AN OVERVIEW OF PSYCHOLOGY AND HEALTH

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PROLOGUE

“I suppose I should feel lucky, but mostly I just feel really lousy,” Alec said from his bed in the intensive care unit the day after open heart surgery. “We’re all lucky, but things in our lives need to change,” replied Nancy, his worried and exhausted wife, grateful that she still had a husband and their two college-age girls still had a father. It was a close call.

In the prior few weeks, Alec had noticed he was more tired than usual, became short of breath during exertion, and had odd sensations that felt like indigestion. He first thought that his demanding job managing an electronics store was getting to him, making for long days, too little sleep, and too much fast food at the mall where he worked. He decided his symptoms were temporary; “I just need a vacation,” he thought. But at home two days ago, Nancy noticed he was perspiring excessively and complaining of nausea and pain in his left shoulder, so she insisted that he go to the hospital. Alec was lucky. Thanks to his wife, he got treatment before his heart suffered much damage. He would be in the hospital for a few more days, and then sent home to a life changed in ways he was only beginning to grasp.
AN ILLNESS/WELLNESS CONTINUUM

Consider Alec, in the opening story. Before he noticed growing fatigue and other vague symptoms, was he healthy? Even though he had no outward signs of the serious illness he was about to suffer, his diet was poor, and he got far too little exercise. In fact, his heart disease had begun many years before, progressing with no obvious signs or symptoms. What about someone who feels fine but whose lungs are being damaged from smoking cigarettes? These are all signs of improper body functioning. Are people with these signs healthy? We probably would say they are not “sick”—they are just less healthy than they would be without the unhealthful conditions.

This means health and sickness are not entirely separate concepts—they overlap. There are degrees of wellness and of illness. Medical sociologist Aaron Antonovsky (1979, 1987) has suggested that we consider these concepts as ends of a continuum, noting that “We are all terminal cases. And we all are, so long as there is a breath of life in us, in some measure healthy” (1987, p. 3). He also proposed that we revise our focus, giving more attention to what enables people to stay well than to what causes people to become ill. Figure 1-1 presents a diagram of an illness/wellness continuum, with death at one end and optimal wellness at the other.

We will use the term health to mean a positive state of physical, mental, and social well-being—not simply the absence of injury or disease—that varies over time along a continuum. At the wellness end of the continuum, health is the dominant state. At the other end of the continuum, the dominant state is illness or injury, in which destructive processes produce characteristic signs, symptoms, or disabilities.

ILLNESS TODAY AND IN THE PAST

People in the United States and other developed, industrialized nations live longer, on the average, than they did in the past, and they suffer from a different pattern of illnesses. During the 17th, 18th, and 19th centuries, people in North America suffered and died chiefly from two types of illness: dietary and infectious (Grob, 1983). Dietary diseases result from malnutrition—for example, beriberi is caused by a lack of vitamin B1, and is characterized by anemia, paralysis, and wasting away. Infectious diseases are acute illnesses caused by harmful matter or microorganisms, such as bacteria or viruses, in the body. In much of the world today, infectious diseases continue to be a main cause of death. Specifically, in lower income or developing countries, lower respiratory infections such as pneumonia and...
tuberculosis, diarrheal diseases, and HIV/AIDS are the leading causes of death (WHO, 2014).

A good example of the way illness patterns have changed in developed nations comes from the history of diseases in the United States. From the early colonial days in America through the 18th century, colonists experienced periodic epidemics of many infectious diseases, especially smallpox, diphtheria, yellow fever, measles, and influenza. It was not unusual for hundreds, and sometimes thousands, of people to die in a single epidemic. Children were particularly hard hit. Two other infectious diseases, malaria and dysentery, were widespread and presented an even greater threat. Although these two diseases generally did not kill people directly, they weakened their victims and reduced their ability to resist other fatal diseases. Most, if not all, of these diseases did not exist in North America before the European settlers arrived—the settlers brought the infections with them—and the death toll among Native Americans skyrocketed. This high death rate occurred for two reasons.

Epidemics of deadly infectious diseases have occurred throughout the world. Before the 20th century, there were no effective methods for prevention or treatment of the plague, for instance, which is the disease illustrated in this engraving.
First, the native population had never been exposed to these new microorganisms, and thus lacked the natural immunity that our bodies develop after lengthy exposure to most diseases (Grob, 1983). Second, Native Americans’ immune functions were probably limited by a low degree of genetic variation among these people (Black, 1992).

In the 19th century, infectious diseases were still the greatest threat to the health of Americans. The illnesses of the colonial era continued to claim many lives, but new diseases began to appear. The most significant of these diseases was tuberculosis, or “consumption” as it was often called. In 1842, for example, consumption was listed as the cause for 22% of all deaths in the state of Massachusetts (Grob, 1983). But by the end of the 19th century, deaths from infectious diseases had decreased sharply. For instance, the death rate from tuberculosis declined by about 60% in a 25-year period around the turn of the century.

Did this decrease result mostly from advances in medical treatment? Although medical advances helped to some degree, the decrease occurred before effective vaccines and medications were introduced. This was the case for most of the major diseases we’ve discussed, including tuberculosis, diphtheria, measles, and influenza (Grob, 1983; Leventhal, Prohaska, & Hirschman, 1985). It appears that the decline resulted chiefly from preventive measures such as improved personal hygiene, greater resistance to diseases (owing to better nutrition), and public health innovations, such as building water purification and sewage treatment facilities. Many people had become concerned about their health and began to heed the advice of health reformers like William Alcott, an advocate of moderation in diet and sexual behavior (Leventhal, Prohaska, & Hirschman, 1985). Fewer deaths occurred from diseases because fewer people contracted them.

The 20th century witnessed great changes in the patterns of illness afflicting people. The death rate from life-threatening infectious diseases declined, and people’s average life expectancy increased dramatically. For example, at the turn of the century in the United States, the life expectancy of babies at birth was about 48 years (USDHHS, 1987); today it is nearly 79 years (NCHS, 2013). Figure 1-2 shows this change and an important reason for it: the death rate among children was very high many years ago. Babies who survived their first year in 1900 could be expected to live to about 56 years of age, adding 7 years to their expected total life span. Moreover, people in 1900 who had reached the age of 20 years could expect to live to almost 63 years of age. Today, the death rate for American children is much lower, and only a small difference exists in the expected total life span for newborns and 20-year-olds. Developed countries around the world experienced similar histories.

Death is still inevitable, of course, but people die at later ages now and from different causes. The main health problems and causes of death in developed countries today are chronic diseases—that is, degenerative illnesses, such as heart disease, cancer, and stroke—that develop or persist over a long period of time. And worldwide, chronic illnesses account for more than half of all deaths (WHO, 2014). These diseases are not new, but they were responsible for a much smaller proportion of deaths before the 20th century.

Why? One reason is that people’s lives are different today. For example, more people today survive to old age, and chronic diseases are more likely to afflict older than younger individuals. Thus, a major reason for the current prominence of chronic diseases is that more people are living to the age when they are at high risk for contracting them. In addition, the growth of industrialization increased people’s stress and exposure to harmful chemicals. Trends show that chronic diseases are increasing rapidly in low income or developing nations of the world: in the next few decades, deaths due to infectious diseases other than HIV/AIDS are expected to decrease, and deaths from cardiovascular disease, tobacco-related chronic disease, and chronic
diseases related to obesity, such as diabetes, are likely to rise (Mathers & Loncar, 2006).

Are the main causes of death in childhood and adolescence different from those in adulthood? Yes. In the United States, for example, the leading cause of death in children and adolescents, by far, is not an illness, but accidental injury (NCHS, 2013). In the age range from 1 to 24 years, about 40% of deaths result from accidents, frequently involving automobiles. In this age group, the next three most frequent causes of death are suicide, cancer, and cardiovascular diseases, all of which are far more common among 15- to 24-year-olds than for younger ages. Clearly, the role of disease in death differs greatly at different points in the life span.

VIEWPOINTS FROM HISTORY: PHYSIOLOGY, DISEASE PROCESSES, AND THE MIND

Is illness a purely physical condition? Does a person’s mind play a role in becoming ill and getting well? People have wondered about these questions for thousands of years, and the answers they have arrived at have changed over time.

EARLY CULTURES

Although we do not know for certain, it appears that the best educated people thousands of years ago believed physical and mental illness were caused by mystical forces, such as evil spirits (Benyamini, 2011). Why do we think this? Researchers found ancient skulls in several areas of the world with coin-size circular holes in them that could not have been battle wounds. These holes were probably made with sharp stone tools in a procedure called trephination. This procedure was done presumably for superstitious reasons—for instance, to allow illness-causing demons to leave the head. Because there are no written records from those times, we can only speculate about the reasons for the holes.

ANCIENT GREECE AND ROME

The philosophers of ancient Greece produced the earliest written ideas about physiology, disease processes, and the mind between 500 and 300 B.C. Hippocrates, often called “the Father of Medicine,” proposed a humoral theory of illness. According to this theory, the body contains four fluids called humors (in biology, the term humor refers to any plant or animal fluid). When the mixture of these humors is harmonious or balanced, we are in a state of health. Disease occurs when the mixture is faulty (Friedman & Adler, 2011; Stone, 1979). Hippocrates recommended eating a good diet and avoiding excesses to help achieve humoral balance.

Greek philosophers, especially Plato, were among the first to propose that the mind and the body are separate entities (Marx & Hillix, 1963; Schneider & Tarshis, 1975). The mind was considered to have little or no relationship to the body and its state of health. This remained the dominant view of writers and philosophers for more than a thousand years. Today, the body and mind are separate concepts: The body refers to our physical being, including our skin, muscles, bones, heart, and brain; the mind refers to an abstract process that includes our thoughts, perceptions, and feelings. Although we can separate the mind and body conceptually, an important issue is whether they function independently. The question of their relationship is called the mind/body problem.

Galen was a famous and highly respected physician and writer of the 2nd century A.D. who was born in Greece and practiced in Rome. Although he believed generally in the humoral theory and the mind/body split, he made many innovations (Friedman & Adler, 2011). For example, he “dissected animals of many species
(but probably never a human), and made important discoveries about the brain, circulatory system, and kidneys” (Stone, 1979, p. 4). From this work, he became aware that illnesses can be localized, with pathology in specific parts of the body, and that different diseases have different effects. Galen’s ideas became widely accepted.

THE MIDDLE AGES

After the collapse of the Roman Empire in the 5th century A.D., much of the Western world was in disarray. The advancement of knowledge and culture slowed sharply in Europe and remained stunted during the Middle Ages, which lasted almost a thousand years. The influence of the Church in slowing the development of medical knowledge during the Middle Ages was enormous. According to historians, the Church regarded the human being

as a creature with a soul, possessed of a free will which set him apart from ordinary natural laws, subject only to his own willfulness and perhaps the will of God. Such a creature, being free-willed, could not be an object of scientific investigation. Even the body of man was regarded as sacrosanct, and dissection was dangerous for the dissector. These strictures against observation hindered the development of anatomy and medicine for centuries. (Marx & Hillix, 1963, p. 24)

The prohibition against dissection extended to animals as well, as they were thought to have souls, too.

People’s ideas about the cause of illness took on pronounced religious overtones, and the belief in demons became strong again (Sarason & Sarason, 1984). Sickness was seen as God’s punishment for doing evil things. As a result, the Church came to control the practice of medicine, and priests became increasingly involved in treating the ill, often by torturing the body to drive out evil spirits.

It was not until the 13th century that new ideas about the mind/body problem began to emerge. The Italian philosopher St. Thomas Aquinas rejected the view that the mind and body are separate and saw them as interrelated (Leahey, 1987). Although his position did not have as great an impact as others had had, it renewed interest in the issue and influenced later philosophers.

THE RENAISSANCE AND AFTER

The word *renaissance* means rebirth—a fitting name for the 14th and 15th centuries. During this period in history, Europe saw a rebirth of inquiry, culture, and politics. Scholars became more “human-centered” than “God-centered” in their search for truth and “believed that truth can be seen in many ways, from many individual perspectives” (Leahey, 1987, p. 80). These ideas set the stage for important changes in philosophy once the scientific revolution began after 1600.

The 17th-century French philosopher and mathematician René Descartes probably had the greatest influence on scientific thought of any philosopher in history (Schneider & Tarshis, 1975). Like the Greeks, he regarded the mind and body as separate entities, but he introduced three important innovations. First, he conceived of the body as a machine and described the mechanics of how action and sensation occurred. For example, Figure 1-3 shows his concept of how we experience pain. Second, he proposed that the mind and body, although separate, could *communicate* through the pineal gland, an organ in the brain (Leahey, 1987). Third, he believed that animals have no soul and that the soul in humans leaves the body at death (Marx & Hillix, 1963). This belief meant that dissection could be an acceptable method of study—a point the Church was now ready to concede (Engel, 1977).

In the 18th and 19th centuries, knowledge in science and medicine grew quickly, helped greatly by improvements in the microscope and the use of dissection in autopsies. Once scientists learned the basics of how the body functioned and discovered that microorganisms cause certain diseases, they rejected the humoral theory of illness and proposed new theories. The field of surgery flourished after antiseptic techniques and anesthesia were introduced in the mid-19th century (Stone, 1979). Before then, hospitals were “notorious places, more likely to spread diseases than cure them” (Easterbrook, 1987, p. 42). Over time, the reputation of physicians and hospitals began to improve, and people’s trust in the ability of doctors to heal increased.

These advances, coupled with the continuing belief that the mind and body are separate, laid the foundation for a new approach, or “model,” for conceptualizing health and illness. This approach—called the *biomedical model*—proposes that all diseases or physical disorders can be explained by disturbances in physiological processes, which result from injury, biochemical imbalances, bacterial or viral infection, and the like (Engel, 1977; Suls, Luger, & Martin, 2010). The biomedical model assumes that disease is an affliction of the body and is separate from the psychological and social processes of the mind. This viewpoint became widely accepted during the 19th and 20th centuries and still represents the dominant view in medicine today.

Yet, during this formative period of the biomedical approach, some physicians took the view that the mind
could influence health. For instance, in Sir William Osler’s late 19th century view of heart disease.

In the worry and strain of modern life, arterial degeneration is not only very common, but occurs often at a relatively early age. For this the high pressure at which men live, and the habit of working the machine to its maximum capacity, are responsible, rather than excesses in eating and drinking (Osler, 1897, pp. 153–154).

Although we might disagree with Osler about the role of diet and alcohol intake in heart disease, we’ll see later that his view of the role of stress and related aspects of everyday life on the heart has validity; this view has become a focus of modern medical research.

SEEING A NEED: PSYCHOLOGY’S ROLE IN HEALTH

The biomedical model has been very useful, guiding researchers to make enormous achievements. They conquered many infectious diseases, such as polio and measles, through the development of vaccines. They also developed antibiotics, which made it possible to cure illnesses caused by bacterial infection. Despite these great advances, the biomedical model needs improvement. Let’s see why.

PROBLEMS IN THE HEALTH CARE SYSTEM

Scarcely a week goes by when we don’t hear through the mass media that health care costs are rising rapidly, particularly for prescription drugs and for hospital and nursing home care. Countries worldwide have been facing escalating costs in health care. For example, between 1960 and today the United States saw a 63-fold increase (to over $9,200) in the amount of money spent per capita on health care, and total health costs increased from about 5% to 17.4% of the gross domestic product (NCHS, 2015). In Canada and most European countries, total health costs are now at about 9% to 12% of their gross domestic products (WHO, 2014). Because medical costs continue to rise rapidly, we need to consider new approaches for improving people’s health.

We’ve seen that the patterns of illness affecting people have changed, particularly in developed nations, where the main health problems now are chronic diseases. Consider cancer, for example. Although a great deal of progress is being made in understanding the causes of cancers, improvements in techniques for treating them have been modest: gains in cancer survival rates from the 1950s to the 1980s, for instance, resulted
more from earlier detection of the disease than from improved treatments (Boffey, 1987). Although detection occurs earlier today partly because diagnostic methods have improved, another part of the reason is that people have changed. Many individuals are more aware of signs and symptoms of illness, more motivated to take care of their health, and better able to afford visits to physicians than they were in the past. These factors are clearly important and relate to psychological and social aspects of the person. But the person as a unique individual is not included in the biomedical model (Engel, 1977, 1980).

“THE PERSON” IN HEALTH AND ILLNESS

Have you ever noticed how some people are “always sick”—they get illnesses more frequently than most people do and get well more slowly? These differences between people can result from biomedical sources, such as variations in physiological processes and exposure to harmful microorganisms. But psychological and social factors also play a role. Let’s look briefly at two of these factors: the lifestyle and personality of the person. (Go to —as described in the Preface, this instruction prompts you to read the nearby boxed material that has the same icon.)

Lifestyle and Illness

Earlier we saw that the occurrence of infectious diseases declined in some nations in the late 19th century chiefly because of preventive measures, such as improved nutrition and personal hygiene. These measures involved changing people’s lifestyles—their everyday patterns of behavior, such as in washing, preparing, and eating healthful foods. Changes in people’s lifestyles can also reduce chronic illnesses. Let’s see how.

Characteristics or conditions that are associated with the development of a disease or injury are called risk factors for that health problem. Although some risk factors are biological, such as having inherited certain genes, others are behavioral. For example, it is well known that people who smoke cigarettes face a much higher risk of developing cancer and other illnesses than nonsmokers do. Other risk factors for cancer include eating diets high in saturated fat and having a family history of the disease. People who “do more” or “have more” of these characteristics or conditions are more likely to contract cancer than people who “do less” or “have less” of these factors. Keep in mind that a risk factor is associated with a health problem—it does not necessarily cause the problem. For example, being an African American man is a risk factor for prostate cancer (ACS, 2015), but that status does not cause the disease—at least, not directly.

Many risk factors result from the way people live or behave, such as smoking cigarettes and eating unhealthful diets. Some behavioral risk factors associated with the five leading causes of death in the United States are:

1. Heart disease—smoking, high dietary cholesterol, obesity, and lack of exercise.
2. Cancer—smoking, high alcohol use, and diet.
4. COPD (chronic lung diseases, e.g., emphysema)—smoking.
5. Accidents (including motor vehicle)—alcohol/drug use and not using seat belts. (Sources: ACS, 2015; AHA, 2015; ALA, 2015; NHTSA, 2015)

ASSESS YOURSELF

What’s Your Lifestyle Like?

At various points in this book, you’ll find brief self-assessment surveys like this one that you should try to fill out as accurately as you can. These surveys relate to the nearby content of the chapter, and most of them can be completed in less than a minute or two.

This survey assesses seven aspects of your usual lifestyle. For each of the listed practices, put a check mark in the preceding space if it describes your usual situation.

- I sleep 7 or 8 hours a day.
- I eat breakfast almost every day.
- I rarely eat a lot between meals.
- I am at or near the appropriate weight for my height (see Table 8.4 on page 208)
- I never smoke cigarettes.
- I drink alcohol rarely or moderately.
- I regularly get vigorous physical activity.

Count the check marks—six or seven is quite good. The more of these situations that describe your lifestyle now and in the future, the better your health is likely to be, particularly after the age of 50.
Many of the people who are the victims of these illnesses and accidents live for at least a short while and either recover or eventually succumb. Part of today’s high medical costs result from people’s lifestyles that contribute to their health problems, and society, not the individual, often bears the burden of medical costs through public and private health insurance programs.

How influential are lifestyle factors on health? Researchers studied this question by surveying nearly 7,000 adults who ranged in age from about 20 to over 75, asking them two sets of questions. One set asked about the health of these people over the previous 12 months—for instance, whether illness had prevented them from working for a long time, forced them to cut down on other activities, or reduced their energy level. The second set of questions asked about seven aspects of their lifestyles: sleeping, eating breakfast, eating between meals, maintaining an appropriate weight, smoking cigarettes, drinking alcohol, and getting physical activity. The questions you answered previously are similar to those in this research. When the researchers compared the data for people in different age groups, they found that at each age health was typically better as the number of healthful practices increased. In fact, the health of those who “reported following all seven good health practices was consistently about the same as those 30 years younger who followed few or none of these practices” (Belloc & Breslow, 1972, p. 419). And these health practices were also important in the future health of these people. Breslow (1983) has described later studies of the same people, conducted to find out which of them had died in the 9 1/2 years after the original survey. The data revealed that the percentage dying generally decreased with increases in the number of healthful behaviors practiced, and this impact was greater for older than younger people, especially among males. These findings suggest that people’s practicing of healthful behaviors can reduce their risk of illness and early death substantially.

In the last several decades the evidence from this type of research has become clear and compelling. Summarizing this evidence across all of the leading sources of health care expenditures and causes of death in industrialized nations, a panel of experts reached a simple but telling conclusion: behavior matters (Fisher et al., 2011). Some behavioral risk factors, such as cigarette smoking, are less common than they once were, but others are more common. For example, the percentage of the population in the United States and many other industrialized nations that is seriously overweight has increased in recent decades, indicating that the behaviors that influence this health problem—such as diet and

What risk factors for disease does this photo suggest this boy has developed?
physical activity—are changing in the wrong direction (Flegal et al., 2012).

You’ve surely heard someone ask, “Why don’t people do what’s good for them?” There’s no simple answer to that question—there are many reasons. One reason is that less healthful behaviors often bring immediate pleasure, as when the person has a “good-tasting” cigarette or ice cream. Long-range negative consequences seem remote, both in time and in likelihood. Keep in mind that pleasurable lifestyles can benefit health: some evidence suggests that engaging in enjoyable activities, such as vacationing or attending concerts, may lead to better health (Bygren et al., 2009; Pressman et al., 2009). Another reason why people don’t do what’s good for them is that they may feel social pressures to engage in unhealthful behavior, as when an adolescent begins to use cigarettes, alcohol, or drugs. Also, some behaviors can become very strong habits, perhaps involving a physical addiction or psychological dependency, as happens with drugs and cigarettes. Quitting them becomes very difficult. Lastly, sometimes people are simply not aware of the dangers involved or how to change their behavior. These people need information about ways to protect their health.

**Personality and Illness**

Do you believe, as many do, that people who suffer from ulcers tend to be worriers or “workaholics”? Or that people who have migraine headaches are highly anxious? If you do, then you believe there is a link between personality and illness. The term **personality** refers to a person’s cognitive, affective, or behavioral tendencies that are fairly stable across time and situations.

Researchers have found evidence linking personality traits and health (Smith, Gallo et al., 2012). For example, people whose personalities include:

- Low levels of **conscientiousness** measured in childhood or adulthood are more likely to die at earlier ages, such as from cardiovascular diseases, than individuals high in conscientiousness (Kern & Friedman, 2008; Terracciano et al., 2008).
- High levels of **positive emotions**, such as happiness or enthusiasm, tend to live longer than individuals with low levels of these emotions (Chida & Steptoe, 2008; Xu & Roberts, 2010).
- High levels of **anxiety**, depression, hostility, or pessimism are at risk for dying early and developing a variety of illnesses, particularly heart disease (Boehm & Kubzansky, 2012; Houle, 2013).

Anxiety, depression, hostility, and pessimism are reactions that often occur when people experience stress, such as when they have more work to do than they think they can finish or when a tragedy happens. Many people approach these situations with relatively positive emotions. Their outlook is more optimistic than pessimistic, more hopeful than desperate. These people are not only less likely to become ill than are people with less positive personalities, but when they do, they tend to recover more quickly (Boehm & Kubzansky, 2012; Scheier & Carver, 2001).

The link between personality and illness is not a one-way street: illness can affect one’s emotional adjustment and outlook, too (Cohen & Rodriguez, 1995). People who suffer from serious illness and disability often experience feelings of anxiety, depression, anger, and hopelessness. But even minor health problems, such as the flu or a toothache, produce temporary negative thoughts and feelings (Sarason & Sarason, 1984). People who are ill and overcome their negative thoughts and feelings can speed their recovery. We will examine this relationship in more detail later in this book.

Our glimpse at the relationships of the person’s lifestyle and personality in illness demonstrates why it is important to consider psychological and social factors in health and illness. Next we will see how this recognition came about.

**HOW THE ROLE OF PSYCHOLOGY EMERGED**

The idea that medicine and psychology are somehow connected has a long history, dating back at least to ancient Greece. It became somewhat more formalized early in the 20th century in the work of Sigmund Freud, who was trained as a physician. He noticed that some patients showed physical symptoms with no detectable organic disorder. Using his **psychoanalytic theory**, Freud proposed that these symptoms were “converted” from unconscious emotional conflicts (Alexander, 1950). He called this condition **conversion hysteria**; one form it can take is called **glove anesthesia** because only the hand has no feeling. Symptoms like these occur less often in urban than in backwoods areas, perhaps because urbanites realize that medical tests can generally determine if an organic disorder exists (Kring et al., 2012). The need to understand conditions such as conversion hysteria led to the development of psychosomatic medicine, the first field dedicated to studying the interplay between emotional life and bodily processes.

**Psychosomatic Medicine**

The field called **psychosomatic medicine** was formed in the 1930s and began publishing the journal *Psychosomatic*...


Medicine (Alexander, 1950). Its founders were mainly trained in medicine, and their leaders included psychoanalysts and psychiatrists. The field was soon organized as a society now called the American Psychosomatic Society.

The term psychosomatic does not mean a person’s symptoms are “imaginary”; it means that the mind and body are both involved. Early research in psychosomatic medicine focused on psychoanalytic interpretations for specific, real health problems, including ulcers, high blood pressure, asthma, migraine headaches, and rheumatoid arthritis. For example, Alexander (1950) described the case of a 23-year-old man with a bleeding ulcer and proposed that the man’s relationship with his mother created feelings of insecurity and dependence that caused the ulcer. The man’s stomach problems later decreased, presumably because he overcame these feelings through therapy. Over the years, the field’s approaches and theories evolved (Duberstein, 2004). It is currently a broader field concerned with interrelationships among psychological and social factors, biological and physiological functions, and the development and course of illness (Novak et al., 2007).

Behavioral Medicine and Health Psychology

Two new fields emerged in the 1970s to study the role of psychology in illness: one is called behavioral medicine, and the other is called health psychology.

The field of behavioral medicine formed an organization called the Society of Behavioral Medicine, which publishes the Annals of Behavioral Medicine. This field has two defining characteristics (Gentry, 1984): First, its membership is interdisciplinary, coming from a wide variety of fields, including psychology, sociology, and various areas of medicine. Second, it grew out of the perspective in psychology called behaviorism, which proposed that people’s behavior results from two types of learning:

- Classical (or respondent) conditioning, in which a stimulus (the conditioned stimulus) gains the ability to elicit a response through association with a stimulus (the unconditioned stimulus) that already elicits that response.
- Operant conditioning, in which behavior is changed because of its consequences: reinforcement (reward) strengthens the behavior; punishment suppresses it.

Conditioning methods had shown a good deal of success as therapeutic approaches in helping people modify problem behaviors, such as overeating, and emotions, such as anxiety and fear (Sarafino, 2012). By the 1970s, physiological psychologists had clearly shown that psychological events—particularly emotions— influence bodily functions, such as blood pressure. And researchers had demonstrated that people can learn to control various physiological systems if they are given feedback as to what the systems are doing (Miller, 1978).

Why were these findings important? They revealed that the link between the mind and the body is more direct and pervasive than was previously thought. Soon they led to an important therapeutic technique called biofeedback, whereby a person’s physiological processes, such as blood pressure, are monitored by the person so that he or she can gain voluntary control over them. This process involves operant conditioning: the feedback serves as reinforcement. As we shall see in later chapters, biofeedback can be useful in treating a variety of health problems, such as headaches. Although the field of behavioral medicine broadened its focus to include additional perspectives beyond these specific learning processes, its roots in behaviorism are still evident today.

Behaviorism also served as an important foundation for health psychology, a field that is principally within the discipline of psychology. The American Psychological Association has many divisions, or subfields; the Division of Health Psychology was introduced in 1978 (Sarafino, 2004b) and soon began publishing the journal Health Psychology. Joseph Matarazzo (1982), the first president of the Division, outlined four goals of health psychology. Let’s look at these goals and some ways psychologists can contribute to them.

- To promote and maintain health. Health psychologists study such topics as why people do and do not smoke cigarettes, exercise, drink alcohol, and eat particular diets. As a result, these professionals can help in the design of school health education programs and media campaigns to encourage healthful lifestyles and behaviors.
- To prevent and treat illness. Psychological principles have been applied effectively in preventing illness, such as in reducing high blood pressure. For people who become seriously ill, psychologists with clinical training can help them adjust to their current condition, rehabilitation program, and future prospects, such as reduced work or sexual activity.
- To identify the causes and diagnostic correlates of health, illness, and related dysfunction. Health psychologists study the causes of disease; the research we saw earlier showing the importance of personality factors in the development of illness is an example of the work toward this goal. Psychologists also study physiological and perceptual processes, which affect people’s experience of physical symptoms.
- To analyze and improve health care systems and health policy. Health psychologists contribute toward this goal by
studying and advising medical professionals on ways by which characteristics or functions of hospitals, nursing homes, medical personnel, and medical costs affect patients and their likelihood of following medical advice.

Psychologists work to achieve these goals in a variety of ways, some of which involve applying techniques that were derived from behaviorism. (Go to CLINICAL METHODS AND ISSUES)

An Integration

By now you may be wondering, “Aren’t psychosomatic medicine, behavioral medicine, and health psychology basically the same?” In a sense they are—they have very similar goals, study similar topics, and share the same knowledge. The three fields are separate mainly in an organizational sense, and many professionals are members of all three organizations. The main distinctions among the fields are the degree of focus they give to specific topics and viewpoints, and the specific disciplines and professions involved. Psychosomatic medicine is an interdisciplinary field that includes physicians and behavioral scientists but continues to be closely tied to medical disciplines, including the application of psychiatry to understanding and treating physical illness. Behavioral medicine is also an interdisciplinary field, and tends to focus on interventions that promote healthy lifestyles without using drugs or surgery. Health psychology is based in psychology and draws heavily on other psychology subfields—clinical, social, developmental, experimental, and physiological—to identify and alter lifestyle and emotional processes that lead to illness, and to improve functioning and recovery for people who are sick. Although this book focuses mainly on health psychology, all three fields share the view that health and illness result from the interplay of biological, psychological, and social forces.

HEALTH PSYCHOLOGY: THE PROFESSION

Because the field of health psychology is so new, the profession is expanding quickly. Most health psychologists work in hospitals, clinics, and academic departments of colleges and universities. In these positions, they either provide direct help to patients or give indirect help through research, teaching, and consulting activities.

The direct help health psychologists provide generally relates to the patient’s psychological adjustment to, and management of, health problems. Health psychologists with clinical training can provide therapy for emotional and social adjustment problems that being ill or disabled can produce—for example, in reducing the patient’s feelings of depression. They can also help people make difficult changes in behavioral risk factors and manage their health problems by, for instance, teaching them psychological methods, such as biofeedback, to control pain.

Health psychologists provide indirect help, too. Their research provides information about lifestyle and personality factors in illness and injury. They can apply this and other knowledge to design programs that help people practice more healthful lifestyles, such as by preventing or quitting cigarette smoking. They can also educate health professionals toward a fuller understanding of the psychosocial needs of patients.

The qualifications for becoming a health psychologist vary across countries, but they usually include

**CLINICAL METHODS AND ISSUES**

Behaviorism’s Legacy: Progress in Health Psychology’s Goals

The perspective of behaviorism led to the development of behavior modification techniques, which use principles of learning and cognition to understand and change people’s behavior (Sarafino, 2012). These techniques can be grouped into two categories. Behavioral methods apply mainly principles of operant and classical conditioning to change behavior, and cognitive methods are geared toward changing people’s feelings and thought processes, such as by helping individuals identify and alter problematic beliefs. Most cognitive methods were developed after the mid-1960s.

How can professionals use behavioral and cognitive methods to promote and maintain people’s health and to prevent and treat illness? Let’s consider two examples. Using behavioral methods, psychologists reduced work-related injuries at worksites with high accident rates by applying a program of reinforcement for safety behaviors (Fox, Hopkins, & Anger, 1987). Using cognitive methods with patients suffering from chronic back pain, psychologists reduced their degree of pain, depression, and disability by providing training in ways to relax and think differently about the pain (Hoffman et al., 2007).
The Role of Biological Factors

What is included in the term biological factors? This term includes the genetic materials and processes by which we inherit characteristics from our parents. It also includes the function and structure of the person's physiology. For example, does the body contain structural defects, such as a malformed heart valve or damage in the brain, that impair the operation of these organs? Does the body respond effectively in protecting itself, such as by fighting infection? Does the body overreact sometimes in the protective function, as happens in many allergic reactions to harmless substances, such as pollen or dust?

The body is made up of enormously complex physical systems. For instance, it has organs, bones, and nerves, and these are composed of tissues, which in turn consist of cells, molecules, and atoms. The efficient, effective, and healthful functioning of these systems depends on the way these components operate and interact with each other.

The Role of Psychological Factors

When we discussed the role of lifestyle and personality in health and illness earlier, we were describing behavior and mental processes, which are the focus of psychology—and they involve cognition, emotion, and motivation.

Cognition is a mental activity that encompasses perceiving, learning, remembering, thinking, interpreting, believing, and problem solving. How do these cognitive factors affect health and illness? Suppose, for instance, you strongly believe, “Life is not worth living without the things I enjoy.” If you enjoy smoking cigarettes, would you quit to reduce your risk of getting cancer or heart disease? Probably not. Or suppose you develop a pain in your abdomen and you remember having had a similar symptom in the past that disappeared in a couple of days. Would you seek treatment? Again, probably not. These examples are just two of the countless ways cognition plays a role in health and illness.

Emotion is a subjective feeling that affects, and is affected by, our thoughts, behavior, and physiology. Some emotions are positive or pleasant, such as joy and affection, and others are negative, such as anger, fear, and sadness. Emotions relate to health and illness in many ways. For instance, people whose emotions are relatively positive are less disease-prone and more likely to take good care of their health and to recover quickly from an illness than are people whose emotions are relatively negative. We considered these relationships when we discussed the role of personality in illness. Emotions can also be important in people’s decisions about seeking treatment. People who are frightened of doctors and dentists may avoid getting the health care they need.

Motivation is the process within individuals that gets them to start some activity, choose its direction, and persist in it. A person who is motivated to feel and
look better might begin an exercise program, choose the goals to be reached, and stick with it. Many people are motivated to do what important people in their lives want them to do. Parents who quit smoking because their child pleads with them to protect their health are an example.

The Role of Social Factors

People live in a social world. We have relationships with individual people—a family member, a friend, or an acquaintance—and with groups. As we interact with people, we affect them and they affect us. For example, adolescents often start smoking cigarettes and drinking alcohol as a result of peer pressure (Murphy & Bennett, 2004). They want very much to be popular and to look “cool” or “tough” to schoolmates and others. These social processes provide clear and powerful motivational forces. Also, relationships with friends and family are important predictors of future health. But our social world is larger than just the people we know or meet.

On a fairly broad level, our society affects the health of individuals by promoting certain values of our culture, such as that being fit and healthy is good. The mass media—television, newspapers, and so on—often reflect these values by setting good examples and urging us to eat well, not to use drugs, and not to drink and drive. The media can do much to promote health, but sometimes they encourage unhealthful behavior, such as when children see jazzy TV commercials for sweet, nutrient-poor foods (Harris et al., 2009). Can individuals affect society’s values? Yes, by writing our opinions to the mass media and lawmakers, selecting which television shows and movies to watch, and buying healthful products, for example.

Our community consists of individuals who live fairly near one another, such as in the same town or county, and organizations, such as government. Research has found that communities differ in the extent to which their members practice certain health-related behaviors, such as smoking cigarettes or consuming fatty foods (Diehr et al., 1993). There are many reasons for these differences. For instance, a community’s environmental characteristics seem to influence residents’ physical activity and diets (Sallis et al., 2006; Story et al., 2008). Residents tend to be more physically active and have healthier diets in communities that have parks, are safe, and have stores and restaurants with large selections of high-quality fruits, vegetables, and low-fat products. But neighborhoods can also be threatening, crowded, and stressful, and these characteristics can affect the residents’ chances of developing health problems (Diez-Roux & Mair, 2010). Policies intended to alter these aspects of the places where we live can be important in preventing chronic disease and limiting its effects (Brownson, Haine-Joshu, & Luke, 2006).

The closest and most continuous social relationships for most people occur within the family, which can include nonrelatives who live together and share a strong emotional bond. As young children grow and develop, the family has an especially strong influence (Murphy & Bennett, 2004). Children learn many health-related behaviors and ideas from their parents, brothers, and sisters. Parents can set good examples for healthful behavior by using seat belts, serving and eating nutritious meals, exercising, not smoking, and so on. Families can also encourage children to perform healthful behaviors and praise them when they do. And as we have said, an individual can influence the larger social unit. A family may stop eating certain nutritious foods, such as broccoli or fish, because one member has a tantrum when these foods are served.

The role of biological, psychological, and social factors in health and illness is not hard to see. What is more difficult to understand is how health is affected by the interplay of these components, as the biopsychosocial model proposes. The next section deals with this interplay.
The Concept of “Systems”

“We need to understand the whole person,” you’ve probably heard a professional say. This statement reflects the recognition that people and the reasons for their behavior are very complex. Many health professionals strive to consider all aspects of people’s lives in understanding health and illness. This approach uses the biopsychosocial model and is sometimes called holistic, a term many people use and define to include a wide range of “alternative” approaches to promote health, such as treatments that use aromas and herbs to heal.

We can conceptualize the whole person by applying the biological concept of “systems” (Engel, 1980). A system is a dynamic entity with components that are continuously interrelated. By this definition, your body qualifies as a system, and it includes the immune and nervous systems, which consist of tissues and cells. Your family is a system, too, and so are your community and society. There are levels of systems, as Figure 1-4 depicts. If we look at levels within the person, illness in one part of the body can have far-reaching effects: if you fell and seriously injured your leg, your internal systems would be automatically mobilized to help protect the body from further damage. In addition, the discomfort and disability you might experience for days or weeks might affect your social relations with your family and community. As systems, they are entities that are constantly changing, and they have components that interrelate, such as by exchanging energy, substances, and information.

To illustrate how the systems concept can be useful, let’s use it to speculate how Alec’s heart disease might have come about. Let’s assume that he did inherit some factor that affects risk of the disease, such as a tendency to develop high blood levels of cholesterol in response to a diet high in calories and fat. When he was young, his family regularly consumed this sort of diet, and he continued to do so after he married Nancy. Alec did not like exercise and sports as a child, and his demanding job made it even more difficult to adopt a more physically active lifestyle as an adult. In the little leisure time he did have, his family preferred to spend time together enjoying sedentary activities, like watching television and playing video games. These interacting biopsychosocial systems probably increased Alec’s risk of heart disease.

Using the biopsychosocial model as a guide, researchers have discovered new and important findings and ways to promote people’s health and recovery from illness. Here is a sample of discoveries that we will discuss in later chapters:

- Using psychological methods to reduce anxiety of patients who are awaiting surgery enables them to recover more quickly and leave the hospital sooner.
- Programs that teach safer sex practices have dramatically reduced risky sexual behavior and the spread of HIV infection.
- People who have a high degree of social support from family and friends are healthier and live longer than people with little support.
- Stress impairs the functioning of the immune system.

Figure 1-4 A diagram of the interplay of systems in the biopsychosocial model. The person consists of biological and psychological systems, which interrelate, and each of the systems includes component systems. The person interrelates with the social systems of his or her world. Each system can affect, and be affected by, any of the other systems.
Applying psychological and educational programs for heart disease patients reduces their feelings of stress and enables them to live longer.

Biofeedback and other psychological techniques can reduce the pain of people who suffer from chronic, severe headaches.

**LIFE-SPAN AND GENDER PERSPECTIVES**

People change over time through the process called development, and each portion of the life span is affected by happenings in earlier years and affects the happenings in the years ahead. Throughout people’s lives, health, illness, and the roles of different biological, psychological, and social systems change. Gender also plays a role, such as in the health-related behaviors males and females perform and the illnesses they develop. This is why it is important to keep the life-span and gender perspectives in mind when we examine health psychology.

In the life-span perspective, characteristics of a person are considered with respect to their prior development, current level, and likely development in the future (Hayman, 2007). Health and illness characteristics vary with development. For instance, the kinds of illnesses people have tend to change with age. Compared with older people, children are less likely to experience activity limitations from chronic diseases. Illnesses that keep children out of school tend to be short-term infectious diseases, such as colds or the flu. In contrast, many people in late adulthood and old age suffer from heart disease, cancer, and stroke, which often result in disability and death. As we saw earlier, life expectancy has increased substantially in the United States, as it has in many industrialized nations. Because the portion of these populations that is elderly has grown substantially, the health problems of older adults have become a particular concern in health psychology (Siegler, Elias, & Bosworth, 2012). Pediatrics and geriatrics are branches of medicine that deal with the health and illness of children and the elderly, respectively.

How do the roles of different biopsychosocial systems change as we develop? Biological systems change in many ways. Virtually all systems of the body grow in size, strength, and efficiency during childhood and decline in old age. The decline can be seen in the slowing down that older people notice in their physical abilities. They have less stamina because the heart and lungs function less efficiently and the muscles are weaker (Tortora & Derrickson, 2012). They also recover from illness and injury more slowly. Early influences on biological systems can have major effects many years later. For example, changes in blood vessels that begin in childhood and adolescence eventually cause heart disease in adulthood (Charakida, Deanfield, & Halcox, 2009), as may have occurred for Alec in our opening story. Stressful adverse childhood experiences—such as emotional or physical abuse, poverty, and unstable family life—can increase the risk of developing several adult diseases many years later by altering the person’s response to stress (Cohen et al., 2010; Gilbert et al., 2015; Miller, Chen, & Parker, 2011). The more adversity the children experienced, the greater the likelihood of adult diseases.

Changes occur in children’s psychological systems, too, such as in cognitive processes. Children’s knowledge and ability to think are limited during the preschool years but grow rapidly during later childhood. Before children can assume responsibility for their health, they need to understand how their behavior can affect it. As children get older and their cognitive skills improve, they are better able to understand implications of their own illness when they are sick and the rationally for behaviors that promote their health and safety (Murphy & Bennett, 2004).

How do people’s social relationships and systems change with development? For one thing, there are some usual progressions: children usually progress through levels of education, enter a career in adulthood, become parents and grandparents, and retire in old age. Changes in social relationships also relate to health and illness. Children’s health is largely the responsibility of adult caregivers—parents and teachers. During the teenage years, adolescents take on more and more of these responsibilities. Parents and teachers are still important, but age-mates in the community have a powerful influence, and the need to be accepted by peers sometimes leads teens toward unhealthful or unsafe behavior (Wilson, St. George, & Zarrett, 2010). For example, an adolescent who has a chronic illness that can be controlled—as diabetes can—may neglect his or her medical care to avoid looking and feeling different from other teens (La Greca & Stone, 1985). At the other end of the life span, elderly people become less socially active and more lonely as they develop chronic illnesses (Barlow, Liu, & Wrosch, 2015).

The gender perspective also adds an important dimension to the biopsychosocial perspective in our effort to understand how people deal with issues of health and illness (Davis, Burleson, & Kruszewski, 2011; Helgeson, 2012). Males and females differ in their biological functioning; health-related behaviors, such as drinking alcohol; social relationships; experience of stress; and risk of specific illnesses, such as breast cancer. Even for the same illness, males and females may differ in the factors that affect it, its main symptoms, and the course of the disease over time.
RELATED SCIENTIFIC FIELDS:
FOUNDATIONS AND CONNECTIONS FOR HEALTH PSYCHOLOGY

Knowledge in health psychology is greatly enriched by information from many other disciplines, including some disciplines within psychology, such as the clinical and social areas; medicine, including internal medicine, family medicine, cardiology, oncology, obstetrics and gynecology, anesthesiology, psychiatry, pediatrics, and other medical specialties; and allied fields, such as nursing, nutrition, pharmacology, biology, and social work. We will look at several fields that are important because they provide information and a context for health psychology.

RELATED FIELDS

Medicine provides an essential foundation and connection for health psychology. To understand how psychological factors can influence health and illness and how illness influences psychological outcomes like physical symptoms and emotional adjustment, we must have a basic understanding of the body's healthy and unhealthy functioning. This understanding enables health psychologists to make use of findings from biomedical research, see new points of connection between behavior and health, and help improve medical care. To offer useful ideas toward improving medical care, health psychologists must know what the usual medical tests and treatments are for the various diseases and medical conditions, and how that care is usually delivered. To understand how medical conditions can affect patients' psychological and social functioning, it is essential to understand their experience of the condition, its likely course, and the procedures they will undergo during typical medical care. In many cases, the interventions health psychologists create are actually delivered by physicians and nurses during medical care, so it is not only the patient's behavior that is the focus of change but the health care provider's behavior as well (Spring, 2011). To accomplish this, health psychologists need to develop a working knowledge of medical fields and effective professional relationships with health care providers.

Health psychologists also need to know the context in which health and illness exist. The field of epidemiology—the scientific study of the distribution and frequency of disease and injury—provides part of this context. Researchers in this field determine the occurrence of illness in a given population and organize these data in terms of when the disease or injury occurred, where, and to which age, gender, and racial or cultural groups. Then they attempt to discover why specific illnesses are distributed as they are. You have probably seen the results of epidemiologists' work in the mass media. For example, news reports have described areas of the United States where Lyme disease, a tick-borne illness, occurs at high levels and where certain forms of cancer are linked to high levels of toxic substances in the environment.

Epidemiologists use several terms in describing aspects of their findings (Kaplan, 2010; MedlinePlus, 2012; Runyan, 1985). We will define five of these terms:

- **Mortality** means death, generally on a large scale. An epidemiologist might report a decrease in mortality from heart disease among women, for instance.
- **Morbidity** means illness, injury, or disability—basically any detectable departure from wellness.
- **Prevalence** refers to the number of cases, such as of a disease or of persons infected or at risk. It includes both continuing (previously reported) and new cases at a given moment in time—for example, the number of cases of, or percentage of the population with, asthma as of the first day of the current year.
- **Incidence** refers to the number of new cases, such as of illness, infection, or disability, reported during a period of time. An example is the number of new tuberculosis cases in the previous year.
- **Epidemic** usually refers to the situation in which the incidence, generally of an infectious disease, has increased rapidly.

Some of these terms are used with the word rate, which adds relativity to the meaning. For instance, the mortality rate gives the number of deaths per number of people in a given population during a specified period of time. An example might be a mortality rate of 5 babies per 1,000 births dying in their first year of life in the current year in Canada.

Epidemiologists play a pivotal role in identifying risk factors for disease and health disparities, either within a population, such as the entire United States, or across nations, such as those that are or are not highly industrialized. This information can tell us which groups are at particularly high or low risk for health problems. For example, in industrialized nations, people with low levels of income or education tend to have a relatively short life expectancy and a high risk of developing the major chronic diseases, and this is not explained by the limited access to health care that often goes along with low income (Matthews & Gallo, 2011; Ruiz, Prather, & Steffen, 2012).

Another discipline of importance to health psychology is public health, the field concerned with protecting, maintaining, and improving health through organized effort in the community. People who work in public
health do research and set up programs to promote or provide immunizations, sanitation, health education and awareness, and community health services (Runyan, 1985). This field studies health and illness in the context of the community as a social system. The success of public health programs and the way individual people react to them are of interest to health psychologists.

Two other related fields are sociology and anthropology (Adler & Stone, 1979). Sociology focuses on human social life; it examines groups or communities of people and evaluates the impact of various social factors, such as the mass media, population growth, epidemics, and institutions. Medical sociology is a subfield that studies a wide range of issues related to health, including the impact of social relationships on the distribution of illness, social reactions to illness, socioeconomic factors of health care use, and the way hospital services and medical practices are organized. Anthropology includes the study of human cultures. Its subfield, medical anthropology, examines differences in health and health care across cultures: How do the nature and definition of illness vary across different cultures? How do people in these cultures react to illness, and what methods do they use to treat disease or injury? How do they structure health care systems? Without the knowledge from sociology and anthropology, health psychologists would have a very narrow view. Knowledge from sociology and anthropology gives us a broad social and cultural view of medical issues and allows us to consider different ways to interpret and treat illness.

Finally, health economics and health policy are fields that also relate to health psychology. Health economics examines the supply and demand for health resources, the expenditures related to health care, and the costs and benefits of health care. For example, a health economics study found that for smoking-related illnesses, interventions to stop smoking can achieve the same benefits as medical or surgical treatment in terms of the length and quality of life at 10% or less of the cost (Fisher et al., 2011). Health policy examines the decisions, plans, and actions taken by governments and other organizations, such as insurance companies and employers, regarding health care and health-related behavior. Decisions based on health policy findings might, for example, require private insurance companies to pay for smoking cessation treatment or encourage a tax increase on tobacco products. As we will see for many topics in health psychology, such policies can have important effects on the behaviors that affect the development of medical conditions.

The combined information health psychologists obtain from medicine, epidemiology, public health, sociology, anthropology, health economics, and health policy paints a broad picture for us. It describes the social systems in which health, illness, and the person exist and develop. (Go to [page].)

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**HIGHLIGHT**

**Related Nonpsychology Careers**

The process of providing care for a patient who is suffering from a chronic illness, serious injury, or disability involves a variety of professionals working together with physicians as a team. Each professional has specific training for a special role in the treatment or rehabilitation process. Most of them have some education in psychology. We’ve already seen how health psychologists can play a role. Let’s look at some careers outside of psychology and the training they require to practice in the United States, as described in the Occupational Outlook Handbook (USDL, 2015).

**Nurses and Physician Assistants**

There are two overall categories of nurses: registered nurses (RNs) and licensed practical nurses (LPNs). RNs work in hospitals, community health clinics, physicians’ offices, and industrial settings. They assess and record patients’ symptoms and progress, conduct tests, administer medications, assist in rehabilitation, provide instructions for self-treatment, and instruct patients and their families in ways to improve or maintain their health. RNs often deal with mental and emotional aspects of the patient as well. RNs in the United States must be licensed to practice, have graduated from an approved training program in nursing, and have passed a national examination. RN training programs vary in structure and length; programs leading to a bachelor’s degree take about 4 years.

LPNs work in hospitals, clinics, physicians’ offices, and patients’ homes. They perform nursing activities that require less training than those performed by RNs. For example, they take and record temperatures and blood pressures, administer certain medications, change dressings, assist physicians or RNs, and help patients with personal hygiene. Like RNs, LPNs must be licensed to practice and have graduated from an approved practical nursing program. Training programs for LPNs take about a year to complete and are offered (continued)
through various types of institutions, such as trade and vocational schools, community and junior colleges, and hospitals.

Physician assistants and nurse practitioners usually work closely with medical doctors, performing routine tasks that physicians ordinarily did in the past, such as examining patients with symptoms that do not appear serious and explaining treatment details. Training involves a bachelor’s degree plus at least 2 years of study in a physician assistant program; licensure is required.

Dietitians

Dietitians study and apply knowledge about food and its effect on the body. They do this in a variety of settings, such as hospitals, clinics, nursing homes, colleges, and schools. Some dietitians are administrators; others work directly with patients in assessing nutritional needs, implementing and evaluating dietary plans, and instructing patients and their families on ways to adhere to needed diets after discharge from the hospital. Some dietitians work for social service agencies in the community, where they counsel people on nutritional practices to help maintain health and speed recovery when they are ill.

Becoming a dietitian requires a bachelor’s or master’s degree specializing in nutrition sciences or institutional management. To become a registered dietitian, the individual must complete a supervised internship and pass an exam.

Physical Therapists

Many patients need help in restoring functional movement to parts of their body and relieving pain. If they have suffered a disabling injury or disease, treatment may be needed to prevent or limit permanent disability. Physical therapists plan treatment for these goals in rehabilitation; they or their assistants apply the treatment.

To plan the treatment, physical therapists review the patient’s records and perform tests or measurements of muscle strength, motor coordination, endurance, and range of motion of the injured body part. Treatment is designed to increase the strength and function of the injured part and aid in the patient’s adaptation to having reduced physical abilities, which may be quite drastic. People who have suffered severe strokes are sometimes left partially paralyzed, for instance. The most universal technique used in physical therapy involves exercise, generally requiring little effort initially and becoming more and more challenging. Another technique involves electrical stimulation to move paralyzed muscles or reduce pain. Physical therapists also give instructions for carrying out everyday tasks, such as tying shoelaces or cooking meals. If the patient needs to use adaptive devices, such as crutches or a prosthesis (replacement limb), the therapist provides training.

Physical therapists in the United States must have completed an approved training program and be licensed by passing an exam. A doctorate in physical therapy is now required to enter the profession.

Occupational Therapists

Occupational therapists help physically, mentally, and emotionally disabled individuals gain skills needed for daily activities in a work setting, at school, in the community, and at home. Their patients are often people who had these skills at one time, but lost them because of an injury or disease, such as muscular dystrophy. These professionals usually specialize in working with a particular age group, such as the elderly, and a type of disability—physical, for example. They design and implement educational, vocational, and recreational activities based on the patient’s age and the type and degree of disability. The program for a child, for instance, might involve academic tasks and crafts; for an adult, it might involve typing, driving a vehicle, and using hand and power tools.

Occupational therapists in the United States must be licensed by passing an exam. Training now requires a master’s degree from an approved occupational therapy program.

Social Workers

The field of social work is quite broad. Probably most social workers are employed in mental health programs, but many others work in hospitals, nursing homes, rehabilitation centers, and public health programs. When working with people who are physically ill or disabled, social workers help patients and their families make psychological and social adjustments to the illness and obtain needed community services, including income maintenance. Thus, social workers may arrange for needed nursing care at home after a patient leaves the hospital or refer a patient for vocational counseling and occupational therapy if the illness or disability requires a career change.

Social workers in the United States must be licensed or certified to practice. Training requires a bachelor’s degree in a social science field, usually social work, but often a degree in psychology or sociology is sufficient. Many positions require a master’s degree in social work, the MSW degree.
HEALTH AND PSYCHOLOGY ACROSS CULTURES

Health and illness have changed across the history and cultures of the world: in New York City and Birmingham, England around the year 1900, infant mortality rates were comparable to those of very impoverished countries today; and looking:

behind these statistics also shows that the main causes of infant death in New York and Birmingham then were much the same as in the developing world now—diarrheal disease and malnutrition, respiratory infections, and whooping cough. (UNICEF, cited in Skolnick, 1986, p. 20)

The world view we get from historical-cultural comparisons can be quite dramatic. Each country’s present culture is different from every other’s and from the culture it had 200 years ago. Lifestyles have changed in each culture, and so has the pattern of illnesses that afflict its citizens.

Sociocultural Differences in Health

The term sociocultural means involving or relating to social and cultural factors, such as ethnic and income variations within and across nations. The World Health Organization (WHO) collects epidemiological data on sociocultural differences in health by regions of the world (WHO, 2014). They reported, for instance, that the incidence rates (per 100,000 population) for tuberculosis are far higher for the African and Southeast Asian regions than for the Americas and European regions. Sociocultural health differences also occur within specific countries. In the United States, for example, Whites and American Indians have over twice the incidence rate for kidney cancer as Asian Americans (ACS, 2015). And among males, African Americans have far higher rates of lung and prostate cancer than any other ethnic group. The differences we see in illness patterns between countries, regions, or ethnic groups result from many factors, including heredity, environmental pollution, economic barriers to health care, discrimination-based negative emotions, and cultural differences in people’s diets, health-related beliefs, and values (Mays, Cochran, & Barnes, 2007; Whitfield et al., 2002). Although people around the world value good health, not all people have the attitudes, environments, and access to health care that promote good health.

Sociocultural Differences in Health Beliefs and Behavior

Differences across history and culture can also be seen in the ideas people have about the causes of illness. Recall our discussion of the widespread beliefs in the Middle Ages that evil spirits caused illness. Today, educated people in advanced societies generally reject such ideas. But less sophisticated people often do not; a disadvantaged person in the United States described how people’s illnesses were caused by snakes in their bodies, and they were taken to a witch doctor for treatment.

My sister, she had somethin’, a snake that was in her arm. She was a young woman. I can remember her bein’ sick, very sick . . . This thing was just runnin’ up her arm, whatever it was, just runnin’ up her arm. You could actually see it. (Snow, 1981, p. 86)

Descriptions like this are typical of the level of knowledge generally found in people in underdeveloped regions or countries. This is important to recognize because the large majority of people in the world live in underdeveloped societies.

The United States has been described as a melting pot for immigrants from every corner of the world. Immigrants carry with them health ideas and customs from their former countries. For example, many Chinese immigrants have entered their new country with the belief that illness results from an imbalance of two opposing forces, yin and yang, within the body (Campbell & Chang, 1981). According to this view, too much yin causes colds and gastric disorders, for instance, and too much yang causes fever and dehydration. Practitioners of traditional Chinese medicine try to correct an imbalance by prescribing special herbs and foods or by using acupuncture, in which fine needles are inserted under the skin at special locations of the body. Immigrants and others with these beliefs often use these methods when sick instead of, or as a supplement to, treatment by an American physician. They may also pressure their family members to do this, too: a pregnant Chinese woman who was a registered nurse “followed her obstetrician’s orders, but at the same time, under pressure from her mother and mother-in-law, ate special herbs and foods to insure birth of a healthy baby” (Campbell & Chang, 1981, p. 164).

Religion and spirituality are aspects of culture. Religion involves a system of beliefs in a divine power, practices of worship, and other rituals. Spirituality tends to be more subjective and private than religion, and includes practices such as meditation. Like religion, spirituality is oriented toward a sacred object or notion, but does not necessarily involve a divine being. Religion and spirituality can have important influences on health, often with a positive or health promoting effect, but sometimes with the opposite effect (Chida, Steptoe, & Powell, 2009, Park, 2012).

Some religions include beliefs that relate directly to health and illness. For instance, Jehovah’s Witnesses
RESEARCH METHODS

Contemporary mass media present lots of scientific findings. Diets high in fiber and low in saturated fats are good for your health. Smoking is not. Dozens of toxic, or poisonous, chemicals can cause cancer. How do scientists discover these relationships? What methods do they use?

Scientists do research. Often their research is planned and conducted to test a theory—a tentative explanation of why and under what circumstances certain events occur (Michie & Prestwich, 2010). For example, a leading theory of the cause of heart disease is that excess cholesterol, a fatty substance in the blood, is deposited in artery walls. This buildup narrows the diameter of the artery, thereby causing tissue damage to the heart if the flow of blood in an artery becomes blocked. Cholesterol comes from two sources. Most cholesterol in the blood is manufactured by the body; the rest of it comes from the foods we eat—especially red meats, egg yolks, butter and some oils, and most cheeses.

The cholesterol theory is one of several useful theories of heart disease. By useful we don’t necessarily mean that it is correct. We mean that it:

• Is clearly stated.
• Brings together or organizes known facts.
• Relates information that previously seemed unrelated.

EXPERIMENTS

An experiment is a controlled study in which researchers manipulate an independent variable to study its effect on a dependent variable. In a well-designed experiment—which is often called a trial in health research—all other variables are controlled or held constant. The term manipulate means that the researchers produce or introduce the levels of the independent variable they are studying.

The Experimental Method: A Hypothetical Example

To illustrate the experimental method, let’s see how researchers might test the cholesterol theory of heart disease. One prediction, or hypothesis, from the theory is that people’s incidence of heart disease should decrease if they reduce their cholesterol levels. We could test this hypothesis by lowering some people’s cholesterol levels and seeing if these people develop fewer heart attacks over a suitable period of time than they otherwise would. How can we lower their cholesterol levels? There are two ways to manipulate this independent variable, both of which would require including medical professionals in the research team. One way is to alter the people’s diets, and the other is to have them take a cholesterol-lowering drug regularly. We will use the latter approach
and assume, for our example, that the drug is new and the only one available.

We’d start the research by selecting a fairly large sample of people—preferably at least middle-aged, because they have a relatively high risk of having a heart attack in the near future. Then we assign them randomly to the conditions or groups in the experiment. One way to assign them randomly is to put their names on cards in a bowl, mix up the cards, and draw the cards out one at a time. The first name drawn would be assigned to one group, the second name to another group, and so on. By doing this, we can equate the groups, distributing the people’s existing characteristics, such as personality and genetic factors, fairly equally across groups. As a result, the characteristics will have about the same impact on the dependent variable (heart attacks) for each of the groups.

To test the hypothesis, we will need two groups of people. One group receives the experimental treatment, the cholesterol-lowering pills, and is called the experimental group. The other group receives their usual care without the drug, and is called the control group (or comparison group). By administering the drug to, and lowering the cholesterol level of, one group but not the other, we are manipulating the independent variable. We then observe over several years the incidence of heart attacks. If the experimental group has fewer heart attacks than the control group, the hypothesis is supported.

You may be wondering, “Isn’t it possible that a decrease in heart attacks for the experimental group could result not from the drug per se, but simply from taking any substance a medical person prescribes?” Sometimes people’s beliefs or expectations can affect their health (Rehm & Nayak, 2004). To control for this possibility, we would have a third group: they’d receive an inert, or inactive, substance or procedure—called a placebo—in the form of pills that look like medicine. The placebo group would be given the same instructions as the experimental group, and both would have equal expectations about the effectiveness of the pills. Any influence the placebo has on the dependent variable is called a placebo effect.

One other control procedure is needed: the person who distributes the pills should not know which pills contain the active drug. Why? This person could inadvertently bias the outcome of the experiment, such as by giving instructions offhandedly to the placebo group but emphatically and precisely to the experimental group. Being unaware of which individuals are getting which treatment is called being blind as to the treatment. Because both the individuals receiving and distributing the pills are unaware, the method we are using is called the double-blind procedure.

Now that we have included these control procedures, let’s look at the outcome of our hypothetical experiment. As Figure 1-5 shows, the people in the experimental group had far fewer heart attacks than those in the other groups. Thus, we can conclude that lowering cholesterol levels in the blood causes a decrease in heart disease, as the theory predicts. Notice also in the graph that the people in the placebo group had somewhat fewer heart attacks than the controls. This suggests a placebo effect, with expectancy having some effect on heart disease, but not nearly as much as the active ingredient in the cholesterol-lowering drug.

![Diagram](image-url)

**Figure 1-5** The left-hand portion of this diagram shows how the study would be carried out. Subjects (also called participants) are assigned to groups and, after a suitable period of time, the researcher checks whether they have had heart attacks. The right-hand portion illustrates how the results might appear on a graph: participants who received the anticholesterol drug had far fewer heart attacks than subjects in the placebo group, who had somewhat fewer attacks than those in the control group.
You may have noticed that our conclusion used the word *causes*; lowering cholesterol "causes" a decrease in heart disease. To make a *cause-effect* conclusion, it must be clear that three criteria have been met:

- The levels of the independent and dependent variables corresponded or varied together.
- The cause preceded the effect.
- All other plausible causes have been ruled out.

Well-designed experiments, usually called *randomized controlled trials*, meet these requirements because the researchers use random assignment to equate the groups, manipulate the independent variable, and control variables that are not being studied. Other research approaches do not use experimental methods and do not provide the ability to determine clearly what causes what.

**Comparing Experimental and Nonexperimental Methods**

Research always involves the study of variables, but in *nonexperimental methods*, the researchers either do not manipulate an independent variable and/or do not equate the groups. In addition, there is frequently less opportunity for precise measurement and for control of variables not being studied. As a result, although nonexperimental methods may be used to point out relationships between variables, they do not provide direct and unambiguous tests of cause-effect relationships.

Nonexperimental methods are nevertheless very valuable and have some important advantages. Sometimes it is simply not possible or feasible to assign subjects randomly and manipulate the variable of interest. We cannot manipulate the past lifestyles of people, for instance; the past has already happened. Nor can we have individuals in one group of a study do harmful things they would ordinarily not do simply to test an important theory. For instance, it would be unethical to assign people of a sample to a group in which they must smoke cigarettes for the next 5 years if some of these people do not smoke or want to quit. Even if it were ethical, nonsmokers might refuse to do it. What if we didn’t randomly assign individuals to groups? If we do not randomly assign them, the groups are not likely to be equal at the start of the study with respect to characteristics, such as genetics or past lifestyle, that could affect the outcome of the research. In situations like this in which ethical considerations prevent the study of humans in research, animals are sometimes used.

In many cases, the aim of a research project requires only that an association between variables be demonstrated. We may want to know, for instance, which people are at greatest risk for a disease so that we may help them avert it. For example, studies to determine risk factors have revealed that people who are among the most likely to develop heart disease are male and/or over 50 years old (AHA, 2015). Researchers can determine this relationship without manipulating gender or age, and a nonexperimental method is, in fact, the most appropriate technique.

The rest of our examination of research methods will focus on nonexperimental approaches in research relating to health psychology and continue to use the cholesterol theory of heart disease as the basis for research examples. Let’s turn to correlational studies as the first of these methods.

**CORRELATIONAL STUDIES**

The term *correlation* refers to the *ca* or joint relation that exists between variables—changes in one variable correspond with changes in another variable. Suppose, for example, we did a study of two variables: blood pressure and people’s diets, particularly the amount of cholesterol they consume. A measure of blood pressure can be taken at home or in a medical setting, and its level is measured in specific units, as you’ve seen doctors or nurses do with a device that inflates a cuff on the person’s arm. Working with a physician, we recruit a sample of, say, 200 middle-aged adults and have them keep detailed records of their diets for the 2 weeks before the visit when their blood pressure is measured. We then calculate the amount of cholesterol consumed on the basis of their dietary records.

Once we know the blood pressure and cholesterol intake of each of the subjects, we can assess the degree to which these variables are related, expressed statistically as a *correlation coefficient*, which can range from +1.00 through .00 to –1.00. The sign (+ or –) of the coefficient indicates the *direction* of the relationship. A plus sign means that the association is “positive”: for instance, people with high (or low) scores on one variable, say, blood pressure, tend to have high (low) scores on the other variable, in this case cholesterol intake. Conversely, a minus sign means that the association is “negative”: *high* scores on one variable tend to be associated with *low* scores on the other variable. For example, people who get lower levels of exercise tend to have higher blood pressure. Thus, there is a negative correlation between blood pressure and physical activity.

Disregarding the sign of the correlation coefficient, the absolute value of the coefficient indicates the *strength* of association between variables. The higher the absolute value (that is, the closer to either +1.0 or –1.0), the stronger the correlation. As the absolute value decreases,
the strength of the relationship declines. A coefficient near 0.00 means that the variables are not related. From the information we have just covered, we can now state a definition: **correlational studies** are nonexperimental investigations of the degree and direction of statistical association between two variables.

Let’s suppose that our study revealed a strong positive correlation—a coefficient of +.72—between blood pressure and cholesterol intake. This would support the cholesterol theory, because high cholesterol intake should produce more fatty buildup to clog and narrow the arteries, thereby raising the pressure in those narrowed arteries. But we cannot say on the basis of our study that these events occurred, and we cannot conclude that high cholesterol intake *causes* high blood pressure. Why? Because we did not manipulate any variable—we simply measured what was there. It may be that some variable we did not measure was responsible for the correlation. For example, the people with high cholesterol intake may also have a high intake of salt in their diet, and it may have been this latter factor that caused their high blood pressure. We don’t know. We would only know for sure that the two variables have a strong positive relationship.

Although correlational studies typically cannot determine cause-effect relations, they are useful for examining existing relationships and variables that cannot be manipulated, developing hypotheses that may be tested experimentally, and generating predictive information, such as risk factors for health problems.

**QUASI-EXPERIMENTAL STUDIES**

Quasi-experimental studies look like experiments because they have separate groups of subjects, but they are not because the subjects were not randomly assigned to groups. In some types of quasi-experiments, the independent variable is manipulated, but in other types, it is not. A commonly used quasi-experimental approach is called an *ex post facto study*, in which subjects are categorized and placed in groups on the basis of an existing variable or circumstance. Groups based on gender (males and females), cholesterol level (high, moderate, and low), or diet (high-fat and low-fat) in the past year are examples.

We could do a quasi-experimental study relating to the cholesterol theory of heart disease in the following way. Suppose we wanted to see if people’s cholesterol level at the time they were admitted to the hospital. Then we would determine whether the attacks were more severe for one group than for the other.

If we found that the high-cholesterol patients had the more severe heart attacks, could we conclude that higher levels of cholesterol in the blood cause more severe attacks? No—for the same reasons we’ve discussed before. We cannot tell what caused what. In fact, this particular study could have been turned around. We could have categorized the patients on the basis of the severity of their attacks and then compared these groups for cholesterol levels. We would have found the same relationship: severe heart attacks are associated with a high level of cholesterol in the blood.

In general, the conclusions from quasi-experimental studies are basically correlational. The relationships they reveal do not become causal simply because we categorize subjects. There are many variations to the quasi-experimental method. We will look at a few of the more important ones, beginning with retrospective and prospective approaches.

**Retrospective and Prospective Approaches**

The prefix *retro* means “back” or “backward,” and *prospective* comes from the Latin word meaning “to look.” Thus, the **retrospective approach** uses procedures that look back at the histories of subjects, such as individuals who do or do not have a particular disease. The purpose of this approach is to find commonalities in the people’s histories that may suggest why they developed the disease.

How is the retrospective approach used in a quasi-experimental study? We might identify two groups of individuals. One group would consist of people who have already developed a particular illness, such as heart disease. They would be compared against a control group, consisting of similar people without the disease. We would then examine the two groups for characteristics of their histories that are common to one group, but not the other. We might find, for example, that the heart disease victims reported having eaten higher-cholesterol diets during the preceding 10 years than the controls did. Although the retrospective approach is relatively easy to implement, it has a potential shortcoming: when the procedures rely on people’s memories, especially of long-past happenings, the likelihood of inaccurate reports increases.

The **prospective approach** uses procedures that look forward in the lives of individuals, by studying whether differences in a variable at one point in time are related to differences in another variable at a later time. We could do this to see whether certain characteristics or events in people’s lives are associated with their
eventual development of one or more diseases. In using the prospective approach, we would start by recruiting a large group of people—say, 2,000—who did not yet have the illness in question, heart disease. Periodically over several years we would interview them, have a physician examine them, and check their medical records. The interviews would inquire about various events and characteristics, such as cholesterol intake. Then we would categorize the people—for instance, as having or not having had a heart attack—and determine whether these groups differed in some earlier aspects of their lives.

What might our study show? We might find that, compared with people who did not have heart attacks, those who did had eaten diets that were much higher in cholesterol. We might also find that changes in people’s diets, becoming higher or lower in cholesterol content over the years, corresponded with their suffering an attack. That is, those who consumed increasing amounts of cholesterol had more heart attacks than those whose cholesterol intake decreased. Because this is a quasi-experimental study, we cannot be certain that high-cholesterol diets caused the heart disease. But the prospective approach gives greater plausibility to a causal link than the retrospective approach would. This is because the diets, and changes in them, clearly preceded the heart attacks.

Retrospective and prospective approaches to studying health were developed by epidemiologists. These approaches have been useful in identifying risk factors for specific illnesses.

Developmental Approaches

We saw earlier that the life-span perspective adds an important dimension to the study of health and illness. An essential research approach in studying life-span development is to examine and compare subjects at different ages. Of course, the age of the subjects cannot be manipulated; we can assign individuals to groups based on their age, but this assignment is not random. This approach is quasi-experimental, and, therefore, age itself cannot be viewed as a cause of health or behavior.

Two basic approaches are used for studying the age variable. In the cross-sectional approach, different individuals of different ages are observed at about the same time. The longitudinal approach involves the repeated observation of the same individuals over a long period of time. The longitudinal approach is like the prospective method, but it focuses specifically on age as a variable. Let’s see how the cross-sectional and longitudinal approaches are used.

Suppose we were interested in examining age-related changes in dietary intake of cholesterol among middle-aged adults. If we use a cross-sectional approach, we might evaluate the diets of, say, 50 adults at each of three approximate ages—for example, 35, 45, and 55 years—during the current month. On the other hand, if we use a longitudinal approach to examine the same age range, we would evaluate the diets of 50 35-year-olds during the current month, and again when they are 45 and 55 years of age. This longitudinal study would take 20 years to complete.

Not all longitudinal studies take so long to do. Often a shorter span of ages—sometimes only a few months—is appropriate, depending on the question or issue the researcher wants to resolve. But the longitudinal approach, and the prospective approach in general, is typically more costly in time and money than the cross-sectional approach. Also the longer a study lasts, the greater the likelihood that subjects in the sample will be lost. Some will move away, others will lose interest in participating, and still others may die. Despite these difficulties, it is a valuable research approach that is unique in its ability to examine change and stability in the lives of individuals across time. For example, our longitudinal study could tell us whether individuals who eat a high-cholesterol diet at age 35 will generally continue to do so many years later. In contrast, a cross-sectional approach loses sight of stability and individual changes.

Now, let’s suppose we did our cross-sectional study and found that the cholesterol content of adults’ diets decreased with age. We would then like to know why this is so. One possible answer is that people change their diets as they get older because they feel more vulnerable to heart disease. So we asked the oldest group, using the retrospective approach, if they feel more vulnerable and eat less high-cholesterol food today than they used to. Sure enough, they said yes. But another reason for the current age differences in diet could be that the older adults never ate diets as high in cholesterol as those of the younger adults. So we asked the oldest group to describe the diets they ate 10 or 20 years ago. The diets they described contained less cholesterol than their current diets (which we already knew) and the current diets of the 35- and 45-year-olds in our study! This finding reflects the fact that the older subjects grew up at a different time, when food preferences or availability may have been different.

The influence of having been born and raised at a different time is called a cohort effect. The term cohort refers to a group of people who have in common a demographic factor, such as age, generation, or social class. As a result, they share a set of experiences that are distinct from those of other cohorts. Researchers can examine cohort effects by combining the two developmental approaches. Looking back at our study with middle-aged adults, the...
combined approach could be carried out by selecting and testing 35-, 45-, and 55-year-olds initially. So far the study is cross-sectional, but we would follow most of these same adults longitudinally and add younger subjects along the way. By doing this in a planned and systematic way, we'll have data on cross-sectional differences, changes within each cohort, and differences between cohorts.

Single-Subject Approaches

Sometimes studies are done with just one subject. One type of research that uses this approach is the case study, in which a trained researcher constructs a systematic biography from records of the person’s history, interviews, and current observation. This kind of research is useful in describing, in depth, the development and treatment of an unusual medical or psychological problem. Other types of research that use one subject are called single-subject designs. This approach is often used for demonstrating the usefulness of a new treatment method for a specific medical or behavioral problem. In the simplest of these designs, data on the subject’s problem at the beginning and end of treatment are compared. Often, follow-up assessments are made weeks or months later to see if the person’s condition has regressed. Some single-subject designs have additional phases or features that enable them to provide evidence for cause-effect relationships.

The principal disadvantage of single-subject approaches is that information on only one subject, no matter how detailed it is, may not describe what would be found with other individuals. A major purpose of psychological research is to collect information that can be applied or generalized to other people. Nevertheless, studies using one subject stimulate the development of new treatment procedures and suggest topics for further research.

GENETICS RESEARCH

In the 19th century, Charles Darwin speculated that unseen particles called “gemmules” were present in the sperm and ovum. Darwin’s concept of gemmules formed the basis for the search for genetic materials. What did this search yield?

Genetic Materials and Transmission

Researchers discovered threadlike structures called chromosomes and proposed that these structures contained units called genes. Soon they determined the basic substance in all genetic material—deoxyribonucleic acid, or DNA for short—and described its structure. Today we know that DNA determines our growth patterns and physical structures (Tortora & Derrickson, 2012). We also know that genes are discrete particles of DNA that are strung together in chromosomes and transmitted from parent to child. Each parent contributes half of the genetic information we inherit.

We'll discuss two features of chromosomes. First, photographs taken through a microscope can be arranged according to the size and shape of chromosome pairs. One pair is called the sex chromosomes because they carry the genes that will determine whether an individual will be female or male. The normal sex chromosomes for males consist of one large chromosome (called an X chromosome) and one small chromosome (called a Y chromosome); females have two X chromosomes.

Second, the tips of each chromosome contain DNA sequences, called telomeres. Although telomeres generally shorten as we age, they can lengthen across months under certain conditions, such as with diets that contain beneficial fats (Kiecolt-Glaser et al., 2013). Research has linked short telomere length with the risk of contracting a viral infection (Cohen et al., 2013) and of dying in a 10-year period (Kimura et al., 2008).

As with chromosomes, genes come in pairs. Although a single pair of genes may determine some traits a person inherits, others require many genes. Some traits occur in the presence of a single dominant gene, with the paired gene making little or no contribution. But when a trait occurs only if two identical genes make up the pair, these genes are called recessive.

Twin and Adoption Studies

How do psychologists and other scientists determine whether hereditary factors influence people’s health and illness? The methods are based on a distinction between two types of twins. Monzygotic (MZ), or identical, twins are conceived together and have the same genetic inheritance; dizygotic (DZ), or fraternal, twins are conceived separately and are no more genetically similar than singly born siblings and may, of course, be of different sexes.

Much of the research on hereditary factors has focused on the differences in characteristics shown in MZ twins as compared with DZ twins. Investigations using this approach are called twin studies. The rationale for making these comparisons, although statistically complex, is logically simple. Because the two individuals in an MZ pair are genetically identical, we can assume that differences between them are environmentally determined. Conversely, the greater the similarity between MZ twins, the more likely it is that the characteristic is genetically influenced. Differences between DZ twins, on the other hand, are due to both genetic
and environmental factors, even when they are the same sex. If we could assume that both members of each MZ and same-sex DZ pair that we study have had equal environmental experiences, we could measure genetic influence simply by subtracting the differences for MZ from the differences for DZ twins. Even though both members of each MZ and DZ pair may not have had equal environmental experiences, researchers can take the differences into account—and when they do, important genetic forces are still found (Scarr & Kidd, 1983).

Another way to examine hereditary influences is to study children adopted at very early ages. Adoption studies compare traits of adopted children with those of their natural parents and their adoptive parents. Why? Adoptive parents contribute greatly to the rearing environment, but are genetically unrelated to the children; the natural parents are genetically related to the children, but play little or no role in rearing them. So, if adopted children are more similar to their natural parents than to their adoptive parents, we then have evidence for heredity’s influence.

Let’s look at some conclusions relevant to health psychology that have come from twin and adoption studies. First, heredity affects not only physical characteristics, such as height and weight, but also physiological functions, including heart rate and blood pressure (Ditto, 1993; Wu, Treiber, & Snieder, 2013). Second, genetic disorders can produce very high levels of cholesterol in the blood, making their victims susceptible to heart disease at very early ages (AMA, 2003). Third, some evidence indicates that heredity has its greatest impact on people’s health early in life, and by old age the role of habits and lifestyle becomes increasingly important (Harris et al., 1992). Fourth, although genetic factors affect people’s risk of developing cancer, environmental factors appear to play a stronger role for most people (Lichtenstein et al., 2000). Fifth, research in the field of biology called molecular genetics is identifying specific genes involved in complex behavioral traits, such as susceptibility to addictive behavior, biological traits, such as high cholesterol; and specific diseases (Nolte, McCaffery, & Snieder, 2010). These findings have the potential to identify people for whom healthy behavior is critically important.

Linking Specific Genes with Diseases

After having identified which disorders have a genetic basis, researchers began looking for links to specific genes. We now know that every human cell contains 30,000–40,000 genes, and almost all of the human system of genes have been identified and mapped (IHGSC, 2001). Genes influence a vast number of traits, including more than 3,000 diseases. For some diseases, researchers have even pinpointed the exact gene locations. We will look at a few of these traits and diseases.

Sickle-cell anemia is a hereditary disease whose victims are usually Black people. In the United States, nearly 10% of the African American population carries a recessive gene for this disease and do not have the disorder (Damon & Andreadis, 2015). The body of a person who has two of these genes manufactures large quantities of sickle-shaped red blood cells that carry little oxygen and tend to clump together in the bloodstream—often they cannot pass through capillaries. As a result, the vital organs of people with sickle-cell anemia receive inadequate amounts of oxygen and incur tissue damage. The condition, which usually develops in childhood, produces painful episodes, progressive organ failure, and brain damage.

Another recessive disease is phenylketonuria (PKU). In this disease, which occurs more frequently among Whites than other racial groups, the baby’s body fails to produce a necessary enzyme for metabolizing phenylalanine, a toxic amino acid present in many common foods (AMA, 2003). If the disease is not treated, the amino acid builds up and causes brain damage. Placing PKU babies on special diets as soon as possible after birth can prevent this. When the brain is more fully developed after about 5 years of age, many PKU children can switch to normal diets. PKU provides a good example of an inherited disease that can be controlled by modifying the victim’s behavior.

Researchers are also closing in on certain oncogenes, which are genes that can cause cancer. Researchers have, for example, found oncogenes for certain types of cancers of the colon (Bodmer et al., 1987), breast (Chen et al., 1995; Wooster et al., 1995), skin (Hussussian et al., 1994), lung (Rodenhuis et al., 1987), and prostate (Lee et al., 1994). Oncogenes can be normal genes or mutations that may result from exposure to harmful environmental agents, such as tobacco smoke.

Epigenetic Effects

Epigenetics is a process in which chemical structures within or around the DNA govern how, when, and how much a gene acts. These structures typically suppress the gene’s usual activity, can change, and can be passed on to one’s offspring (Foley et al., 2009; Zhang & Meaney, 2010). Epigenetics operates in normal development, such as when cells specialize to become heart or brain cells. But environmental events can change epigenetic processes, especially during prenatal, early childhood, and puberty periods. Environmental factors that can lead to epigenetic changes include exposure to toxic chemicals, bacterial and viral infection, dietary elements, tobacco, alcohol, and drugs.
For both members of an MZ twin pair, gene activity is highly similar in childhood and becomes less and less similar as they get older, especially when their lifestyles differ and the resulting epigenetic changes accumulate. Evidence today suggests that epigenetic changes can influence an individual’s response to stress, ability to learn and remember, and development of health problems, such as cancer, heart disease, obesity, asthma, and diabetes. The study of epigenetics is fairly new, and there is a lot we don’t yet know about it. Given that most of the research on epigenetics has been conducted with animals, to what extent do the same specific effects occur in humans? What determines the chances that an epigenetic change will be inherited? Can epigenetic processes that lead to health problems be reversed, maybe by taking medication or changing aspects of lifestyle? New methods in molecular biology have created opportunities to study epigenetic effects in humans (Miller & Cole, 2010), such as in the role of early experience in modifying the body’s response to stress and susceptibility to disease later in life (Miller, Chen, & Parker, 2011).

WHICH RESEARCH METHOD IS BEST?

In this chapter, we have discussed a variety of research methods that are useful in health psychology. Which one is best? Some scientists might say that randomized controlled trials are best because they can uncover cause-effect relationships. But as we’ve seen, sometimes controlled experiments are simply not possible. In such cases, informative experiments can be done on laboratory animals, because many diseases and underlying biological processes are similar in these animals and humans (Nation, Schneiderman, & McCabe, 2010). However, even in experimental studies of humans, precise control and manipulation do not always yield results that help us understand real-life behavior—for example, the behavior of subjects may be affected when experimental settings involve artificial conditions, such as precisely occurring events and special equipment, that are unlike the real world. As a result, when reading about an experiment, it is useful to ask, “If the experimental situation is highly artificial, what specific effect might this have on the outcome of the experiment?” New methods may help avoid these and other problems. For example, a technique called ecological momentary assessment uses devices, such as pagers, to cue and collect data on individuals periodically in their regular day-to-day living (Shiffman & Stone, 1998).

In a sense, all the research methods we discussed are “best,” as the investigator must select the most suitable method(s) to answer the specific question(s) under study. This leads us to a final point: it is possible, and desirable, to use experimental and nonexperimental methods simultaneously in one study. For instance, if we wanted to find out whether people’s reading information about the health effects of excessive cholesterol would induce them to modify their diets, we could manipulate the independent variable by having the experimental group, but not the control group, read the health information. We might also want to test people of different ages: people who are 50 years of age might be more easily persuaded to lower their cholesterol levels than people who are 20. We could examine both variables by randomly assigning people of each of the two age groups to experimental and control groups and later examining their diets and blood cholesterol levels. Note, however, that the kinds of conclusions yielded by each variable (information and age) will differ; only the manipulated variable can yield unambiguous causal statements.

SUMMARY

Health and illness are overlapping concepts that exist along a continuum. One end of the illness/wellness continuum is dominated by health—a positive state of physical, mental, and social well-being that varies over time; the other end is dominated by illness, which produces signs, symptoms, and disabilities. The patterns of illness affecting people have changed across history, especially since 1900. Compared with earlier times, today people die at later ages and from different causes. Infectious diseases are no longer the principal cause of death in developed societies around the world. Chronic illnesses now constitute the main health problem in developed nations. Ideas about physiology, disease processes, and the mind have changed since the early cultures thousands of years ago, when people apparently believed that illness was caused by such things as evil spirits. Greek philosophers produced early written ideas about health and illness, considering how sickness happens and the mind/body problem. During the Middle Ages, the Church had an enormous influence on ideas about illness, and the belief in mystical causes of disease became strong again. Philosophers and scientists from the 17th to the 20th centuries provided the foundation for the biomedical model as a way to conceptualize health and illness.
The biomedical model has been extremely useful, enabling researchers to make great advances in conquering many infectious diseases through the development of vaccines and treatments. But many researchers today have come to recognize that aspects of individual patients—their histories, social relationships, lifestyles, personalities, mental processes, and biological processes—must be included in a full conceptualization of risk factors for illness. As a result, the biopsychosocial model has emerged as an alternative to the biomedical approach and proposes a constant interplay of biological, psychological, and social systems—each interrelated with, and producing changes in, the others. Psychosomatic medicine, behavioral medicine, and health psychology have introduced new techniques, such as behavioral and cognitive methods, to promote health. Life-span, gender, and sociocultural perspectives add important dimensions to this model by considering the role of people’s development, sex, and culture in health and illness. Health psychology draws on knowledge from a variety of other psychology and nonpsychology fields, such as medicine, biology, social work, epidemiology, public health, sociology, anthropology, health economics, and health policy. Epidemiology examines the mortality, morbidity, prevalence, incidence, and epidemic status of illnesses.

The study of important variables in health psychology involves the use of experimental and nonexperimental research methods, often testing a theory. A well-designed experiment can lead to cause-effect conclusions because it involves rigorous control, such as with placebo and double-blind methods, and manipulation of variables. Correlational studies test relationships between variables; a correlation coefficient describes an association between variables but does not indicate whether it is a causal relation. Quasi-experimental studies are useful when subjects cannot be randomly assigned to groups or independent variables cannot be manipulated, such as the subjects’ history, age, and gender; quasi-experiments often use retrospective and prospective approaches. To study people at different ages, researchers use cross-sectional and longitudinal approaches. Genetic influences on health and illness can be examined through twin and adoption studies, genotyping, and by examining epigenetics.

**KEY TERMS**

- illness/wellness continuum
- health
- infectious diseases
- chronic diseases
- mind/body problem
- biomedical model
- risk factors
- personality
- psychosomatic medicine
- behavioral medicine
- health psychology
- behavioral methods
- cognitive methods
- biopsychosocial model
- system
- mortality
- morbidity
- prevalence
- incidence
- epidemic
- sociocultural
- theory
- variable
- experiment
- placebo
- double-blind
- correlation coefficient
- correlational studies
- quasi-experimental studies
- retrospective approach
- prospective approach
- cross-sectional approach
- longitudinal approach
- twin studies
- adoption studies
- epigenetics