010; Lucas et al., 2004; Lyubomirsky, 2013; Myers, 1993, 2000; Myers & Diener, 1995, 1996; Newport, 2022; Steel et al., 2008. Veenhoven, 2014, 2015 offers a database of 13,000+ correlates of happiness at WorldDatabaseofHappiness.eur.nl

TABLE 38.2 Evidence-Based Suggestions for a Happier Life

- **Take control of your time.** Happy people feel in control of their lives and less time-stressed (Whillans, 2019). Too little time is stressful; too much is boring. So, set goals and divide them into manageable daily aims. We all tend to overestimate how much we will accomplish in any given day, but the good news is that we generally *underestimate* how much we can accomplish in a year, given just a little daily progress.
- **Label your feelings.** Research shows that people who chose a word that fit their feelings actually felt more positive and less negative (Vlasenko et al., 2021). So, label your feelings. We can often find our way into a happier state of mind by understanding what we are feeling.
- **Seek work and leisure that engage your skills.** Happy people often are in a zone called *flow*—absorbed in tasks that challenge but don’t overwhelm them. Passive forms of leisure (streaming movies and television shows) often provide less flow experience than exercising, socializing, or expressing artistic interests.
- **Seek experiences rather than things.** For those who are not struggling financially, money buys more happiness when spent on experiences—especially socially shared experiences—that you look forward to, enjoy, remember, and talk about (Caprariello & Reis, 2013; Kumar & Gilovich, 2013, 2015; J. C. Lee et al., 2018). As pundit Art Buchwald said, “The best things in life aren’t things.”
- **Join the “movement” movement.** Aerobic exercise not only promotes health and energy, it also helps relieve mild depression (McIntyre et al., 2020; Willis et al., 2018). Researchers have found that certain kinds of body movement while exercising, such as reaching our arms up or bouncing to a beat, may be especially good at elevating feelings of joy (McGonigal, 2019; Shafir et al., 2013). Sound minds often reside in sound bodies.
- **Give your body the sleep it wants.** Happy people live active lives yet reserve time for renewing, refreshing sleep. Sleep debt results in fatigue, diminished alertness, poor physical health, and gloomy moods. If you sleep now, you’ll smile later.
- **Give priority to close relationships.** Compared with unhappy people, happy people engage in more meaningful conversations (Milek et al., 2018). Resolve to nurture your closest relationships by *not* taking your loved ones for granted: Give them the sort of kindness and affirmation you give others. Relationships matter.
- **Focus and find meaning beyond self.** Reach out to those in need. Perform acts of kindness. Happiness increases helpfulness, but doing good for others also fills us with happiness, meaning, and purpose (Kumar & Epley, 2022). And meaning matters mightily: A meaningful life is often a long, active, and healthy life (Alimujiang et al., 2019; Hooker & Masters, 2018).
- **Challenge your negative thinking.** Remind yourself that a disappointment today may not seem like that big a deal in a month, or a year.
- **Count your blessings and record your gratitude.** Keeping a gratitude journal heightens well-being (Davis et al., 2016). Take time to savor positive experiences and achievements, and to appreciate why they occurred (Sheldon & Lyubomirsky, 2012). Share your gratitude with others and prepare for smiles all around (Dickens, 2017; Kumar & Epley, 2018).
- **Nurture your spiritual self.** Relaxation and meditation help us stay emotionally steady. And for many people, faith provides a support community, a reason to focus beyond self, and a sense of purpose and hope. That helps explain why, worldwide, people active in faith communities report greater-than-average happiness and often cope well with crises (Pew, 2019).
- **Take an “awe walk.”** Experiencing a sense of awe or wonder can reduce stress and increase well-being (Bai et al., 2021; Sturm et al., 2020). Taking a 15-minute outdoor awe walk can help you appreciate the presence of something bigger than yourself.

Happy societies are not only prosperous, but also places where people trust one another, feel free, and enjoy close relationships (Helliwell et al., 2013; Oishi & Schimmack, 2010). This knowledge may guide nations toward policies that decrease stress, foster human flourishing, and promote “the pursuit of happiness.” Debates about economic inequality, tax rates, divorce laws, parental leave, health care, and city planning can all consider people’s psychological well-being.

Questioning Some Myths About Happiness

People believe many myths about happiness. Let’s review the most common and see what the science has to say.

DOES MONEY BUY US HAPPINESS? Would you be happier if you made more money? How important is “Being very well off financially”? “Very important” or “essential,” say 84 percent of entering U.S. college students (Stolzenberg et al., 2019). But can money buy happiness?

Personal income predicts happiness—but the more you have, the more it takes to raise your happiness. Having enough money to eat, to feel control over your life, and to occasionally treat yourself to something special predicts greater happiness (Fischer & Boer, 2011; Ruberton et al., 2016). This is especially true for people during their midlife working years (Cheung & Lucas, 2015). But money’s power to buy happiness also depends on your current income. Although nearly everyone welcomes more money, a \$3000 wage



Experiencing awe in nature improves well-being.

increase does much more for someone making \$30,000 per year than for someone making \$300,000 (Killingsworth, 2021).

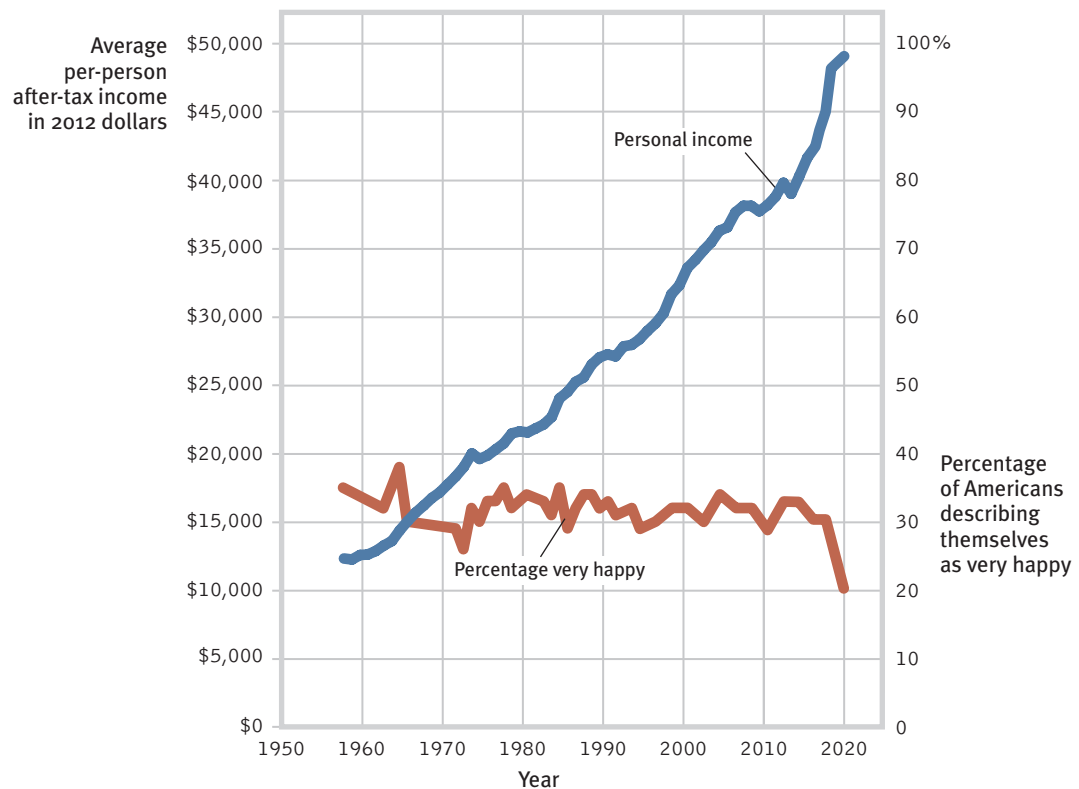
Those living in countries where most people have a secure livelihood tend to be happier than those living in very low-income countries (Diener & Tay, 2015). Money may not buy happiness, but extreme poverty often means misery, which can be lessened by more fairly distributed economic growth (Roser, 2021). Once we have enough money for comfort and security, however, we reach an “income satiation” point beyond which piling up more and more matters less and less (Donnelly et al., 2018; Jebb et al., 2018).

Economic growth in higher-income countries has provided no apparent boost to people’s morale or social well-being. Since the late 1950s, the average U.S. citizen’s buying power has almost tripled, and with it came new home entertainment systems, safer cars, fresh fruit in winter, and easy information access. Did it also buy more happiness? As **FIGURE 38.4** shows, Americans have become no happier. In 1957, some 35 percent said they were “very happy,” as did slightly fewer—31 percent—in 2018 (and 19 percent during the Covid pandemic in 2021). The same thing happened in China and India, where living standards have risen but happiness and life satisfaction have not (Easterlin & O’Connor, 2020). The good life is not the goods life.

Extreme inequality is socially toxic. Why has economic growth not made us happier? Economic growth has been accompanied by rising inequality, which, across time and place, predicts unhappiness (Cheung & Lucas, 2016; Graafland & Lous, 2019). In countries such as the United States, China, and India, the last half-century’s rising economic tide has lifted the yachts faster than the rowboats (Hasell, 2018). In countries and states with greater inequality, people with lower incomes tend to experience more physical, emotional, and social problems than they do in places with less inequality (Payne, 2017; Sommet et al., 2018; Vyas et al., 2022). One study following over 40,000 Canadian children found that those experiencing poverty had greater odds of having asthma and a psychological disorder, and were less ready for school (Roos et al., 2019).

Thus, the more unequal a country’s income, the more money predicts happiness (Macchia, 2020; Quispe-Torreblanca et al., 2021). Across the world, we seem to understand that extreme inequality is socially toxic. Regardless of their political party, most

FIGURE 38.4
Money didn’t buy happiness
(Happiness data from National Opinion Research Center surveys; income data from *Historical Statistics of the United States and Economic Indicators*.)



people say they would prefer smaller pay gaps between people with high incomes and people with low incomes (Arsenio, 2018; Kiatpongpan & Norton, 2014).

Ironically, in every culture, those who strive hardest for wealth have tended to live with lower well-being, especially when they seek money to prove themselves, gain power, or show off rather than support their families (Donnelly et al., 2016; Niemiec et al., 2009; Srivastava et al., 2001). Those who instead strive for intimacy, personal growth, and community contribution experience a higher quality of life (Kasser, 2018; Ward et al., 2020).

The bottom line: Money by itself does not buy happiness, but if you spend it on others in ways that promote kindness, it can predict happiness.

IS OUR HAPPINESS INDEPENDENT OF OTHERS? Are you happy? Many people, especially those from individualist cultures, believe our happiness is independent of others. “If you want to live a happy life, tie it to a goal, not to people,” advised Albert Einstein.

Yet the reality is that we are social animals. We often compare ourselves to others—our looks, our achievements, and our happiness. Whether we feel good or bad depends on our perception of just how successful those others are (Lyubomirsky, 2001). Most new university students perceive their peers as more socially connected, which diminishes their well-being and makes it harder to form friendships (Whillans et al., 2017; Zell et al., 2018). Across many studies, people ranging from mall shoppers to online respondents have perceived others’ social lives as more active than their own (Deri et al., 2017). Do such social comparisons—which social media may encourage—leave you, too, feeling like your life is a bit dull and unromantic compared to that of your friends? If so, you likely are experiencing **relative deprivation**.

When expectations soar above attainments, we feel disappointed. Worldwide, life satisfaction suffers when people with low incomes compare themselves to those with higher incomes (Macchia et al., 2020). One analysis of 2.4 million participants in 357 studies found that happiness depended less on actual financial success than on how participants *compared* themselves financially to their peers (Tan et al., 2020). As British philosopher Bertrand Russell (1930/1985) noted, “Napoleon envied Caesar, Caesar envied Alexander, and Alexander, I daresay, envied Hercules, who never existed. You cannot, therefore, get away from envy by means of success alone, for there will always be in history or legend some person even more successful than you are” (pp. 68–69).

Just as comparing ourselves with those who are better off creates envy, so counting our blessings as we compare ourselves with those worse off boosts our contentment. In one study, when mildly depressed people read about someone who was even more depressed, they felt somewhat better (Gibbons, 1986). “I cried because I had no shoes,” states a Persian saying, “until I met a man who had no feet.”

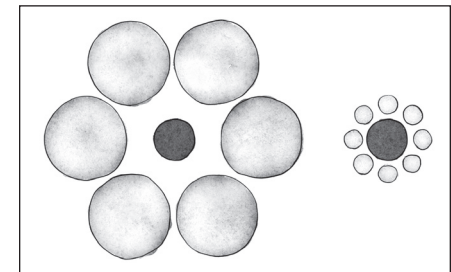
MUST BAD EVENTS CAUSE LONG-TERM UNHAPPINESS? Extremely stressful events—the loss of a spouse or a job—can drag us down for a long time (Infurna & Luthar, 2016). But eventually, most bad moods end. We may feel that our heart has broken during a romantic breakup, but in time the wound heals. In one study, faculty members up for tenure expected a negative decision would deflate their lives. Actually, 5 to 10 years later, their happiness level was about the same as for those who received tenure (Gilbert et al., 1998).

Grief over the loss of a loved one or anxiety after a severe trauma can linger. But tragedy and trauma are usually not permanently depressing. People who become blind or paralyzed may not completely recover their previous well-being, but many—especially those with an agreeable personality—eventually approach their prior levels of day-to-day happiness (Bonanno, 2004; Boyce & Wood, 2011; Hall et al., 1999). Although the 9/11 terrorist attacks and Covid-19 pandemic caused widespread immediate distress, a year later many people had returned to their baseline levels of happiness (Aknin et al., 2021). “Distress is a normal reaction to mass tragedy,” said psychologist George Bonanno (2021), “but so is a relatively prompt climb back to good mental health.” In the poetry of an ancient Psalm, “Weeping may linger for the night, but joy comes with the morning.”

Bonanno (2021) told the story of Jed, who lost his leg when he was run over by a garbage truck. Despite this traumatic accident and the challenges he faced adapting to life with

relative deprivation the perception that we are worse off relative to those with whom we compare ourselves.

Students tend to have a higher academic self-concept if they attend a school where most other students are not exceptionally able (Marsh et al., 2020, 2021). If you were near the top of your graduating class, you might feel inferior or discouraged upon entering a college or university where all students were near the top of their class. As Theodore Roosevelt reportedly observed, “Comparison is the thief of joy.”



“Two dark circles that are the same size.
or
Would I be happier if I had less successful friends?”

Relative deprivation Comparing ourselves with more successful others, we feel diminished; comparing ourselves with those who are worse off, we feel contented. How does the cartoon illustrate this *relative deprivation* principle?

Think back to some significant event that either elated or depressed you. How long did your extreme emotions last before returning to more typical levels?

➔ **resilience** the personal strength that helps people cope with stress and recover from adversity and even trauma.

one less limb, Jed demonstrated **resilience**. After recovery, he returned to being a happy person whose endless optimism could light up a room. Overcoming serious setbacks, as Jed did, can even foster a deeper sense of life’s purpose and meaning (Seery, 2011).

ASK YOURSELF

Were you surprised by any of the findings related to happiness? How might you increase your happiness?

RETRIEVAL PRACTICE

RP-2 Which of the following factors does *not* predict self-reported happiness?

- a. Age
- b. Personality traits
- c. Sleep and exercise
- d. Active religious faith

ANSWERS IN APPENDIX E

MODULE

38 REVIEW Experiencing Emotion

LEARNING OBJECTIVES

Test Yourself Answer these repeated Learning Objective Questions on your own (before “showing” the answers here, or checking the answers in Appendix D) to improve your retention of the concepts (McDaniel et al., 2009, 2015).

- LOQ 38-1** What are some of the basic emotions?
- LOQ 38-2** What are the causes and consequences of anger?
- LOQ 38-3** What is happiness? Why does happiness matter?
- LOQ 38-4** How do time, wealth, adaptation, and comparison affect our happiness levels?
- LOQ 38-5** What predicts happiness, and how can we be happier?

TERMS AND CONCEPTS TO REMEMBER

Test Yourself Write down the definition in your own words, then check your answer.

happiness, p. 434	adaptation-level phenomenon, p. 435
feel-good, do-good phenomenon, p. 434	relative deprivation, p. 439
positive psychology, p. 434	resilience, p. 440
subjective well-being, p. 434	

MODULE TEST

Test Yourself Answer the following questions on your own first, then “show” the answers here, or check your answers in Appendix E.

- One of the most consistent findings of psychological research is that happy people are also
 - more likely to express anger.
 - generally luckier than others.
 - concentrated in the wealthier nations.
 - more likely to help others.
- _____ psychology is a scientific field of study focused on how humans thrive and flourish.
- After moving to a new apartment, you find the street noise irritatingly loud, but after a while it no longer bothers you. This reaction illustrates the
 - relative deprivation principle.
 - adaptation-level phenomenon.
 - feel-good, do-good phenomenon.
 - catharsis principle.
- There will always be someone more successful, more accomplished, or more popular with whom to compare ourselves. In psychology, this phenomenon is referred to as the _____ principle.

MODULE

39 Stress and Illness

“It’s killing me inside. I’m kind of broken. I’m broken. And my colleagues are broken. And people say, ‘It’s not that big a deal.’ And I want to take them by the collar and say you don’t know what you’re talking about. Come see my world.” So explained Montana nurse Joey Traywick (2020), choking back tears while his hospital’s intensive care unit was overwhelmed with Covid patients.

When restricted from visiting, patients' loved ones also experienced deep distress. Such was witnessed by Nebraska nurse Antonia Brune (2021) as she accompanied a patient to life's finish line: "I could feel how my patient's three daughters were tormented by not being able to be there physically with their mom." Brune used an iPad to enable the daughters to spend "the whole night talking to their mother—sharing stories, laughter, tears, memories, and music." When their mother's breathing ceased, Brune recalled, "[the daughters] asked me, 'Could you touch her face?' I softly stroked her forehead. 'Could you touch her cheek?' I caressed her cheek. 'Could you hold her hand?' I took her hand. Her daughters gained peace from the sense that they were touching their mom, through me. We were all united in a beautiful, ephemeral moment—patient, family, and caregiver—as they said their final goodbyes."¹

The Covid pandemic caused major stress: loss of loved ones, illness, fear of becoming ill, social isolation, job loss, and the upheaval of normal routines. How did you cope? The impact of Covid illustrates what this module explores: what causes stress, and how stress affects us.

To live is to experience stress. Worldwide, 41 percent of people reported experiencing "a lot of stress" the day before (Gallup, 2022). People from Afghanistan and Lebanon (74 percent) were the most stressed. Those from Uzbekistan and Kazakhstan were the least stressed (12 percent). People from the United States (52 percent) and Canada (49 percent) were about in the middle. A third of U.S. college students recently considered withdrawing from school, reported a Gallup survey—and 7 in 10 blamed emotional stress (Marken, 2022).

Some stresses we anticipate. An important exam is not an unexpected event, but it will still make you tense. Although well-intended, *trigger warnings* that alert people to possibly disturbing content do little to prevent distress, and may even increase anxiety (Bellet et al., 2020; Sanson et al., 2019). Even when trigger-warned about a literary passage describing an assault (and given the option of reading a neutral passage), 96 percent of students in one study chose to read the triggering passage. Two weeks later, the students (even those with preexisting posttraumatic stress disorder) showed no increased distress (Kimble et al., 2021).

Other stress strikes without warning. Imagine being 21-year-old Ben Carpenter, who experienced the world's wildest and fastest wheelchair ride. As he was crossing a highway intersection, the light changed, and a big truck moved into the intersection. When they bumped, Carpenter's wheelchair handles got stuck in the truck's grille. The driver, who hadn't seen Carpenter and couldn't hear his cries for help, took off down the highway, pushing the wheelchair at 50 miles per hour until, after two miles, passing police flagged down the truck. Meanwhile, Carpenter reacted to the loss of control: His heart raced, his hands sweated, and his breathing sped up. "It was very scary," he recalled.

Stress may be extreme but brief, as Carpenter experienced. It may be deep and prolonged, as Covid nurses Traywick and Brune endured. Ordinary life transitions and everyday hassles also cause stress and produce similar, though weaker, physical and psychological responses. And as we will see, stress—from the catastrophic to the everyday—can harm our health.

Stress: Some Basic Concepts

LOQ 39-1 How does our appraisal of an event affect our stress reaction, and what are the three main types of stressors?

Stress is a slippery concept. We sometimes use the word informally to describe threats or challenges ("Nurse Brune was under a lot of stress"), and at other times to describe our responses ("She felt very stressed"). Psychologists use more precise terms. The challenge or event (Brune's distressing time treating Covid patients) is a *stressor*. Her physical and emotional responses are a *stress reaction*. And the process by which she interpreted the threat was *stress*.

¹Credit: Nebraska Nurses Association



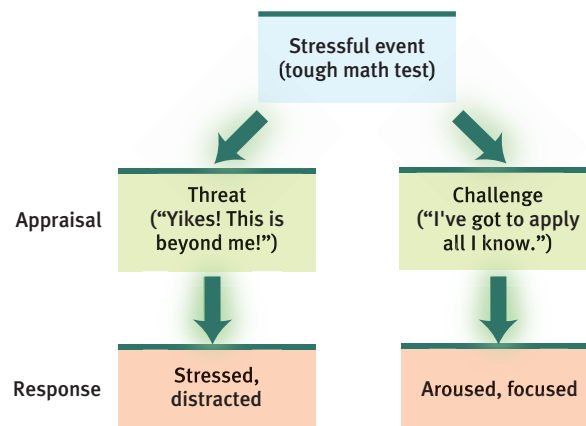
Dasha Pietrenko/Alamy Stock Photo

Covid nursing stress

stress the process by which we perceive and respond to certain events, called *stressors*, that we appraise as threatening or challenging.

➔ **FIGURE 39.1**

Stress appraisal The events of our lives flow through a psychological filter. How we appraise an event influences how much stress we experience and how effectively we respond.



Fuse/Getty Images

Stress often arises less from events themselves than from how we think about or *appraise* them (Lazarus, 1998). One person, alone in a house, ignores its creaking sounds and experiences no stress; another suspects an intruder and becomes alarmed. One person regards a difficult new class as a welcome challenge; another appraises it as risking failure (FIGURE 39.1). Once we've appraised an event as a stressor (the *primary appraisal*), we assess our ability to respond to it (the *secondary appraisal*).

When short-lived, or when perceived as challenges, stressors can have positive effects. Momentary stress can mobilize the immune system to fend off infections and heal wounds (Segerstrom, 2007). Stress also arouses and motivates us to conquer problems. In a Gallup World Poll, those who were stressed, but not depressed, reported being energized and satisfied with their lives. This is the opposite of the lethargy reported by those who were depressed, but not stressed (Ng & Feldman, 2009).

Championship athletes, successful entertainers, motivated students, and great teachers and leaders often thrive and excel when aroused by a challenge (Blascovich & Mendes, 2010; Z. Wang et al., 2015). When we think about our stress as being helpful to us, we show less cardiovascular stress and even attend less to negativity (Jamieson et al., 2012). In games and athletic contests, the stress of not knowing who will win makes the competition enjoyable (Abuhamdeh et al., 2015). Having conquered cancer or rebounded from a lost job, some people emerge with stronger self-esteem and a deepened spirituality and sense of purpose. Indeed, experiencing some stress builds *resilience*—our ability to adapt to, cope with, and rebound from life's challenges (Bonanno, 2021; Wu et al., 2019). When we experience hardship, we sometimes discover the hidden power of our talents and relationships (Nuñez et al., 2022; Schwartz et al., 2022). By teaching us how to cope with life's twists and turns, occasional stressors can even build a healthier immune system (Epel et al., 1998). Adversity can produce growth.

But stress can also harm us. Stress can trigger risky decisions and unhealthy behaviors (Cohen et al., 2016; Starcke & Brand, 2016). And stress can affect health directly, by increasing infectious-disease-related illnesses and even deaths (Epel et al., 2004; Hamer et al., 2019). Those who endure extreme stress during pregnancy tend to have shorter pregnancies, which pose health risks for infants (Ding et al., 2021). What is your perceived stress level (FIGURE 39.2)?

So, there is an interplay between our head and our health. That isn't surprising: *Mind and body interact; everything psychological is simultaneously physiological.* Before exploring that interplay, let's look more closely at stressors and stress reactions.

Stressors — Things That Push Our Buttons

Stressors fall into three main types: catastrophes, significant life changes, and daily hassles (including social stress).

CATASTROPHES Catastrophes are large-scale disasters: think earthquakes, hurricanes, wildfires, wars. Their damage to emotional and physical health can be significant. In the four months after Hurricane Katrina in 2005, New Orleans' suicide rate tripled (Saulny, 2006). And in surveys taken in the three weeks after the 9/11 terrorist attacks,

"Too many parents make life hard for their children by trying, too zealously, to make it easy for them." —German author Johann Wolfgang von Goethe (1749–1832)

Perceived Stress Scale

The questions in this scale ask about your feelings and thoughts *during the last month*. In each case, indicate how often you felt or thought a certain way.

0	1	2	3	4
Never	Almost never	Sometimes	Fairly often	Very often

In the last month...

- ___ ...how often have you been upset because of something that happened unexpectedly?
- ___ ...how often have you felt that you were unable to control the important things in your life?
- ___ ...how often have you felt nervous and “stressed”?
- ___ ...how often have you felt confident about your ability to handle your personal problems?
- ___ ...how often have you felt that things were going your way?
- ___ ...how often have you found that you could not cope with all the things you had to do?
- ___ ...how often have you been able to control irritations in your life?
- ___ ...how often have you felt that you were on top of things?
- ___ ...how often have you been angered because of things that were outside of your control?
- ___ ...how often have you felt difficulties were piling up so high that you could not overcome them?

SCORING:

- First, reverse your scores for questions 4, 5, 7, and 8. On these four questions, change the scores like this: 0 = 4, 1 = 3, 2 = 2, 3 = 1, 4 = 0.
- Next, add up your scores to get a **total score**.
- Scores range from 0 to 40, with higher scores indicating higher perceived stress.
- Scores ranging from 0-13 would be considered *low perceived stress*.
- Scores ranging from 14-26 would be considered *moderate perceived stress*.
- Scores ranging from 27-40 would be considered *high perceived stress*.

Scale data from Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385-396.

FIGURE 39.2
Perceived Stress Scale

58 percent of Americans said they were experiencing greater-than-average arousal and anxiety (Silver et al., 2002). People were especially likely to report such symptoms in the New York City area, and sleeping pill prescriptions rose by 28 percent (HMHL, 2002; NSF, 2001). Worldwide, a similar uptick in anxiety and depression occurred during the initial months of the Covid pandemic (Aknin et al., 2022).

For those who respond to catastrophes, the stress may be twofold. The trauma of uprooting and family separation may combine with the challenges of adjusting to a new culture’s language, ethnicity, and social norms (Pipher, 2002). Newcomers often feel marginalized and experience culture shock, leading to stress-related inflammation (Gonzales et al., 2018; Scholaske et al., 2018). This *acculturative stress* can decline over time, especially when people engage in meaningful activities and connect socially (Bostean & Gillespie, 2017; Kim et al., 2012).

SIGNIFICANT LIFE CHANGES Life transitions—leaving home, having a loved one die, taking on student debt, losing a job, getting divorced—are often keenly felt. Even happy transitions, such as graduating or getting married, can be stressful. Many stresses peak during adolescence and young adulthood: A massive Canadian survey investigating people’s responses to difficult problems revealed that adolescents struggled the most (Statistics Canada, 2019). In another survey, nearly two-thirds of U.S. 15- to 29-year-olds—but less than half of those over 50—reported experiencing stress during “a lot of the day yesterday” (Ray, 2019).

Some psychologists study the health effects of life changes by following people over time. Others compare the life challenges previously endured by those who have (or have not) experienced a health problem, such as a heart attack. In such studies, recently widowed, fired, or divorced people have been more vulnerable to disease (Dohrenwend et al., 1982; Sbarra et al., 2015; Strully, 2009). One Finnish study of 96,000 widowed people found that the survivor’s

A hurricane of stress and destruction

Hurricane Ian raged across Florida in 2022, killing more than 100 people and destroying the homes and possessions of thousands more. Alice Pujols (shown here) survived the storm but her home was destroyed. “I’m trying to make it to the next day,” she said. “That’s all I can do. It’s really depressing” (Calvan & Melley, 2022).



➔ **approach and avoidance motives** the drive to move toward (approach) or away from (avoid) a stimulus.

risk of death doubled in the week following a partner’s death (Kaprio et al., 1987). A cluster of crises—losing a job, home, and partner—puts one at even greater risk.

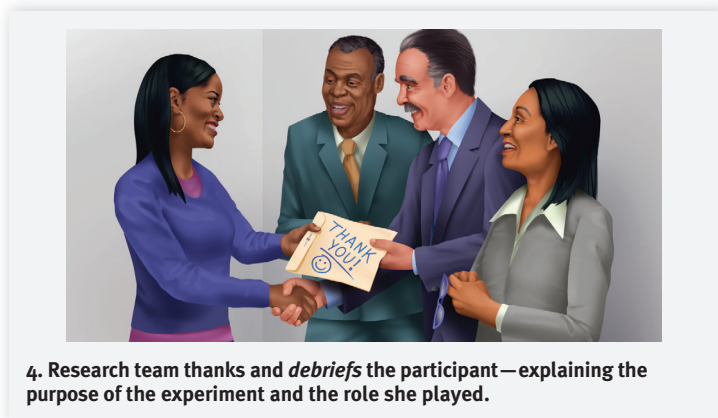
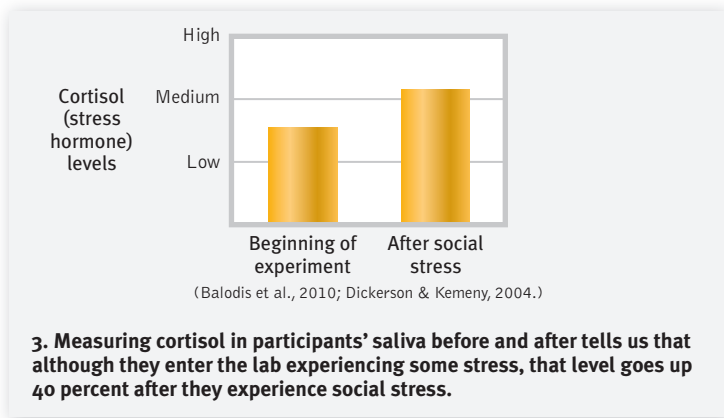
DAILY HASSLES AND SOCIAL STRESS Events don’t have to remake our lives to cause stress. Stress also comes from *daily hassles*—aggravating housemates, incessant social media notifications, bumper-to-bumper traffic, and overflowing to-do lists (Lazarus, 1990; Pascoe & Richman, 2009; Ruffin, 1993). We might have to give a speech or do difficult math problems (Dickerson & Kemeny, 2004; Meier et al., 2022; **FIGURE 39.3**).

Some people shrug off such hassles; others cannot. Daily pressures can become especially toxic when they are serious and ongoing. Chronic workplace stress can cause worker “burnout”—feeling ineffective, emotionally depleted, and disconnected (Guthier et al., 2020). Others may wake up each day facing housing problems, unreliable child care, budgets that won’t stretch to the next payday, physical or emotional challenges, or poor health. Such daily hassles can harm physical health years later—and even shorten life (Chiang et al., 2018; Leger et al., 2022).

Daily pressures may be compounded by social stressors, such as prejudice. Like other stressors, prejudice can have significant psychological and physical consequences (Michaels et al., 2022; Pascoe et al., 2022). Thinking that some of the people you encounter each day will dislike, distrust, or doubt you is a toxic stressor. Many transgender and gender-nonconforming people experience the stress of stigma and discrimination (Valentine & Shipherd, 2018). People with a same-sex sexual orientation who face frequent prejudice in their communities have died, on average, 12 years earlier than have those who live in more accepting communities (Hatzenbueler, 2014). For many Black Americans, the stress of racial discrimination can lead to unhealthy blood pressure and insulin levels and inflammation (Ajilore & Thames; 2020; Brody et al., 2018; Lawrence et al., 2022). Black Americans who have experienced police brutality are also at greater risk of depression, anxiety, and heart disease (Alang et al., 2022; Freedman et al., 2022).

Stress also arises from the daily conflicts we face between our different **approach and avoidance motives** (Hovland & Sears, 1938; Lewin, 1935). Least stressful are the

▼ **FIGURE 39.3**
Studying stress Most people experience stress when giving a public speech. To study stress, researchers re-create this type of situation. At the end, they *debrief* and reassure each participant.



approach-approach conflicts, in which two attractive but incompatible options pull us—to choose tacos or pizza, a dance or music class, the green or the gray hoodie. Other times, we face an *avoidance-avoidance* conflict between two undesirable alternatives. Do you avoid studying a disliked subject, or avoid failure by doing your reading? Do you suffer someone's wrath for admitting the truth, or feelings of guilt for having lied?

In times of *approach-avoidance* conflict, we feel simultaneously attracted and repelled. You may enjoy your job but dislike its lack of remote work flexibility. From a distance, the goal—making a good living—looks appealing. But as you approach that goal, your avoidance tendency may begin to overtake your approach tendency and you feel an urge to escape. Stepping back, the negative aspects fade, and you again feel attracted. Stress multiplies when we face several approach-avoidance conflicts simultaneously—where to work, which courses to take, whom to date.

The Stress Response System

LOQ 39-2 How do we respond and adapt to stress?

Medical interest in stress began with Hippocrates (460–377 B.C.E.). Centuries later, Walter Cannon (1929) confirmed that the stress response is part of a unified mind-body system. He observed that extreme cold, lack of oxygen, and emotion-arousing events all trigger an outpouring of the adrenal stress hormones epinephrine and norepinephrine. When alerted by any of a number of brain pathways, the sympathetic nervous system arouses us, preparing the body for the wonderfully adaptive response Cannon called the **fight-or-flight response**. It increases heart rate and breathing, diverts blood from digestion to the skeletal muscles for greater mobility, dulls feelings of pain, and releases sugar and fat from the body's energy stores. The sympathetic nervous system helps more with immediate or acute threats (a poisonous snake nearby) than with distant or looming threats (a climate apocalypse). By fighting or fleeing, we increase our chances of survival.

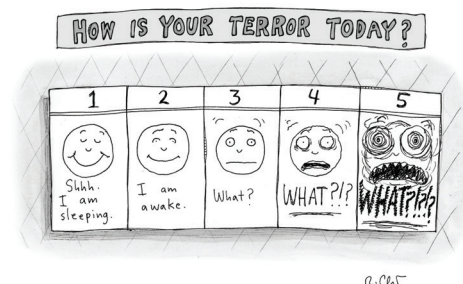
Since Cannon's time, physiologists have identified an additional stress response system. On orders from the cerebral cortex (via the hypothalamus and pituitary gland), the outer part of the adrenal glands secretes *glucocorticoid* stress hormones such as cortisol. The two systems work at different speeds, explained biologist Robert Sapolsky (2003): "In a fight-or-flight scenario, epinephrine is the one handing out guns; glucocorticoids are the ones drawing up blueprints for new aircraft carriers needed for the war effort." The epinephrine guns were firing at high speed during an experiment inadvertently conducted on a British Airways San Francisco to London flight. Three hours after takeoff, a mistakenly played message told passengers the plane was about to crash into the sea. Although the flight crew immediately recognized the error and tried to calm the terrified passengers, several required medical assistance (Associated Press, 1999).

Canadian scientist Hans Selye's (1936, 1976) 40 years of research on stress extended Cannon's findings. Selye's studies of animals' reactions to various stressors, such as electric shock and surgery, helped make stress a major concept in both psychology and medicine. Selye proposed that the body's adaptive response to stress is so general that, like a burglar alarm, it sounds, no matter what intrudes. He named this response the **general adaptation syndrome (GAS)**, which he saw as a three-phase process.

Let's say you're experiencing physical or emotional trauma:

- In **Phase 1**, you have an **alarm reaction**, as your sympathetic nervous system is suddenly activated. Your heart rate zooms. Blood is diverted to your skeletal muscles. With your resources mobilized, you are now ready to fight back.
- During **Phase 2**, **resistance**, your temperature, blood pressure, and respiration remain high. Your adrenal glands pump epinephrine and norepinephrine into your bloodstream. You are fully engaged, summoning all your resources to meet the challenge. As time passes, with no relief from stress, your body's reserves begin to dwindle.
- You have reached **Phase 3**, **exhaustion**. With exhaustion, you become more vulnerable to illness or, in extreme cases, collapse and even death.

Selye's basic point: Although the human body copes well with temporary stress, prolonged stress can damage it. Syria's civil war, for example, has taken a toll on Syrians'



Roz Chast/Cartoon Stock

fight-or-flight response an emergency response, including activation of the sympathetic nervous system, that mobilizes energy and activity for attacking or escaping a threat.

general adaptation syndrome (GAS) Selye's concept of the body's adaptive response to stress in three phases—alarm, resistance, exhaustion.



Sultan Kitaz/Reuters/Newscom



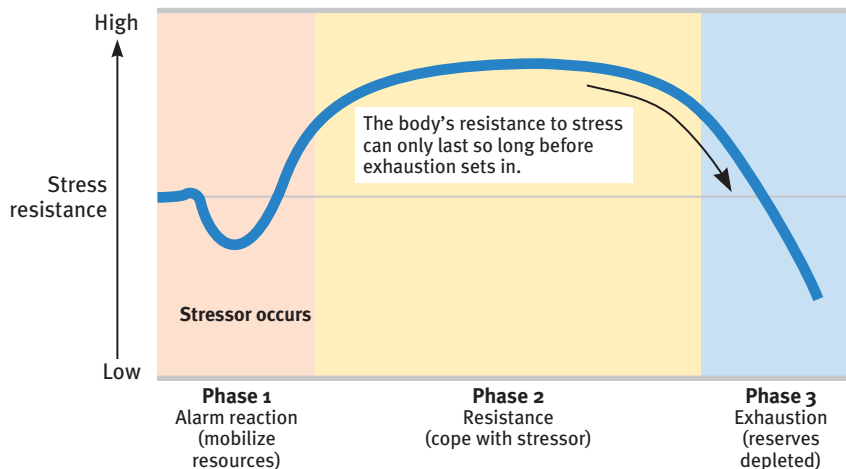
Sebastiano Tomada/Getty Images

FIGURE 39.4
Selye's general adaptation syndrome

Due to ongoing conflict, Syria's White Helmets (volunteer rescuers) were perpetually in "alarm reaction" mode, rushing to pull victims from the rubble after each fresh attack. As their resistance depleted, they risked exhaustion.

"We sleep afraid, we wake up afraid, and leave our homes afraid." —15-year-old girl's Facebook post, describing her family's daily life in war-torn Yemen (al-Asaadi, 2016).

Bring to mind a personal experience related to the Covid pandemic. What stressors affected you? What stress responses did you experience? How did you cope?



physical health and increased their risk for PTSD (Al Ibraheem et al., 2017; **FIGURE 39.4**). Severe childhood stress gets under the skin, leading to greater adult stress, sleeplessness, and heart disease (Jakubowski et al., 2018; Puterman et al., 2016; Talvitie et al., 2019). Some examples:

- In one 2-decade study, severely stressed Welsh children were three times more likely to develop heart disease as adults (Ashton et al., 2016).
- Black Americans who experience frequent racial discrimination develop shorter telomeres—DNA pieces protecting the chromosome ends (Chae et al., 2020). That helps explain why, compared with White Americans, Black Americans have a shorter life expectancy (CDC, 2020; Puterman et al., 2020).
- In studies of abused youth and stressed caregivers, those who were most stressed had cells that looked older than their chronological age (Nelles-McGee et al., 2022).

Severe stress ages people.

We respond to stress in other ways, too. One response is common after severe stress: Withdraw. Isolate. Conserve energy. Or act like a mouse, whose stressed-out brain induces them to recharge by taking a nap (Yu et al., 2022). (Do you also get sleepy when you're stressed?) Faced with an extreme disaster, such as a ship sinking, some people become paralyzed by fear. Another response, found among women more often than men, is to give and receive support—what's called the **tend-and-befriend response** (Lim & DeSteno, 2016; Taylor, 2006; von Dawans et al., 2019).

RETRIEVAL PRACTICE

RP-1 When alerted to a negative, uncontrollable event, our _____ nervous system arouses us. Heart rate and respiration _____ (increase/decrease). Blood is diverted from digestion to the skeletal _____. The body releases sugar and fat. All this prepares the body for the _____ - _____ response.

ANSWERS IN APPENDIX E

Stress and Vulnerability to Disease

LOQ 39-3 How does stress make us more vulnerable to disease?

It often pays to spend our resources in fighting or fleeing an external threat. But we do so at a cost. When stress is momentary, the cost is small. When stress persists, the cost may be greater, in the form of lowered resistance to infections and other threats to mental and physical well-being.

To study how stress—and healthy and unhealthy behaviors—influence health and illness, psychologists and physicians created the interdisciplinary field of *behavioral*

tend-and-befriend response under stress, people (especially women) often provide support to others (*tend*) and bond with and seek support from others (*befriend*).

medicine, integrating behavioral and medical knowledge. **Health psychology** provides psychology’s contribution to behavioral medicine. A branch of health psychology called **psychoneuroimmunology** focuses on mind-body interactions (Kiecolt-Glaser, 2009; Kipnis, 2018). This awkward name makes sense: Your thoughts and feelings (*psycho*) influence your brain (*neuro*), which influences the endocrine hormones that affect your disease-fighting *immune* system. And this subfield is the study (*ology*) of those interactions.

If you’ve ever had a stress headache, or felt your blood pressure rise with anger, you know that our psychological states have physiological effects. Stress can even leave you less able to fight off disease because your nervous and endocrine systems influence your immune system (Sternberg, 2009). You can think of the immune system as a complex surveillance system. When it functions properly, it keeps you healthy by isolating and destroying bacteria, viruses, and other invaders. Four types of cells are active in these search-and-destroy missions (FIGURE 39.5).

Your age, nutrition, genetics, and stress level all influence your immune system’s activity. When your immune system doesn’t function properly, it can err in two directions:

- 1. Overreacting.** The immune system may attack the body’s own tissues, causing an allergic reaction or a self-attacking disease, such as lupus, multiple sclerosis, or some forms of arthritis. Women, who are immunologically stronger than men, are more susceptible to such *autoimmune diseases* (Nussinovitch & Schoenfeld, 2012; Schwartzman-Morris & Putterman, 2012).
- 2. Underreacting.** The immune system may allow a bacterial infection to flare, a dormant virus to erupt, or cancer cells to multiply. To protect transplanted organs, which the recipient’s body treats as foreign invaders, a patient’s immune system may be deliberately suppressed.

Immune system suppression has been observed in animals stressed by physical restraints, unavoidable electric shocks, noise, crowding, cold water, social defeat, or separation from their mothers (Maier et al., 1994). One study monitored immune responses in 43 monkeys over 6 months (Cohen et al., 1992). Half were left in stable groups. The rest



Sreeter Leckel/Getty Images

Friendly foes Tending and befriending helped U.S. marathon rivals and good friends Kara Goucher and Shalane Flanagan cope with stress and excel. During the 2012 London Olympic Marathon, they battled intense rain and physical pain, finishing 1 second apart.

“I’ve stopped turning the telly on. I’ve had to because the news was making me ill.” —U.K. nurse explaining how she coped with stress during the Covid pandemic (Kinsella et al., 2022).

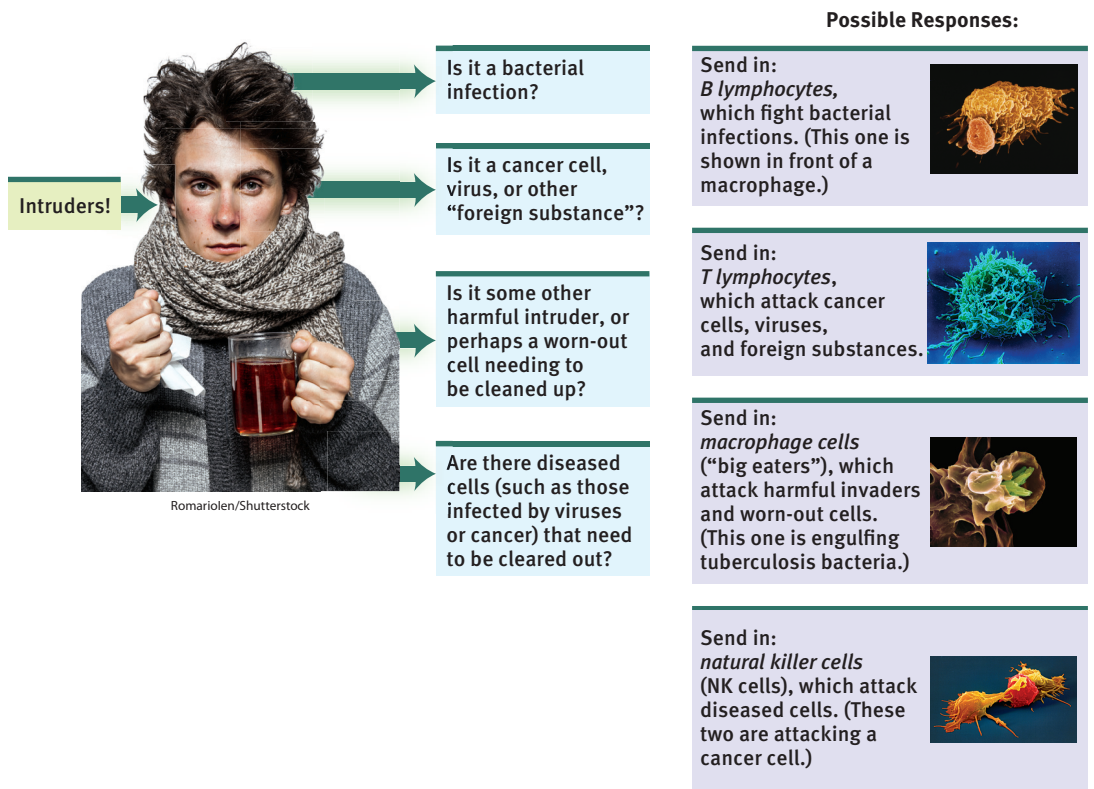


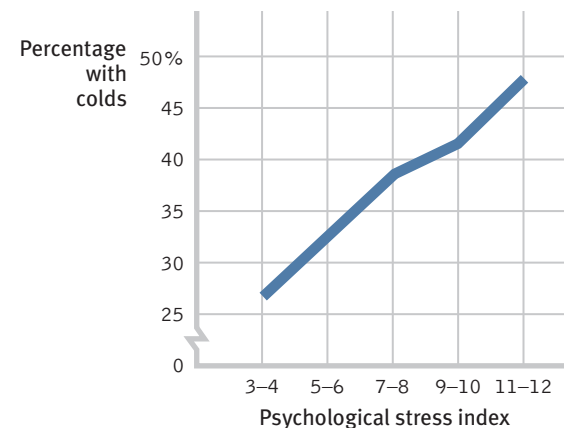
FIGURE 39.5
A simplified view of immune responses

health psychology a subfield of psychology that contributes to behavioral medicine.

psychoneuroimmunology the study of how psychological, neural, and endocrine processes together affect our immune system and resulting health.

➤ FIGURE 39.6

Stress and colds People with the highest life stress scores were also most vulnerable when exposed to an experimentally delivered cold virus (Cohen et al., 1991).



were stressed by being housed with new roommates—three or four new monkeys each month. By the end of the experiment, the socially disrupted monkeys had weaker immune systems.

Human immune systems react similarly. Three examples:

- **Surgical wounds heal more slowly in stressed people.** In one experiment, dental students received punch wounds (precise small holes punched in the skin). Compared with wounds placed during summer vacation, those placed three days before a major exam healed 40 percent more slowly (Kiecolt-Glaser et al., 1998). In other studies, marriage conflict has also slowed punch-wound healing (Kiecolt-Glaser et al., 2005).
- **Stressed people are more vulnerable to illness.** Major life stress increases the risk of a respiratory infection (Pedersen et al., 2010). When psychologist Sheldon Cohen and his colleagues dropped a cold virus into people's noses, 47 percent of those living stress-filled lives developed colds (FIGURE 39.6). Among those living relatively free of stress, only 27 percent did. In a U.K. study, high stress levels at the outset of the Covid pandemic predicted a greater likelihood of Covid infection eight months later (Ayling et al., 2022).
- **Stress can hasten the course of disease.** As its name tells us, *AIDS (acquired immune deficiency syndrome)* is an immune disorder, caused by the *human immunodeficiency virus (HIV)*. Stress cannot give people AIDS. But a global analysis of 33,252 found that stress and negative emotions sped the transition from HIV infection to AIDS. And stress predicted a faster decline in those with AIDS (Chida & Vedhara, 2009).

The stress effect on immunity makes physiological sense. It takes energy to track down invaders, produce swelling, and maintain fevers. Thus, when diseased, your body reduces its muscular energy output by decreasing activity (and increasing sleep). Stress creates a competing energy need. During an aroused fight-or-flight reaction, your stress responses divert energy from your disease-fighting immune system and send it to your muscles and brain. This renders you more vulnerable to illness. Even within twin pairs, the less happy twin tends to die first (Saunders et al., 2018). *The point to remember:* Stress gets under the skin. It does not make us sick, but it does alter our immune functioning, which leaves us less able to fight infection and more likely to get sick.

RETRIEVAL PRACTICE

- RP-2** The field of _____ studies mind-body interactions, including the effects of psychological, neural, and endocrine functioning on the immune system and overall health.
- RP-3** What general effect does stress have on our health?

ANSWERS IN APPENDIX E

Stress and Heart Disease

LOQ 39-4 Why are some of us more prone than others to coronary heart disease?

Imagine a world where you wake up each day, make your breakfast, and check the news. Among the headlines, you see that 64 jumbo jets crashed again yesterday, killing another 25,000 passengers. You finish your breakfast and go on with your morning. It's just an average day.

Replace airline crashes with **coronary heart disease**, the United States' leading cause of death, and you have reentered reality. More than 9 million people die annually from heart disease (Roth et al., 2020). High blood pressure and a family history of the disease increase the risk. So do smoking, obesity, an unhealthy diet, physical inactivity, and a high cholesterol level. Such factors—along with more opioid deaths, the Covid pandemic, and economic inequality—help explain why, despite spending much more on health care, U.S. life expectancy is lower than in other high-income countries, and has been declining since 2014 (Rabin, 2022; Roser, 2021). Worldwide, coronary heart disease kills more men than women (Zhang et al., 2021).

Stress and personality also play a big role in heart disease. The more ongoing stress people experience, the more their bodies generate inflammation, which is associated with heart and other health problems, including depression (Madison et al., 2022). Plucking a hair and measuring its level of the stress hormone cortisol can help indicate whether women were exposed to violence or children have experienced prolonged stress (Bürgin et al., 2022; Lynch et al., 2022). Cortisol in a fingernail clipping can also indicate people's prior stress exposure and current heart problems and depression (Izawa et al., 2017; Phillips et al., 2021).

THE EFFECTS OF PERSONALITY, PESSIMISM, AND DEPRESSION In a classic study, Meyer Friedman, Ray Rosenman, and their colleagues tested the idea that stress increases vulnerability to heart disease. At different times of the year, they measured the blood cholesterol level and clotting speed of 40 U.S. male tax accountants (Friedman & Ulmer, 1984). The test results were initially typical, but as the accountants scrambled to finish their clients' tax returns before the April 15 filing deadline, their cholesterol and clotting measures rose to dangerous levels. After the deadline, the measures returned to typical levels. For these men, stress predicted heart attack risk.

The researchers then launched a *longitudinal study* of more than 3000 healthy middle-aged men. They interviewed each man for 15 minutes, noting his work and eating habits, manner of talking, and other behavior patterns, and then identified him as either **Type A** or **Type B** (with a roughly equal number of each type).

Nine years later, 257 men had experienced heart attacks—69 percent of them Type A. Moreover, not one of the “pure” Type Bs—the most mellow and laid-back of their group—had experienced a heart attack.

As often happens in science, this exciting discovery provoked both enormous public interest and researchers' curiosity. Was the finding reliable? If so, what was the toxic component of the Type A profile? Time-consciousness? Competitiveness? Anger?

Hundreds of other studies have since explored possible psychological predictors of cardiovascular disease (Chida & Hamer, 2008; Chida & Steptoe, 2009). These reveal that Type A's toxic core is negative emotions—especially the anger associated with an aggressively reactive temperament. Their often-active sympathetic nervous system redistributes blood flow to their muscles, pulling it away from their internal organs. The liver, which usually removes cholesterol and fat from the blood, can't do its job. Thus, excess cholesterol and fat may continue to circulate in the blood and later get deposited around the heart. Hostility also correlates with other risk factors, such as smoking, drinking, and obesity (Bunde & Suls, 2006). Our mind and heart interact.

In Western cultures, suppressing negative emotions increases gloomy moods, relationship problems, and health risks (Cameron & Overall, 2018; Kitayama et al., 2015). Many studies have also found that people who react with anger over little things are the most coronary-prone. Rage “seems to lash back and strike us in the heart muscle” (Spielberger & London, 1982). To have a healthy body and mind, learn how to reframe unpleasant events (“I have overcome obstacles like this before” or “There are other

In India and the United States, Type A bus drivers are literally hard-driving: They brake, pass, and honk their horns more often than their more easygoing Type B colleagues (Evans et al., 1987).

coronary heart disease the clogging of the vessels that nourish the heart muscle; a leading cause of death in many developed countries.

Type A Friedman and Rosenman's term for competitive, hard-driving, impatient, verbally aggressive, and anger-prone people.

Type B Friedman and Rosenman's term for easygoing, relaxed people.

“A cheerful heart is a good medicine, but a downcast spirit dries up the bones.”

—Proverbs 17:22

positive aspects of my life”) and pause when agitated rather than letting your anger erupt. (For some tips on managing anger, see Module 38.)

ASK YOURSELF

Do you think you are Type A, Type B, or somewhere in between? In what ways has this tendency been helpful to you, and in what ways has it been a challenge?

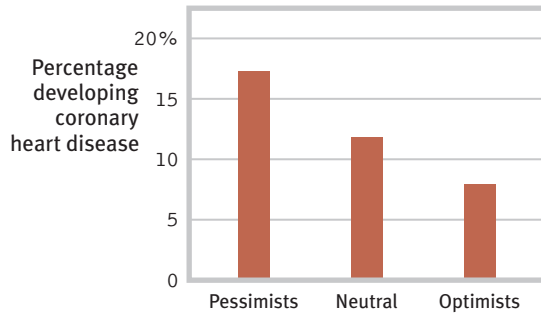


FIGURE 39.7
Pessimism and heart disease (Data from Krittanawong et al., 2022.)

Chronic pessimism may be similarly toxic. In 10 longitudinal studies, researchers compared health records among 215,000 people who scored as optimists, pessimists, or neither (Krittanawong et al., 2022). When the researchers followed up with participants years later, they found that pessimists were 43 percent more likely than optimists to develop heart disease and 13 percent more likely to be dead (FIGURE 39.7). Pessimism’s pestilence even emerged among people in their eighties and nineties, with pessimistic participants at greater risk of dying over the next 5 years (Jacobs et al., 2021).

Happiness also matters. Happy and consistently satisfied people tend to be healthy and to outlive their unhappy peers (Diener et al., 2017; Gana et al., 2016; Martín-María et al., 2017). People with big smiles tend to have extensive social networks, which predict longer life (Hertenstein et al., 2009). Boosting people’s happiness (with a 10-week educational and skills-building experimental intervention) reduced their subsequent sick days (Kushlev et al., 2020). Having a happy spouse also predicts better health (Chopik & O’Brien, 2017). Happy you, healthy me.

As we noted earlier, depressed people tend to age faster and die sooner (Han et al., 2018). This is in part because depressed people often smoke more and exercise less (Whooley et al., 2008). In one study, nearly 4000 English adults (ages 52 to 79) provided mood reports from a single day. Compared with those in a good mood, those in a depressed mood were twice as likely to be dead 5 years later (Steptoe & Wardle, 2011). In a U.S. survey of 164,102 adults, those who had experienced a heart attack were twice as likely to report also having been depressed at some point in their lives (Witters & Wood, 2015). And in the years following a heart attack, people with high scores for depression were four times more likely than their low-scoring counterparts to develop further heart problems (Frasure-Smith & Lesperance, 2005). Depression is disheartening.

A broken heart? Two days after Irma Garcia was tragically killed in the Uvalde, Texas, elementary school massacre, her husband Joe Garcia died of a heart attack at age 50. Might grief-related depression and stress hormones have contributed to his death? In a British study, older adults were at increased risk for a stroke or heart attack in the month following a partner’s death (Carey et al., 2014).



Robin Jerstad/ZUMA/PRESS/Newscom

RETRIEVAL PRACTICE

RP-4 Which component of the Type A personality has been linked most closely to coronary heart disease?

ANSWERS IN APPENDIX E

Stress and Inflammation

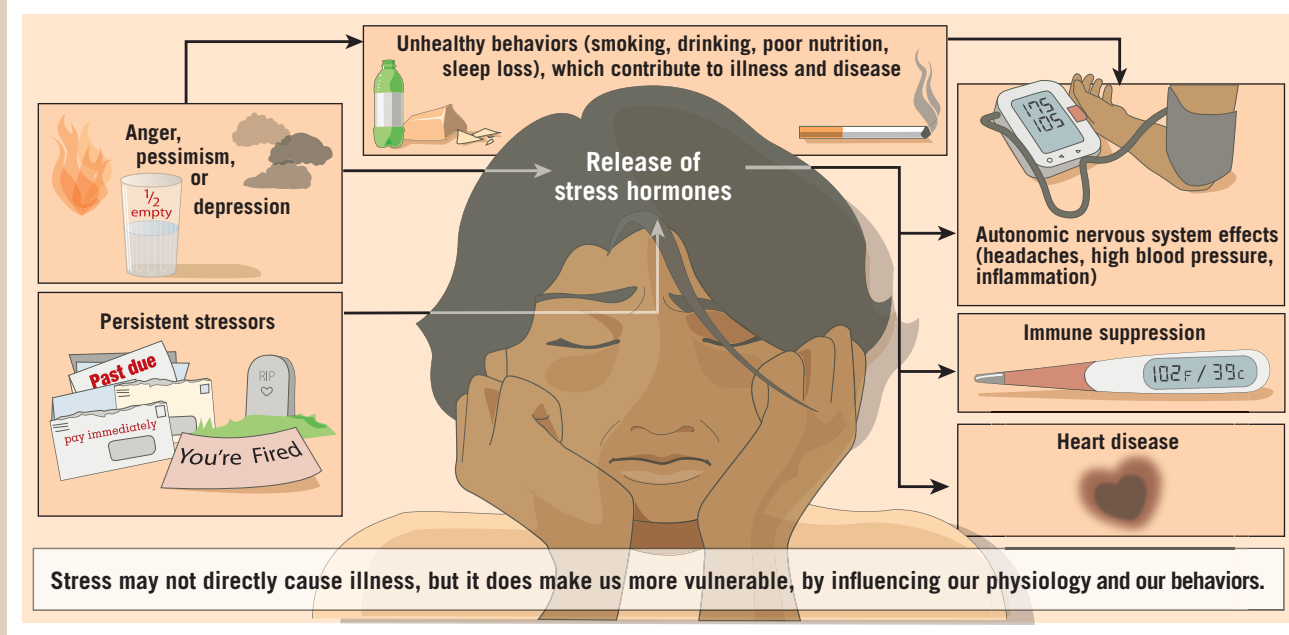
Stress is also disheartening: Work stress, involuntary job loss, and trauma-related stress symptoms increase heart disease risk (Allesøe et al., 2010; Gallo et al., 2006; Kubzansky et al., 2009; Slopen et al., 2010).

Both heart disease and depression may result when chronic stress triggers blood vessel inflammation, disrupting the body’s disease-fighting immune system (Miller & Blackwell, 2006; Mommersteeg et al., 2016). People who experience social threats, including harshly raised children, are more prone to inflammation responses (Chiang et al., 2022; Dickerson et al., 2009). So are bereaved spouses experiencing severe grief (Brown et al., 2022). Inflammation fights infections. But persistent inflammation can produce problems such as asthma or clogged arteries, and worsen depression (Enache et al., 2019; Sforzini et al., 2019).

So, stress can affect our health in many ways. (See Thinking Critically About: Stress and Health.) The stress-illness connection is a price we pay for the benefits of stress. Stress invigorates our lives by arousing and motivating us (see the What Drives Us modules for a discussion of motivation). An unstressed life would hardly be challenging, productive, or even safe.

Thinking Critically About: Stress and Health

LOQ 39-5 So, does stress cause illness?



Research on stress and health reminds us that psychological states are physiological events that influence other parts of our physiological system. Just pausing to *think* about biting into an orange wedge—imagine the sweet, tangy juice from the pulpy fruit flooding across your tongue—can trigger salivation. As the ancient Indian text the Mahābhārata recognized, “Mental disorders arise from physical causes, and likewise physical disorders arise from mental causes.” We are biopsychosocial systems.

MODULE

39 REVIEW Stress and Illness

LEARNING OBJECTIVES

Test Yourself Answer these repeated Learning Objective Questions on your own (before “showing” the answers here, or checking the answers in Appendix D) to improve your retention of the concepts (McDaniel et al., 2009, 2015).

- LOQ 39-1** How does our appraisal of an event affect our stress reaction, and what are the three main types of stressors?
- LOQ 39-2** How do we respond and adapt to stress?
- LOQ 39-3** How does stress make us more vulnerable to disease?
- LOQ 39-4** Why are some of us more prone than others to coronary heart disease?
- LOQ 39-5** So, does stress *cause* illness?

TERMS AND CONCEPTS TO REMEMBER

Test Yourself Write down the definition in your own words, then check your answer.

- | | |
|---|--------------------------------|
| stress, p. 441 | health psychology, p. 447 |
| approach and avoidance motives, p. 444 | psychoneuroimmunology, p. 447 |
| fight-or-flight response, p. 445 | coronary heart disease, p. 449 |
| general adaptation syndrome (GAS), p. 445 | Type A, p. 449 |
| tend-and-befriend response, p. 446 | Type B, p. 449 |

MODULE TEST

Test Yourself Answer the following questions on your own first, then “show” the answers here, or check your answers in Appendix E.

1. The number of short-term illnesses and stress-related psychological disorders was higher than usual in the months following an earthquake. Such findings suggest that
 - a. daily hassles have adverse health consequences.
 - b. experiencing a very stressful event increases a person’s vulnerability to illness.

- c. the amount of stress a person feels is directly related to the number of stressors experienced.
 - d. daily hassles don't cause stress, but catastrophes can be toxic.
2. Which of the following is NOT one of the three main types of stressors?
 - a. Catastrophes
 - b. Significant life changes
 - c. Daily hassles
 - d. Pessimism
 3. Selye's general adaptation syndrome (GAS) consists of an alarm reaction followed by _____, then _____.
 4. When faced with stress, women are more likely than men to show a _____-and-_____ response.
 5. Stress can suppress the _____ by prompting a decrease in the release of cells that ordinarily attack bacteria, viruses, cancer cells, and other foreign substances.
 6. A Chinese proverb warns, "The fire you kindle for your enemy often burns you more than him." How is this true of Type A people?

40 Health and Coping

Promoting health begins with implementing strategies that prevent illness and enhance wellness. Traditionally, people have thought about their health only when something goes wrong and they visit a physician. That, say health psychologists, is like ignoring a car's maintenance and going to a mechanic only when the car breaks down. Health maintenance includes alleviating stress, preventing illness, and promoting well-being.

Coping With Stress

LOQ 40-1 In what two ways do people try to alleviate stress?

Stressors are unavoidable. This fact, coupled with the fact that persistent stress correlates with heart disease, depression, and lowered immunity, gives us a clear message. We need to learn to **cope** with the stress in our lives.

Coping Strategies

We address some stressors directly, with **problem-focused coping**. If our impatience leads to a family fight, we may go directly to that family member to work things out. We tend to use problem-focused strategies when we feel a sense of control over a situation and think we can change the circumstances, or at least change ourselves to deal with the circumstances more capably. We turn to **emotion-focused coping** when we believe we cannot change a situation. If, despite our best efforts, we cannot get along with that family member, we may relieve stress by reaching out to friends for support and comfort. Some emotion-focused strategies can harm our health, such as when we respond by eating unhealthy comfort foods. When challenged, some of us tend to respond with problem-focused coping, others with emotion-focused coping (Connor-Smith & Flachsbart, 2007). Our feelings of personal control, our explanatory style, our sense of humor, and our supportive connections all influence our ability to cope successfully.

→ **coping** alleviating stress using emotional, cognitive, or behavioral methods.

problem-focused coping attempting to alleviate stress directly — by changing the stressor or the way we interact with that stressor.

emotion-focused coping attempting to alleviate stress by avoiding or ignoring a stressor and attending to emotional needs related to our stress reaction.

RETRIEVAL PRACTICE

RP-1 To cope with stress when we feel in control of our world, we tend to use _____ (emotion/problem)-focused strategies. To cope with stress when we believe we cannot change a situation, we tend to use _____ (emotion/problem)-focused strategies.

ANSWERS IN APPENDIX E

Perceived Lack of Control

LOQ 40-2 How does a perceived lack of control affect health?

Picture the scene: Two rats receive simultaneous shocks. Only one of them can turn a wheel to stop the shocks. The helpless rat, but not the wheel turner, becomes more susceptible to ulcers and lowered immunity to disease (Laudenslager & Reite, 1984). In humans, too, uncontrollable threats trigger the strongest stress responses (Dickerson & Kemeny, 2004).

Any of us may feel helpless, hopeless, and depressed after experiencing a series of bad events beyond our **personal control**. One Syrian refugee in Canada reflected on life during the Covid-19 pandemic: “We have all been made refugees by this virus, trapped and terrified. We are all in this together, facing the same pandemic” (Al-Kontar, 2020). Martin Seligman and his colleagues have shown that for some animals and people, a series of uncontrollable events creates a state of **learned helplessness**. In experiments (which likely would not be repeated today), dogs were strapped in a harness and given repeated shocks, with no opportunity to avoid them (Seligman & Maier, 1967). Later, when placed in another situation where they *could* escape the punishment by simply leaping a hurdle, the dogs displayed learned helplessness; they cowered as if without hope. Other dogs that had been able to escape the first shocks reacted differently. They had learned they were in control and easily escaped the shocks in the new situation (Seligman & Maier, 1967). People have shown similar patterns of learned helplessness (Abramson et al., 1978, 1989; Seligman, 1975).

Perceiving a loss of control, we become more vulnerable to ill health. This is an especially serious problem for older people, who are highly susceptible to health problems and also perceive the greatest loss of control (Drewelies et al., 2017). In a famous study of elderly nursing home residents, those who perceived the least amount of control over their activities declined faster and died sooner than those given more control (Rodin, 1986). Workers able to adjust office furnishings and control interruptions and distractions in their work environment have also experienced less stress (O’Neill, 1993). Such findings help explain why British executives have tended to outlive those in clerical or laboring positions, and why Finnish workers with low job stress have been less than half as likely to die of stroke or heart disease as those with a demanding job and little control. The more control workers have, the longer they live (Bosma et al., 1997, 1998; Kivimaki et al., 2002; Marmot et al., 1997).

Poverty entails less control of one’s life, which helps explain a link between economic status and longevity (Jokela et al., 2009). In one study of 843 grave markers in an old cemetery in Glasgow, Scotland, those with the costliest, highest pillars (indicating the most affluence) tended to have lived the longest (Carroll et al., 1994). Likewise, U.S. presidents, who are generally high-income and well-educated, have had above-average life spans (Olshansky, 2011). Across cultures, high economic status predicts a lower risk of heart and respiratory diseases (Sapolsky, 2005). High-income parents also tend to have healthy, advantaged children (Savelieva et al., 2016). With higher economic status comes reduced risk of low birth weight, infant mortality, smoking, and violence. Even among other primates, those at the bottom of the social pecking order have been more likely than their higher-status counterparts to become sick when exposed to a cold virus (Cohen et al., 1997).

When rats cannot control shock or when humans or other primates feel unable to control their environment, stress hormone levels rise, blood pressure increases, and immune responses drop (Rodin, 1986; Sapolsky, 2005). The greater nurses’ workload, the higher their cortisol level and blood pressure—but only among nurses who reported little control over their environment (Fox et al., 1993). The crowding in high-density neighborhoods, prisons, and college and university dorms is another source of diminished feelings of control—and of elevated levels of stress hormones and blood pressure (Fleming et al., 1987; Ostfeld et al., 1987).

personal control our sense of being in charge of our environment rather than feeling helpless.

learned helplessness the hopelessness and passive resignation humans and other animals learn when unable to avoid repeated aversive events.

Separation stress In 2018, new U.S. immigration policies led to thousands of immigrating children being separated from their parents at the southern border. Children isolated from parents and held in detention camps lose a sense of control, making them vulnerable to physical and psychological problems.



Adrees Latif/Reuters/Newscom

BENEFITS OF BOOSTING CONTROL Increasing control—allowing prisoners to move chairs and to control room lights and the TV, having workers participate in decision making, allowing people to personalize their workspace—has often improved health and morale (Humphrey et al., 2007; Ng et al., 2012; Ruback et al., 1986). In the case of nursing home residents, 93 percent of those who were given more control over how they arranged their room and spent their time became more alert, active, and happy (Langer & Rodin, 1976). As researcher Ellen Langer concluded, “Perceived control is basic to human functioning” (1983, p. 291). “For the young and old alike,” she suggested, environments should enhance people’s sense of control over their world. No wonder mobile devices and online streaming, which enhance our control of the content and timing of our entertainment, are so popular.

People thrive when they live in conditions of personal freedom and empowerment. At the national level, citizens of stable democracies report higher levels of happiness (Inglehart et al., 2008). Freedom and personal control foster human flourishing. But does ever-increasing choice breed ever-happier lives? Today’s Western cultures may offer an “excess of freedom”—too many choices. The result can be decreased life satisfaction, increased depression, or even behavior paralysis (Schwartz, 2000, 2004). In one study, people offered a choice of one of 30 brands of jam or chocolate were less satisfied with their decision than were others who had chosen from only 6 options (Iyengar & Lepper, 2000). This *tyranny of choice* brings information overload and a greater likelihood that we will feel regret over some of the things we left behind (Chernev et al., 2015). Do you, too, ever waste time agonizing over too many choices?

INTERNAL VERSUS EXTERNAL LOCUS OF CONTROL Consider your own perceptions of control, and how they have been influenced by your upbringing and culture. Do you believe that your life is beyond your control? That getting a good job depends mainly on being in the right place at the right time? Or do you more strongly believe that you control your own fate? That being a success is a matter of hard work?

Hundreds of studies have compared people who differ in their perceptions of control. On one side are those who have what psychologist Julian Rotter called an **external locus of control**. In one study of more than 1200 Israeli people exposed to missile attacks, those with an external locus of control experienced the most *posttraumatic stress* symptoms (Hoffman et al., 2016). On the other side are those who perceive an **internal locus of control**. In study after study, the “internals” have achieved more in school and work, acted more independently, enjoyed better health, and felt less depressed than did the “externals” (Lefcourt, 1982; Ng et al., 2006). In longitudinal research on more than 7500 people, those who had expressed a more internal locus of control at age 10 exhibited less obesity, lower blood pressure, and less distress at age 30 (Gale et al., 2008). Compared with nonleaders, military and business leaders have lower-than-average levels of stress hormones and report less anxiety, thanks to their greater sense of control (Sherman et al., 2012).

Compared with their parents’ generation, today’s U.S. youth more often express an external locus of control (Twenge et al., 2004). This shift may help explain an associated increase in rates of depression and other psychological disorders in young people (Twenge et al., 2010).

We tend to believe we are in control of our own life when we say we have *free will*. Studies show that people who believe they have free will behave more helpfully, learn better, and persist and perform better at work (Job et al., 2010; J. Li et al., 2018; Stillman et al., 2010). Across varied cultures, those who believe in free will also experience greater job satisfaction (Feldman et al., 2018). Belief in free will feeds *self-control*—to which we turn next.



external locus of control the perception that outside forces beyond our personal control determine our fate.

internal locus of control the perception that we control our own fate.

ASK YOURSELF

How much control do you have over your life? How much do others (family members, friends, work supervisors) control your life? What changes could you make to increase your sense of control?

BUILDING SELF-CONTROL

LOQ 40-3 Why is self-control important, and can our self-control be depleted?

When we have a sense of personal control over our lives, we are more likely to develop **self-control**—the ability to control impulses and delay short-term gratification for longer-term rewards. Self-control predicts good health, higher income, and better school performance (Bub et al., 2016; Keller et al., 2016; Moffitt et al., 2011). In studies of American, Asian, and New Zealander children, self-control outdid intelligence test scores in predicting future academic and life success (Duckworth & Seligman, 2005, 2017; Poulton et al., 2015; Wu et al., 2016).

Strengthening self-control is key to coping effectively with stress. Doing so requires attention and energy—similar to strengthening a muscle. It's easy to form bad habits, but it takes hard work to break them. With frequent practice in overcoming unwanted urges, people have improved their self-management of anger, dishonesty, smoking, and impulsive spending (Beames et al., 2017; Wang et al., 2017).

Although self-control grows stronger with exercise, it may also weaken after use and need rest to recover (Baumeister & Vohs, 2016). While some researchers debate the reliability of this effect (Hagger et al., 2016), others have shown that exercising willpower can temporarily consume the mental energy we need for self-control on other tasks (Dang et al., 2021; Vohs et al., 2021). In one famous experiment, hungry people expended willpower to resist eating tasty cookies. They then abandoned a frustrating task sooner than those who hadn't had to deal with the cookies (Baumeister et al., 1998).

The bottom line: Research on self-control teaches us that developing self-discipline can lead to a healthier, happier, and more successful life (Baumeister et al., 2018; Tuk et al., 2015). Delaying a little fun now can lead to bigger future rewards. And persevering through today's struggles builds an inner strength that enables us to tackle tomorrow's challenges.

Explanatory Style: Optimism Versus Pessimism

LOQ 40-4 How does an optimistic outlook affect health and longevity?

Our outlook—what we expect from the world—influences how we cope with stress. Pessimists expect things to go badly (Aspinwall & Tedeschi, 2010). They attribute their poor performance to a basic lack of ability (“I can’t do this”) or to situations enduringly beyond their control (“There is nothing I can do about it”). Optimists do the opposite by expecting more control, coping ability, and better health (Aspinwall & Tedeschi, 2010; Boehm & Kubzansky, 2012; Hernandez et al., 2015). During a semester’s final month, optimistic students reported the least fatigue and fewer coughs, aches, and pains. And during the stressful first few weeks of law school, optimists enjoyed better moods and stronger immune systems (Segerstrom et al., 1998). Optimists tend to have optimal health.

Optimists have tended to get better grades because they respond to setbacks with a hopeful attitude that they can improve (Noel et al., 1987; Peterson & Barrett, 1987). Optimists and their romantic partners generally manage conflict constructively, resulting in feeling more supported and satisfied with the resolution and with their relationship (Srivastava et al., 2006). Optimism relates to well-being and success in many places, from Europe and North America to China and Japan (Qin & Piao, 2011).

Consider the consistency and startling magnitude of the optimism and positive emotions factor in several longitudinal studies:

- **Long lives.** One research team followed 70,021 nurses over time; those scoring in the top quarter on optimism were nearly 30 percent less likely to have died than those scoring in the bottom quarter (Kim et al., 2017). Even greater optimism-longevity differences have been found in studies of Finnish men and U.S. Vietnam War veterans (Everson et al., 1996; Phillips et al., 2009). In long-term studies of nurses and veterans, the most optimistic were 50 to 70 percent more likely than pessimists to live beyond age 85 (Lee et al., 2019). In fact, just being not-pessimistic predicts good health (Scheier et al., 2021).



Brian Fairbrother/LatitudeStock/Alamy Stock Photo

Extreme self-control Our ability to exert self-control increases with practice, and some of us have a lot of practice! This performer has made her living as a very convincing human statue on The Royal Mile in Edinburgh, Scotland.

“I do the very best I can to look upon life with optimism and hope and looking forward to a better day.” —Civil rights activist Rosa Parks, “Standing Up for Freedom,” 2005

self-control the ability to control impulses and delay short-term gratification for greater long-term rewards.

→ emotion regulation how we manage our emotions, including which emotions we allow ourselves to feel, when we feel them, and how we express those emotions.

- *The famous “Nuns Study.”* A classic study followed up on 180 Catholic nuns who had written brief autobiographies at about 22 years of age and had thereafter lived similar lifestyles. Those who had expressed happiness, love, and other positive feelings in their autobiographies lived an average 7 years longer than their more dour counterparts (Danner et al., 2001). By age 80, some 54 percent of those expressing few positive emotions had died, as had only 24 percent of the most positive-spirited.
- *Optimism and the end of life.* Optimists not only live longer lives, they approach the end of life positively. One study followed more than 68,000 U.S. women, ages 50 to 79 years, for nearly 2 decades (Zaslavsky et al., 2015). As death grew nearer, the optimists tended to feel more life satisfaction than did the pessimists.

Optimism runs in families, so some people are born with a sunny, hopeful outlook. If one identical twin is optimistic, the other typically will be, too (Bates, 2015; Mosing et al., 2009).

The good news is that all of us, even the most pessimistic, can learn to become more optimistic. Compared with a control group of pessimists who simply kept diaries of their daily activities, pessimists in a skill-building group—who learned ways of seeing the bright side of difficult situations and of viewing their goals as achievable—reported lower levels of depression (Sergeant & Mongrain, 2014). In other experiments, people instructed to imagine their best possible future—one where they have worked hard and succeeded in all their life goals—became more optimistic (Malouff & Schutte, 2017). Positive expectations often motivate eventual success: Optimism is the light bulb that can brighten anyone’s life.

Emotion Regulation

LOQ 40-5 How does controlling our feelings affect our well-being and health?

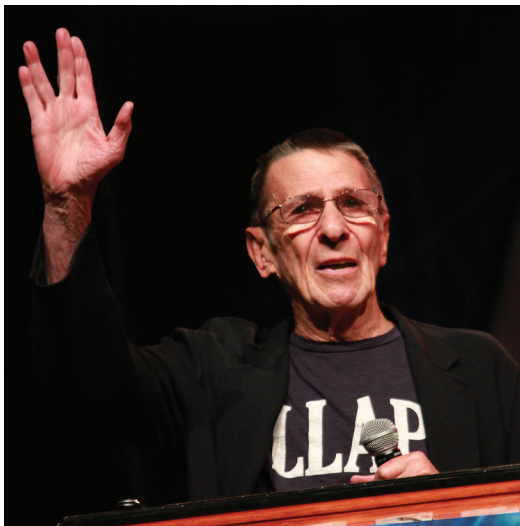
Life is full of emotions. A frustrating conversation with a friend can throw us off for the rest of the day. An upcoming class presentation can strike us with fear and get our heart pounding. People vary in how often and how well we manage our feelings. And how we navigate our emotional ups and downs matters for our health.

Our emotions can be our best friends or our worst enemies—it all depends how well we manage them (Gross, 2013). Think back to a time when you felt really upset. Were you able to control your feelings? Healthy **emotion regulation** enables more happiness, better life satisfaction, closer social relationships, and even less depression and anxiety (Aldao et al., 2010; Gross, 1998).

In what ways do we change our feelings? We can increase or decrease emotional intensity and how long our feelings last, and we can control which kinds of emotions

“Getting angry . . . is easy and everyone can do it; but doing it . . . in the right amount, at the right time, and for the right end, and in the right way is no longer easy, nor can everyone do it.” — Aristotle, *Nicomachean Ethics* (II.9, 1109a27)

Control contrasts Some actors seem to have complete control over their feelings (Leonard Nimoy, who was nearly as calm in real life as his *Star Trek* character, Spock). Others seem to have much less emotional control (Tom Cruise famously expressing his feelings for a new girlfriend on the Oprah Winfrey Show).



David Livingston/Getty Images



PhotoFest

we feel (Gross et al., 2011). People most often report trying to decrease their negative feelings (sadness, anger, worry) and increase their positive feelings (joy, love, contentment) (Gross et al., 2006; Quoidbach et al., 2010). But sometimes people aim for the reverse: They may embrace their anger at social justice protests. And any parent knows the importance of helping young children calm excited feelings before bedtime (FIGURE 40.1).

The idea that changing our thoughts upstream can shape our moods and feelings downstream is at the heart of modern-day cognitive therapy for depression and anxiety (see the Therapy modules). Psychologist James Gross (1998, 2015) describes three strategies people often use—with the first two usually being more helpful than the third.

- **Situation selection** Change your situation to alter your feelings, such as by getting new roommates.
- **Cognitive reappraisal** Think about a situation in a more neutral way to dampen its negativity, such as reminding yourself that a mediocre grade on an exam could have been worse.
- **Suppression** Contain those feelings, as when forcing a smile after an argument. (As we will see, this strategy can backfire.)

Some strategies seem to benefit us more than others. In one study, participants watched a disturbing video of a gory medical procedure. Researchers had asked some viewers to step back and “adopt a detached and unemotional attitude” (*reappraisal*), and others to “behave so that someone watching you would not know that you are feeling anything at all” (*suppression*). Compared with those in the emotion suppression group, participants who used the reappraisal strategy had a lower bodily stress response and experienced fewer negative emotions (Gross, 1998). Using reappraisal regularly also promotes health and well-being. Using *situation selection* is associated with greater emotional well-being and happiness, and less depression (Webb et al., 2017; TABLE 40.1).

FOUR TIPS FOR MANAGING EMOTIONS Psychology’s toolkit offers four tips for managing your emotions.

1. **Accept rather than criticize your feelings, and embrace a diversity of emotions.** We navigate many emotional ups and downs throughout our day. That is perfectly okay—our emotions are pieces of information about our world that help us get through tough times and appreciate good ones. A sad mood may remind us of what matters to us, and a dose of fear can keep us alert and safe. We are healthier when we let ourselves feel our natural negative and positive emotions rather than pressuring ourselves to be happy all the time (Quoidbach et al., 2014; see also

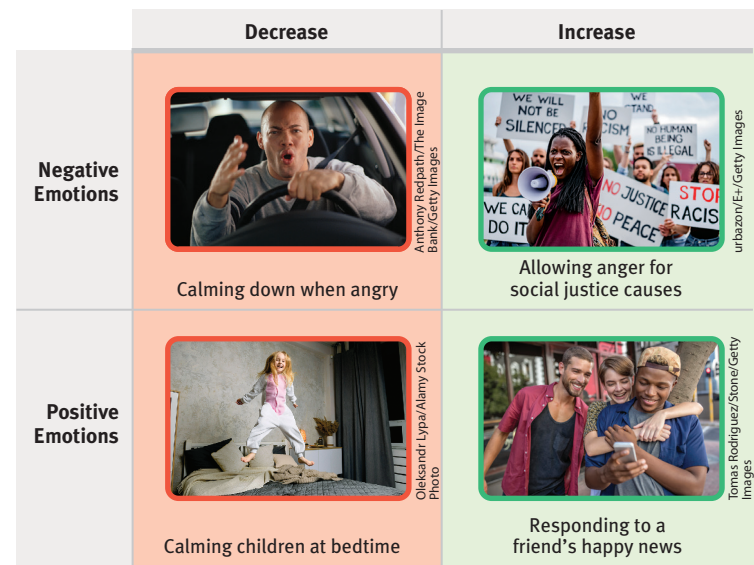
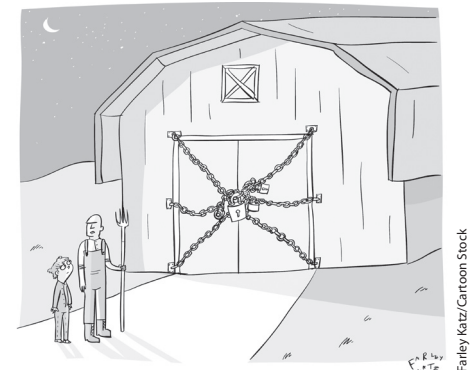


FIGURE 40.1 How do we change our feelings? We can decrease or increase all of our feelings, both negative and positive.



“This is the barn where we keep our feelings. If a feeling comes to you, bring it out here and lock it up.”

Unhealthy emotion regulation

TABLE 40.1 Consequences of Three Emotion Regulation Strategies		
Emotion Regulation Strategy	Definition	Consequences
<i>Situation selection</i>	Changing your situation to influence your feelings	<ul style="list-style-type: none"> • Greater well-being and happiness • More positive emotions; fewer negative emotions • Less depression
<i>Reappraisal</i>	Changing how you think about a situation to influence your feelings	<ul style="list-style-type: none"> • Better social relationships • Better coping with stress • More positive emotions
<i>Suppression</i>	Hiding or dampening your emotional expression	<ul style="list-style-type: none"> • Feeling less authentic in social life • Poorer coping with stress • Fewer positive emotions; more negative emotions

emodiversity.org). Adopting an accepting, matter-of-fact attitude toward emotions helps our mental and physical health.

2. **Develop an emotion road map.** Rather than wandering among emotions, decide when, where, and how you can enable your desired emotions. For example, you might strategize about how to reduce angry outbursts or how to replace jealousy with excitement when congratulating a friend on their accomplishments. People who flesh out their emotional goals with detailed plans more often stay on track and achieve their desired emotional endpoint (Mauss & Tamir, 2014).
3. **Create a supportive environment.** When something good happens, share the joyful news with someone to feel even better (Peters et al., 2018). When feeling upset, reach out to someone close for perspective and social support. Choose your friends wisely. Supportive friends can help you sustain the good feelings longer and bounce back from down times more quickly.
4. **Remember that emotions are temporary.** Emotions are usually short-lived. As psychologist Marsha Linehan (2016) explains: Emotions are like an ocean wave—however intense and high they peak they will eventually come down. Riding through an emotional wave may mean sitting with that emotion until it passes.

ASK YOURSELF

Which of these tips will you employ to improve your own emotion regulation?

RETRIEVAL PRACTICE

- RP-2** Which of the following emotion regulation strategies tends to lead to *fewer* positive emotions and *more* negative emotions?
- a. Reappraisal
 - b. Suppression
 - c. Situation selection

ANSWERS IN APPENDIX E

Social Support

LOQ 40-6 How does social support promote good health?

Social support—feeling liked, encouraged, and helped-when-needed by friends and family—promotes both happiness and health. When randomly prompted by a researcher’s phone app, people report more happiness when with others (Quoidbach et al., 2019). In international studies following thousands of people over several years, close relationships have predicted happiness and health in both individualist and collectivist cultures (Brannan et al., 2013; Chu et al., 2010; Rueger et al., 2016). People supported by close relationships tend to enjoy better health and longer lives (Holt-Lunstad, 2021; Vila, 2021). When researchers combined data from 70 studies of 3.4 million people worldwide, they confirmed a striking social support benefit: Compared with those who had ample social connections, socially isolated or lonely people had a 30 percent greater death rate during the 7-year study period (Holt-Lunstad et al., 2010, 2015, 2017). “Loneliness [predicts] a reduction of life span,” former U.S. Surgeon General Vivek H. Murthy (2017) noted, that is “similar to that caused by smoking 15 cigarettes a day.”

To combat social isolation, we need to do more than collect acquaintances. We need people who genuinely care about us (Cacioppo et al., 2014; Hawkey et al., 2008). Some fill this need by connecting with friends, family, co-workers, members of a faith community, or support groups. Others connect in positive, supportive marriages. Happy marriages bathe us in social support, leading to less weight gain and a longer life (Chen et al., 2018; VanderWeele, 2017). One 7-decade-long study found that at age 50, healthy aging was better predicted by a good marriage than by a low cholesterol level (Vaillant, 2002). On the flip side, divorce predicts poor health. In one analysis of 600 million people in 24 countries, separated and divorced people were more likely to die early (Shor et al., 2012). But it’s less marital status than marital quality that predicts health—to about



Jesse Dittmar

Funny business Part of our pleasure in authoring this text—and, we hope, yours in reading it—is finding cartoons that offer comic relief while illustrating and reinforcing psychological concepts. Many have come from the *New Yorker*, whose longtime cartoonist and cartoon editor was Bob Mankoff—a former psychology major who lectures on the psychology of humor and is president of CartoonCollections.com. Mankoff explains: “Humor, like other forms of play, has three main benefits. First, it’s physically and psychologically healthy, especially in the way it blocks stress. Second, humor makes us mentally flexible—able to manage change, take risks, and think creatively. And third, humor serves as a social lubricant, making us more effective in dealing with colleagues and clients.”

the same extent as a healthy diet and physical activity do (Bookwala & Gaugler, 2020; Smith & Baucom, 2017).

Research suggests that social support has many health benefits:

Social support calms us, improves our sleep, and reduces blood pressure (Baron et al., 2016; Kent de Grey et al., 2018; Uchino & Way, 2017). To see if social support might calm people’s response to threats, one research team asked happily married women to lie in an fMRI machine, and subjected them to the threat of electric shock to an ankle (Coan et al., 2006). During the experiment, some women held their husband’s hand. Others held a stranger’s hand or no one’s hand. While awaiting the occasional shocks, women holding their husband’s hand showed less activity in threat-responsive brain areas. This soothing benefit was greatest for those reporting the highest-quality marriages. Simply holding your romantic partner’s hand while resolving a conflict may help you handle stress and improve communication (Jakubiak & Feeney, 2019).

Social support fosters stronger immune functioning. Stress hampers immune functioning, but social connections strengthen it (Leschak & Eisenberger, 2019). Recognizing this, some physicians have begun providing “social prescriptions” for patients that advise connecting with others. These have helped people with conditions ranging from dementia to diabetes to Parkinson’s disease (Hanc, 2021). Volunteers exposed to cold viruses showed the health-promoting effect of social support while being quarantined for 5 days (Cohen, 2004; Cohen et al., 1997). (In these experiments, the more than 600 participants were well-paid volunteers.) Age, race, sex, and health habits being equal, those with close social ties were least likely to catch a cold. People whose daily life included frequent hugs likewise experienced fewer cold symptoms (Cohen et al., 2015). The cold fact: The effect of social ties is nothing to sneeze at!

Close relationships give us an opportunity for “open heart therapy”—a chance to confide painful feelings (Frattaroli, 2006). Talking about a stressful event can temporarily arouse us, but in time it calms us (Lieberman et al., 2007; Mendolia & Kleck, 1993; Niles et al., 2015). In one study, 33 Holocaust survivors spent 2 hours recalling their experiences, many in intimate detail never before disclosed (Pennebaker et al., 1989). Those who disclosed the most had the most improved health 14 months later. In another study of surviving spouses of people who had died by suicide or in car accidents, those who bore their grief alone had more health problems than those who shared it with others



Tim Robbins/Getty Images

Laughter among friends is good medicine

Laughter arouses us, massages muscles, and leaves us feeling relaxed (Robinson, 1983). Humor (though not hostile sarcasm) may ease pain, and strengthen immune activity (Ayan, 2009; Berk et al., 2001; Dunbar et al., 2011). Humor buffers stress (H. Fritz et al., 2017). People who laugh a lot have also tended to have lower rates of heart disease (Clark et al., 2001).



Pets are friends, too Having a pet may increase the odds of survival after a heart attack, relieve depression among people with AIDS, and lower blood pressure and other coronary risk factors (Allen, 2003; McConnell et al., 2011; Wells, 2009). Pets are no substitute for effective drugs and exercise. But for people who enjoy animals, and especially for those who live alone, pets are a healthy pleasure (Reis et al., 2017; Siegel, 1990). The Covid-19 pandemic made many of us new pet owners, as we sought to cope with stress and social isolation.



FluxFactory/E+/Getty Images

(Pennebaker & O’Heeron, 1984). Confiding is good for the body and the soul (see the Therapy modules).

Suppressing emotions can be detrimental to physical health. When psychologist James Pennebaker (1985) surveyed more than 700 undergraduate women, those who had experienced a traumatic sexual experience in childhood reported more headaches and stomach ailments than those who had experienced other traumas—possibly because survivors of sexual abuse are less likely than other trauma survivors to confide in others. Another study, of 437 Australian ambulance drivers, confirmed the ill effects of suppressing one’s emotions after witnessing traumas (Wastell, 2002).

Even writing about personal traumas in a diary can help (Burton & King, 2008; Kállay, 2015; Lyubomirsky et al., 2006). For trauma survivors, writing therapy reduces posttraumatic stress (Pavlicic et al., 2019). In one experiment, volunteers who kept trauma diaries had fewer health problems during the ensuing 4 to 6 months (Pennebaker, 1990). As one participant explained, “Although I have not talked with anyone about what I wrote, I was finally able to deal with it, work through the pain instead of trying to block it out. Now it doesn’t hurt to think about it.”

If we are aiming to exercise more, drink less, quit smoking, or be a healthy weight, our social ties can tug us away from, or toward, our goal. If you are trying to achieve some goal, think about whether your social network is helping or hindering you.

“Woe to one who is alone and falls and does not have another to help.” —Ecclesiastes 4:10

ASK YOURSELF

Can you remember a time when you felt better after discussing a problem with a friend or family member? How did doing so help you to cope—either emotionally (emotion-focused), or by resolving the problem (problem-focused)?

Reducing Stress

Having a sense of control, developing more optimistic thinking, and building social support can help us experience less stress and thus improve our health. People who have been upbeat about themselves and their future also have tended to enjoy health-promoting social ties (Stinson et al., 2008). But sometimes we cannot alleviate stress and simply need to *manage* our stress. Aerobic exercise, relaxation, meditation, and spiritual communities have helped people gather inner strength and lessen stress effects.

“These mountains that you are carrying, you were only supposed to climb.” —Poet Najwa Zebian, *The Nectar of Pain*, 2016

Aerobic Exercise

LOQ 40-7 How effective is aerobic exercise as a way to manage stress and improve well-being?

It’s hard to find a medicine that works for most people most of the time. But **aerobic exercise**—sustained, oxygen-consuming exertion—is one of those rare near-perfect “medicines.” Estimates vary, but some studies suggest that exercise adds to your quantity of life—about 7 hours longer life for every exercise hour (Lee et al., 2017; Mandsager et al., 2018; Zahrt & Crum, 2017). Think about it: Nature generously gives a 7-to-1 return for time spent exercising. It also boosts your quality of life, with more energy, better mood, and stronger relationships (Buecker et al., 2020; Wiese et al., 2018). As author Bill Bryson (2019) noted, “If someone invented a pill that could do for us all that a moderate amount of exercise achieves, it would instantly become the most successful drug in history.”

→ aerobic exercise sustained exercise that increases heart and lung fitness; also helps alleviate depression and anxiety.

In the late 1940s, British government doctor Jeremy Morris and his colleagues (1953) sought a low-cost way to test their belief that exercise reduced people's risk of heart attacks. While riding the bus to work one day, Morris realized that every double-decker bus offered a perfect laboratory: Each had a driver who sat while working, and a conductor who moved constantly and climbed 600 steps in a typical shift. After following 31,000 drivers and conductors for 2 years and adjusting for other factors, he had the first causal evidence of exercise affecting health: Compared with drivers, the conductors experienced fewer than half as many heart attacks.

Exercise helps fight heart disease by strengthening the heart, increasing blood flow, keeping blood vessels open, lowering blood pressure, and reducing the hormone and blood pressure reaction to stress (Ford, 2002; Manson, 2002). Compared with inactive adults, people who exercise experience about half as many heart attacks (Evenson et al., 2016; Visich & Fletcher, 2009). Among older women, those who take 4400 steps per day have a lower risk of death than those who take 2700 or fewer steps (Lee et al., 2019). Until 7500 or so steps, the risk continues to drop; more steps = less death.

It's a fact: Fitness predicts longevity (Moholdt et al., 2018). Dietary fat contributes to clogged arteries, but exercise makes our muscles hungry for those fats and cleans them out of our arteries (Barinaga, 1997). A study of 1.44 million Americans and Europeans found that exercise predicted "lower risks of many cancer types" (Moore et al., 2016). Scottish mail carriers, who spend their days walking, have lower heart disease risk than Scottish mail office workers (Tigbe et al., 2017). Regular exercise in later life also predicts better cognitive functioning and reduced risk of neurocognitive disorder and Alzheimer's disease (Kramer & Erickson, 2007).

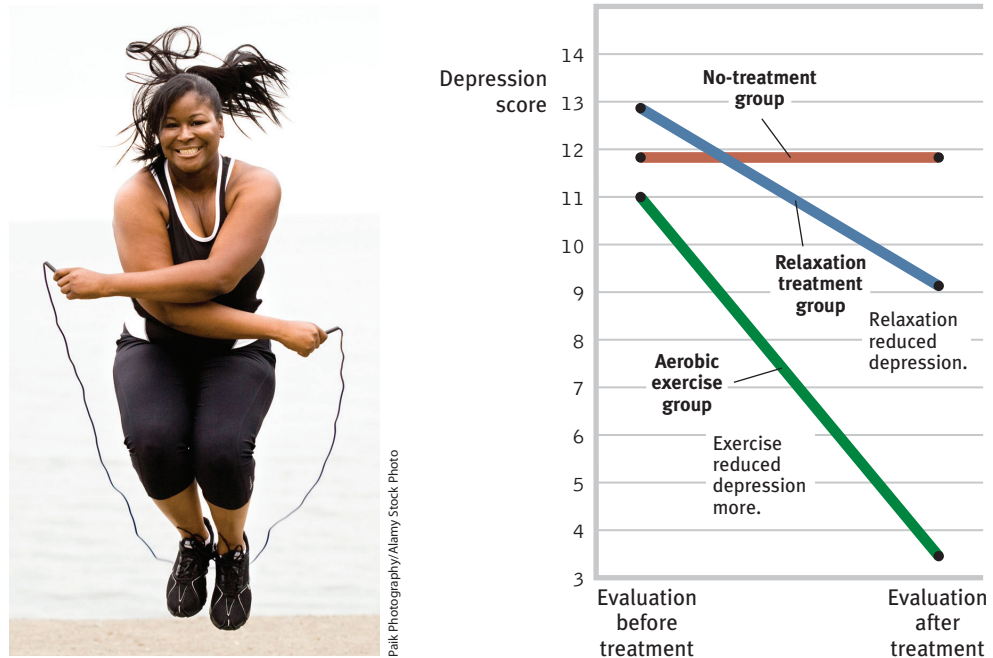
The genes passed down to us from our distant ancestors enabled the physical activity essential to hunting, foraging, and farming (Raichlen & Polk, 2013; Shave et al., 2019). In muscle cells, those genes, when activated by exercise, respond by producing proteins. We are made for exercise. In the modern inactive person, these genes produce lower quantities of proteins and leave us susceptible to more than 20 chronic diseases, such as type 2 diabetes, coronary heart disease, stroke, and cancer (Booth & Neuffer, 2005). Inactivity is thus potentially toxic. Physical activity can weaken the influence of some genetic risk factors. In one analysis of 45 studies, the risk of obesity fell by 27 percent (Kilpeläinen et al., 2012).

Does exercise also boost the spirit? In a 21-country survey of university students, physical exercise was a strong and consistent predictor of life satisfaction (Grant et al., 2009). People from the United States, Canada, and the United Kingdom who do aerobic exercise at least three times a week manage stress better, exhibit more self-confidence, have more vigor, and feel less depressed and fatigued than their inactive peers (Rebar et al., 2015; Smits et al., 2011). One analysis of 1.2 million Americans compared exercisers with nonexercisers. After controlling for other physical and social differences among them, the exercisers experienced 43 percent "fewer days of poor mental health in the last month" (Chekroud et al., 2018). "Exercise has a large and significant antidepressant effect," concluded one digest of 49 controlled studies (Schuch et al., 2018).

But remember, correlation does not imply causation. We could state this observation another way: Stressed and depressed people exercise less. To sort out cause and effect, researchers experiment. They *randomly assign* stressed, depressed, or anxious people either to an aerobic exercise group or to a control group. Next, they measure whether aerobic exercise (compared with a control activity not involving exercise) produces a change in stress, depression, anxiety, or some other health-related outcome. One classic experiment randomly assigned mildly depressed female college students to three groups. One-third participated in a program of aerobic exercise. Another third took part in a program of relaxation exercises. The remaining third (the control group) formed a no-treatment group (McCann & Holmes, 1984). As **FIGURE 40.2** shows, 10 weeks later, the women in the aerobic exercise program reported the greatest decrease in depression. Many had, quite literally, run away from their troubles.

Dozens of other experiments and longitudinal studies confirm that exercise reduces or prevents depression and anxiety (Catalan-Matamoros et al., 2016; Harvey et al., 2018; Stubbs et al., 2017). When experimenters randomly assigned depressed people to an exercise group, an antidepressant group, or a placebo pill group, exercise diminished depression as effectively as antidepressants—and with longer-lasting effects (Hoffman et al., 2011).

FIGURE 40.2
Aerobic exercise reduces mild depression (Data from McCann & Holmes, 1984.)



Vigorous exercise provides a substantial and immediate mood boost (Watson, 2000). Even a 10-minute walk stimulates 2 hours of increased well-being by raising energy levels and lowering tension (Thayer, 1987, 1993). Exercise works its magic in several ways. It increases arousal, thus counteracting depression's low arousal state. It enables muscle relaxation and sounder sleep. It produces toned muscles, which filter out a depression-causing toxin (Agudelo et al., 2014). Like an antidepressant drug, it orders up mood-boosting chemicals from our body's internal pharmacy—neurotransmitters such as norepinephrine, serotonin, and the endorphins (Jacobs, 1994; Salmon, 2001). Exercise also fosters *neurogenesis*. In mice, exercise causes the brain to produce a molecule that stimulates the production of new, stress-resistant neurons (Hunsberger et al., 2007; Reynolds, 2009; van Praag, 2009).

On a simpler level, the sense of accomplishment and improved physique and body image that often accompany a successful exercise routine may enhance one's self-image, leading to a better emotional state. Frequent exercise is like a drug that prevents and treats disease, increases energy, calms anxiety, and boosts mood—a drug we would all take, if available. Yet few people (only 1 in 4 in the United States) take advantage of it (Mendes, 2010).

Relaxation and Meditation

LOQ 40-8 In what ways might relaxation and meditation influence stress and health?

Knowing the damaging effects of stress, could we learn to counteract our stress responses by altering our thinking and lifestyle? In the late 1960s, psychologists began experimenting with *biofeedback*, a system of recording, amplifying, and feeding back information about subtle physiological responses in an effort to help people control them. After a decade of study, however, the initial claims for biofeedback seemed overblown and oversold (Miller, 1985).

Simple relaxation methods, which require no expensive equipment, produce many of the results biofeedback once promised. Massage relaxes both premature infants and those experiencing pain, and it also helps reduce depression (Hou et al., 2010). Figure 40.2 pointed out that aerobic exercise reduces depression. But did you notice in that figure that depression also decreased among women in the relaxation treatment group? More than 60 studies have found that relaxation procedures can also relieve headaches, hypertension, anxiety, and insomnia (Nestoriuc et al., 2008; Stetter & Kupper, 2002).

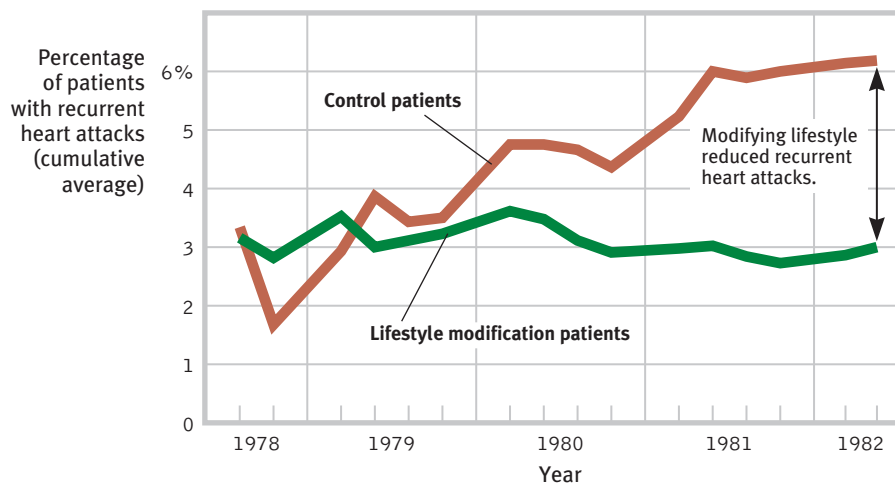


FIGURE 40.3
Recurrent heart attacks and lifestyle modification (Data from Friedman & Ulmer, 1984.)

Such findings would not surprise Meyer Friedman, Ray Rosenman, and their colleagues. They tested relaxation in a program designed to help hard-driving *Type A* heart attack survivors (who are more prone to heart attacks than their relaxed *Type B* peers) reduce their risk of future attacks. Among hundreds of randomly assigned middle-aged men, half received standard advice from cardiologists about medications, diet, and exercise habits. The other half received similar advice, but they also learned to slow down and relax by walking, talking, and eating more slowly; to smile at others and laugh at themselves; to admit their mistakes; to take time to enjoy life; and to renew their religious faith. The training paid off (FIGURE 40.3). During the next 3 years, those who learned to modify their lifestyle had half as many repeat heart attacks as did the group that received standard advice. This, wrote the exuberant Friedman, was an unprecedented, spectacular reduction in heart attack recurrence. A smaller-scale British study spanning 13 years similarly showed a halved death rate among high-risk people trained to alter their thinking and lifestyle (Eysenck & Grossarth-Maticek, 1991). After experiencing a heart attack at age 55, Friedman started taking his own behavioral medicine—and lived to age 90 (Wargo, 2007). Learning to chill → less risk of getting ill.

Time may heal all wounds, but relaxation can help speed that process. In one study, surgery patients were randomly assigned to two groups. Both groups received standard treatment, but the second group also experienced a 45-minute relaxation session and received relaxation recordings to use before and after surgery. A week after surgery, patients in the relaxation group reported lower stress and showed better wound healing (Broadbent et al., 2012).

Meditation is a practice with a long history. In many world religions, meditation has been used to reduce suffering and improve awareness, insight, and compassion. Today, meditation apps offer free, guided techniques that can improve health (Adams et al., 2018). Numerous studies have confirmed meditation's benefits (Goyal et al., 2014; Rosenberg et al., 2015; Sedlmeier et al., 2012). One type, **mindfulness meditation**, has found a new home in stress management programs. If you learned this practice, you would relax and silently attend to your inner state, without judging it (Goldberg et al., 2018, 2019; Kabat-Zinn, 2001). You would sit down, close your eyes, and mentally scan your body from head to toe. Zooming in on certain body parts and responses, you would remain aware and accepting. You would also pay attention to your breathing, attending to each breath as if it were a material object.

For many people, practicing mindfulness boosts happiness and lessens anxiety and depression (Goldberg et al., 2021; van Agteren et al., 2021). In one experiment, Korean participants were asked to think about their own mortality. Compared with nonmeditators, those who meditated were less anxious when reminded of their inevitable death (Park & Pyszczynski, 2019). Mindfulness practices have also been linked with improved sleep, helpfulness, and immune system functioning (Donald et al., 2018; Rusch et al., 2019; Villalba et al., 2019). They also increase the length of the *telomeres* protecting our chromosome tips, which reduces the risk of cancer and heart disease (Conklin et al., 2018). Just a few minutes of daily mindfulness



Is music a natural antistress medicine?

One analysis of more than 100 studies showed that listening to music (especially slower tempo music) reduced heart rate, blood pressure, and psychological distress (de Witte et al., 2019). The next time you find yourself stressed, remember that music may help you mellow out. When exercising, however, up-tempo music is energizing—it reduces perceived exertion (Terry et al., 2020).

Meditation is an ancient practice with deep roots in many world religions. Gregory of Sinai (d. 1346) offered this guidance: "Sit down alone and in silence. Lower your head, shut your eyes, breathe out gently, and imagine yourself looking into your own heart. . . . As you breathe out, say 'Lord Jesus Christ, have mercy on me.' . . . Try to put all other thoughts aside. Be calm, be patient, and repeat the process very frequently."

mindfulness meditation a reflective practice in which people attend to current experiences in a nonjudgmental and accepting manner.



AP Photo

Furry friends relieve stress Some schools bring cuddly critters on campus to help students relax and lower disruptive stress levels. In one study, exam-stressed college students who interacted with therapy dogs felt less stressed 10 hours later (Ward-Griffin et al., 2018).

And then there are the mystics who seek to use the mind's power to enable Novocain-free cavity repair. Their aim: transcendental medication.

meditation is enough to improve concentration and decision making (Hafenbrack et al., 2014; Rahl et al., 2017).

Nevertheless, some researchers caution that mindfulness is overhyped (Britton, 2019; Van Dam et al., 2018). For some people, mindfulness meditation produces self-absorption or even adverse effects (Britton, 2019; Van Dam et al., 2018; Vonk & Visser, 2021). Moreover, say critics, meditation's stress relief is mirrored by mere solitude, which can similarly relax us and reduce stress (Nguyen et al., 2018). Even so, meditation's positive results make us wonder: What's going on in the brain as we practice mindfulness? Correlational and experimental studies offer three explanations. Mindfulness

- **strengthens connections among brain regions.** The affected regions are those associated with focusing our attention, processing what we see and hear, and being reflective and aware (Berkovich-Ohana et al., 2014; Ives-Deliperi et al., 2011; Kilpatrick et al., 2011).
- **activates brain regions associated with emotion regulation** (Davidson et al., 2003; Way et al., 2010). When labeling emotions, mindful people show less activation in the amygdala, a brain region associated with fear, and more activation in the prefrontal cortex, which aids emotion regulation (Creswell et al., 2007; Gotink et al., 2016).
- **calms brain activation in emotional situations.** This lower activation was clear in one study in which participants watched two movies—one sad, one neutral. Those in the control group, who were not trained in mindfulness, showed strong brain activation differences when watching the two movies. Those who had received mindfulness training showed little change in brain response to the two movies (Farb et al., 2010). Emotionally unpleasant images also trigger weaker electrical brain responses in mindful people than in their less mindful counterparts (Brown et al., 2013). A mindful brain is strong, reflective, and calm.

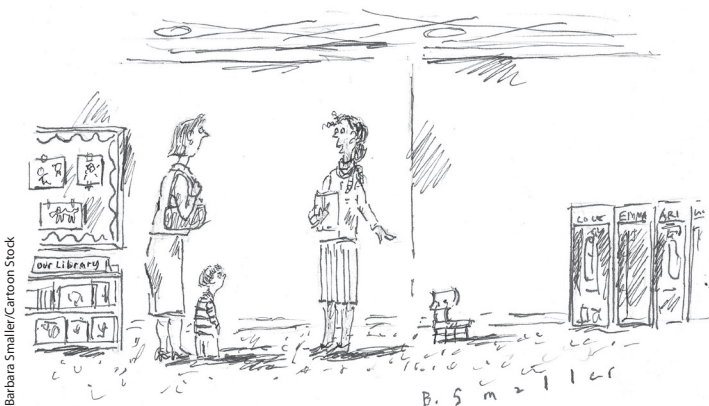
Faith Communities and Health

LOQ 40-9 What is the *faith factor*, and what are some possible explanations for the link between faith and health?

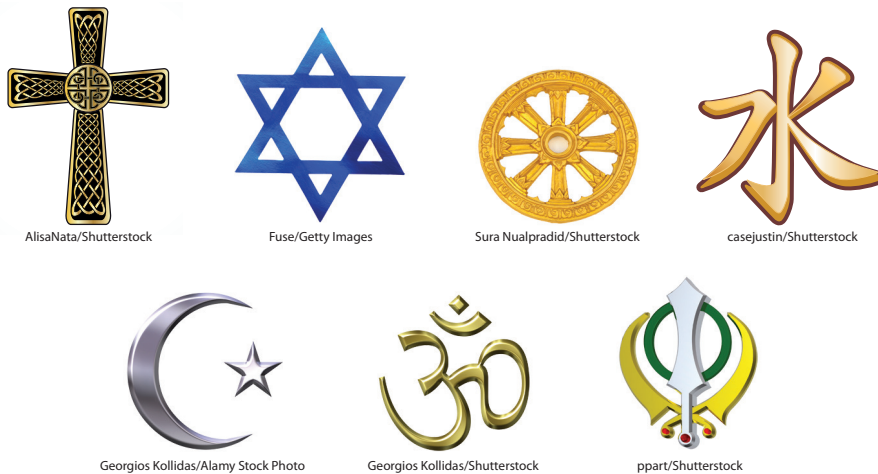
A wealth of studies—more than 2000 in the twenty-first century's first two decades alone—has revealed a curious correlation called the *faith factor* (Oman & Syme, 2018; VanderWeele, 2018). Religiously active people (especially in more religious cultures) tend to live longer than those not religiously active (Ebert et al., 2020). One such study compared the death rates for 3900 people living in two Israeli communities. The first contained 11 religiously orthodox collective settlements; the second contained 11 matched, nonreligious collective settlements (Kark et al., 1996). Over a 16-year period, “belonging to a religious collective was associated with a strong protective effect” not explained

by age or economic differences. In every age group, religious community members were about half as likely to have died as were their nonreligious counterparts. This difference is roughly comparable to the gender difference in mortality. Another study followed 74,534 U.S. nurses over 20 years. When controlling for various health risk factors, those who attended religious services more than weekly were a third less likely to have died than were non-attenders, and were much less likely to have died by suicide (Li et al., 2016; VanderWeele et al., 2016). In U.S. obituaries, mention of a religious affiliation predicted 7.5 years of additional life compared with no religious affiliation (Wallace et al., 2018).

How should we interpret such findings, recalling that researchers cannot randomly assign people to be religiously engaged or not? Correlations are not cause-effect statements, and they leave many factors uncontrolled (Sloan, 2005; Sloan & Bagiella, 2002; Sloan et al., 1999, 2000). Here is another possible interpretation:



“We don't have a time-out chair in our Classroom Community. That's our mindfulness chair.”



Women are more religiously active than men, and women outlive men. Might religious involvement merely reflect this gender-longevity link?

Apparently not. One 8-year National Institutes of Health study followed 92,395 women, ages 50 to 79. After controlling for many factors, researchers found that women attending religious services at least weekly experienced an approximately 20 percent reduced risk of death during the study period (Schnall et al., 2010). Moreover, the association between religious involvement and life expectancy is also found among men (Benjamins et al., 2010; McCullough et al., 2000; McCullough & Laurenceau, 2005). A 28-year study that followed 5286 Californians found that, after controlling for age, gender, ethnicity, and education, frequent religious attenders were 36 percent less likely to have died in any year (FIGURE 40.4). In another 8-year controlled study of more than 20,000 people (Hummer et al., 1999), this effect translated into a life expectancy of 83 years for those frequently attending religious services and 75 years for nonattenders.

Research points to three possible explanations for the religiosity-longevity correlation (FIGURE 40.5):

- **Healthy behaviors** Religion promotes self-control (DeWall et al., 2014; McCullough & Willoughby, 2009). This helps explain why religiously active people tend to smoke and drink much less and to have healthier lifestyles (Islam & Johnson, 2003; Koenig & Vaillant, 2009; Masters & Hooker, 2013; Park, 2007). In one large U.S. Gallup survey, 15 percent of the very religious were smokers, as were 28 percent of the nonreligious (Newport et al., 2010). But such lifestyle differences are not great enough to explain the dramatically reduced mortality in the Israeli religious settlements. In U.S. studies, too, about 75 percent of the longevity difference remained when researchers controlled for unhealthy behaviors, such as inactivity and smoking (Musick et al., 1999).
- **Social support** To belong to a faith community is to participate in a support network. Religiously active people are often there for one another when misfortune strikes.

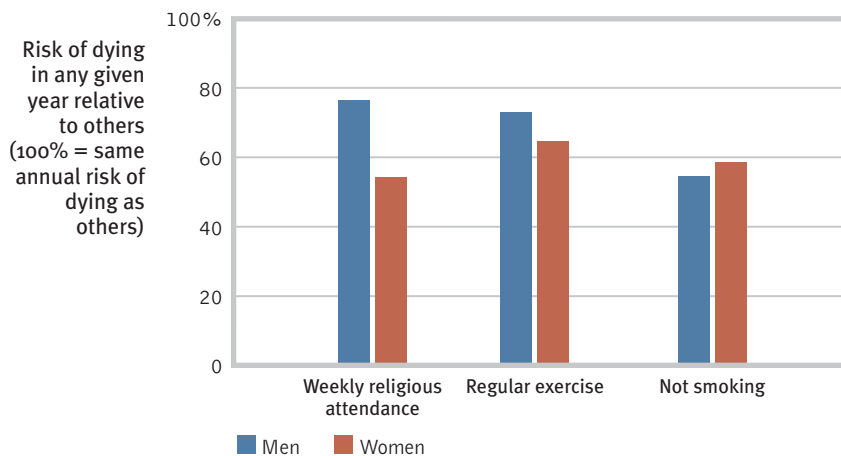
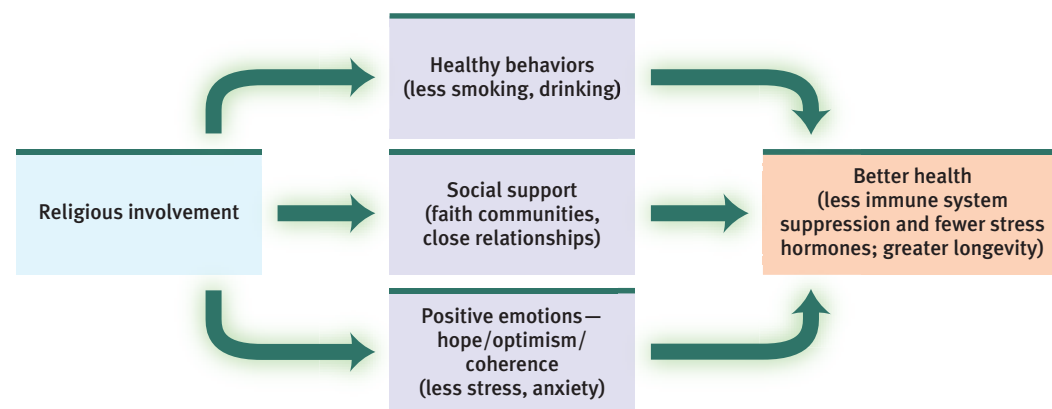


FIGURE 40.4
Predictors of longer life Researchers found that among adult participants, religious attendance, regular exercise, and not smoking all predicted a lowered risk of death in any given year (Oman et al., 2002; Strawbridge, 1999; Strawbridge et al., 1997). Women attending weekly religious services, for example, were only 54 percent as likely to die in a typical study year as were nonattenders.

➤ **FIGURE 40.5**
Possible explanations for the correlation between religious involvement and health/longevity



In the 20-year nurses study, for example, religious people’s social support was the best predictor of their good health. Moreover, religion encourages marriage, another predictor (when happy) of health and longevity (Bookwala & Gaugler, 2020).

- **Positive emotions** Even after controlling for social support, unhealthy behaviors, gender, and preexisting health problems, studies have found that religiously engaged people tend to live longer (Chida et al., 2009). Researchers speculate that religiously active people may benefit from a stable, coherent worldview, a sense of hope for the long-term future, feelings of ultimate acceptance, and the relaxed meditation of prayer or other religious observances. The religiously active have had healthier immune functioning, fewer hospital admissions, and, for people with AIDS, fewer stress hormones and longer survival (Ironson et al., 2002; Koenig & Larson, 1998; Lutgendorf et al., 2004).

ASK YOURSELF

What strategies have you used to cope with stress in your life? How well have they worked? What other strategies could you try?

RETRIEVAL PRACTICE

- RP-3** What are some of the tactics we can use to successfully manage the stress we cannot avoid?

ANSWERS IN APPENDIX E

40 REVIEW Health and Coping

LEARNING OBJECTIVES

Test Yourself Answer these repeated Learning Objective Questions on your own (before “showing” the answers here, or checking the answers in Appendix D) to improve your retention of the concepts (McDaniel et al., 2009, 2015).

LOQ 40-1 In what two ways do people try to alleviate stress?

LOQ 40-2 How does a perceived lack of control affect health?

LOQ 40-3 Why is self-control important, and can our self-control be depleted?

LOQ 40-4 How does an optimistic outlook affect health and longevity?

LOQ 40-5 How does controlling our feelings affect our well-being and health?

LOQ 40-6 How does social support promote good health?

LOQ 40-7 How effective is aerobic exercise as a way to manage stress and improve well-being?

LOQ 40-8 In what ways might relaxation and meditation influence stress and health?

LOQ 40-9 What is the *faith factor*, and what are some possible explanations for the link between faith and health?

TERMS AND CONCEPTS TO REMEMBER

Test Yourself Write down the definition in your own words, then check your answer.

coping, p. 452	internal locus of control, p. 454
problem-focused coping, p. 452	self-control, p. 455
emotion-focused coping, p. 452	emotion regulation, p. 456
personal control, p. 453	aerobic exercise, p. 460
learned helplessness, p. 453	mindfulness meditation, p. 463
external locus of control, p. 454	

MODULE TEST

Test Yourself Answer the following questions on your own first, then “show” the answers here, or check your answers in Appendix E.

- When faced with a situation over which you feel you have little control, you are more likely to turn to _____ (emotion/problem)-focused coping.
- Seligman’s classic research showed that a dog will respond with learned helplessness if it has received repeated shocks and has had
 - the opportunity to escape.
 - no control over the shocks.
 - pain or discomfort.
 - no food or water prior to the shocks.
- When nursing home residents take an active part in managing their own care and surroundings, their morale and health tend to improve. Such findings indicate that people do better when they experience an _____ (internal/external) locus of control.
- How does accepting our feelings help us regulate our emotions more healthfully?
- People who have close relationships are less likely to die prematurely than are those who do not, supporting the idea that
 - social ties can be a source of stress.
 - gender influences longevity.
 - Type A behavior is responsible for many premature deaths.
 - social support has a beneficial effect on health.
- Because it triggers the release of mood-boosting neurotransmitters, such as norepinephrine, serotonin, and the endorphins, _____ exercise raises energy levels and helps alleviate depression and anxiety.
- Research on the faith factor has found that
 - pessimists tend to be healthier than optimists.
 - our expectations influence our feelings of stress.
 - religiously active people tend to outlive those who are not religiously active.
 - religious engagement promotes social isolation and repression.