CHAPTER 5

DIVERSE UNDERSTANDINGS OF STRESS
Chapter 5 Outline

Measuring Up: Got Daily Hassles? What's Your Stress Score?

**Ponder This**

What is Stress?
Measuring Stress

- Stress over Time
- Main Theories of Stress
  - Cannon's Fight-or-Flight Theory
  - Taylor et al.’s Tend-and-Befriend Theory
  - Selye's General Adaptation Syndrome
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Factors Influencing Our Appraisals
- The Role of Culture in Appraisal
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- Stress, Hormones, and Genes
- Different Varieties of Stressors
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APPLICATION SHOWCASE: Stress Really Can Kill: The Baskerville Effect, Culture, and Stress

SUMMARY
TEST YOURSELF
KEY TERMS, CONCEPTS, AND PEOPLE
ESSENTIAL READINGS

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**MEASURING UP**

**GOT DAILY HASSLES? WHAT'S YOUR STRESS SCORE?**

Identify which of the following events you experienced in the past six months.

<table>
<thead>
<tr>
<th>Event</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Death of a close family member</td>
<td>100</td>
</tr>
<tr>
<td>2. Death of a close friend</td>
<td>73</td>
</tr>
<tr>
<td>3. Divorce between parents</td>
<td>65</td>
</tr>
<tr>
<td>4. Jail term</td>
<td>63</td>
</tr>
<tr>
<td>5. Major personal injury</td>
<td>63</td>
</tr>
<tr>
<td>6. Marriage</td>
<td>58</td>
</tr>
<tr>
<td>7. Fired from job</td>
<td>50</td>
</tr>
<tr>
<td>8. Failed important course</td>
<td>47</td>
</tr>
<tr>
<td>9. Change in health of a family member</td>
<td>45</td>
</tr>
<tr>
<td>10. Pregnancy</td>
<td>44</td>
</tr>
<tr>
<td>11. Sex problems</td>
<td>44</td>
</tr>
<tr>
<td>12. Serious argument with family member</td>
<td>40</td>
</tr>
<tr>
<td>13. Change in financial status</td>
<td>39</td>
</tr>
<tr>
<td>14. Change of major</td>
<td>39</td>
</tr>
<tr>
<td>15. Trouble with parents</td>
<td>39</td>
</tr>
<tr>
<td>16. New girlfriend or boyfriend</td>
<td>38</td>
</tr>
<tr>
<td>17. Increased workload at school</td>
<td>37</td>
</tr>
<tr>
<td>18. Outstanding personal achievement</td>
<td>36</td>
</tr>
<tr>
<td>19. First semester in college</td>
<td>35</td>
</tr>
<tr>
<td>20. Change in living conditions</td>
<td>31</td>
</tr>
<tr>
<td>21. Serious argument with instructor</td>
<td>30</td>
</tr>
<tr>
<td>22. Lower grades than expected</td>
<td>29</td>
</tr>
<tr>
<td>23. Change in sleeping habits</td>
<td>29</td>
</tr>
<tr>
<td>24. Change in social habits</td>
<td>29</td>
</tr>
<tr>
<td>25. Change in eating habits</td>
<td>28</td>
</tr>
<tr>
<td>26. Chronic car trouble</td>
<td>26</td>
</tr>
<tr>
<td>27. Change in number of family get-togethers</td>
<td>26</td>
</tr>
<tr>
<td>28. Too many missed classes</td>
<td>25</td>
</tr>
<tr>
<td>29. Change of college</td>
<td>24</td>
</tr>
<tr>
<td>30. Dropped more than one class</td>
<td>23</td>
</tr>
<tr>
<td>31. Minor traffic violations</td>
<td>20</td>
</tr>
</tbody>
</table>

On the scale, you can determine your “stress score” by adding up the number of points corresponding to the events that you have experienced in the past six months or expect to experience in the coming six months.

Don’t you detest those times when you have to introduce yourself to a large group of strangers? Most of us do. Maybe it is a first day of class, and the instructor has everyone say something about themselves. Maybe it is a meeting where everybody has to share opinions. Your heart starts to beat a little faster as your turn approaches. You review what you want to say in your head, while thoughts about how others will perceive you intrude on your planning (“How will this make me look?”). You barely notice what other people say before your turn. Your palms may become moist, and your face may turn red. The moment arrives when you must speak, and the drumbeat of your heart hammers away in a frenzied crescendo. Suddenly, when you finish, the world is a whole different place, and you can hear the birds singing in the trees again.

Stress is a term that everybody uses freely and that we all seem to understand naturally. “Don’t stress out” is often used interchangeably with other soothing advice, such as “Don’t freak out,” slang phrases related to those dreaded times when everything seems to go wrong or there is too much to do and too little time. There are many such stressful times in life. For example, when you have not started on the large paper that is due the next day, or you reach Sunday night after having wasted the entire weekend when you should have been studying for Monday’s test. How about experiencing getting sick, your car breaking down, and learning a close family member had a major accident—all at the same time? Almost everyone can recall a number of times when they felt stressed. The American Psychological Association’s yearly Stress in America surveys show Americans have high stress levels, rely on unhealthy behaviors to manage stress, and experience physical health consequences of stress (American Psychological Association, 2017). The survey also shows 86% of Americans constantly check their electronic devices, a new form of stress called “telepressure” (Barber & Santuzzi, 2017).

Stress can be a tricky monster. There are many intriguing aspects to stress and how we experience it. Some things that caused you stress at one time (e.g., giving a five-minute presentation) may amuse you today. Some things that are stressful for some people (such as getting up to sing at a karaoke machine) are actually enjoyable for others. At its most extreme, stress can kill, severely hamper health, or drive someone to behave in risky, unhealthy ways.

WHAT IS STRESS?

What exactly is stress? Why do different people and cultures experience stress differently? What can we do to reduce stress? These are some of the questions that we will answer in this chapter. We begin by defining the term and looking at how health psychologists study stress. You will notice that causes of stress for people vary historically. Next, we will look at how we can measure stress in an effort to control and manage it. Then we shift our focus to the role of psychological processes, specifically thinking and behavior. We also examine how different types of stress (e.g., prejudice and noise) are associated with different cultures (e.g., SES and ethnicity), reviewing how different cultural beliefs influence the experience of stress.
We can define stress in many different ways. It has been studied using different approaches, and each of us has different notions of what is stressful (Table 5.1). It is important that a definition of stress can be applied to many different people (and animals, too). Not all negative events are stressful, and not all positive events are automatically free from stress. For example, losing your job may sound initially like a stressful event, but it may be a happy event if you hated your job and if this now opens up new opportunities for you. Similarly, although finding a romantic partner after a long period of being single sounds like a very positive event, you may worry about how to make sure the relationship lasts or whether your partner likes you or not. These worries could make this positive event stressful. As you can see, stress is subjective. What then is the best way to measure stress?

Most researchers argue that the best way to know when a person is stressed is to look at how his or her body responds to a situation (Gruenwald, 2019). If the sympathetic nervous system activates in response to an event, then the person is under stress. This activation results in elevated heart rate, respiration, and circulation (this is a good time to look over the section on the nervous system in Chapter 4). Many early definitions of stress relied heavily on biological activity. Walter Cannon (1929) viewed stress as the biological mobilization of the body for action, involving sympathetic activation and endocrine activity. Hans Selye (1956) similarly saw stress as the activation of a host of physiological systems. Later theorists added more psychological components to the process of stress (e.g., Lazarus, 1966).

Psychological theories defined stress as the result of perceived demands on the organism that exceed the resources to meet those demands (e.g., Frankenhaeuser et al., 1989). Although these different definitions have all been well supported, the easiest way to define stress is as the upsetting of homeostasis (Cannon, 1929). Each of our bodies has an optimal level of functioning for blood glucose level, body temperature, rate of circulation, and breathing. Homeostasis is the ideal level of bodily functions (Prus, 2018). Similar to the thermostat in homes, our body is designed to maintain its optimal level in all areas of functioning. We set our thermostats and if the temperature drops too low or too high, the thermostat kicks in to return the temperature to an optimal level. Similarly, stress is the signal that our body is not functioning optimally and needs to be regulated back to its ideal level.

### TABLE 5.1

<table>
<thead>
<tr>
<th>Definitions of Stress</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>A substantial imbalance between environmental demand and the response capability of the focal organism.</td>
<td>McGrath (1970, p. 17)</td>
</tr>
<tr>
<td>The response to the actual loss, threat of loss, or lack of gain of resources that all individuals actively seek to gain and maintain.</td>
<td>Hobfoll (1989)</td>
</tr>
<tr>
<td>A condition or feeling experienced when a person perceives that demands exceed the personal and social resources the individual is able to mobilize.</td>
<td>Lazarus (1966)</td>
</tr>
<tr>
<td>Psychosocial stress reflects the subject’s inability to forestall or diminish perception, recall, anticipation, or imagination of disvalued circumstances, those that in reality or fantasy signify great and/or increased distance from desirable (valued) experiential states, and, consequently, evoke a need to approximate the valued states.</td>
<td>Kaplan (1983, p. 196)</td>
</tr>
<tr>
<td>A perceptual phenomenon arising from a comparison between the demand on the person and his or her ability to cope. An imbalance in this mechanism, when coping is important, gives rise to the experience of stress, and to the stress response.</td>
<td>Cox (1978)</td>
</tr>
<tr>
<td>The upsetting of homeostasis.</td>
<td>Cannon (1929)</td>
</tr>
</tbody>
</table>
below the set level, the furnace starts. In this way, a constant temperature is maintained. The hypothalamus in our brains similarly maintains set levels. Stress to our systems can thus be seen as something that upsets our ideal balance. This simple but effective definition of stress harkens back to the origins of the word “stress.”

Physicists have long studied the effects of large forces on solid structures, and stress was originally used to describe the force exerted on a body that results in deformation or strain. Stress has similar effects on our body. A stressor is anything that disrupts the body’s homeostatic balance. The stress response is what is done to reestablish the homeostatic balance. This definition allows for subjectivity because stressors can vary among individuals (Guenole, Chernyshenko, Stark, McGregor, & Ganesh, 2008). If an event does not activate your stress response or disrupt your system, it is just another event. If an event disrupts you, it is a stressor. One person’s event can be another person’s stressor. For example, even if talking in public is not stressful for you, it could be very stressful for someone else.

MEASURING STRESS

A variety of tools can assess the different psychological and physiological aspects of stress (O’Connor & Ferguson, 2016). There are measures of stressfulness of specific events, measures of how we appraise situations, and generic measures. Table 5.2 summarizes some of the main measures of stress.

The easiest way to measure whether someone is stressed is to ask. If your colleague at work seems stressed, a simple question may confirm your observation. To make a valid and reliable measure of stress, health psychologists have devised a number of different forms of measurement.

| TABLE 5.2 |
| Some of the Major Measures of Stress |

<table>
<thead>
<tr>
<th>Title of Scale</th>
<th>Author</th>
<th>Number of Items/Events</th>
<th>Dimensions Assessed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Generic Measures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived Stress</td>
<td>Cohen, Kamarck, &amp; Mermelstein (1983)</td>
<td>14, 10, &amp; 4</td>
<td>Global perceived stress score</td>
</tr>
<tr>
<td>Stress Arousal Checklist</td>
<td>Mackay et al. (1978)</td>
<td>30</td>
<td>Stress scale, arousal scale</td>
</tr>
<tr>
<td>Trier Inventory of Chronic Stress</td>
<td>Schulz, Schlotz, &amp; Becker (2011)</td>
<td>57</td>
<td>Work overload, social overload, pressure to perform, work discontent, excessive demands at work, lack of social recognition, social tensions, social isolation, and chronic worrying</td>
</tr>
<tr>
<td><strong>Event Measures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Readjustment Rating Scale (SRRS)</td>
<td>Holmes &amp; Rahe (1967)</td>
<td>43</td>
<td>Total life change unit</td>
</tr>
<tr>
<td>Life Events and Difficulties Scale</td>
<td>Brown &amp; Harris (1978)</td>
<td>N/A (events elicited via interview)</td>
<td>Ratings of acute (events) and chronic (difficulty) stressors based on expert ratings following detailed interview and assessment</td>
</tr>
<tr>
<td>Hassles Scale</td>
<td>Kanner et al. (1981)</td>
<td>117</td>
<td>Work, family, social activities, environment, practical considerations, finances, and health</td>
</tr>
<tr>
<td>Hassles and Uplifts Scale</td>
<td>DeLongis, Folkman, &amp; Lazarus (1988)</td>
<td>53</td>
<td>Work, family, social activities, environment, practical considerations, finances, and health</td>
</tr>
<tr>
<td>Single-item Visual Analogue Scale/Rating Scale</td>
<td>N/A</td>
<td>1</td>
<td>Perceived stress in relation to single events</td>
</tr>
</tbody>
</table>
### Title of Scale | Author | Number of Items/Events | Dimensions Assessed
--- | --- | --- | ---
Daily Hassles/Stressors — free response format | O’Connor et al. (2008) | N/A | Frequency/intensity of ego-threatening, interpersonal, work-related, and physical

#### Cognitive appraisal measures

| Stress Appraisal Measure | Author | Number of Items | Dimensions Assessed |
--- | --- | --- | ---
Stress Appraisal Measure | Peacock & Wong (1990) | 28 | Primary appraisals: Threat, challenge, centrality
| | | | Secondary appraisals: Uncontrollable, controllable-by-others, controllable-by-self

Appraisal of Life Events | Ferguson, Matthews, & Cox (2010) | 16 | Primary appraisals: Threat, challenge, loss

Dimensions of Cognitive Appraisal | Gall & Evans (1987) | 19 | Primary appraisals, undesirability/threat, gain/challenge, need for information, familiarity, need to accept

Emotion | Folkman & Lazarus (1985) | 15 | Threat, challenge, harm, benefit

Stressor Appraisal Scale | Schneider (2008) | 10 | Primary and secondary appraisal, but no challenge, loss, or control items

Stressor Appraisal Scale, modified | Gartland, O’Connor, & Lawton (2012) | 10 | Primary and secondary appraisal, but no challenge, loss, or control items

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Early stress research focused primarily on major events in people’s lives, or **life events** (Brown & Harris, 1978; Holmes & Rahe, 1967). For example, the Social Readjustment Rating Scale (SRRS) consists of 43 items, each given a value called a life change unit (Holmes & Rahe, 1967). Although the SRRS is one of the critical landmarks in the measurement of stress, it has been heavily criticized and is not as widely used today. Sometimes the occurrence of an event does not make it stressful.

Most measures take the form of questionnaire checklists containing a number of different events (e.g., getting fired, having a fight with a romantic partner, or getting in trouble with the law). Test subjects are asked to indicate which of the events happened to them in a given period of time (e.g., the past 6 months). Totaling the number of events that the person experienced provides an estimate of the demands placed on the individual and hence the level of stress. Examples of such questionnaires are the Life Experiences Survey (Sarason, Johnson, & Seigel, 1978) and the SRRS (Holmes & Rahe, 1967).

Together with major life events, you probably know that small hassles add up: hearing the noisy neighbor every morning, being stuck in traffic, or having too many things to do. There is a scale to measure even these little things. The Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981) consists of 117 events. Small hassles have been shown to negatively affect health and aggravate the damage done by major life events (Weinberger, Hiner, & Tierney, 1987; Werner, Frost, Macnee, McCabe, & Rice, 2012).

Although many of these measures tap into acute one-time events and daily hassles, other questionnaires assess major chronic stressors (Lepore, 1997). For example, Gurung, Taylor, Kemeny, and Myers (2004) demonstrated how measuring chronic stress could predict depression in an ethnically diverse sample of low-income women (see Table 5.3). Chronic stress or burden and low SES were significant predictors of increased depression for African American women and Latina women, respectively. Gurung et al. (2004) measured chronic burden using a 21-item scale developed...
from focus groups in which HIV-positive women discussed the life stresses that they faced. The researchers compiled a list of the most commonly mentioned stressors from the focus groups. Then participants in the study indicated whether they had experienced each stressor during the previous 6 months and the extent to which each stressor was a problem for them using a 4-point scale ranging from 1, “Not a problem for me in the past 6 months,” to 4, “A major problem for me in the past 6 months.” The final list, shown in the Measuring Up section at the start of the chapter, included financial difficulties, transportation problems, housing problems, child-care or caregiving difficulties, difficulties in personal relationships, work-related difficulties, exposure to accident or injury, immigration or citizenship problems, and exposure to crime and discrimination. Another new measure of chronic stress that promises to add to our ability to predict the effects of long-term stressors is the Trier Inventory of Chronic Stress (Schulz, Schlotz, & Becker, 2011).

Most of the measures of stress discussed so far ask whether certain specific events actually took place. Whether hassles or life events, the assumption is that if you experienced one of these, then you are likely to experience stress. A different type of assessment focuses on perceived stress (Uchino, Bowen, Carlisle, & Birmingham, 2012). As the term suggests, this approach relies on what the individual feels. Cohen, Kamarck, and Mermelstein (1983)

<p>| TABLE 5.3  |</p>
<table>
<thead>
<tr>
<th>The Chronic Burden Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Not having enough money to cover the basic needs of life (food, clothing, housing)</td>
</tr>
<tr>
<td>2. Not having any savings to meet problems that come up</td>
</tr>
<tr>
<td>3. No reliable source of transportation (such as car that works or reliable bus service)</td>
</tr>
<tr>
<td>4. Housing problems (uncertainty about housing, problems with landlord)</td>
</tr>
<tr>
<td>5. Problems arranging child care</td>
</tr>
<tr>
<td>6. Being a caregiver for someone (taking care of someone sick, elderly, or infirm)</td>
</tr>
<tr>
<td>7. Divorce or separation from partner</td>
</tr>
<tr>
<td>8. Long-term unresolved conflict with someone very important (child, parent, lover/partner, sibling, or friend)</td>
</tr>
<tr>
<td>9. Being fired or laid off</td>
</tr>
<tr>
<td>10. Trouble with your employer (in danger of losing job or being suspended/demoted)</td>
</tr>
<tr>
<td>11. Having work hours or responsibilities change for the worse</td>
</tr>
<tr>
<td>12. Partner’s work hours or responsibilities change for the worse</td>
</tr>
<tr>
<td>13. Serious accident, injury, or new illness happening to you or a close family member/spouse/partner/close friend</td>
</tr>
<tr>
<td>14. You or a close family member/spouse/partner/friend being the victim of a crime or physical assault</td>
</tr>
<tr>
<td>15. Chronic pain or restriction of movements due to injury or illness</td>
</tr>
<tr>
<td>16. Long-term medical problems</td>
</tr>
<tr>
<td>17. Either you or someone you are close to and depend on having immigration or citizenship problems</td>
</tr>
<tr>
<td>18. You or a close family member/spouse/partner/close friend being arrested or sent to jail</td>
</tr>
<tr>
<td>19. Living in a high-crime area</td>
</tr>
<tr>
<td>20. Losing the help of someone you depend on (person moved, got sick, or otherwise was unavailable)</td>
</tr>
<tr>
<td>21. Being discriminated against because of your race, nationality, gender, or sexual orientation</td>
</tr>
</tbody>
</table>

developed the Perceived Stress Scale (PSS) that asks respondents how often they had certain thoughts or feelings in the preceding month. Responses to the perceived stress scale reliably predict a range of health issues such as coronary heart disease (Ghasemipour & Ghorbani, 2010; Strodl, Kenardy, & Aroney, 2003) and immune responses to vaccinations (Burns, Drayson, Ring, & Carroll, 2002). The PSS is one of the most commonly used stress scales today (Gruenwald, 2019). Table 5.4 shows you all the items.

Asking if someone is stressed can be a good indicator of how stressed they really are. However, our perceptions of stress are not always accurate. Sometimes we may not be completely honest about our experiences (both to ourselves or to researchers who want to know). To compensate for these inaccuracies, a vast array of physiological measures can be used. It is difficult to trick your physiology. If you look back to the physiological effects of stress, you can see how you can get a measure of stress without asking questions. You can measure a person’s blood pressure (systolic and diastolic), take a person’s temperature, or measure a person’s heart rate. When we become stressed, sympathetic activation increases all these physiological measures. Most laboratory studies of stress, especially experimental studies in which a person is stressed on purpose, use physiological measures. Some use galvanic skin responses, a measure of how our skin conducts electricity. We sweat more when we get stressed; even a minute increase in perspiration at the skin’s surface increases the rate at which our skin conducts electricity. Measuring devices pick up this increase in conductance.

In many studies, blood samples are assessed for the levels of different chemical markers. The levels of stress chemicals in the blood, such as cortisol, epinephrine, and norepinephrine, increase when we are stressed. The number and types of different immune system cells vary when we

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**TABLE 5.4**

Perceived Stress Scale

<table>
<thead>
<tr>
<th>The Perceived Stress Scale (PSS) is a classic stress assessment instrument. The tool, originally developed in 1983, remains a popular choice for helping us understand how different situations affect our feelings and our perceived stress. The questions in this scale ask about your feelings and thoughts during the past month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer fairly quickly. That is, don’t try to count up the number of times you felt a particular way; rather, indicate the alternative that seems like a reasonable estimate. For each question choose from the following alternatives: 0 - never, 1 - almost never, 2 - sometimes, 3 - fairly often, 4 - very often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In the past month, how often have you been upset because of something that happened unexpectedly?</td>
</tr>
<tr>
<td>2. In the past month, how often have you felt that you were unable to control the important things in your life?</td>
</tr>
<tr>
<td>3. In the past month, how often have you felt nervous and stressed?</td>
</tr>
<tr>
<td>4. In the past month, how often have you felt confident about your ability to handle your personal problems?</td>
</tr>
<tr>
<td>5. In the past month, how often have you felt that things were going your way?</td>
</tr>
<tr>
<td>6. In the past month, how often have you found that you could not cope with all the things that you had to do?</td>
</tr>
<tr>
<td>7. In the past month, how often have you been able to control irritations in your life?</td>
</tr>
<tr>
<td>8. In the past month, how often have you felt that you were on top of things?</td>
</tr>
<tr>
<td>9. In the past month, how often have you been angered because of things that happened that were outside of your control?</td>
</tr>
<tr>
<td>10. In the past month, how often have you felt difficulties were piling up so high that you could not overcome them?</td>
</tr>
</tbody>
</table>

Stress Test. A modern measure of physiological reactions to stress.

Stress over Time

Stressors today differ from what was perceived as stressful in the past. A list of common stressors can be seen in the Daily Hassles Scale (chapter opening). If you review the list you will see that most of the examples are psychological in nature. They are not tangible threats such as impending invasion by a powerful army or being mauled by a wildcat, but instead are things that we worry about or stress over. There is also a range of stressful events that are tangible, such as living in a high-crime neighborhood or a very cold environment (Lowe et al., 2016). In a study of single-parent families living in violent neighborhoods in Philadelphia, parents described high levels of stress and concern for their children's well-being (Jacoby, Tach, Guerra, Wiebe, & Richmond, 2017). The effects of stress can add up. The cumulative effects of stress and living a disadvantaged life influence how young children react to stress (Tackett et al., 2017).

Our current stress response is hypothesized to have developed in response to the stressors faced by primitive humans. Both early theorists such as Walter Cannon (1929) and contemporary researchers such as Robert Sapolsky (2017) suggested that the physiological responses to stress evolved many hundreds, even thousands, of years ago. Consider the early days of human history before we lived in cities and towns. Archaeological evidence suggests that humans as we know them today first flourished on the African continent (see Diamond, 2005, for a review of the archaeological evidence). Many wild animals and predators roamed freely. Most of the early stressors were physical in nature and short-term or acute. The body had to be able to get ready to mobilize for sudden action in this fashion (e.g., run from an animal). Early stressors were most likely acute physical stressors.

With an acute physical stressor, your stress response either worked—you escaped the beast or defeated the ravaging tribes—or that was the end of your story. Those humans with better stress responses lived to reproduce. As civilization proceeded, humans started to live longer and experience more long-term, or chronic, stressors. Once agriculture flourished, humans traded nomadic lifestyles for village and town living, and the types of stressors changed. Sometimes crops failed, and people would go hungry for long periods. At other times, climate conditions such as drought made food scarce. As the domestication of animals increased, their germs probably caused large numbers of illnesses in people. All of these stressors could cause prolonged illnesses, but again the stressors were physical in nature. For much of human history, especially through the Middle Ages when millions died of the plague (e.g., bubonic, septicemic, and others), the main stressors and causes of death were physical in nature. As described in Chapter 1, medicine was not a successful cure of disease until the past hundred years, and diseases such as pneumonia, tuberculosis, and influenza caused great physical stress and death.

Today, stressors are very different. Yes, people still die of diseases due to viruses and bacteria. People who live in countries experiencing political strife or civil war and people living in high-crime neighborhoods also suffer from acute stress due to threats to their physical safety. But the
main physical killers in the United States, such as heart disease, are caused and made worse by the slow accumulation of psychological damage (Bishop, 2019). Much of this damage is related to stress. Today, the major stressors in North America are psychological in nature. Our thoughts, and the pressures we apply to ourselves, generate stress (anticipatory stress; Sapolsky, 2004/1994). Few physical stressors exist here today. Instead, the bulk of our stress is self-generated and related to the pressures, frustrations, and changes of everyday modern life.

Yet the bottom line is that stress, whether physical or psychological in nature, leads to a variety of poor health outcomes (e.g., Gruenwald, 2019).

MAIN THEORIES OF STRESS
Cannon’s Fight-or-Flight Theory
Walter Cannon applied the concept of homeostasis to the study of human interactions with the environment (Cannon, 1914). Specifically, he studied how stressors affect the sympathetic nervous system (SNS). His basic idea is intuitive and can be remembered by a simple example.

\[ \text{\textbullet FIGURE 5.1} \]

Major Components of the Autonomic Nervous System

<table>
<thead>
<tr>
<th>Parasympathetic division</th>
<th>Sympathetic division</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pupils constriction</td>
<td>Pupils dilated</td>
</tr>
<tr>
<td>Salvation stimulated</td>
<td>Salvation inhibited</td>
</tr>
<tr>
<td>Decreased respiration</td>
<td>Increased respiration</td>
</tr>
<tr>
<td>Bronchial passages constricted</td>
<td>Bronchial passages dilated</td>
</tr>
<tr>
<td>Decreased heart rate</td>
<td>Decreased heart rate</td>
</tr>
<tr>
<td>Digestion stimulated</td>
<td>Digestion inhibited</td>
</tr>
<tr>
<td></td>
<td>Secretion of adrenal hormones</td>
</tr>
<tr>
<td>Bladder contracted</td>
<td>Increased secretion by sweat gland</td>
</tr>
<tr>
<td></td>
<td>Hair follicles raised: goose bumps</td>
</tr>
<tr>
<td></td>
<td>Bladder relaxed</td>
</tr>
</tbody>
</table>
Imagine going to a Saturday night movie. You drove to the cinema by yourself and the only parking spot you found was far away from the theater doors. After the movie, you walk back to your car alone because the friends you met had closer parking spots. As you reach your car, you hear a crunching sound in the dark behind you. You stop. The crunching stops. You start walking faster, and the crunching speeds up. You scramble for your keys and in the reflection of your car window you see a hulking figure draw up behind you. You can probably guess what your body is doing. Your heart pumps faster, your blood pressure rises, you breathe faster, you may be a little flushed, and your palms may be sweaty. All these reactions that prepare our body for action are caused by the SNS, as described in Figure 5.1.

Activation of the SNS increases circulation, respiration, and metabolism, all factors that fuel your body to ready it to either fight or flee. The higher respiration rate gets more oxygen into your lungs, the increased heart rate and blood pressure get the oxygenated blood to the muscles, and the increased metabolism breaks down energy for use by the fighting/fleeing muscles. The SNS also turns off certain systems in response to stress. Faced by a threatening mugger, you are probably not in a mood for two things: food and sex. Your body cannot be wasting resources and energy on these things. The SNS down-regulates (turns down) the digestive system and the reproductive system in times of stress. For example, many female high school cross-country runners have irregular menstrual cycles—to the body running cross-country is a stressor.

The complete reversal of this process (the activating of some systems and the deactivating of others) is what helps your body recover from a stressor and is managed by the parasympathetic nervous system (PNS). The PNS decreases circulation and respiration and increases digestion and reproduction. Correspondingly, most stress management techniques work to activate your PNS and slow down breathing and heart rate. The PNS and SNS are both parts of the autonomic nervous system and are coordinated by higher brain structures such as the hypothalamus.

Cannon (1914) was the first to sketch this pattern of responding to stress and to map out the full level of physiological activation. Cannon argued that, when faced with a stressor, the SNS is activated and in turn it activates the adrenal glands that secrete a class of hormones called catecholamines. The two major catecholamines are epinephrine and norepinephrine. Epinephrine is also known as adrenaline. You have probably heard the phrase, “My adrenaline was flowing,” to suggest that someone was stressed or ready for action. The inner part of the adrenal glands, an area called the medulla, produces both these hormones. Consequently, Cannon’s fight-or-flight theory of stress describes stress as leading to sympathetic-adrenal-medullary (SAM) activation.

This fight-or-flight system has eight clear-cut effects (Guyton, 1977). Blood pressure, blood flow to large muscles, total energy consumption, blood glucose concentration, energy release in the muscles, muscular strength, mental activity, and the rate of blood coagulation all increase.

An intricate dance of chemical secretions leads to all these events. The hypothalamus orchestrates the SNS via the secretion of corticotropin-releasing factor (CRF). CRF stimulates the secretion of adrenocorticotropic hormone (ACTH) from the anterior pituitary gland and stimulates the locus coeruleus (located in the pons area of the brain stem) to increase the levels of norepinephrine in the system. Epinephrine is what increases both the heart rate and blood pressure. With prolonged stress, there is a circular reaction, and higher levels of epinephrine increase the secretions of ACTH. Research during the past 60 years has shown that the relative levels of epinephrine and norepinephrine vary with the type of emotion experienced with one being more of a flight chemical and the other being more of a fight chemical. Epinephrine is present in greater amounts when we are scared; norepinephrine is present in greater amounts when we are angry (Ax, 1953; Ward et al., 1983). The different physiological parts of SAM activation are heavily interconnected.

In recent years, the basic fight-or-flight idea has been modified to include the option of freezing. As the term suggests, new work looks at how in the face of something stressful we freeze up and seem unable to do anything. Research is mapping out both the cognitive and physiological
associations of freezing in humans (Alban & Pocknell, 2017) as well as ways to measure fight, flight, and freeze tendencies (Maack, Buchanan, & Young, 2015).

**Taylor et al.’s Tend-and-Befriend Theory**

For years health psychologists assumed Cannon’s model was the only major way both sexes reacted to stress. Then a team from UCLA launched a challenge to conventional thinking about stress. **Shelley Taylor** and colleagues suggested that women tend-and-befriend in addition to fighting or fleeing (Taylor et al., 2000).

Diverse findings in the stress literature do not fit with the fight-or-flight model. The fight or flight model assumes that men and women faced the same challenges in our evolutionary history. However, this was not true. Due to pregnancy and nursing, women have been the primary caregivers of infants. Men have easily been able to fight or flee, but women often had to look after infants. If women fought and lost they would leave their infant defenseless. If women ran they would either have to leave their infant behind or the weight of the infant would surely slow them down. Instead, Taylor et al. (2000) argued that women developed additional stress responses aimed to protect, calm, and quiet the child, to remove it from harm’s way (i.e., tending), and to marshal resources to help. Essentially, women create social networks to provide resources and protection for themselves and their infants (i.e., befriending).

The tend-and-befriend response thus provides more-reasonable stress responses for women than the basic fight-or-flight theory. This relatively new theory builds on the brain’s attachment/caregiving system that counteracts the metabolic activity associated with the traditional fight-or-flight stress response—increased heart rate, blood pressure, and cortisol levels—and leads to nurturing and affiliative behavior.

Existing evidence from research with nonhuman animals, neuroendocrine studies, and human-based social psychology supports this new theory (Israel-Cohen & Kaplan, 2016; Taylor & Masters, 2011). Neuroendocrine research shows that although women show the same immediate hormonal and sympathetic nervous system response to acute stress as men, other factors intervene to make fight-or-flight less likely. In terms of the fight response, while male aggression appears to be driven by hormones such as testosterone, female aggression is not. In fact, a major female hormone, oxytocin, actually counteracts the effects of stress chemicals such as cortisol and the catecholamines (Cardoso, Valkanas, Serravalle, & Ellenbogen, 2016; Doom, Doyle, & Gunnar, 2017). Men low on this hormone do not reap its benefits (Berger, Heinrichs, von Dawans, Way, & Chen, 2016). Oxytocin inhibits flight and enhances relaxation, reduces fearfulness, and decreases the other stress responses typical to the fight-or-flight response. Strong evidence suggests oxytocin underlies both the tending and the befriending parts of the theory. Supporting the role of oxytocin in befriending, blocking oxytocin in women actually makes them spend less time with their friends (Jamner, Alberts, Leigh, & Klein, 1998). On the flip side, spraying oxytocin into someone’s nose via a nasal spray can improve how accurate people are at recognizing feelings in others, a critical part of befriending (Graustella & MacLeod, 2012), and can modify social perceptions relating to friendship (Hecht, Robins, Gautam, & King, 2017). In fact, research is even exploring the potential of oxytocin nasal spray treatment for specific mental health problems that involve impairments in engaging comfortably with other people (Liu, McErlean, & Dadds, 2012; Mah, 2016). On a related note, oxytocin is also related to trustworthiness (Zak, Kurzban, & Matzner, 2005).

In terms of tending, oxytocin plays a key role in maternal bonding (Szymanska, Schneider, Chateau-Smith, Nezelof, & Vulliez-Coady, 2017). Although extensively studied in animals, the tending role of oxytocin in humans has only recently been illustrated. Feldman, Weller, Zagoory-Sharon, and Levine (2007) measured the oxytocin levels in pregnant women twice during their pregnancy and once after they had given birth. Women with higher levels of oxytocin bonded better with their babies and behaved in ways to form better bonds (e.g., feeding in special ways). More oxytocin in early life is also related to later tending and befriending in both animals (Mandel & Nicol, 2017) and humans (Taylor, 2012).
Tending is observed in animal studies when rat pups are removed from their nest for brief periods—a stressful situation for pups and mothers—and then returned. The mothers immediately move to soothe their pups by licking, grooming, and nursing them (Meaney, 2001). Similar behaviors are seen in sheep (Dwyer, 2008) and many mammals (Anacker & Beery, 2013). In humans, breastfeeding mothers are found to be calmer (Uvnäs-Moberg, 1996), and touch has been shown to soothe both the mother and infant (Uvnäs-Moberg, Handlin, & Petersson, 2015). In clear support of the tend-and-befriend model, Repetti and Wood (1997) showed that after a stressful day on the job, men want to be left alone and often fight with their spouses and kids, while women who felt stressed tended toward spending more time with their kids and having more physical contact with them. A more recent review shows that men exhibit more-negative reactions to work stress than women and a partner’s stress can significantly influence how much social support is given in a family (Repetti & Wang, 2017).

One humorous but related aside. You may be surprised by what increases oxytocin. In one study, Internet shoppers received a $10 coupon. These shoppers showed an increase in oxytocin and happiness, compared to a control group of shoppers who did not get the coupon (Alexander, Tripp, & Zak, 2015).

Selye’s General Adaptation Syndrome

Hans Selye was a young assistant professor in search of direction when a colleague gave him some ovarian extracts (Sapolsky, 2005). Selye set out to determine the role played by these extracts and, quite by chance, discovered another major explanation for the stress response. In his early experiments, he injected rats with ovarian extract and observed them for changes. After months of study, he found that the rats had developed ulcers. As a good scientist, he decided to replicate his findings. He recreated the study and added a control group—a group of rats who got a placebo injection instead of the extract. Then he found that his control group developed ulcers as well. What did this mean?

Well, Selye was not an established animal handler, and he had a lot of trouble weighing, injecting, and studying his rats. Through different forms of (unintended) mistreatment, he actually stressed both the experimental and control groups, resulting in both groups developing ulcers. The rats also had other physiological problems, such as shrunked adrenal glands and deformed lymph nodes (Selye, 1956). On realizing the actual true cause of the ulcers, Selye exposed rats to a variety of stressors such as extreme heat and cold, sounds, and rain. He found that in every case, the rats developed physiological problems similar to those in his first groups of rats. Selye concluded that organisms must have a general, nonspecific response to a variety of stressful events. Specifically, he hypothesized that no matter what the stressor, the body would react in the same way and theorized that these responses were driven by the hypothalamic-pituitary-adrenal (HPA) axis.

The first part of the HPA axis sequence of activation resembles the characteristics of SAM activation. The hypothalamus activates the pituitary gland that then activates the adrenal gland. The difference in Selye’s theory is that a different part of the adrenal gland, the cortex, gets activated. The cortex is the outer part of the adrenal gland (the medulla in SAM activation is the inner part) and secretes a class of hormones called corticosteroids. The major hormone in this class is cortisol (hydrocortisone). Cortisol generates energy to deal with the stressor by converting stored glycogen into glucose, a process called gluconeogenesis. Gluconeogenesis aids in breaking down protein, the mobilization of fat, and the stabilization of lysosomes. See Figures 5.2A and 5.2B for a summary of the basic physiological reactions to stress.

Selye argued that organisms have a general way of responding to all stressors, what he called the general adaptation syndrome (Figure 5.3). When faced with a stressor, whether a wild animal, a threatening mugger, or intense cold, the body first goes into a state of alarm. HPA axis activation takes place, and the body attempts to cope with the stressor during a period of resistance. Short-term reactions to stress and HPA activation can even be experimentally
Many acute or short-term stressors can be successfully dealt with in the resistance stage; however, if the stressor persists for too long, the body breaks down in a state of exhaustion. Chronic stressors can exert true physiological and psychological damage on human bodies. Recent work on the HPA axis looks at how genetic variations and early stress can influence brain functioning (Di Iorio et al., 2017).

Cannon (1914) and Selye (1956) were the earliest theorists to offer physiological bases for stress. In summary, combining their models suggests that our SNS and the hypothalamus coordinate a physiological stress response that involves the pituitary and adrenal glands and the secretion of catecholamines and corticosteroids. Psychological aspects did not play major roles in their theories. Cannon suggested that organisms had threshold levels and that if stressors were below
Part i • stress

these limits, the fight-or-flight response did not activate. He also discussed emotional stressors, suggesting that mental processes played some role. Likewise, both Cannon and Selye believed that events had to be recognized as threatening to activate the response. However, neither scientist explained how this happened.

Lazarus’s Cognitive Appraisal Model

Richard Lazarus (1966) devised the first psychological model of stress, which is still actively used in stress research designs today (Eschleman, Alarcon, Lyons, Stokes, & Schneider, 2012). Lazarus saw stress as the imbalance between the demands placed on the individual and that individual’s resources to cope (Figure 5.4). He argued that the experience of stress differed significantly across individuals, depending on how they interpreted the event and the outcome of a specific sequence of thinking patterns called appraisals.

All of us are faced with demands. In school, you have papers to write and exams to take. At work, you have projects and production deadlines to meet or a certain number of sales to make. Even in our personal lives, our family and friends rely on us and expect us to do various things. These different expectations, deadlines, and situations are all potential stressors. However, according to Lazarus, these expectations, deadlines, and situations are just events until we deem them to be stressful. The main cognitive process at work here is making appraisals. On the television show Antiques Road Show, people bring in possessions from their homes, attics, and garages to be evaluated. Experts appraise the articles for how much they are worth, sometimes surprising the owners (“Did you know the table you bought at a garage sale for $50.00 is a Colonial collectible worth $15,000?”). When we appraise events, we follow essentially the same process. We set a value or judge the nature or quality of a situation or event.

Lazarus suggested that we make two major types of appraisals when we face any potentially stressful event. During primary appraisals, we ascertain whether the event is positive, negative, or neutral; if negative, we ascertain if it...
is harmful, threatening, or challenging. A harm (or harm–loss) appraisal is made when we expect to lose or actually do lose something of great personal significance. For example, when we break up a close relationship we lose a confidante. The event can involve psychological aspects, such as loss of support from the ex-partner or love of a dying parent, harm to one’s self-esteem with the loss of a job, or even physical harm and loss from the diagnosis of a terminal illness.

Threat appraisals are made when we believe the event will be extremely demanding and will put us at risk for damage. If you think that your bad performance on an upcoming project can severely ruin your reputation, or that taking part in a certain race will hurt your body, you are seeing the project or race as a threat. Challenge appraisals occur in situations when we believe that we can grow from dealing with the event and may even look at the positive ways that we can benefit from an event. For example, you can view an exam as harmful to your self-esteem and a threat if you expect to do badly, or as a challenge to your intelligence and how much you have studied. A primary appraisal can be heavily influenced by the stake we have in the outcome of the event (Lazarus, 1991), or how good we are at the challenging task (Liu & Li, 2018). A primary appraisal is also tied to quality of life in caregivers and patients with chronic illnesses (La & Yun, 2017).

After we make a primary appraisal, we assess whether we have the necessary resources to cope with the event. During secondary appraisal we essentially determine whether we can deal with the event and how we can cope. We may think about the social support we have, who can help us, and what exactly can be done. We ask ourselves, “Do I have what it takes to cope?” The answer is critical. If the answer is “no,” and we appraised the event as being harmful and threatening and determined that we do not have the resources to cope, then the event is a stressor. If we appraised the event as a challenge and feel that we have the resources to deal with it, the event remains just that—an event. Cognitive appraisals can play a significant role in specific situations such as responding to a laboratory stressor (O’Connor, Wilson, & Lawton, 2017) and to our psychological health in general (Gomes, Faria, & Lopes, 2016). All along this process there is often cognitive reappraisal taking place during which we can change how we view the situation. As Shakespeare’s Hamlet said, “There is nothing either good or bad, but thinking makes it so.”

FACTORS INFLUENCING OUR APPRAISALS

Many factors contribute to appraisals of events (Table 5.5). The duration of an event can play an important role in the process. Acute or short-term events may be appraised differently from chronic or long-term events. For example, you may not worry too much if you know that you will have houseguests for a weekend. You know that even though your routine is going to be disrupted, it will not be for too long. You will have an entirely different reaction if, on the other hand, you hear that your in-laws will be staying with you for 3 months. Similarly, acute physical threats, such as taking a wrong turn and driving through a dangerous part of town, can have very different effects from chronic physical threats, such as living in a high-crime neighborhood (Anderson, Akeeb, Lavela, Chen, & Mellman, 2017).

Events can have either a positive or negative valence. This dimension of stress is more straightforward. Some events are automatically more threatening on the surface, such as having

![TABLE 5.5](image)

<table>
<thead>
<tr>
<th>Duration: Acute vs. chronic</th>
<th>Predictability: Predictable vs. unpredictable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valence: Negative vs. positive</td>
<td>Definition: Ambiguous vs. clear cut</td>
</tr>
<tr>
<td>Control: Having control leads to longevity</td>
<td>Centrality: Proximity to cause</td>
</tr>
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Synthesize, Evaluate, Apply

- What are the different factors that make it difficult to define stress?
- What are the pros and cons of the different theories of stress?
- How can you merge the different theories of stress?
to speak in front of 500 people or being the victim of a crime. Others can be positive on the surface, such as getting married. However, positive events can involve a lot of demands on your mind and body such as planning and coordinating the event. The valence of an event often is colored by our emotional memories of similar events. We store emotional memories with other details of the event (Feldman Barrett, 2017), and these can influence future appraisals. A negative experience of public speaking in the past can influence our appraisal of doing it again in the future.

**Control** is another important feature in stress. When we believe that we have control over a situation, the situation is less likely to be stressful. Knowing that you are capable of changing the event is less stressful than not having any control over it. In a classic study demonstrating the positive effects of control, researchers gave 91 nursing home residents extra control over their day-to-day activities, their menus, and a little plant (they were told that they were completely responsible for the care of the plant). They were told that they were also responsible for themselves and their day-to-day lives. In contrast, a similar group of residents was given a communication emphasizing that staff members were responsible for them and planned their activities. The comparison group had no control over aspects of their lives, such as their menus. After 6 months, the group with control was significantly better off (Langer & Rodin, 1976).

Control can make a difference in how we cope with diseases, such as Type 2 diabetes and coronary heart disease (Thakur et al., 2017). If you monitor what you eat and how much exercise you get, you reduce your chances of having a heart attack or getting diabetes (Ornish et al., 1998). Knowing that you can control the course of these diseases (based on your lifestyle choices) makes the diagnosis of coronary heart disease and diabetes less stressful. Having cognitive control also helps prevent episodes of post-traumatic stress disorder (PTSD; Bomyea, Amir, & Lang, 2012).

**Predictability** is related to control. Think about sitting in a dentist’s chair. If the dentist needs to use the drill but you have no idea how long the drilling is going to last, you will be stressed. Being able to predict how long a drill is going to be used reduces stress. Research from the first Gulf War showed that when Israel was targeted, the citizens’ ability to predict what the missiles held greatly reduced their stress. When the missiles first rained down, many people were hospitalized just from the trauma of not knowing whether the warheads contained chemical weapons (Wolfe & Proctor, 1996). In a similar wartime study, when a signal preceded an oncoming missile attack, this predictability of stress led to a reduction in the number of stress-related problems reported (Rosenhan & Seligman, 1989). Not being able to predict the onset of a stressor can, not surprisingly, also interfere with sleep (Yang, Wellman, Ambrozewicz, & Sanford, 2011).

Not having all the details about an event, not being able to tolerate ambiguity, or not having the mental resources to understand fully what needs to be done in a certain case make the outcome of an event unpredictable and stressful (Kebelo & Rao, 2012; Tomono, 2010). For example, patients in a veterans’ hospital did not perceive scheduled medical examinations to be stressful when information about medical procedures was provided (Mischel, 1984). Hence the definition of the event is also important. Ambiguous events are a lot more stressful than are clear-cut ones, an issue that also applies to jobs where the responsibilities are not well defined. In fact, new research is aimed at designing better measures of work role ambiguity (Bowling et al., 2017). More on this later in this chapter.

**The Role of Culture in Appraisal**

Culture influences both the appraisal of stress and the experience of stress. Given the central role of appraisal to the process of stress, anything that influences your appraisals correspondingly can influence how much stress you experience. One major influence on appraisals is culture.
Different cultural groups have different expectations for various aspects of life, and these different expectations can make a low-threat event to one cultural group be a high-threat event to another group. For example, European Americans customarily look one another in the eye when speaking (Galanti, 2015). This same behavior is considered rude among many Asian Americans. This difference between ethnicities is also influenced by cultural gender roles. In some cultures, it is impolite for a woman to look a man directly in the eyes and the converse, or even to have the most basic physical contact. Cultural differences can lead to many stressful situations, especially in the context of health care (Wendorf, Brouwer, & Mosack, 2014). Imagine the stress a male Asian American patient might experience when being examined by a female European American doctor. Interactions such as these between doctors and patients of different cultures and genders can sometimes be strained, as we will discuss in more detail in Chapter 9.

Culture also influences the experience of stress. Not everyone in the United States is treated in the same way. Therefore, members of some cultural groups may experience more stress than others (Van Dyke et al., 2017). Ethnic minority women living with HIV face multiple stigmas that lead to overwhelming levels of stress (Lopez, Antoni, Fekete, & Penedo, 2012). In a different domain, it can be stressful for a female manager to work with a group of male managers (Bourg Carter, 2011). Age often interacts with gender to differentially influence how much stress someone experiences (Rauschenbach & Hertel, 2011). Adolescent girls, for example, experience some of the highest levels of stress among children (Starrs et al., 2017).

Together with age and gender cultural differences, some of the most critical differences in the experience of stress are due to race and ethnicity (Carter, Muchow, & Pieterse, 2017). It may be stressful for a white European American to live in a predominantly African American neighborhood or for an African American to live in a predominantly White European American neighborhood. It is stressful for many Black men and women to live in society in general because they fear mistreatment. In 2016 and 2017 a number of high-profile cases involving the shooting of unarmed Black men by police made many Americans take a closer look at race and crime and policing.

Many minority groups experience high levels of stress because of their ethnicity, race, or religious beliefs. This discomfort is highlighted in the 2018 Academy Award–winning Get Out in which a White woman takes her Black boyfriend to stay with her parents who live in an all-White community. His discomfort is captured well and the movie puts a finger on what many African Americans feel. Many cities in North America have ethnic enclaves that may make outsiders feel unwelcome. For example, driving through a Chinatown in New York, Toronto, or San Francisco and not being Chinese or strolling through Little Havana in Miami and not being Cuban or through Little Italy in Boston and not being Italian can be stressful to many. Of course, a large part of the stress may be in the appraisal and the mind of the perceiver, but as we know, real or not, even a perception of stress is bad for our bodies.

Cultural differences in appraisal and in exposure to situations have led to the formulation of multicultural models of the stress process. Hobfoll (2011) directs our attention to how the appraisal process can be biased by a range of conscious and nonconscious processes, such as cultural and familial norms. If your family has raised you to fear a certain group (e.g., White police officers) you are going to be conditioned to fear persons of that group. In a similar vein, Slavin, Rainer, McCreary, and Gowda (1991) expanded Lazarus and Folkman’s (1984) cognitive appraisal model of stress to include a number of culture-specific dimensions (Figure 5.5).

Slavin et al. (1991) argued that the occurrence of potentially stressful events can vary based on minority status, discrimination, or specific cultural customs. Furthermore, the primary appraisal of the occurring event can be biased by how the culture interprets the event. Similarly, the secondary appraisal, coping efforts, and final outcomes can be modified by the culture of...
the individual. For example, some cultural groups (e.g., Mexican Americans and African Americans) have closer family ties and more-active social support networks that could influence secondary appraisals. These cultural differences can even be seen at the level of the family (influenced by, but not necessarily completely due to, race or ethnicity). Some family cultural environments, based on the way parents raise their children, can be a lot more stressful than others. Families in which both parents are always fighting or that experience low socioeconomic levels that lead to hardships can be stressful (Repetti, Taylor, & Seeman, 2002).

**STRESS AND PSYCHOPATHOLOGY: THE DIATHESIS-STRESS MODEL**

The relationship between stress and psychopathology has been well documented in adolescents and younger children (Compas et al., 2001) and in adults (Hammen, 2003). Yet, not everyone who experiences stressful life events and chronic stress develops psychological disorders (Gurung & Roethel, 2009).

To explain this, one of the main frameworks in which the etiology of psychopathology is described is through the diathesis-stress model (Tiegel, 2017). This multidimensional model, first described in the context of schizophrenia (Bleuler, 1963), involves a relationship between vulnerable predispositions (diathesis) and stress as contributors to the development of psychopathology. The theory posits that stress may serve as an activator of the diathesis, leading to the development and manifestation of psychopathology (Monroe & Simons, 1991). Individuals with a diathesis (a vulnerability) who are exposed to significant stress may be more likely to develop mental disorders than individuals who do not have similar predispositions (Pruessner, Cullen, Aas, & Walker, 2017).

For individuals suffering from a mental disorder, the occurrence of stressful life events may act to further sensitize the individual to subsequent stressful life events and may initiate future episodes or relapses of the mental disorder, as seen with major depressive disorder (Braet, Van Vlierberghe, Vandevivere, Theuwis, & Bosmans, 2013) and schizophrenia (Pruessner et al., 2017).

**CULTURE AS A CRITICAL STRESSOR**

Culture may act as a stressor in the diathesis-stress model of psychopathology, activating certain vulnerabilities and predispositions that may lead to the emergence of psychopathology (Krueger, Saint Onge, & Chang, 2011). In a study comparing differences in psychological distress, social stress, and resources in a sample of culturally diverse adolescents, Hispanic and Asian American teens reported higher levels of social stress, were more likely to experience psychological distress, and had lower scores on resources in the context of family, coping, self-esteem, and SES than European American adolescents. Furthermore, compared to European American teens, Hispanic and African American teens had an increased likelihood of experiencing social stress (Choi, Meininger, & Roberts, 2006).
The interactions between physical and mental stressors and mental health issues are clearly seen in studies of specific ethnic groups such as American Indians. American Indians have a high risk of developing mental health disorders and have higher numbers of this population in need of mental health services (Peters et al., 2014). Two major studies document the magnitude of this problem. Data from the National Health Interview Survey indicated that American Indians were significantly more likely to report experiencing recent serious psychological distress and feelings of helplessness compared to all other ethnic groups surveyed (Barnes, Adams, & Powell-Griner, 2005). Data from the Behavioral Risk Factor Surveillance System (BRFSS) regarding health-related quality of life show that during the years 2000 through 2004, American Indians experienced the greatest mean number of mentally unhealthy days per month (4.8). They also experienced the greatest percentage of frequent mental distress, defined as 14 or more unhealthy days in a month (15.1%), compared to all the other ethnic groups in the nationwide sample (CDC, 2005). As a general survey of the mental health prevalence in American Indian populations living on or near a reservation in the Northern Plains and the Southwest area of the United States, Beals et al. (2005) found that diagnoses of alcohol dependence, post-traumatic stress disorder, and depression were the most prevalent Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV; American Psychiatric Association, 1994) diagnoses. American Indians in both tribes studied had a higher prevalence of PTSD, a higher prevalence of substance abuse, and a lower prevalence of depression, compared to a nationally representative survey documenting the prevalence of mental health disorders.

**Perceived Discrimination**

One of the biggest cultural chronic stressors that has serious implications for the development of poor health is perceived discrimination (Irby-Shasanmi & Leech, 2017). The current emphasis of research in race-based discrimination spans disciplines such as sociology, psychology, and neuroscience. For example, Mays, Cochran, and Barnes (2007) describe and review current perspectives in a comprehensive approach for understanding the mediating and moderating variables in the relationship between race-based discrimination and health disparities. Specifically, these perspectives are social spaces and environments, family environments and development, and physiological approaches.

A nationally representative study of discrimination viewed in the context of major discrimination and day-to-day perceived discrimination found that for all races, major discrimination was significantly correlated with psychological distress and major depression, while day-to-day perceived discrimination was significantly associated with the development of emotional problems and mental disorders such as psychological distress, depression, and generalized anxiety disorder (Kessler, Mickelson, & Williams, 1999). Recently, the study of day-to-day discrimination has expanded to focus on those events that are so subtle that sometimes they are not seen as problems (Mercer, Zeigler-Hill, Wallace, & Hayes, 2011). Such microaggressions are defined as everyday insults, indignities, and demeaning messages sent to people of color by well-intentioned White people who are unaware of the hidden messages they are sending (Sue, 2010). Predominantly White environments are prime contexts for producing microaggression fatigue among men and women of non-White ethnicities (Anderson & Finch, 2017).

The link between perceived discrimination and depression is common and has been found in a number of ethnic groups (Chou, 2012). In a study examining the relationship between perceived discrimination and depression and moderating variables of coping, acculturation, and ethnic social support in a sample of Korean immigrants living in Canada, Noh and Kaspar (2003) found a significant association between perceived discrimination and depression. The use of ethnic social support (i.e., support from other Koreans) moderated the relationship between perceived discrimination, emotion-focused coping, and depressive symptoms. (For more on moderation see Chapter 2; for more on coping see Chapter 6.) Individuals who used emotion-focused coping frequently and had more ethnic social support had fewer depressive symptoms, as compared to others who had less ethnic social support (Noh & Kaspar, 2003).
A significant association between perceived discrimination and depressive symptoms was also seen in a sample of immigrants from Mexico and U.S.-born individuals of Mexican descent in California. The immigrants who were highly acculturated were the most likely to have experienced perceived discrimination, followed by less-acculturated immigrants, and U.S.-born individuals of Mexican descent, who were the least likely to have experienced perceived discrimination (Finch, Kolody, & Vega, 2000). Perceived discrimination was also associated with depressive symptoms in a sample of American Indians in the upper Midwest (Whitbeck et al., 2002). However, participation in traditional activities such as powwows, in addition to familiarity with tribal languages (reflecting measures of cultural identification), decreased the association between discrimination and depression (Whitbeck et al., 2002).

There is some evidence that the effects of discrimination stress can have a stronger effect on men of color. Utsey, Payne, Jackson, and Jones (2002) found gender differences in the relationships among race-related stress, quality of life, and life satisfaction in a sample of elderly African Americans. Men in this sample had significantly higher scores than women for race-related stress in the context of institutional racism and collective racism. Data also indicated a significant relationship between institutional racism as a predictor of quality of life and life satisfaction; higher ratings of race-related stress attributed to institutional racism predicted a lower rating of quality of life and life satisfaction.

Perhaps most disturbing is that discrimination can have biological effects at the microscopic level. A recent large study looked at the association between discrimination and leukocyte telomere length, a biological marker of aging. Both African American men and women who experienced high discrimination showed shorter telomeres (Lee, Kim, & Neblett, 2017).

The negative effects of discrimination go beyond the ethnic and racial aspects of culture. Individuals in sexual minority groups may be at increased risk for suffering from mental disorders. Studies have shown that there is a higher prevalence of mental health disorders among lesbian, gay, and bisexual populations. Explanations for the increased prevalence may include sources of minority stress such as prejudice, stigmatization, and discrimination (Meyer, 2003). A study by Greenland and Taulke-Johnson (2017) found that social discrimination was a strong predictor of mental health symptoms and psychological stress in a sample of gay and bisexual men in the workplace. Furthermore, social isolation and low self-esteem were two sources of stress identified that may be viewed in the context of stemming from social discrimination.

**STRESS, HORMONES, AND GENES**

To a large extent the study of stress did not produce significant innovations for many years. Taylor et al.’s (2000) tend-and-befriend theory spurred a large increase in research, but the newest contributions to our understanding of stress are in the area of genetic mechanisms determining how stress leads to disease (Gruenwald, 2019; Robles, Mercado, Nooteboom, Price, & Romney, 2019).

One important mechanism involves a receptor for glucocorticoids (Sarabdjitsingh, Joëls, & de Kloet, 2012). Glucocorticoids play an important part in the breakdown of glucose and form in the adrenal cortex. A type of steroid hormone, glucocorticoids bind to their receptors, which in turn speeds up the release of anti-inflammatory proteins in the cell. You ran into the most common glucocorticoid in Chapter 4, cortisol, a key outcome of Selye’s general adaption syndrome theory of stress discussed previously. In a prototypical study, Chen et al. (2017) recently reviewed
a large body of work linking harsh family environments to the modification of children’s genes. Specifically, a proinflammatory phenotype develops that is signaled by excessive immune responses to bacterial stimuli and resistance to the anti-inflammatory properties of cortisol. Miller and Chen (2010) repeatedly measured psychological stress and immune activity in 135 female adolescents on four occasions over 1.5 years. Those raised in harsh family environments showed the proinflammatory phenotype during the follow-up analyses. The researchers introduced bacteria into blood samples taken from the children and found the exaggerated immune responses and reduction in cortisol’s ability to properly regulate inflammatory responses. This reaction could eventually lead to increased sickness over time.

A similar pattern occurs with the serotonin transporter gene (Way & Taylor, 2011) and the oxytocin receptor gene (Kim et al., 2010). Similar to the harsh familial stress study, in stressful situations people with a certain variation of the serotonin transporter gene (a short allele) are more likely to be depressed (Caspi, Hariri, Holmes, Uher, & Moffitt, 2011) and show increased cardiovascular activity (Way & Taylor, 2011).

Are there effects of culture? Kim et al. (2011) examined sensitivity to cultural norms regarding emotion regulation by measuring the expression of the oxytocin receptor gene (OXTR). Given that suppressing emotions is common among East Asian cultures but not in American culture, they predicted an interaction of culture and OXTR in emotional suppression. Korean nationals and American nationals completed measures of emotion regulation and were genotyped for OXTR. Kim et al. found that among Americans, those with one form of the OXTR gene used emotional suppression less than those with another type of gene allele, whereas Koreans showed the opposite pattern.

### DIFFERENT VARIETIES OF STRESSORS

Many different areas of life can be stressful. In today’s world and in the health psychological literature on stress, we tend to focus on three main areas of stress that encompass the majority of life: relationships, work, and the environment. In addition, a number of physical stressors also are present in today’s world. Millions of people around the world do not have enough food to eat or sufficient shelter. Many of us in North America do not experience these stressors but often create our own stressful worlds in our heads as we negotiate our situations of relationships and work.

#### Relationship Stress
At every stage of life, interacting with others can be potentially stressful. The adolescence period in particular is a transitional period during which the importance of the peer group increases as the importance of the family decreases (Larson & Asmussen, 1991). Levels of conflict with parents and hence interpersonal stress rise (Laurensen, 1996). The large number of divorces in North America also reflects the level of relationship conflict in adulthood. A number of health psychologists are actively studying the effects of marital conflict and divorce as stressors and their effects on health.
An unhealthy close relationship can be particularly problematic not just for your state of mind but for your physiology as well. Kiecolt-Glaser, Bane, Glaser, and Malarkey (2003) collected physiological measures from 90 couples during their first year of marriage (time 1) and found that these measures related to breakups and marital satisfaction 10 years later (time 2). Compared with those who remained together, the stress hormone levels (e.g., epinephrine) of divorced couples were 34% higher during conflict discussions and 22% higher throughout the day, and both epinephrine and norepinephrine levels were 16% higher at night. Couples whose marriages were troubled at time 2 produced 34% more norepinephrine during conflict, 24% more norepinephrine during the daytime, and 17% more during nighttime hours at time 1 than the couples with untroubled marriages.

The family is another area of focus in the context of stress and relationships. The family cycle has distinct phases—partner selection, marital adjustment, raising and caring for children, having children leave the home, and retirement—each of which can be associated with stressors (Aldwin, 1994; Patterson, 2002). The ways parents deal with stress can serve as critical models for how children deal with stress and can influence the children’s own health as well (Hilliard, Monaghan, Cogen, & Streisand, 2011). Events such as the death of a parent, divorce, the departure of a child to college or to the military, the loss of income, hospitalization, a long-term chronic illness of a family member, or imprisonment of a family member can be stressful and need to be adjusted to. A number of stress theories have been devised, especially to focus on family dynamics and stress (e.g., Hill, 1949; Patterson & Garwick, 1994; Santiago, Etter, Wadsworth, & Raviv, 2012), that closely parallel Lazarus’ (1991) cognitive appraisal model described above.

Abuse is one family stressor receiving great attention today. There is growing focus on spouse and child abuse (MacKenzie, Kotch, Lee, Augsberger, & Hutto, 2011) and violence during pregnancy (e.g., Arslantaş et al., 2012). In fact, family violence may be a more common problem for pregnant women than some conditions for which they are routinely screened and evaluated.

**Work Stress**

A 2017 APA poll reported that most North Americans felt work was their top stressor (APA, 2017). Job stress can produce physical health problems, psychological distress, and behavioral changes. On a physical level, there are many thousands of deaths on the job every year. Day-to-day stress can make a person more likely to develop physical problems later.

Occupational stress even has an entry in the *DSM-IV* (American Psychiatric Association, 1994), the main tool used to diagnose clinical disorders. Some symptoms of work stress include feelings of frustration, anger, and resentment; lowered self-esteem; boredom; job dissatisfaction; mental fatigue; loss of concentration; loss of spontaneity and creativity; and emotional hyperactivity. Know anyone experiencing any of these? Maybe this person should look at how happy he or she is at work. Psychologically speaking, work stress can arise from a number of factors, many of which interact (Barr, 2017):
1. Cognitive overload: having too much to do
2. Role conflict: being unsure of one’s job description
3. Ambiguity: not knowing what one is supposed to be doing
4. Discrimination: job ceilings that prevent one from rising in the ranks
5. Not getting promoted because of sexism, ageism, or other prejudices
6. Poor social networks preventing outlets to process job stress
7. Lack of control over what one is doing and when it is done
8. Multiple roles that need to be balanced
9. Not being challenged enough

At first glance it may seem like the last item should not be a problem. Why would someone not want a comfortable, easy job? Everly and Girdano (1980) described and documented deprivational stress, a form of stress resulting from a job that fails to maintain the worker’s interest and attention. The National Institute for Occupational Safety and Health even described assembly-line hysteria, a condition in which workers with boring, repetitive jobs display symptoms of nausea, muscle weakness, headaches, and blurry vision, all without any physical basis. Lacking a physical cause, these symptoms are more likely a psychological consequence of boredom.

If a person is unhappy or stressed at work there are consequences for both the individual and for people close to the individual. Work stress has been shown to spill over into family life and personal interactions (Hamaideh, 2012; Wang et al., 2007). For example, Doumas, Margolin, and John (2003) had 49 husbands and wives separately complete daily diaries addressing questions about work experiences, health-promoting behaviors, and marital interactions over 42 consecutive days. The researchers found that spouses reported more-positive marital interactions on days when they worked less.

Many different theories demonstrate the interconnectedness of the work and home spheres. This interconnectedness is referred to as a stress contagion effect (Mo-Yeol & Yun-Chul, 2017; Voydanoff, 2002). Bolger, DeLongis, Kessler, and Wethington (1989) first recognized and defined two specific types of stress contagion: spillover and crossover. Spillover refers to the intra-individual transmission of stress; when stress occurring in one domain of an individual’s life affects other domains of his or her life (Westman & Etizon, 1995). Often stress from the workplace spills over to influence parenting and spousal relationships (Malinen, Rönkä, Sevón, & Schoebi, 2017). In comparison, crossover is the transmission of stress between individuals. Crossover occurs when stress or strain experienced by an individual affects the stress or strain of another individual (Westman & Vinokur, 1998). Crossover can occur between workers at a worksite or between an employee and his or her family.

The majority of studies on work stress have been cross-sectional, focusing on the crossover from the husband to the wife. Most studies show positive correlations between occupational stressors and spouse’s stress or strain (Jones & Fletcher, 1993; Westman, 2001). Of note, crossover studies examining crossover from wives to husbands have not produced any consistent findings (Westman, 2001), and the literature suggests that a wife tends to be more vulnerable to her husband’s stress than a husband is to his wife’s stress.

The work stress contagion findings are explained by a combination of ecological theory and role theory. Ecological theory (Bronfenbrenner, 1977) identifies different levels or systems in which the individual acts. Work and home domains are examples of microsystems. A microsystem includes the activities and roles the individual takes on in a particular setting. A mesosystem contains the relationships and interactions between microsystems at a specific
Bronfenbrenner’s concept of **reciprocity** recognizes that systems are not independent of one another but are in constant interaction. Consequently, elements of the work domain affect elements of the home domain, and vice versa.

According to the **role theory** of Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964), stress contagion from work to home rises as a person gains more roles and as those roles lack definition. A role is the set of behaviors to be performed and is determined by one’s own perceptions and the expectations of others. As an individual accumulates roles, the quantity and incompatibility of role demands increase. An individual experiences role strain that results in increased role conflict and ambiguity (Voydanoff, 2002). **Role ambiguity** is the degree to which required information regarding role expectations are available, clear, and communicated to the focal person. When companies establish new positions, the expectation for what someone in that position has to do is often undefined. Someone in this new position or in any position for which the job description is inadequate can experience role ambiguity. **Role conflict** is the incompatibility of expectations for a given role and between different roles. For example, a job may require you to evaluate a member of your own work team, when the resulting evaluation contributes to your raise or bonus. In this case you have a conflict between making an accurate assessment and potentially hurting your own pay.

**Environmental Stress**

Working and living in a noisy environment can lead to many problems. Noise can even retard learning in children (Bronzaft & McCarthy, 1975). Children living close to an airport where constant roars of jet engines interrupt their daily lives were found to have higher levels of stress and more learning difficulties than students not living close to an airport (Cohen, Evans, Krantz, & Stokols, 1980). In a similar study, Cohen, Glass, and Singer (1973) showed that children living in noisy homes near busy roadways had greater difficulties with reading tasks than did children who lived in quiet homes. In a classic series of studies on the effects of noise, Glass and Singer (1972) had students work on different tasks and then exposed them to bursts of sound. Unpredictable bursts of sound hindered their performance the most, but those students who faced consistent background sounds during early tasks performed badly on later tasks. Noise can play a large role in how stressed we feel and often implicitly influences our well-being.

Just as noise can be a problem, crowding can also be stressful. If you grew up in a city or town with a population of between 30,000 and 100,000 or less, your experiences with crowding are very different from mine. I grew up in Mumbai (previously called Bombay), a city with a population tipping the scales at more than 20 million people. Overcrowding can often produce negative moods for men (Freedman, 1975; not so much for women in support of the tend-and-befriend theory), physiological arousal (e.g., higher blood pressure), increased illness, more aggression, and a host of other stressful outcomes. Even if you do not live in a big city, you can see the effects of crowding at large gatherings. Large rock concerts, state fairs, or amusement parks during holiday weekends can become overcrowded, making people feel stressed and frustrated.

Environmental stressors can be divided into three main categories: background stressors, natural disaster stressors, and techno-political stressors. **Background stressors** include crowding and noise, together with air pollution and chemical pollution (Fisher, Bell, & Baum, 1984). All of these can be long-term stressors and affect a large number of people. A second major category of environmental stressors is **natural disaster stressors**. These are short-term stressors and are often more severe than long-term stressors. For example, natural disasters such as flooding, earthquakes, and hurricanes can kill thousands of people, and survivors often experience severe psychological consequences lasting a lifetime (Leach, 1995; Norris, Byrne, & Diaz, 2002).

Take Hurricane Katrina. It hit New Orleans in 2005 and damaged 80% of the city. Almost the entire city was evacuated, and close to 2,000 died (Brunkard, Namulanda, & Ratard, 2008).
Not surprisingly, this major disaster had stressful effects resulting in a range of symptoms, including diagnoses of post-traumatic stress disorder (PTSD), a specific form of mental illness related to the experience of severe stress, that impacted thousands (Arcaya et al., 2017; Trivedi, 2019). Two years after Katrina, the rate of PTSD was ten times higher in New Orleans than in the general public. The majority of adults who developed PTSD did not recover within 18–27 months (McLaughlin et al., 2011) and the effects were worse for those with pre-Katrina mental illnesses (Constans et al., 2012).

The third category of stressors can be called techno-political stressors. Although these types of stressors can be unpredictable and uncontrollable like natural disasters, they are directly linked to technological or political causes. Some examples are nuclear reactor accidents (e.g., Three Mile Island in Pennsylvania and Chernobyl near the Ukraine border), chemical plant accidents (e.g., the Union Carbide accident in Bhopal, India), and dam-related flooding (e.g., Buffalo Creek in West Virginia). Political tragedies, such as wars and acts of terrorism, are also extremely stressful. A longitudinal study of more than 2,000 adults found that stress responses to the 9/11 attacks predicted increased heart problems even 3 years after the attacks (Holman et al., 2008).

A number of other factors are stressful even though at first they do not appear to be. Many of us wish we had less to do and become stressed trying to complete everything that we have to do. However, not having enough to do can also be stressful. Bexton, Heron, and Scott (1954) paid students to just lie in bed and sleep. This seems pretty easy, right? Well, the twist was that they had to lie in a cubicle with their hands and arms padded and with glasses on that blocked their vision. They could not hear any outside sounds. No subject could do it for more than 3 days, and all reported extreme boredom, restlessness, and growing levels of stress, thus proving that boredom and low levels of sensory stimulation can be stressful too.

CONSEQUENCES OF STRESS

In a nutshell, stress can make a person sick (Gruenwalk, 2018). Stress can have a variety of direct physiological effects on the body: damage to the heart (Johnston, Tuomisto, & Patching, 2008), suppression of the immune system and neuronal damage (Adamo, 2016; Segerstrom, 2007), an increase in GI symptoms (Blanchard et al., 2008), and irritable bowel syndrome (Levenson, 2007). Many different physiological systems interact when we are stressed (Ali, Nitschke, Cooperman, & Purowski, 2017). Stress can also shape how we respond to challenges (Crum, Akinola, Martin, & Faith, 2017) with direct cognitive and behavioral effects such as increasing risky decision making (Uy & Galvan, 2017) and smoking (Wiggert, Wilhelm, Nakajima, & al'Absi, 2016). Stress can also make one more resilient (Dooley, Slavich, Moreno, & Bower, 2017) and improve memory for emotional aspects of events (Buchanan & Tranel, 2008). Stress also can have secondary effects such as exacerbating illnesses and delaying recovery (see Dougall & Baum, 2002). Figure 5.6 illustrates some stress-related illnesses.

Most of the early major theories of stress (e.g., Selye and Cannon) paid a lot of attention to the physiological changes in the body that accompany the experience of stress. There is a good reason for that. A lot happens in our body when we get stressed. For example, the sympathetic nervous system has connections all over the body (nerves project all over the body from the brain and spinal cord) from sweat gland to muscles and hair follicles, all of which are stimulated to some extent during stress. We have also discussed the two main systems that are activated: the HPA axis releasing corticosteroids and SAM activation releasing norepinephrine and epinephrine. From a practical standpoint, the activation of these systems is important and critical.
They prepare our bodies to deal with stressors. A problem arises when we experience stress for a long time. Chronic, long-term stressors cause wear and tear on body systems, leading to tissue damage and irregular responding, hypertension, and ulcers (Levenson, 2007). How long is too long? The answer to that question depends on the individual.

Chronic stress can lead to other physiological consequences. Some people develop heart problems or loss of appetite. Others develop sexual dysfunction (e.g., men are unable to achieve or maintain an erection), skin problems (e.g., rashes), or nervous tics (e.g., uncontrollable jerky movements or winking). Chronic stress is a problem for many people and can be either objective (living in a noisy neighborhood) or subjective (overworking week after week and month after month). Health psychologists who focus directly on allostatic load, or the effects of chronic stress, have unearthed some disturbing findings (McEwen, 1998).

Allostasis is defined as the ability to achieve stability through change (McEwen & Lasley, 2007). Our environments keep changing, putting our body systems through various fluctuations to adjust to them. The different forces that shake our homeostatic balance stretch our systems to act like rubber bands. It is critical to our survival that our systems go back to their original shape and function like a taut rubber band does when it is released. With chronic stress, wear and tear on the body result from chronic overactivity or underactivity of allostatic systems (i.e., a load). Being under an allostatic load (AL) can have three main consequences.

Look at Figure 5.7. The first line represents normal responses to stress (a). For most acute stressors, our sympathetic system is activated before and during the event (e.g., you have to make an oral presentation), and we adapt afterwards. Even if this acute stressor is repeated a few times (e.g., you have to give a number of talks in a month), the healthy stress response shows an
activation followed by a return to baseline functioning. In the case of chronic stress (e.g., living in a high-crime neighborhood where there are frequent stressors), AL is seen when the post-stress adaptation or the normal lessening of the response for repeat stressors is not seen (b). You still respond, but it is a lower activation each time. Correspondingly, there is a prolonged exposure to the different stress hormones. This extra exposure can lead to a host of problems, such as coronary heart disease. Another result of AL takes place when our body is unable to shut off the stress response after the stressor stops. This again leads to extended exposure to stress hormones.

The final case is system malfunctions in the response to stress. One system may not work, and other systems overcompensate. This also leads to extended exposure to stress hormones.

Bruce McEwen and colleagues have identified many markers of AL (McEwen & Wingfield, 2003). Major markers include hypertension (high blood pressure), atherosclerosis (plaque deposits on arteries), fat staying in the system longer, higher waist-to-hip ratios (when the body stores fat at the waist and not at the hips), and sleep disruption. In an example of how these markers are used that also illustrates some cultural differences, Deuster, Su Jong, Remaley, and Poth (2011) summed measures of fitness, body fat, C-reactive protein (CRP), mood, social support, blood pressure, sleep and exercise habits, coping, and insulin responses. They found that African Americans have significantly higher allostatic load scores than European Americans. Significantly more African Americans score greater than 3 (67.9%) than European Americans (48.9%).

Extended stress also interferes with the immune system (more on this in Chapter 13) and with memory. Long-term stress actually destroys neurons in the hippocampus (they grow back if the stress is short term). Long-term stress and allostatic load as well as short-term stressors also have negative effects on our behavior, our thoughts or cognition, and our feelings. Going beyond physiology, stress makes us act, feel, and think differently.

Stress affects one’s mood, behavior, problem solving, motivations, and goals and can cause distraction, memory lapses, and a host of other psychological consequences (Dougall & Baum, 2002). You are more likely to get depressed and be fearful when you are stressed, angry, or
aggravated. People under stress often lose their tempers and are not as patient as they normally would be. In an interesting study about the effects of stress on memory, Cahill, Prins, Weber, and McGaugh (1994) told two groups of students a story. The experimental group heard about a boy who had an accident that amputated his legs, which were subsequently reattached (a very stressful situation). The control group heard a neutral version of the story in which the boy watched what was happening in a hospital. Half the participants in each group received a drug that blocked the action of norepinephrine, thereby reducing stress; the other half got a placebo. A week later all participants were asked to recall as many elements of the story as they could. The participants in the stress condition who received the placebo (and hence felt the effects of stress) remembered the least amount of information.

Stress also influences our behaviors. When we are stressed, we often are busy thinking about the cause of the stress, which allows our attention to other tasks to suffer. Paying bills on time, remembering appointments, taking medicines, watering plants, or caring for a pet can all be negatively affected (Baba, Jamal, & Tourigny, 1998; Kompier & DiMartino, 1995; McNally, 1997). Obviously, the quality of work and the nature of interactions with friends and colleagues can also suffer. In some cases, people may not be able to sleep and may experience changes in their eating and drinking behavior (Conway, Vickers, Weid, & Rahe, 1981; Mellman, 1997).

**POST-TRAUMATIC STRESS DISORDER**

Post-traumatic stress disorder (PTSD) is a psychological disorder that is a possible consequence of a major stressful event. The PTSD diagnosis includes a prerequisite traumatic event, three subsets of symptom types (e.g., flashbacks), a requisite duration of symptoms beyond 1 month after the associated event, and a significant decrease in functioning (Helsley, 2008). Major symptoms include migraine headaches or poor respiratory health (Arcaya et al., 2017; Waszczuk et al., 2017). Recently, psychologists have argued that PTSD can occur even if the event is not experienced directly (i.e., the event is seen on television). Evidence surrounding 9/11 supports this perspective (Marshall et al., 2007). There have been many controversies surrounding this disorder such as the recent broadening of the definition of the traumatic event that is required to meet a diagnosis for PTSD and the political climate surrounding its conception (Yeomans & Forman, 2009).

In one of the biggest reviews of studies on PTSD, Ozer, Best, Lipsey, and Weiss (2003) reviewed 2,647 studies of PTSD and found that psychological processes at the time of or around the trauma (i.e., peritraumatic) and not prior characteristics (e.g., family history, prior trauma, and prior adjustment) are the strongest predictors of PTSD. Ozer et al. (2003) also noted that for a long period of time the study of extreme responses to stress centered around war but have since expanded to other stressors such as environmental stress (see above) and sexual assault (Campbell, Greeson, Bybee, & Raja, 2008). Even parents whose children experience severe accidents such as burns can experience PTSD (Egberts, van de Schoot, Geenen, & Van Loey, 2017).

There is considerable cultural variability in PTSD prevalence. For example, differences in traumatic stress across gender have been observed in both the United States and Mexico after landfall of comparable hurricanes (Norris, Perilla, Ibanez, & Murphy, 2001). Al-Saffar, Borga, Edman, and Hallstrom (2003) sampled foreign nationals (from Iran, Turkey, and Saudi Arabia) who had immigrated to Sweden at least 4 years prior to the study. All participants had previous trauma exposure, yet response across ethnic differences was highly variable. The study found the presence of PTSD in 69% of the Iranians, 59% of the Saudis, 53% of the Turks, and only 29% of the Swedes.

A growing number of international epidemiological studies conclude that PTSD is found across cultures, particularly in samples exposed to violence (Marsella & Christopher, 2004; Yeomans & Forman, 2009). Nonetheless, the sole application of the PTSD model may not be the most useful model around which to focus prevention and treatment services across cultures. De Jong (2005), despite having researched PTSD prevalence rates around the globe, articulates
the need to put more attention on other mental health issues that remain underinvestigated, such as mood disorders, somatoform disorder, dissociative disorders, and other anxiety disorders. PTSD may not always be the best diagnosis, covering other problems. For example, Laban et al. (2005) found that among Iraqi asylum seekers, postmigration challenges in their daily life were the best predictors of psychopathology, even more so than traumatic events themselves.

Stress has many different causes, can be studied in different ways, and has many different effects. In the next chapter we shall examine the different ways to cope.

Synthesize, Evaluate, Apply

• How can your knowledge of Lazarus’s theory reduce relationship stress?
• What strategies and structures can employers use to keep work stress at a minimum?
• How can the results of spillover and contagion studies be applied to improving family life?
• What do you think are the most potent consequences of stress?

APPLICATION SHOWCASE

STRESS REALLY CAN KILL: THE BASKERVILLE EFFECT, CULTURE, AND STRESS

Many crime and mystery buffs regard the classic Sherlock Holmes tale, The Hound of the Baskervilles, as one of the best ways to be introduced to author Sir Arthur Conan Doyle’s legendary detective. (Spoiler alert: If you have not read it yet but are tempted, skip this section because it will reveal a major plot element.) Perhaps you had your introduction via Benedict Cumberbatch’s interpretation of the same character. In the novel, the fictional Charles Baskerville dies as a result of the stress of running into the fierce hound of the book’s title. The book has all the elements of a good read: family curses, smart detective work, and rich descriptions of the English moors. Key point: man dies of fright. Does this literary case study have real-life parallels? There are tales of Australian Aborigines dying if they are cursed: healthy people can keel over and die from one day to the next if told they are cursed. The sociologist David Phillips and colleagues provide some provocative data on the Chinese and Japanese (Phillips et al., 2001). Also, the University of California, San Diego, team showed that heart attacks actually increase on psychologically stressful unlucky days.

Phillips et al. (2001) compared the death certificates of more than 200,000 Chinese Americans and Japanese Americans with 47,000 European Americans. The researchers matched deaths by cause, patient status, sex, age, and marital status, and controlled for seasonal differences. The findings were astounding: for the Chinese Americans and Japanese Americans, deaths peaked on the fourth day of the month. On such days, there was a 13% increase in deaths. No such pattern existed for the European Americans.

Many Chinese and Japanese consider the number four to be unlucky. In fact, in Mandarin, Cantonese, and Japanese, the number four (4) is pronounced quite similar to the word “death” (Milne, 2002). Throughout China and Japan, the number is not used in numbering floors or rooms in hospitals. In North America, the number 13 is the one to fear. The bottom line is that superstition can be stressful. If you believe bad things will happen on a certain day, there is a chance they will. This phenomenon, referred to by social psychologists as a self-fulfilling prophecy (Merton, 2010; see Chapters 8 and 9), has only recently been found to also result in powerful behavior.

(Continued)
changes (see Madon et al., 2008, for self-fulfilling prophecy and drinking behavior). The suggestion from the Phillips et al. (2001) data is that the stress of an unlucky day may be strong enough to cause physiological damage. This takes the self-fulfilling prophecy to a whole new level.

The Baskerville effect, as this special type of self-fulfilling prophecy has come to be called, could not be explained in any other way. The ethnic groups who fear the number 4 seem more likely to die of cardiac arrest on the fourth of the month. This finding has some major implications for health psychologists and health-care practitioners, because it highlights the need to take into account patients' beliefs and superstitions. If an American Indian or Hindu patient comes into a hospital room with a black or red thread tied around his or her wrist and the doctors or nurses have it cut off, the patient's health could be at stake. American Indians (see Chapter 3) and Hindus both use sacred threads. Sometimes the threads are part of healing ceremonies such as sweat lodges. People wearing the thread may believe that their health is dependent on the string and cutting it off may prove to be a psychological affront that could tip the balance between fighting the good fight and throwing in the towel. The Baskerville effect certainly seems to suggest that this may be the case. Different cultural groups are superstitious about or fear different things. Being sensitive to these differences and helping people cope, even with stressors that may seem silly, can clearly be very important to their well-being. Chapter 6 tells the full story of coping and resilience.

(Continued)

CHAPTER REVIEW

SUMMARY

• Stress is the physiological and psychological experience of disruption to our homeostatic balance. We are stressed any time excessive demands are placed on our body and mind. Stressors are factors that disrupt our homeostasis. Early stressors were acute and more physical in nature. Today stressors are long term and more psychological in nature.

• Stress activates the nervous system, especially the sympathetic nervous system, which in turn mobilizes the body for action. The parasympathetic system restores the body to rest after the stressor ends. The physiological stress response is characterized by the activation of different physiological pathways and the release of stress hormones.

• There are four major theories of stress. Cannon described the fight-or-flight response, which involves sympathetic adrenal medulla activation and the release of catecholamines. Selye described the general adaptation syndrome involving hypothalamic–pituitary–adrenal axis activation and the release of cortisol. Lazarus described a cognitive appraisal model of stress with primary and secondary appraisals of events as determining stress.

• Many factors influence stress appraisal such as the duration, severity, valence, controllability, predictability, and ambiguity of the stressor.

• Stress can be measured by questionnaire and using physiological measures such as blood pressure and galvanic skin response, and analysis of stress chemicals in saliva and urine.

• Different cultural groups experience different stressors by how they appraise stress and by how they are treated (e.g., low SES individuals experience higher stress levels). Different cultural models of stress exist to incorporate such factors.

• Research is conducted on three main varieties of stressors: work stressors, environmental stressors, and relationship stressors.

• Stress has serious physiological and psychological consequences on the body. Allostatic load, or the effects of chronic stress, can cause heart and memory problems.
Check your understanding of the topics in this chapter by answering the following questions.

1. Stress is best defined as
   a. negative events that tax the body.
   b. challenges to the body systems.
   c. the perception of strain.
   d. upsetting of homeostasis.

2. The earliest theory of stress suggests our current response is a remnant of our evolutionary past and was developed by
   a. Walter Cannon.
   b. Hans Selye.
   c. Richard Lazarus.
   d. Rene Descartes.

3. During the fight-or-flight response, epinephrine does which of the following?
   a. Increases heart rate and blood pressure
   b. Energizes the muscles
   c. Converts fat into energy
   d. Gets oxygen into the bloodstream

4. According to Hans Selye, the________ phase of the stress response is responsible for the physiological damage related to stress.
   a. alarm
   b. resistance
   c. threat
   d. exhaustion

5. According to Lazarus’s cognitive appraisal model, in primary appraisal, people assess whether an event involves each of the following except
   a. fear.
   b. harm.
   c. threat.
   d. challenge.

6. When a close friend is undergoing a lot of stress, we tend to feel stressed as well. We are not as affected by events taking place in far off lands and to strangers. The main dimension of stress varying in this example is
   a. duration.
   b. valence.
   c. definition.
   d. centrality.

7. Not having money to cover basic needs, divorce, living in a high crime area, being fired, having housing problems, and long-term medical problems are all examples of which of the following?
   a. Environmental stressors
   b. Chronic burden
   c. Acute stressors
   d. Unpredictable stressors

8. As someone gets stressed, the heart rate increases along with a slight increase in perspiration. This can be seen best by measuring
   a. galvanic skin response.
   b. temperature.
   c. blood pressure.
   d. electroencephalograms.

9. Workers with boring, repetitive jobs sometimes show symptoms of nausea, headaches, muscle weakness, and blurry vision without any physical basis. This is known as
   a. deprivational stress.
   b. assembly-line hysteria.
   c. cognitive load.
   d. ambiguity disorder.

10. Chronic stress over time can cause wear and tear on the body. This can have serious physical and psychological consequences and is called
    a. exhaustion.
    b. allostasis.
    c. contagion.
    d. fatigue.

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KEY TERMS, CONCEPTS, AND PEOPLE

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ESSENTIAL READINGS

