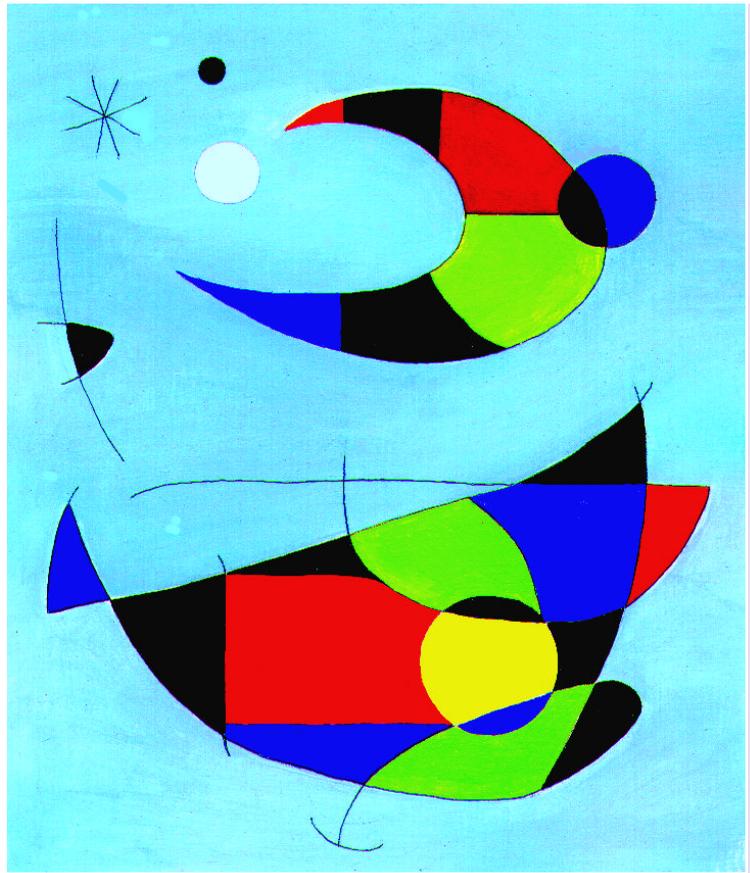


The SAGE Handbook of Health Psychology



Edited by
Stephen Sutton
Andrew Baum
and
Marie Johnston

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THE SAGE HANDBOOK
of
HEALTH PSYCHOLOGY

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STEPHEN SUTTON, ANDREW BAUM
and MARIE JOHNSTON

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Editors' Preface

Health psychology is still a relatively young discipline, but interest and activity in the field are expanding rapidly, as indicated, for example, by the number of specialist journals, master's level courses, introductory texts and, indeed, handbooks of health psychology. So why produce another handbook? Both Sage as publishers, and we as editors, felt that there was a pressing need for a higher-level text providing comprehensive and in-depth treatment of the field and aimed at final year undergraduate psychology students, master's students, and specialist researchers, teachers and practitioners in the field. The *Sage Handbook of Health Psychology* therefore aims to provide a comprehensive, authoritative, detailed, state-of-the-art picture of health psychology at the beginning of the twenty-first century. We wanted to do this in a single self-contained volume that would be affordable to individuals rather than a multi-volume handbook aimed at the library market. We were particularly keen to organize the *Handbook* on *psychological* lines rather than by diseases and conditions. However, we struggled to find a logical way of carving up the field. The nature of the subject matter is such that it does not naturally fall into discrete subtopics: everything is related to everything else. We devised a number of organizational schemes, but they all seemed unsatisfactory and arbitrary. Then one of us (MJ) came up with the idea of basing the *Handbook* on the British Psychological Society's core curriculum or 'knowledge base'. Although no less arbitrary than other schemes, this had the advantage of grounding the content and organization of the *Handbook* in the reality of how the subject is taught.

The result is 14 substantial chapters by 31 contributors, amounting to over a quarter of a million words. We did minimal content editing of the chapters, following the principle that if you ask leading experts to write about their pet topics, they are bound to produce something good, and we tolerated departures from the recommended chapter length. We are delighted with the final product.

We would like to thank Naomi Meredith and Michael Carmichael of Sage for their encouragement and patience, members of the International Editorial Advisory Board for their advice and help, particularly in the early stages of the project, the contributors for producing such fine chapters, and Karen Hinkins for her painstaking work in editing the chapters for style and consistency.

Stephen Sutton, Andrew Baum, Marie Johnston
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Context and Perspectives in Health Psychology

EDWARD P. SARAFINO

INTRODUCTION

Health psychology is a young discipline, and its knowledge is growing rapidly. In the opening chapter, we will examine the context and perspectives of this field by dividing the material into five sections. In the following order, these sections will:

- 1 discuss the concepts of health and illness and how patterns of illness vary around the world and across time
- 2 consider how people across history have viewed the roles of the body and the mind in the development of disease and some evidence that psychosocial processes are involved
- 3 describe several areas of research and application in health psychology, along with a sampling of associated theories and approaches used in the discipline
- 4 examine the relationships of health psychology to other disciplines
- 5 discuss the impact of sociocultural, gender, and developmental factors in health and illness.

THE CHANGING FACE OF HEALTH AND ILLNESS

People commonly think about health in terms of an absence of (1) subjective symptoms of disease or injury, such as pain or nausea, or (2) objective signs that the body is not functioning properly, such as measured high blood pressure (Birren & Zarit, 1985; Thoresen, 1984). But illness and wellness are not entirely separate concepts: they overlap, with increasing degrees of wellness and of illness varying along a continuum with a neutral status in the middle. At the opposite ends are optimal wellness and death (Sarafino, 2002). Thus, the term *health* refers to a range of positive states of physical, mental, and social wellbeing – not just the absence of injury or disease – characterized by variations in healthful signs and lifestyles. In states of illness or injury, destructive processes produce characteristic signs, symptoms, or disabilities.

People in developed, industrialized nations today live longer, on the average, than in the past, and they suffer from a different pattern of

illnesses. For example, during the seventeenth, eighteenth, and nineteenth centuries, people in North America suffered and died mainly from dietary and infectious diseases (Grob, 1983). By the end of the nineteenth century, deaths from infectious diseases had decreased sharply. For instance, in a 25-year period around the turn of the century in the United States, the death rate from tuberculosis declined by about 60 per cent. Although medical advances were responsible for some of these changes, the decreases occurred long before the introduction of effective vaccines and medications (Grob, 1983; Leventhal, Prohaska & Hirschman, 1985). The main cause of these changes was probably preventive measures such as improved personal hygiene, better nutrition, and public health innovations, such as in water purification and sewage treatment. Fewer deaths occurred from dietary and infectious diseases in the United States and other developed nations because fewer people contracted them. But preventive measures have not been adopted as widely in less advanced societies. As a result, infectious diseases continue to be the main causes of death in most of the world today (World Health Organization, 1999).

The patterns of illness that afflict people have continued to change during the twentieth century, particularly in developed nations, and the average life expectancy has increased dramatically (World Health Organization, 1999). For instance, at the turn of the century in the United States, babies' life expectancy at birth was about 48 years (US Department of Health and Human Services, 1987); today it is 76 years (US Bureau of the Census, 1999). Much of the poor life expectancy at birth many years ago resulted from the very high death rate among children then. Those who survived to the age of 20 years could expect to live to nearly 63 years of age. The death rate for American children is much lower today, and only a small difference exists between the expected life spans of newborns and 20-year-olds.

In developed countries today, the main health problems and causes of death are *chronic diseases*, that is, degenerative illnesses that develop or persist over a long period of time. Three chronic diseases – heart disease, cancer,

and stroke – account for about two-thirds of all deaths in developed nations (World Health Organization, 1999). These are diseases that tend to afflict elderly people. Before the twentieth century, these diseases caused a much smaller proportion of deaths partly because fewer people lived to an age when they would be at high risk for contracting chronic diseases (US Department of Health and Human Services, 1982). The causes of death differ greatly at different points in the life span. In the United States, for example, the leading cause of death in children and adolescents is not an illness; it is accidental injury (US Bureau of the Census, 1999). The next two most frequent causes of death in childhood are diseases, but in adolescence they are homicide and suicide.

HISTORICAL VIEWPOINTS: MIND AND BODY IN DISEASE PROCESSES

The best educated people thousands of years ago probably believed that mystical forces, such as evil spirits, caused physical and mental illness (Stone, 1979). Because there are no written records from those times, researchers have inferred this conclusion from indirect evidence, such as the discovery of 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 for superstitious reasons in a procedure called trephination, to allow illness-causing demons to leave the head, for instance. In many cultures around the world today, large numbers of people still believe that mystical forces have a major impact on health and illness.

The Mind–Body Problem

Philosophers of ancient Greece between 500 and 300 BC produced the earliest written ideas about physiology, disease processes, and the mind. Many leading philosophers believed that the mind and body were separate entities (Marx & Hillix, 1963; Schneider & Tarshis, 1975). The body – one's physical being, including the

skin, muscles, bones, heart, and brain – was thought to function independently from the mind. Although it is possible to distinguish between the mind and the body conceptually, an important question is whether they actually function independently. The issue of their relationship is called the mind–body problem.

Hippocrates, often called ‘the Father of Medicine’, proposed that people get sick when the mixture of four body fluids called humors (in biology, the term ‘humor’ refers to plant or animal fluid) is faulty (Stone, 1979). When the mixture of these humors is balanced or harmonious, people are in a state of health. The mind was considered to have little or no relationship to the body and its state of health. According to Hippocrates, people could achieve humoral balance by eating a good diet and avoiding excesses. Galen was a highly respected physician and writer of the second century AD who was born in Greece, practiced in Rome, and believed generally in the role of humors in health and the mind–body split. By dissecting animals of many species and examining their brains and other internal organs, he discovered that illnesses can involve pathology in specific parts of the body and different diseases have different effects (Stone, 1979).

Following the fall of the Roman Empire in the fifth century AD, knowledge and culture advanced slowly in Europe throughout the Middle Ages, which lasted about a thousand years. Galen’s views on physiology and disease processes were favored for most of this time. The influence of the Church in slowing the advancement of medical knowledge during the Middle Ages was enormous, particularly through its prohibition against dissection of human and animal cadavers (Marx & Hillix, 1963). Religious ideas shaped views about the cause of illness, and the belief in demons became strong again (Sarason & Sarason, 1984). Sickness was seen as God’s punishment for evil acts. As a result, the Church came to control medical practice, often with priests treating the ill by torturing the body to drive out evil spirits. In the thirteenth century, new ideas about the mind–body problem emerged. St Thomas Aquinas rejected the view that the mind and body are separate, and his

position renewed interest in the issue and influenced later philosophers (Leahey, 1987).

During the Renaissance of the fourteenth and fifteenth centuries, Europe saw a rebirth of inquiry, culture, and politics. Scholars began to focus less on religious doctrine and more on logic and empirical issues and methods in their search for truth (Leahey, 1987). They proposed that differing perspectives can lead to different views of truth. These ideas brought about important changes in philosophy once the scientific revolution began after 1600. The seventeenth-century 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 thought the mind and body were separate entities, but he proposed that the mind and body could communicate through the pineal gland in the brain (Leahey, 1987). His belief that animals have no soul and that the soul in humans leaves the body at death was eventually accepted by the Church, which meant that dissection could be used again (Engel, 1977; Marx & Hillix, 1963)

Knowledge in science and medicine grew quickly in the eighteenth and nineteenth centuries in Europe and North America. The advent of the microscope and the use of dissection in autopsies enabled scientists to learn how the body functioned and to discover that microorganisms cause certain diseases. With this knowledge, they were able to reject the humoral theory of illness and propose new theories (Stone, 1979). The development of antiseptics and anesthesia in the mid nineteenth century improved medical treatment, which enhanced the reputation of physicians and hospitals and people’s trust in the ability of doctors to heal. These changes and the belief that the mind and body are separate gave rise to a new way to conceptualize health and disease processes. This approach – called the *biomedical model* – proposes that all 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; Leventhal et al., 1985). The biomedical model assumes that disease is an affliction of the

body; psychological and social processes are of little relevance. This viewpoint became widely accepted during the nineteenth and twentieth centuries and still represents the dominant view in Western medicine today.

Psychosocial Processes in Health and Illness

Using the biomedical model as a guide, researchers have made enormous medical advances, such as in developing vaccines, antibiotics, and other effective medical procedures. But there are two reasons to view the model as incomplete (Sarafino, 2002). First, people can act to prevent or detect in early stages the development of illness, and psychosocial processes govern these actions. The need to find ways to improve the practice of these measures is clearly shown by the escalating costs of medical care worldwide. Although chronic diseases are a principal cause of death and disability around the world, particularly in developed nations, they can be prevented or delayed. Many individuals now 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 in the past. Second, there is now considerable evidence that personality processes play a role in health and illness. The role of people's health habits and personality differences in illness is not included in the biomedical model (Engel, 1977, 1980).

Health habits and illness

Earlier we saw that the occurrence of infectious diseases declined sharply in the late nineteenth century chiefly because of preventive measures, such as improving nutrition and personal hygiene. These measures involved changes in people's *health habits* – their usual health-related behaviors, such as the types of foods they consume – which become part of their lifestyles, or everyday patterns of behavior. People's lives often contain many risk factors for illness and injury. Characteristics or conditions that are associated with the development of a disease or injury are called *risk*

factors for that health problem. Some risk factors are biological, such as having inherited certain genes. Others are behavioral: for example, people who smoke cigarettes are at higher risk than nonsmokers for the two leading causes of death in the United States, cancer and heart disease, and other illnesses. Other risk factors for cancer and heart disease include eating diets high in saturated fat (behavioral) and having a family history of the disease (biological). Behavioral risk factors for the fifth leading cause of death, accidents (including motor vehicle), are alcohol or drug use, driving vehicles too fast, and not using seat belts (McGinnis, 1994; US Bureau of the Census, 1999). Although risk factors are associated with a health problem, they do not necessarily cause it. For example, being poor is a risk factor for cancer (Levy, 1985), but it does not cause the disease – at least, not directly.

People live longer if they practice *health behaviors*, that is, activities to maintain or improve their current good health, obtain a diagnosis or remedy when feeling ill, or carry out a program to recover from an illness or injury. Belloc and Breslow (1972) studied the impact of personal lifestyles on future health, surveying nearly 7,000 adults about their patterns of sleep, eating breakfast, eating between meals, maintaining an appropriate weight, smoking cigarettes, drinking alcohol, and getting physical activity. A follow-up 9½ years later revealed that the greater the number of health behaviors practiced, the lower the percentage of these people who had died, and the impact of these lifestyle differences increased as individuals got older after middle age.

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 that personality traits are linked to health. For example, low levels of conscientiousness in childhood and poor mental health in adulthood are related to dying at earlier ages from diseases, such as heart disease and cancer (Friedman et al., 1995). And individuals whose personalities include high

levels of anxiety, depression, anger/hostility, or pessimism appear to be at risk of developing heart disease and several other illnesses (Everson et al., 1996; Friedman & Booth-Kewley, 1987; Scheier & Bridges, 1995). These four emotions 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 suffer a tragedy. Not only are optimistic individuals less likely to become sick than people with less positive personalities, but when they are ill, they tend to recover more quickly (Reker & Wong, 1985; Scheier & Carver, 2001).

The connection between personality and illness is not a one-way street: illness can affect one's personality, too (Cohen & Rodriguez, 1995). Individuals who suffer from serious illness and disability often experience high levels of anxiety, depression, anger, and hopelessness. And as Sarason and Sarason (1984) have pointed out, even minor health problems, such as the flu or a backache, produce temporary negative thoughts and feelings. Medical patients who overcome their negative thoughts and feelings can speed their recovery.

Current Perspectives on Health and Illness

Combining psychosocial processes with the biomedical model produces a different and broader picture of how health and illness come about. This new perspective, called the *biopsychosocial model*, expands the biomedical view by adding to biological factors the role of psychological and social factors (Engel, 1977, 1980; Schwartz, 1982). This new model proposes that all three factors affect and are affected by the person's health. Engel (1980) has proposed that we can conceptualize these influences by applying the concept of 'systems'. A *system* is a dynamic entity with constituents that continuously interrelate, such as by exchanging energy, substances, and information (Bertalanffy, 1968). Thus, one's body qualifies as a system – and it includes the circulatory and nervous systems, which consist of tissues and cells. One's family is a system, too, and so are the community and society.

As an example of the biopsychosocial perspective, we can consider how a person might become severely overweight, which is a risk factor for several illnesses, including diabetes and heart disease. The body is a complex physical system that contains organs, bones, and nerves, and these are composed of tissues, which in turn consist of cells, molecules, and atoms. The body's efficient, effective, and healthful functioning depends on the way these components operate and interact with each other. Biological factors include genetic materials and processes that affect the structure and operation of these components. Inheritance is a biological factor that is known to influence weight (Allison, Heshka, Neale, Lykken & Heymsfield, 1994; Stunkard, Foch & Hrubec, 1986), perhaps through its influence on metabolism and taste sensation (Logue, 1991). Psychological factors can include cognition, emotion, and motivation. For instance, people report that they eat more when they are anxious or upset, and evidence supports the view that stress can induce eating (Arnow, Kenardy & Agras, 1992; Logue, 1991). And food-related cues, such as a waiter's description or display of a dessert, are more likely to persuade an obese person than a nonobese person to order the food (Herman, Olmstead & Polivy, 1983). Social factors include the modeling and consequences other people provide for behavior. One's social world includes family members, friends, classmates and coworkers, and people in the mass media. The role of social factors on weight can be seen in the finding that parents give more encouragement for eating and offer food more frequently to heavier children than to slimmer ones (Baranowski & Nader, 1985). Other research has found that children of overweight parents are more likely to become overweight than children of normal weight parents (Whitaker, Wright, Pepe, Seidel & Dietz, 1997), which may support the role of either genetic or social factors. The combination of biological, psychological, and social factors determines the person's likelihood of becoming overweight, and as individuals gain weight, their biological, psychological, and social processes change. In similar ways, these factors can influence whether a person will develop an illness, such as

cancer or heart disease, through their effects on disease processes directly or on behaviors that increase the risk of these diseases.

Development of Professional Organizations and Functions

The view that medicine and psychology are related has a long history, dating back at least to ancient Greece. Early in the twentieth century, it became somewhat more formalized in the work of Freud, who noticed that some patients showed symptoms of physical illness, such as blindness or the loss of sensation in part of the body, without any organic disorder. He proposed that these symptoms were 'converted' from unconscious emotional conflicts and called this condition conversion hysteria (Alexander, 1950; Davison & Neale, 1998).

The need to understand conditions such as conversion hysteria led professionals to develop the first field dedicated to studying the interplay between emotional life and bodily processes. The field called *psychosomatic medicine* was formed in the 1930s in association with the National Research Council, which then published the journal *Psychosomatic Medicine* (Alexander, 1950). Its founders were mainly trained in medicine and psychoanalysis. Four years later the field organized a society that is now called the American Psychosomatic Society. For the next 30 years or so, research in psychosomatic medicine emphasized psychoanalytic interpretations for specific, real health problems, including asthma, high blood pressure, ulcers, migraine headaches, and rheumatoid arthritis. In the 1960s, psychosomatic medicine began to adopt new approaches and theories (Totman, 1982). It is a broader field today, concerned with the relationships among psychosocial factors, biological and physiological functions, and the development and course of illness (Lipowski, 1986).

Two new fields emerged in the 1970s to study the role of psychology in illness. One of these fields, *behavioral medicine*, began in association with the National Academy of Sciences. The *Journal of Behavioral Medicine* and the Society of Behavioral Medicine were then founded. The society's members come from a

variety of fields, including psychology and various areas of medicine (Gentry, 1984). The field grew out of the behavioral perspective in psychology, focusing on the role of classical (or respondent) and operant conditioning in behavior. Operant and classical conditioning therapy methods had shown considerable success in helping people modify problem behaviors, such as overeating, and emotions, such as anxiety and fear (Sarafino, 2001). By the 1970s, physiological psychologists had shown that psychological events, particularly emotions, influence body functions, such as blood pressure. They had also demonstrated that people can learn to control physiological systems through biofeedback, a technique that provides information as to what a system is doing (Miller, 1978). Behavior modification approaches now include *behavioral methods* (techniques based on operant and classical conditioning) and *cognitive methods*, which are geared toward changing people's feelings and thought processes (Sarafino, 2001).

The behavioral perspective also served as an important foundation for the field of *health psychology*, which is within the discipline of psychology and was formally established as a division of the American Psychological Association in 1978 (Wallston, 1993). The official journal of this division, *Health Psychology*, began publication 4 years later. Matarazzo (1982), the first president of the division, outlined four goals of health psychology: to promote and maintain health, to prevent and treat illness, to identify the causes and diagnostic correlates of health, illness, and related dysfunction, and to analyze and improve health care systems and health policy. International organizations have also developed: for example, the European Health Psychology Society (2001) was formed in 1986 and currently has representation from most European nations. Psychologists around the world work to achieve the goals of health psychology in a variety of ways.

The functions of health psychology professionals are expanding as the field matures. Most health psychologists work in hospitals, clinics, and academic departments of colleges and universities where they can provide direct and indirect help to patients. The direct help

they provide generally relates to the individual's psychological adjustment to and management of health problems. Health psychologists with clinical training provide therapy for adjustment problems that being ill or disabled can produce – for example, in reducing the patient's feelings of depression. They also teach patients psychological methods to help them manage health problems; patients can learn biofeedback to control certain pain conditions, for instance. Health psychologists provide indirect help to patients through research on lifestyle and personality factors in illness and injury, by designing programs to help people lead more healthful lifestyles, and by educating health care workers to understand more fully the psychosocial needs of patients.

The qualifications for becoming a health psychologist include completion of a doctoral degree in psychology (Belar, 1997). More study may be called for if the doctoral program contained little training in health psychology. *Clinical health psychology* is an accredited specialty of the American Psychological Association. To practice clinical techniques, state licensing is required in the United States, and board certification is available (Deardorff, 1996).

Psychosomatic medicine, behavioral medicine, and health psychology have very similar goals, study similar topics, and share the same knowledge. These fields are separate mainly in an organizational sense, and many professionals are members of all three. Although the fields have slightly different perspectives, they share the position that health and illness result from the interplay of biological, psychological, and social forces. As this suggests, these fields use knowledge from a wide variety of disciplines and work together to enhance wellness and reduce illness.

AREAS OF STUDY AND APPLICATION

The field of health psychology has made enormous advances since the 1970s, generating new knowledge and designing and implementing programs and techniques to supplement medical efforts in promoting health. This section describes a sample of the many areas of study

and application in which health psychologists have made important contributions.

Stress, Coping, and Health

Researchers have examined stress in three ways (Baum, 1990; Hobfoll, 1989). One approach focuses on physically or psychologically challenging events or circumstances called *stressors*. Another approach centers on the psychological and physiological responses to a stressor, which are called *strain*. The third approach treats stress as a process involving continuous interactions and adjustments, called *transactions*, between the person and the environment (Lazarus & Folkman, 1984). Transactions generally involve cognitive appraisal processes in which individuals assess the meaning or demands of a stressor and the resources available to cope with or manage it. In effect, transactions allow the person to affect a stressor's impact through cognitive processes, aided by behavioral and emotional coping strategies, such as taking direct action to eliminate the stressor or expressing distress.

Consistent with all three approaches, we can define *stress* as the condition that results when transactions lead the person to appraise a discrepancy between the demands of a stressor and the resources of his or her biological, psychological, and social systems. Strain occurs when stress exists and can involve psychological distress and physiological reactions, called *reactivity*, that include heightened blood pressure, heart rate, and serum levels of two classes of hormones: catecholamines (e.g., epinephrine) and corticosteroids (e.g., cortisol). People who experience chronic stress show high reactivity when a stressor occurs, and their arousal takes more time to return to its baseline, or 'resting,' level (Gump & Matthews, 1999). This and other research findings support Selye's (1956, 1976) *general adaptation syndrome*. Selye proposed that the effects of long-term, intense stress advance through three stages: the alarm reaction with very high arousal, the stage of resistance in which arousal declines somewhat but remains above normal as the body tries to adapt, and the stage of exhaustion when the body's defenses weaken.

Stress can have a variety of sources (Sarafino, 2002). Within the person, for instance, it can arise from disability or pain in illness or from decisional conflicts, such as whether to change jobs or which treatment approach to get when sick. A person's family can create stressors through the birth of a baby, especially one with a difficult temperament; divorce; or a member's illness, disability, or death. And one's community can generate stressors through problems in the environment, such as noise or hazardous pollution, and on the job or at school through work demands, supervisors' evaluations, or interpersonal conflicts. Common measures of stress involve assessing physiological arousal – using a polygraph or biochemical analyses – and self-reports of the person's experiences (Sarafino, 2002). These experiences can be major life events, such as losing a job or a loved one, or daily hassles, such as misplacing something or hearing a loud party when trying to sleep.

Psychosocial factors can modify the impact of stressors on individuals. One of these factors is *social support* – the perceived help, comfort, caring, or esteem one receives from other people (Cobb, 1976; Wallston, Alagna, DeVellis & DeVellis, 1983; Wills, 1984). High levels of social support appear to reduce stress. Another psychosocial modifier of stress is the person's sense of *personal control*, the feeling of being able to make decisions and take effective action to avoid undesirable outcomes and produce desirable ones (Miller, 1979; Rodin, 1986; Thompson, 1981). People's sense of personal control can involve two beliefs: (1) that they can influence events in their lives, that is, they are high in internal locus of control (Rotter, 1966); and (2) that they can succeed at specific activities, that is, they have a high degree of self-efficacy (Bandura, 1977, 1986). A strong sense of personal control appears to reduce stress. People with a weak sense of personal control who experience chronic high levels of stress tend to feel helpless. Another psychosocial modifier of stress is the *type A behavior pattern*, which is marked by a competitive achievement orientation, time urgency, and anger or hostility (Chesney, Frautschi & Rosenman, 1985; Friedman & Rosenman, 1974).

Compared with people with the more easygoing type B pattern, type A individuals respond more quickly and strongly to stressors, with overt behaviors and physiological reactivity, and are more likely to develop coronary heart disease and hypertension (Booth-Kewley & Friedman, 1987; Carver, Diamond & Humphries, 1985; Diamond, 1982; Glass, 1977; Matthews, 1988).

Research has demonstrated clear links between illness and people's degree of reactivity in their cardiovascular, endocrine, and immune systems when stressed. For example, people's high cardiovascular reactivity to laboratory stressors in early adulthood is associated with later development of atherosclerosis (the build-up of fatty plaques on artery walls) and hypertension (Matthews et al., 1998; Menkes et al., 1989). Chronically high levels of catecholamines and corticosteroids (endocrine hormones) appear to increase atherosclerosis (Lundberg, 1999). Some of these hormones are also associated with impaired immune function, which seems to be important in the development and progression of infectious diseases and cancer (Kiecolt-Glaser & Glaser, 1995; Vedhara et al., 1999). Evidence on the connections between psychosocial and physiological processes led researchers to form a new field of study, *psychoneuroimmunology*, which focuses on the interplay between psychosocial factors and the nervous, endocrine, and immune systems (Ader & Cohen, 1985; Dunn, 1995). It is now known that negative emotions, such as depression and stress from major and minor events, are related to impaired immune function (Biondi & Pancheri, 1995; Dunn, 1995; Leonard, 1995). In contrast, positive emotions seem to enhance immune function (Stone et al., 1994).

The impact of stress is also clear in the symptoms and development of various illnesses, and we will consider four. First, evidence indicates that stress can trigger asthma episodes (Sarafino & Goldfeder, 1995; Wright, Rodriguez & Cohen, 1998). Second, studies have found that stress, particularly from everyday hassles, is among the most common triggers of migraine and tension-type headaches (Robbins, 1994; Wittrock & Myers, 1998). Third, stress and blood pressure are also linked. For example, Cobb

and Rose (1973) compared the medical records of thousands of traffic controllers at airports with high and low traffic density. They found that the prevalence rates of hypertension were higher among subjects at high-density sites than at low-density sites. Last, because of the connections between reactivity and both atherosclerosis and hypertension, one would expect that stress would be related to coronary heart disease, and it is. High levels of stress at work or from life events are associated with high incidence rates of heart disease and recurrence of heart attack (Cottingham & House, 1987; Theorell & Rahe, 1975).

Stress management techniques are available to help people who have trouble coping. One behavioral method is progressive muscle relaxation, in which individuals focus their attention on specific muscle groups while alternately tensing and relaxing these muscles (Sarafino, 2001). Another is biofeedback, which can help reduce physiological reactivity to stressors. Other approaches use cognitive methods to help people modify their thoughts when they encounter stressors. Some of these methods use cognitive restructuring strategies: the person learns to replace stress-provoking beliefs or thoughts with more constructive or realistic ones. These methods assume that stress appraisals are frequently based on misperceptions, a lack of information, or irrational ideas. Ellis's (1962, 1977) rational-emotive therapy and Beck's (1976) cognitive therapy are prominent examples of the cognitive restructuring approach. Other cognitive methods focus on teaching skills to help the person cope with or avoid stressful situations, as stress-inoculation training (Meichenbaum & Cameron, 1983) and problem-solving training (D'Zurilla, 1988; Nezu, Nezu & Perri, 1989) do. Stress management techniques are also effective in treating hypertension (Linden & Chambers, 1994) and reducing type A behavior (Roskies, 1983). Furthermore, research has shown that cardiac patients who receive stress management training to decrease type A behavior have much lower rates of heart problems and death in the next several years than patients who do not get training (Powell & Friedman, 1986).

Health Habits and Health Promotion

People's lifestyles typically include many health habits that are risk factors for illness or injury. They may smoke cigarettes, drink excessively, use drugs, eat high-fat or high-cholesterol diets, eat too much and become overweight, get too little physical activity, and behave in unsafe ways, such as by not using seat belts in automobiles or condoms when having sex with a new partner. Practicing health behaviors prevents illness, and this is an important area of interest in health psychology.

Although people tend to think of prevention as occurring before an illness develops, there are actually three levels of prevention – primary, secondary, and tertiary – that differ on the basis of the health status of the person (Runyan, 1985; Sanson-Fisher, 1993). Each level of prevention can include efforts of oneself, one's family or community, and professionals who work to promote health. Primary prevention involves activities to avoid illness or injury, such as getting a flu inoculation or eating a low-fat diet and exercising to avoid heart disease. These activities might be initiated by oneself or at the suggestion and encouragement of one's family, physician, or employer. Secondary prevention refers to actions taken to identify and treat an illness or injury early with the goal of curbing or reversing the problem. Receiving a dental examination or a mammogram would be examples. Tertiary prevention occurs after a health problem has progressed beyond the early stages and includes actions to rehabilitate the patient and to avoid lasting or irreversible damage, disability, and recurrence. Health psychologists study factors that determine the health-related behaviors people practice and try to promote the adoption of health behaviors.

Factors that influence health habits

Biological, psychological, and social factors can influence the likelihood that individuals will engage in specific health-related behaviors. The role of biological processes in health habits can be seen in people's excessive alcohol

use: heredity has an influence (Ciraulo & Renner, 1991; Prescott & Kendler, 1999; Schuckit, 1985). Twin studies have generally found that if one member of a same-sex twin pair is alcoholic, the likelihood that the other member is alcoholic is twice as great if the twins are monozygotic (identical) rather than dizygotic (fraternal). But these links are complex, and developmental processes may moderate them. For instance, genetic factors appear to play a stronger role when alcohol abuse begins before age 25 than after that age (Kranzler & Anton, 1994).

Psychological processes also affect the development of health habits. Learning plays a major role, particularly through operant conditioning in which behavior is changed by its consequences, either reinforcement or punishment (Sarafino, 2001). Reinforcement causes an increase and punishment causes a decrease in performance of the behavior on which the consequence is contingent. A child who has a good deal of success and receives praise for athletic pursuits is more likely to be physically active in the future than a child who experiences failure and derision for those behaviors. If the reinforcing consequences are discontinued at some point, the behavior tends to weaken through the process of extinction. Operant behavior generally occurs following or in the presence of antecedents – that is, cues that precede and set the occasion for an action. Another important learning process is classical (respondent) conditioning in which a stimulus (the conditioned stimulus) gains the ability to elicit a response through repeated association with a stimulus (the unconditioned stimulus) that already elicits that response (Sarafino, 2001). One way classical conditioning affects health habits is by establishing cues that serve as antecedents to the behavior. For example, people who smoke cigarettes, drink alcohol, or use other substances learn antecedents that set the occasion for use, often with feelings of craving. Some behaviors that are prompted by cues may become habitual, or automatic, often occurring without awareness of the behavior or the cues that initiated it, as when a smoker absentmindedly reaches for and lights a cigarette.

Cognition plays an important role in the performance of health-related behaviors. People are more likely to start and continue a health behavior if they have correct knowledge about relevant health issues and the ability to solve problems that arise when trying to practice the behavior, such as how to eat a healthful diet when other family members dislike nutritious foods. One of the most influential theories of people's practicing healthful behaviors is the *health belief model*, which proposes a series of cognitive activities that leads to the likelihood of taking preventive action (Becker, 1979; Becker & Rosenstock, 1984; Rosenstock, 1966). A person's likelihood of preventive action depends directly on two assessments: the perceived threat of illness or injury and the sum of the benefits and barriers of taking the action. These assessments depend on the person's perceptions, such as of the seriousness of and susceptibility to the illness or injury, and modifying factors, such as the person's age, sex, and knowledge about the health issue. Research has generally supported the theory (Becker, 1979; Becker & Rosenstock, 1984; Curry & Emmons, 1994; Kirscht, 1983). For instance, comparisons have been made of people who do and do not regularly get breast and cervical cancer tests, have dental visits, or engage in exercise. These studies have found that people who do these health behaviors are more likely to believe that they are susceptible to the related health problem, that the health problem would have serious effects, and that the benefits outweigh the barriers of preventive action.

The *stages of change model* attempts to account for people's likelihood of changing unhealthful habits by focusing on their cognitive and behavioral 'readiness' to change (Prochaska & DiClemente, 1984; Prochaska, DiClemente & Norcross, 1992). The model outlines five stages of intention to change, ranging from not considering changing at all, to being ready to start soon, to having succeeded and maintained the change for at least several months. According to the stages of change model, people advance from one stage to the next in the process of changing, their psychosocial characteristics at each stage differ,

and it is possible to match intervention strategies with these characteristics to help people advance to the next stage. Research has confirmed that people at higher stages are more likely to adopt relevant health behaviors, such as using safer sex practices and quitting smoking (Bowen & Trotter, 1995; DiClemente et al., 1991). But tests of the utility of matching strategies to help people advance to higher stages have yielded some inconsistent results (see e.g., Quinlan & McCaul, 2000; Velicer, Prochaska, Fava, LaForge & Rossi, 1999).

Most theories focusing on the role of cognition in practicing health habits assume that the processes are mainly rational. But three lines of evidence indicate that nonrational processes also play a role. First, people tend to be overly optimistic about their health, believing that the chances of getting serious illnesses are lower for themselves than for other people who are much like them (Weinstein, 1987). Second, studies have found that people's desires and preferences influence the judgments they make of the validity and utility of new information – a process called motivated reasoning (Kunda, 1990). For instance, people who prefer to reach a particular conclusion about the hazards of eating certain foods will search for reasons to accept supportive information and discount opposing information. And the tendency to use biased reasoning processes appears to be fairly stable and consistent across a variety of situations (Sarafino, 1999). Third, stress and other emotional factors can affect the cognitive processes people use in making decisions, particularly decisions relating to health, because of conflicts about the best course of action (Janis, 1984).

Social factors influence people's health habits through modeling processes and social consequences, such as praise. In modeling, people learn by observing the behavior of another person, especially if the model is similar to themselves and has high status, such as a popular classmate or a movie star or athlete (Bandura, 1969, 1986). Modeling also involves imitation: when drinking socially, for example, people tend to adjust their drinking rates to match those of their companions (McCarty, 1985). Friends and family promote health

behavior by reinforcing it with praise and conveying a value for good health, and they discourage health behavior by punishing it, such as by complaining about how the behavior interferes with other activities (Burg & Seeman, 1994; Weiss, Larsen & Baker, 1996).

Substance use and abuse

Using certain substances repeatedly can produce addiction, the condition of being physically and psychologically dependent on a substance. In *physical dependence*, the body adjusts to the substance and incorporates it into its usual functioning, as reflected in the phenomena of tolerance (requiring increasing doses to achieve the same effect) and withdrawal (symptoms when substance use is sharply reduced). *Psychological dependence* involves feeling compelled to use the substance for its pleasant effect. Health psychologists study factors relating to people's use of various substances; we will focus on tobacco and alcohol. Cigarette smoking is a risk factor for several illnesses, particularly lung cancer and heart disease (American Cancer Society, 2000; American Heart Association, 2000). Heavy alcohol use is related to a variety of health problems, including fetal alcohol syndrome in babies of drinking mothers, injury from automobile accidents, and cirrhosis of the liver (National Institute on Alcohol Abuse and Alcoholism, 1993).

About 1.1 billion people in the world smoke cigarettes (World Health Organization, 1998). Biopsychosocial factors influence people's beginning and continuing to smoke. The role of biological factors is clear: heredity affects whether people will begin and continue to smoke (Hughes, 1986), and people with a specific gene pattern are less likely to become smokers and more able to quit after starting (Lerman et al., 1999). The nicotine in cigarettes is an addictive substance that produces physiological effects quickly by leading to the release of chemicals, including acetylcholine and norepinephrine, that have desirable effects. For example, they increase alertness and decrease symptoms of withdrawal, feelings of anxiety, and pain. One prominent

explanation of continued smoking is the *nicotine regulation model*, which proposes that people continue to smoke to avoid withdrawal symptoms. Although research has supported this model (Schachter et al., 1977), it appears to provide only part of the reasons for continued use. For instance, some smokers don't show the tolerance and withdrawal characteristics of addiction, and most people who quit smoking still crave it long after no nicotine remains in their bodies (Leventhal & Cleary, 1980; Shiffman, Paty, Gnys, Kassel & Elash, 1995).

Psychosocial factors are also involved and may account for some phenomena that the nicotine regulation model cannot explain. For one thing, nicotine appears to have reinforcing effects (Shadel, Shiffman, Niaura, Nichter & Abrams, 2000). A theory called the *biobehavioral model* proposes that because nicotine decreases anxiety and increases alertness, smokers come to depend on it to regulate their cognitive and emotional states, thereby helping them cope better (Pomerleau & Pomerleau, 1989). Second, other psychosocial factors have been linked with smoking. For example, adolescents who start and continue to smoke tend to have peer and adult models of smoking, experience peer pressure to smoke, and believe that smoking can enhance their image (Conrad, Flay & Hill, 1992; Killen et al., 1997; Robinson & Klesges, 1997). It seems clear that a complete explanation of smoking behavior involves the interplay of biological, psychological, and social factors.

Biopsychosocial processes are also involved in the development of heavy alcohol use. In the United States alone, 20 per cent of the men and 8 per cent of the women have abused alcohol at some time in their lives (Davison & Neale, 1998). As mentioned earlier, heredity influences the likelihood of people's excessive alcohol use (Ciraulo & Renner, 1991; Prescott & Kendler, 1999; Schuckit, 1985). Psychosocial processes also play a role. Children and adolescents learn from watching people around them and on TV to expect positive effects of drinking alcohol (Adesso, 1985; Dunn & Goldman, 1998; Scheier & Botvin, 1997). People continue or increase their drinking partly as a result of

positive and negative reinforcement in operant conditioning (Adesso, 1985; Cunningham, 1998; National Institute on Alcohol Abuse and Alcoholism, 1993). With positive reinforcement, people may drink for the taste or the feeling they get from it; with negative reinforcement, they may drink because it reduces unpleasant feelings, such as stress or anxiety, at least in the short run.

Health psychologists have participated in designing and applying interventions to prevent and help people quit smoking and drinking. Programs introduced before adolescence to prevent smoking and drinking can successfully reduce the number of individuals who begin these behaviors, but the effects appear to last only 2 or 3 years and need to be refreshed with booster sessions to maintain the success (Botvin & Epstein, 1999; Klepp, Kelder & Perry, 1995; National Institute on Alcohol Abuse and Alcoholism, 1993). Treatment approaches to help people quit smoking are most effective if they include behavioral methods, the nicotine patch, and advice by a physician to quit (Cinciripini, Cinciripini, Wallfisch, Haque & Van Vunakis, 1996; Fiore, Jorenby & Baker, 1997). For quitting drinking, effective approaches include Alcoholics Anonymous (Ouimette, Finney & Moos, 1997) and programs that use behavioral and cognitive methods (Miller & Hester, 1980; Monti et al., 1993).

Nutrition and exercise

Eating high-cholesterol, low-fiber diets and getting little physical activity are associated with the development of illnesses, including hypertension, heart disease, and some forms of cancer (American Cancer Society, 2000; American Heart Association, 2000). Biopsychosocial factors are involved in the diets people consume and the level of physical activity they get.

Inborn factors influence aspects of an individual's diet. Most people around the world appear to like sweet tastes and dislike bitter ones, right from birth (Rozin, 1989). Furthermore, research findings indicate that brain chemicals influence people's tendency to eat fatty foods (Azar, 1994). Psychosocial factors in people's diets can be seen in the role

of individual and social experiences (Hearn et al., 1998; Rozin, 1989; Schutz & Diaz-Knauf, 1989). For instance, some foods are more available than others at home, work, or school, and exposing individuals to a specific food can increase their liking of it. Modeling is also important, allowing people to develop an attraction to a food if they see that other individuals eat it and like it. Interventions that include nutrition education and other approaches, such as behavioral methods, to change diets that place people at risk for cardiovascular problems appear to reduce serum cholesterol levels and blood pressure (Brunner et al., 1997).

People's age and gender affect their getting physical exercise, and these differences may be partly the result of actual and expected physical capabilities. In the United States, men engage more in exercise in early adulthood and old age than at ages in between, but women exercise relatively little throughout the adult years (US Bureau of the Census, 1999). Older men and women tend to underestimate their ability to perform vigorous exercise and exaggerate the health risks of exercising (Vertinsky & Auman, 1988; Woods & Birren, 1984). Whether people exercise depends also on psychosocial influences, such as modeling, encouragement, and reinforcement by peers and family (Dishman, Sallis & Orenstein, 1985). Interventions can successfully promote exercise behavior, especially if they include behavioral methods (Sallis & Owen, 1999).

Receiving Medical Care

When people experience clear health symptoms, some use medical services right away, some delay getting care, and some don't seek care at all. The health belief model explains part of these differences (Becker & Rosenstock, 1984; Langlie, 1977). For individuals who do get treatment, their *compliance* with, or *adherence* to, the medical regimen and their adjustment to a hospital stay have been of particular interest to health psychologists.

Estimates indicate that about 40 per cent of patients fail to adhere reasonably closely to the treatment regimen their physician recommends

(DiMatteo, 1985; Rand & Weeks, 1998). Low compliance is common if the regimen has a very long duration, is complex, and requires them to change long-standing habits (Burke, Dunbar-Jacob & Hill, 1997; Haynes, 1976; Parrish, 1986). Patients also show poor adherence if the physician does not explain the regimen carefully and they feel a poor relationship with the physician (DiMatteo, 1985). Health psychologists have helped to design and implement successful interventions to improve physicians' communication skills (Roter & Hall, 1989) and patients' compliance motivation through behavioral methods (Burke et al., 1997; Roter et al., 1998).

Being hospitalized with a serious illness or injury produces a great deal of stress and anxiety, which impairs medical recovery. Health psychologists can help by providing psychological counseling and information to enhance patients' understanding and sense of personal control over some of the difficult circumstances they will experience. Providing such help reduces patients' anxiety, recovery time, post-surgical complications, and medication use (Anderson, 1987; Gruen, 1975).

Managing and Adjusting to Pain Conditions

Pain involves the interplay between physiological and psychosocial processes (Bakal, 1979). Most pains are *acute*, and the experiences disappear in hours or weeks; others are *chronic* and last for more than a few months, often becoming worse over time (Turk, Meichenbaum & Genest, 1983). Pain sensations generally arise when injured tissues release chemicals called algogenic substances that activate nerve endings called nociceptors to send pain signals through the spinal cord to the brain (Chapman, 1984; Tortora & Grabowski, 2000). Evidence of the role of psychosocial processes led Melzack and Wall (1965, 1982) to propose the *gate control theory*, which describes a physiological mechanism by which psychological factors can affect people's experience of pain. Psychological factors that increase pain sensations include anxiety, tension, depression, and focusing attention on the pain. The results of

most studies that have tested this theory have supported it (Melzack & Wall, 1982; Winters, 1985).

Chronic, disabling pain has psychosocial effects, often in the form of a syndrome called the *neurotic triad* (Cox, Chapman & Black, 1978; Rosen, Grubman, Bevins & Frymoyer, 1987). The neurotic triad involves extremely high levels of *depression*, *hypochondriasis* (pre-occupation with physical symptoms and health), and *hysteria* (tendency to cope with problems by developing physical symptoms and using avoidance coping methods), as measured with the Minnesota Multiphasic Personality Inventory (MMPI). Health psychologists apply a variety of approaches to reduce patients' pain, drug consumption, and disability. In treating migraine and tension-type headache, for example, relaxation and biofeedback methods yield substantial and durable relief (Blanchard, Appelbaum, Guarnieri, Morrill & Dentinger, 1987; Holroyd & Penzien, 1990). Cognitive methods, such as distracting one's attention and using mental imagery of scenes, effectively reduce acute pain (Fernandez & Turk, 1989; Manne, Bakeman, Jacobsen, Gorfinkle & Redd, 1994). For chronic pain, such as from arthritis or headache, programs combining cognitive and behavioral methods are particularly helpful in reducing pain (Compas, Haaga, Keefe, Leitenberg & Williams, 1998; Morley, Eccleston & Williams, 1999). Hypnosis can relieve pain in patients who can be hypnotized easily and deeply (DeBenedittis, Panerai & Villamira, 1989).

Managing and Adjusting to Disabling and Life-Threatening Conditions

We have seen that chronic diseases are the main health problems in industrialized countries today, where they account for the large majority of deaths. Some chronic illnesses can lead to disability, and some have high rates of death. For people who develop a chronic illness, health psychologists can contribute to tertiary prevention efforts by helping patients manage their health condition and adjust to it psychosocially.

When people develop illnesses that do not pose a very high risk of death, the chief concern in tertiary prevention is helping them manage the illness to reduce symptoms and disability and to prevent a worsening of the condition. We will consider a few psychological techniques that can help these patients, concentrating for our purposes on two illnesses: asthma and diabetes. For asthma, biofeedback and relaxation techniques have had success (Sarafino, 1997). With biofeedback, an asthmatic breathes through an apparatus that measures the flow of air and learns to control the diameter of bronchial airways by receiving periodic feedback regarding airflow. Progressive muscle relaxation is used to help the patient reduce the role of stress in initiating an asthma attack or in making it worse when one occurs. For diabetes, an important concern is fostering compliance with difficult self-management regimens of monitoring serum glucose levels and controlling diet and exercise. Studies with child and adolescent diabetics have found that programs using behavioral methods, such as providing prompts and reinforcers for performing tasks, improve self-management actions and serum glucose levels (Goodall & Halford, 1991).

For people with life-threatening diseases, two common needs involve promoting their adherence to the medical regimen and adjusting to their disability and possibility of dying. In considering some psychological approaches for these patients, we will focus on promoting psychosocial adjustment in heart disease. Initial elevations of anxiety and depression after a heart attack continue in many patients beyond a few months. The poor adjustment these emotions reflect has been linked to decreased regimen adherence and physical condition and increased risk of subsequent heart problems and death (Carney, Freedland, Rich & Jaffe, 1995; Carney et al., 1988; Frasure-Smith, Lespérance, Juneau, Talajic & Bourassa, 1999). Studies with 1- and 2-year follow-up periods have found that interventions with regimen training and psychosocial counseling reduce the risk of heart problems and death (Dusseldorp, van Elderen, Maes, Meulman & Kraaij, 1999; Linden, Stossel & Maurice, 1996).

RELATING HEALTH PSYCHOLOGY TO OTHER DISCIPLINES

Knowledge in health psychology is enriched by information from many other disciplines, including disciplines within *psychology*, such as the clinical and social areas; *medicine*, including psychiatry and pediatrics; and *allied fields*, such as nursing, nutrition, pharmacology, and social work. We will look at some of the fields that provide information and a context for health psychology.

Understanding health psychology fully requires knowledge of the context in which health and illness exist. Part of the context comes from the field of *epidemiology* – the scientific study of the frequency and distribution of disease and injury. Epidemiologists determine the occurrence of illness in a given population and organize these data by relevant variables, such as when the disease or injury occurred, where, and to which age, gender, and racial or cultural groups. Then they conduct research to discover why specific illnesses are distributed as they are. The mass media often report the results of epidemiologists' work – for example, areas of the United States where Lyme disease occurs at high levels and where cancer is linked to high levels of toxic substances in the environment. Five terms epidemiologists use in describing aspects of their findings are: *mortality*, i.e., death, generally on a large scale; *morbidity*, i.e., illness, injury, or disability; *prevalence*, i.e., the number of cases, such as of a disease or of persons infected or at risk, including continuing (previously reported) and new cases at a given moment in time; *incidence*, i.e., the number of new cases; and epidemic, i.e., the situation in which the incidence has increased rapidly (Gerace & Vorp, 1985; Runyan, 1985). Adding the word *rate* conveys relativity to the meaning, as in describing a mortality rate of 6 babies per 1,000 births dying in their first year of life.

Another important discipline for health psychology is *public health*, the field concerned with protecting and improving health through organized effort in the community. Public health workers do research and set up programs to improve health education, immunizations,

sanitation, and community health services (Runyan, 1985). This field considers health and illness in the context of the community as a social system. Many health psychologists study the success of public health programs and the way individuals react to them.

Two other related fields are sociology and anthropology (Adler & Stone, 1979). *Sociology* focuses on human social life in groups or communities and evaluates the impact of social factors, such as the mass media, population growth, and institutions. *Medical sociology* is a subfield that examines, for instance, the impact of social relationships on the distribution of 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*, focuses on differences in health and health care across cultures. Medical anthropologists study how different cultures structure health care systems and react to and treat disease and injury. Knowledge from sociology and anthropology enables health psychologists to have a broad social and cultural view of medical issues and to consider different ways to interpret and treat illness.

A variety of professionals work together with physicians and nurses as a team to provide care for patients who are suffering from a chronic illness, serious injury, or disability. Professionals in each of the four allied fields we will consider have specific training for a special role in a patient's treatment or rehabilitation process, and most of them have some education in psychology. *Dietitians* work in hospitals, clinics, nursing homes, colleges, and schools to study and apply knowledge about food and its effect on the body (American Dietetic Association, 2000). Many dietitians work directly with patients to assess nutritional needs, implement and evaluate dietary plans, and instruct patients and their families on ways to adhere to needed diets after hospital discharge. Some dietitians work for social service agencies, counseling people on nutritional practices to help maintain health and speed recovery when they are ill. *Physical therapists* plan and apply techniques to help patients restore functional movement to parts of their body, relieve pain, and prevent or limit

permanent disability (American Physical Therapy Association, 2000). The most common technique used in physical therapy involves exercise, which generally begins by requiring little effort and becomes more and more challenging. Another technique uses electrical stimulation to move paralyzed muscles or to reduce pain. Physical therapists also give instructions for carrying out everyday tasks, such as cooking meals or tying shoelaces, and using adaptive devices, such as crutches or a prosthesis, if needed. *Occupational therapists* help physically, mentally, and emotionally disabled individuals gain skills needed for daily activities at home, in a work setting or school, and in the community (American Occupational Therapy Association, 2000). Their patients often had these skills at one time, but lost them because of a spinal cord injury or a disease, such as muscular dystrophy. *Medical social workers* provide services in hospitals, nursing homes, rehabilitation centers, and public health programs to help patients and their families make psychological and social adjustments to an illness and obtain needed community services, including income maintenance and occupational therapy (National Association of Social Workers, 2000).

SOCIOCULTURAL, GENDER, AND DEVELOPMENTAL FACTORS IN HEALTH

Health and illness vary across the history and cultures of the world. Comparisons of mortality data in Europe and North America in 1900 and in developing nations of the world today reveal very similar infant mortality rates and causes: diarrheal diseases, malnutrition, respiratory infections, and whooping cough (UNICEF, cited in Skolnick, 1986). Looking only at health patterns today, we see that substantial variations occur across ethnic groups and social classes, between males and females, and across the life span. What variations occur now, and why do they exist?

Sociocultural Differences and Health

The term *sociocultural* means involving or relating to social and cultural factors, such as

ethnic and income variations within and across nations. Epidemiological studies of socio-cultural differences in health have found, for instance, that stomach cancer has a far higher prevalence rate in Japan than in the United States today, but the opposite is true for breast (in females) and prostate (in males) cancers (Williams, 1990). Moreover, large socio-cultural differences exist in the prevalence of specific cancers within the same country (Williams & Rucker, 1996). In the United States, for example, Chinese Americans have much higher rates of liver cancer than Caucasians do. The differences found in the illness patterns of countries, regions, or ethnic groups result from variations in people's heredity, environmental pollution, economic barriers to health care, diets, health-related beliefs, and values (Flack et al., 1995; Johnson et al., 1995). Although people in all parts of the world value good health, people differ in the importance they place on maintaining health. The more people value their health, the more likely they are to take care of it.

Research has revealed wide variations in the health habits of individuals around the world. A survey examined improvements in health behaviors over a 2-year period in three countries (Retchin, Wells, Valleron & Albrecht, 1992). It found that the highest percentage of individuals reporting that they had increased exercising and decreased their consumption of alcohol and red meat was in the United States; England had a much lower percentage, followed by France. Other research has shown that people consume far more animal fat in Denmark than in the United States; people in Israel and Japan consume very little (Criqui & Ringel, 1994). Cigarette smoking shows large variations across and within countries (World Health Organization, 1998). Almost three-fourths of the world's smokers reside in underdeveloped nations, where 48 per cent of the men and 7 per cent of the women smoke. Smoking decreased in the 1990s in industrialized countries, but 42 per cent of men and 24 per cent of women in these nations continue to smoke. In the United States, 27 per cent of men and 23 per cent of women smoke, and the percentage of individuals under age 25 who

smoke is much greater for whites than blacks (National Center for Health Statistics, 2000). Alcohol use also varies widely: for instance, Norwegians drink very little, but French and Italian people drink much more, mainly as wine with meals (Criqui & Ringel, 1994). People in Central and Eastern Europe have high levels of smoking and drinking (Little, 1998).

Research conducted in the United States has shown that minority group background and low social class – or *socioeconomic status*, as measured by income, occupational prestige, and education – are often risk factors for poor health (Myers, Kagawa-Singer, Kumanyika, Lex & Markides, 1995; Ostrove, Feldman & Adler, 1999; Williams & Rucker, 1996). For example, compared with Caucasians, African Americans have higher rates of morbidity and mortality from chronic diseases and greater vulnerability to HIV infection and injury or death from violence. Also, people from the lower classes tend to have poorer health habits – for instance, smoking more and exercising less – than people from higher social classes.

Differences across history and culture can be seen in people's ideas about the causes of illness. Recall that people in the Middle Ages generally believed that evil spirits caused illness. Although educated people in technological societies today typically reject such ideas, less sophisticated people in the same societies and in underdeveloped countries often do not. This is important to recognize because the large majority of people in the world live in underdeveloped societies. And immigrants to industrialized countries carry with them health ideas and customs from their former countries. For example, many Chinese immigrants have entered the United States with the belief that imbalances of two opposing forces, *yin* and *yang*, within the body cause illness: too much *yin* causes colds and gastric disorders, for example, and too much *yang* causes dehydration and fever (Campbell & Chang, 1981). Practitioners of traditional Chinese medicine treat illnesses with acupuncture and special herbs and foods to correct the balance of *yin* and *yang*. Immigrants and others with these beliefs who are sick will often use these methods

instead of or as a supplement to treatment by an American physician, and pressure family members to do this too. As an example, a pregnant registered nurse of Chinese background followed her obstetrician's advice, but also ate special herbs and foods under pressure from her mother and mother-in-law to insure the health of her baby (Campbell & Chang, 1981).

Many religious doctrines relate to health and illness. For instance, Jehovah's Witnesses reject the use of blood and blood products in medical treatment (Sacks & Koppes, 1986). Christian Scientists reject the use of medicine entirely and believe that only mental processes in the sick person can cure the illness, which is promoted through prayer and counsel (Henderson & Primeaux, 1981). These beliefs are controversial and have led to legal conflicts in the United States, particularly when parents' religious beliefs lead them to reject medical treatments for life-threatening illnesses for their children. In such cases, medical authorities can move quickly to seek an immediate judicial decision (Sacks & Koppes, 1986). Some religions include specific beliefs that promote healthful lifestyles. For example, Seventh-Day Adventists believe in taking care of their bodies because the body is the 'temple of the Holy Spirit'. As a result, they encourage exercise and healthful eating and abstain from using tobacco, alcohol, and illicit drugs (Henderson & Primeaux, 1981). Although it is clear that cultural factors influence health, our knowledge about this influence is sparse and needs to be expanded through more research.

Gender and Health

Worldwide, the average life expectancy at birth is about 4 years longer for females than males, and in developed nations the gap in expected longevity is nearly twice as great (World Health Organization, 1999). Although the reasons for these differences are not entirely clear, some possibilities can be described (National Center for Health Statistics, 2000; Reddy, Fleming & Adesso, 1992). First, males have far higher rates of accidental injury and death, such as in drowning and automobile mishaps.

Second, men smoke and drink more than women do and are more likely to be overweight. Third, men show higher physiological reactivity, such as blood pressure and serum catecholamine elevations, when under stress, making them more vulnerable to heart disease and stroke. Paradoxically, even though women have longer lives than men, they appear to have more health problems, having higher rates of acute illnesses, such as respiratory and digestive illnesses, and nonfatal chronic diseases, such as arthritis and headache (National Center for Health Statistics, 2000; Reddy et al., 1992).

Development and Health

People change as they develop, and each portion of the life span is affected by happenings in earlier years and affects the happenings in future years. Because people's health, illness, and biopsychosocial systems change throughout life, the life-span perspective in health psychology considers characteristics of a person with respect to their prior development, current level, and likely development in the future. Because of these changes, the kinds of illnesses people have tend to change with age. Children are far less likely than older people to suffer from chronic diseases (US Bureau of the Census, 1999). Childhood illnesses tend to be short-term infectious diseases, such as colds or the flu. In contrast, prevalence rates for heart disease, cancer, and stroke are high in late adulthood and old age.

People's biopsychosocial systems change in many ways as they develop. The size, strength, and efficiency of virtually all biological systems increase throughout childhood and decline in old age. The decline can be seen in the decrease older people notice in their physical stamina because their muscles are weaker and the heart and lungs function less efficiently (Tortora & Grabowski, 2000). They also recover more slowly from illness and injury. Over the life span, people's psychological systems change, too. For example, children's cognitive abilities are limited during the preschool years but grow rapidly during later childhood. As children get older and their cognitive skills

improve, they become better able to assume responsibility for their health and understand how their behavior can affect it (Maddux, Roberts, Sledden & Wright, 1986). Social relationships and social systems also change with development. As people develop, they progress through levels of education and employment, family life, and retirement. Changes in social relationships also relate to health and illness. In adolescence, teenagers take on more and more responsibilities for their own health, but their social links with age-mates and strong need to be accepted by peers sometimes lead teens toward unhealthful or unsafe behavior. 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 age-mates (La Greca & Stone, 1985). Adolescence is also the time in the life span when individuals are most likely to start to smoke, drink, use drugs, and have sexual relations.

Health psychology research and health promotion efforts in the future must address and be sensitive to the needs of diverse populations that differ in sociocultural background, gender, and developmental level.

SUMMARY

Health and illness are overlapping concepts that exist along a continuum, with optimal wellness at one end and major disability and death at the other end. Historically, compared with time periods before the twentieth century, people today die at later ages and from different causes. Infectious diseases are no longer the principal cause of death in technological societies around the world. Chronic illnesses constitute the main health problem in developed nations now.

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 evil spirits and the like. Ancient Greek philosophers proposed that the mind and body are separate entities. After the Middle Ages, philosophers and scientists from the seventeenth to the twentieth centuries provided the

foundation for the biomedical model as a way to conceptualize health and illness. This model has enabled researchers to make great advances in medicine. But many researchers today believe people's social relationships, lifestyles, personalities, mental processes, and biological processes must be included in a full conceptualization of health and illness. As a result, the biopsychosocial model has emerged, proposing that health status results from and produces a constant interplay of biological, psychological, and social systems.

Health psychologists study factors that affect people's health and apply psychosocial methods to reduce stress, enhance the practice of healthful behavior, reduce illness symptoms and disability, and prevent a worsening of patients' condition or, perhaps, death. The knowledge health psychologists use draws from other subfields in psychology and several nonpsychology fields, such as medicine, biology, social work, epidemiology, public health, sociology, and anthropology. Variations in health and health behaviors can be seen across socio-cultural, gender, and developmental groups.

REFERENCES

- Ader, R., & Cohen, N. (1985). CNS-immune system interactions: Conditioning phenomena. *Behavioral and Brain Sciences*, 8, 379-395.
- Adesso, V. J. (1985). Cognitive factors in alcohol and drug use. In M. Galizio & S. A. Maisto (Eds.), *Determinants of substance abuse: Biological, psychological, and environmental factors* (pp. 179-208). New York: Plenum.
- Adler, N. E., & Stone, G. C. (1979). Social science perspectives on the health system. In G. C. Stone, F. Cohen & N. E. Adler (Eds.), *Health psychology: A handbook* (pp. 19-46). San Francisco: Jossey-Bass.
- Alexander, F. (1950). *Psychosomatic medicine: Its principles and applications*. New York: Norton.
- Allison, D. B., Heshka, S., Neale, M. C., Lykken, D. T., & Heymsfield, S. B. (1994). A genetic analysis of relative weight among 4,020 twin pairs, with an emphasis on sex effects. *Health Psychology*, 13, 362-365.
- American Cancer Society (2000). *Cancer facts and figures - 1999*. Retrieved (7 March 2000) from <http://www.cancer.org>.
- American Dietetic Association (2000). *Becoming a registered dietitian*. Retrieved (3 March 2000) from <http://www.eatright.org>.
- American Heart Association (2000). *Heart and stroke A-Z guide*. Retrieved (7 March 2000) from <http://www.americanheart.org>.
- American Occupational Therapy Association (2000). *About us*. Retrieved (4 March 2000) from <http://www.aota.org>.
- American Physical Therapy Association (2000). *APTA background sheet 1999*. Retrieved (4 March 2000) from <http://www.apta.org>.
- Anderson, E. A. (1987). Preoperative preparation for cardiac surgery facilitates recovery, reduces psychological distress, and reduces the incidence of acute postoperative hypertension. *Journal of Consulting and Clinical Psychology*, 55, 513-520.
- Arnow, B., Kenardy, J., & Agras, W. S. (1992). Binge eating among the obese. *Journal of Behavioral Medicine*, 15, 155-170.
- Azar, B. (1994). Eating fat: Why does the brain say, 'Ahhh'? *American Psychological Association Monitor*, November, p. 20.
- Bakal, D. A. (1979). *Psychology and medicine: Psychological dimensions of health and illness*. New York: Springer.
- Bandura, A. (1969). *Principles of behavior modification*. New York: Holt, Rinehart & Winston.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191-215.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Baranowski, T., & Nader, P. R. (1985). Family health behavior. In D. C. Turk & R. D. Kerns (Eds.), *Health, illness, and families: A life-span perspective* (pp. 51-80). New York: Wiley.
- Baum, A. (1990). Stress, intrusive imagery, and chronic distress. *Health Psychology*, 9, 653-675.
- Beck, A. T. (1976). *Cognitive therapy and the emotional disorders*. New York: International Universities Press.
- Becker, M. H. (1979). Understanding patient compliance: The contributions of attitudes and other psychosocial factors. In S. J. Cohen (Ed.), *New directions in patient compliance* (pp. 1-31). Lexington, MA: Heath.
- Becker, M. H., & Rosenstock, I. M. (1984). Compliance with medical advice. In A. Steptoe & A. Mathews (Eds.), *Health care and human behaviour* (pp. 175-208). London: Academic.
- Belar, C. D. (1997). Clinical health psychology: A specialty for the 21st century. *Health Psychology*, 16, 411-416.

- Belloc, N. B., & Breslow, L. (1972). Relationship of physical health status and health practices. *Preventive Medicine, 1*, 409–421.
- Bertalanffy, L. von (1968). *General systems theory*. New York: Braziller.
- Biondi, M., & Pancheri, P. (1995). Clinical research strategies in psychoimmunology: A review of 46 human research studies (1972–1992). In B. Leonard & K. Miller (Eds.), *Stress, the immune system and psychiatry* (pp. 85–111). New York: Wiley.
- Birren, J. E., & Zarit, J. M. (1985). Concepts of health, behavior, and aging. In J. E. Birren & J. Livingston (Eds.), *Cognition, stress, and aging*. Englewood Cliffs, NJ: Prentice-Hall.
- Blanchard, E. B., Appelbaum, K. A., Guarnieri, P., Morrill, B., & Dentinger, M. P. (1987). Five year prospective follow-up on the treatment of chronic headache with biofeedback and/or relaxation. *Headache, 27*, 580–583.
- Booth-Kewley, S., & Friedman, H. S. (1987). Psychological predictors of heart disease: A quantitative review. *Psychological Bulletin, 101*, 343–362.
- Botvin, G. J., & Epstein, J. A. (1999). Preventing cigarette smoking among children and adolescents. In D. F. Seidman & L. S. Covey (Eds.), *Helping the hard-core smoker: A clinician's guide* (pp. 51–71). Mahwah, NJ: Erlbaum.
- Bowen, A. M., & Trotter, R. (1995). HIV risk in intravenous drug users and crack cocaine smokers: Predicting stage of change for condom use. *Journal of Consulting and Clinical Psychology, 63*, 238–248.
- Brunner, E., White, I., Thorogood, M., Bristow, A., Curle, D., & Marmot, M. (1997). Can dietary interventions change diet and cardiovascular risk factors? A meta-analysis of randomized controlled trials. *American Journal of Public Health, 87*, 1415–1422.
- Burg, M. M., & Seeman, T. E. (1994). Families and health: The negative side of social ties. *Annals of Behavioral Medicine, 16*, 109–115.
- Burke, L. E., Dunbar-Jacob, J. M., & Hill, M. N. (1997). Compliance with cardiovascular disease prevention strategies: A review of the research. *Annals of Behavioral Medicine, 19*, 239–263.
- Campbell, T., & Chang, B. (1981). Health care of the Chinese in America. In G. Henderson & M. Primeaux (Eds.), *Transcultural health care* (pp. 163–172). Menlo Park, CA: Addison-Wesley.
- Carney, R. M., Freedland, K. E., Rich, M. W., & Jaffe, A. S. (1995). Depression as a risk factor for cardiac events in established coronary heart disease: A review of possible mechanisms. *Annals of Behavioral Medicine, 17*, 142–149.
- Carney, R. M., Rich, M. W., Freedland, K. E., Saini, J., teVelde, A., Simeone, C., & Clark, K. (1988). Major depressive disorder predicts cardiac events in patients with coronary artery disease. *Psychosomatic Medicine, 50*, 627–633.
- Carver, C. S., Diamond, E. L., & Humphries, C. (1985). Coronary prone behavior. In N. Schneiderman & J. T. Tapp (Eds.), *Behavioral medicine: The biopsychosocial approach* (pp. 437–465). Hillsdale, NJ: Erlbaum.
- Chapman, C. R. (1984). New directions in the understanding and management of pain. *Social Science and Medicine, 19*, 1261–1277.
- Chesney, M. A., Frautschi, N. M., & Rosenman, R. H. (1985). Modifying type A behavior. In J. C. Rosen & L. J. Solomon (Eds.), *Prevention in health psychology* (pp. 130–142). Hanover, NH: University Press of New England.
- Cinciripini, P. M., Cinciripini, L. G., Wallfisch, A., Haque, W., & Van Vunakis, H. (1996). Behavior therapy and the transdermal nicotine patch: Effects on cessation outcome, affect, and coping. *Journal of Consulting and Clinical Psychology, 64*, 314–323.
- Ciraulo, D. A., & Renner, J. A. (1991). Alcoholism. In D. A. Ciraulo & R. I. Shader (Eds.), *Clinical manual of chemical dependence* (pp. 1–93). Washington, DC: American Psychiatric Press.
- Cobb, S. (1976). Social support as a moderator of stress. *Psychosomatic Medicine, 38*, 300–314.
- Cobb, S., & Rose, R. M. (1973). Hypertension, peptic ulcer, and diabetes in air traffic controllers. *Journal of the American Medical Association, 224*, 489–492.
- Cohen, S., & Rodriguez, M. S. (1995). Pathways linking affective disturbances and physical disorders. *Health Psychology, 14*, 374–380.
- Compas, B. E., Haaga, D. A. F., Keefe, F. J., Leitenberg, H., & Williams, D. A. (1998). Sampling of empirically supported psychological treatments from health psychology: Smoking, chronic pain, cancer, and bulimia nervosa. *Journal of Consulting and Clinical Psychology, 66*, 89–112.
- Conrad, K. M., Flay, B. R., & Hill, D. (1992). Why children start smoking cigarettes: Predictors of onset. *British Journal of Addiction, 87*, 1711–1724.
- Cottington, E. M., & House, J. S. (1987). Occupational stress and health: A multivariate relationship. In A. Baum & J. E. Singer (Eds.), *Handbook of psychology and health* (Vol. 5, pp. 41–62). Hillsdale, NJ: Erlbaum.
- Cox, G. B., Chapman, C. R., & Black, R. G. (1978). The MMPI and chronic pain: The diagnosis of

- psychogenic pain. *Journal of Behavioral Medicine*, 1, 437–443.
- Criqui, M. H., & Ringel, B. L. (1994). Does diet or alcohol explain the French paradox? *Lancet*, 344, 1719–1723.
- Cunningham, C. L. (1998). Drug conditioning and drug-seeking behavior. In W. O'Donohue (Ed.), *Learning and behavior therapy* (pp. 518–544). Boston: Allyn & Bacon.
- Curry, S. J., & Emmons, K. M. (1994). Theoretical models for predicting and improving compliance with breast cancer screening. *Annals of Behavioral Medicine*, 16, 302–316.
- Davison, G. C., & Neale, J. M. (1998). *Abnormal psychology* (7th edn.). New York: Wiley.
- Deardorff, W. W. (1996). Board certification: What do you mean you're not board certified? *Health Psychologist*, 18, 10–11.
- DeBenedittis, G., Panerai, A. A., & Villamira, M. A. (1989). Effects of hypnotic analgesia and hypnotizability on experimental ischemic pain. *International Journal of Clinical and Experimental Hypnosis*, 35, 55–69.
- Diamond, E. L. (1982). The role of anger and hostility in essential hypertension and coronary heart disease. *Psychological Bulletin*, 92, 410–433.
- DiClemente, C. C., Prochaska, J. O., Fairhurst, S. K., Velicer, W. F., Velasquez, M. M., & Rossi, J. S. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation, and preparation stages of change. *Journal of Consulting and Clinical Psychology*, 59, 295–304.
- DiMatteo, M. R. (1985). Physician–patient communication: Promoting a positive health care setting. In J. C. Rosen & L. J. Solomon (Eds.), *Prevention in health psychology* (pp. 328–365). Hanover, NH: University Press of New England.
- Dishman, R. K., Sallis, J. F., & Orenstein, D. R. (1985). The determinants of physical activity and exercise. *Public Health Reports*, 100, 158–171.
- Dunn, A. J. (1995). Psychoneuroimmunology: Introduction and general perspectives. In B. Leonard & K. Miller (Eds.), *Stress, the immune system and psychiatry* (pp. 1–16). New York: Wiley.
- Dunn, M. E., & Goldman, M. S. (1998). Age and drinking-related differences in the memory organization of alcohol expectancies in 3rd-, 6th-, 9th, and 12th-grade children. *Journal of Consulting and Clinical Psychology*, 66, 579–585.
- Dusseldorp, E., van Elderen, T., Maes, S., Meulman, J., & Kraaij, V. (1999). A meta-analysis of psycho-educational programs for coronary heart disease patients. *Health Psychology*, 18, 506–519.
- D'Zurilla, T. J. (1988). Problem-solving therapies. In K. S. Dobson (Ed.), *Handbook of cognitive-behavioral therapies* (pp. 85–135). New York: Guilford.
- Ellis, A. (1962). *Reason and emotion in psychotherapy*. New York: Lyle Stuart.
- Ellis, A. (1977). The basic clinical theory of rational-emotive therapy. In A. Ellis & R. Grieger (Eds.), *Handbook of rational-emotive therapy* (pp. 3–34). New York: Springer.
- Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science*, 196, 129–136.
- Engel, G. L. (1980). The clinical application of the biopsychosocial model. *American Journal of Psychiatry*, 137, 535–544.
- European Health Psychology Society (2001). *Aims and scope: EHPS national delegates*. Retrieved (7 August 2001) from www.ehps.net.
- Everson, S. A., Goldberg, D. E., Kaplan, G. A., Cohen, R. D., Pukkala, E., Tuomilehto, J., & Salonen, J. T. (1996). Hopelessness and risk of mortality and incidence of myocardial infarction and cancer. *Psychosomatic Medicine*, 58, 113–121.
- Fernandez, E., & Turk, D. C. (1989). The utility of cognitive coping strategies for altering pain perception: A meta-analysis. *Pain*, 38, 123–135.
- Fiore, M. C., Jorenby, D. E., & Baker, T. B. (1997). Smoking cessation: Principles and practice based upon the AHCPR guideline, 1996. *Annals of Behavioral Medicine*, 19, 213–219.
- Flack, J. M., Amaro, H., Jenkins, W., Kunitz, S., Levy, J., Mixon, M., & Yu, E. (1995). Panel I: Epidemiology of minority health. *Health Psychology*, 14, 592–600.
- Frasure-Smith, N., Lespérance, F., Juneau, M., Talajic, M., & Bourassa, M. G. (1999). Gender, depression, and one-year prognosis after myocardial infarction. *Psychosomatic Medicine*, 61, 26–37.
- Friedman, H. S., & Booth-Kewley, S. (1987). The 'disease-prone' personality. *American Psychologist*, 42, 539–555.
- Friedman, H. S., Tucker, J. S., Schwartz, J. E., Tomlinson-Keasey, C., Wingard, D. L., & Criqui, M. H. (1995). Psychosocial and behavioral predictors of longevity: The aging and death of the 'Termites'. *American Psychologist*, 50, 69–78.
- Friedman, M., & Rosenman, R. H. (1974). *Type A behavior and your heart*. New York: Knopf.
- Gentry, W. D. (1984). Behavioral medicine: A new research paradigm. In W. D. Gentry (Ed.), *Handbook of behavioral medicine* (pp. 1–12). New York: Guilford.
- Gerace, R. A., & Vorp, R. (1985). Epidemiology and behavior. In N. Schneiderman & J. T. Tapp (Eds.),

- Behavioral medicine: The biopsychosocial approach* (pp. 25–44). Hillsdale, NJ: Erlbaum.
- Glass, D. C. (1977). *Behavior patterns, stress, and coronary heart disease*. Hillsdale, NJ: Erlbaum.
- Goodall, T. A., & Halford, W. K. (1991). Self-management of diabetes mellitus: A critical review. *Health Psychology, 10*, 1–8.
- Grob, G. N. (1983). Disease and environment in American history. In D. Mechanic (Ed.), *Handbook of health, health care, and the health professions* (pp. 3–22). New York: Free Press.
- Gruen, W. (1975). Effects of brief psychotherapy during the hospitalization period on the recovery process in heart attacks. *Journal of Consulting and Clinical Psychology, 43*, 223–232.
- Gump, B. B., & Matthews, K. A. (1999). Do background stressors influence reactivity to and recovery from acute stressors? *Journal of Applied Social Psychology, 29*, 469–494.
- Haynes, R. B. (1976). A critical review of the ‘determinants’ of patient compliance with therapeutic regimens. In D. L. Sackett & R. B. Haynes (Eds.), *Compliance with therapeutic regimens* (pp. 26–40). Baltimore: Johns Hopkins University Press.
- Hearn, M. D., Baranowski, T., Baranowski, J., Doyle, C., Smith, M., Lin, L. S., & Resnicow, K. (1998). Environmental influences on dietary behavior among children: Availability and accessibility of fruits and vegetables enable consumption. *Journal of Health Education, 29*, 26–32.
- Henderson, G., & Primeaux, M. (1981). Religious beliefs and healing. In G. Henderson & M. Primeaux (Eds.), *Transcultural health care* (pp. 185–195). Menlo Park, CA: Addison-Wesley.
- Herman, C. P., Olmstead, M. P., & Polivy, J. (1983). Obesity, externality, and susceptibility to social influence: An integrated analysis. *Journal of Personality and Social Psychology, 45*, 926–934.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*, 513–524.
- Holroyd, K. A., & Penzien, D. B. (1990). Pharmacological versus non-pharmacological prophylaxis of recurrent migraine headache: A meta-analytic review of clinical trials. *Pain, 42*, 1–13.
- Hughes, J. R. (1986). Genetics of smoking: A brief review. *Behavior Therapy, 17*, 335–345.
- Janis, I. L. (1984). The patient as decision maker. In W. D. Gentry (Ed.), *Handbook of behavioral medicine* (pp. 326–368). New York: Guilford.
- Johnson, K., Anderson, N. B., Bastida, E., Kramer, B. J., Williams, D., & Wong, M. (1995). Panel II: Macrosocial and environmental influences on minority health. *Health Psychology, 14*, 601–612.
- Kiecolt-Glaser, J. K., & Glaser, R. (1995). Psycho-neuroimmunology and health consequences: Data and shared mechanisms. *Psychosomatic Medicine, 57*, 269–274.
- Killen, J. D., Robinson, T. N., Haydel, K. F., Hayward, C., Wilson, D. M., Hammer, L. D., Litt, I. F., & Taylor, C. B. (1997). Prospective study of risk factors for the initiation of cigarette smoking. *Journal of Consulting and Clinical Psychology, 65*, 1011–1016.
- Kirscht, J. P. (1983). Preventive health behavior: A review of research and issues. *Health Psychology, 2*, 277–301.
- Klepp, K.-I., Kelder, S. H., & Perry, C. L. (1995). Alcohol and marijuana use among adolescents: Long-term outcomes of the Class of 1989 Study. *Annals of Behavioral Medicine, 17*, 19–24.
- Kranzler, H. R., & Anton, R. F. (1994). Implications of recent neuropsychopharmacologic research for understanding the etiology and development of alcoholism. *Journal of Consulting and Clinical Psychology, 62*, 1116–1126.
- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin, 108*, 480–498.
- La Greca, A. M., & Stone, W. L. (1985). Behavioral pediatrics. In N. Schneiderman & J. T. Tapp (Eds.), *Behavioral medicine: The biopsychosocial approach* (pp. 255–291). Hillsdale, NJ: Erlbaum.
- Langlie, J. K. (1977). Social networks, health beliefs, and preventive health behavior. *Journal of Health and Social Behavior, 18*, 244–260.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Leahy, T. H. (1987). *A history of psychology: Main currents in psychological thought* (2nd edn.). Englewood Cliffs, NJ: Prentice-Hall.
- Leonard, B. E. (1995). Stress and the immune system: Immunological aspects of depressive illness. In B. E. Leonard & K. Miller (Eds.), *Stress, the immune system and psychiatry* (pp. 113–136). New York: Wiley.
- Lerman, C., Caporaso, N. E., Audrain, J., Main, D., Bowman, E. D., Lockshin, B., Boyd, N. R., & Shields, P. G. (1999). Evidence suggesting the role of specific genetic factors in cigarette smoking. *Health Psychology, 18*, 14–20.
- Leventhal, H., & Cleary, P. D. (1980). The smoking problem: A review of research and theory in behavioral risk modification. *Psychological Bulletin, 88*, 370–405.
- Leventhal, H., Prohaska, T. R., & Hirschman, R. S. (1985). Preventive health behavior across the life

- span. In J. C. Rosen & L. J. Solomon (Eds.), *Prevention in health psychology* (pp. 191–235). Hanover, NH: University Press of New England.
- Levy, S. M. (1985). *Behavior and cancer*. San Francisco: Jossey-Bass.
- Linden, W., & Chambers, L. (1994). Clinical effectiveness of non-drug treatment for hypertension: A meta-analysis. *Annals of Behavioral Medicine*, 16, 35–45.
- Linden, W., Stossel, C., & Maurice, J. (1996). Psychosocial interventions for patients with coronary artery disease. *Archives of Internal Medicine*, 156, 745–752.
- Lipowski, Z. J. (1986). What does the word 'psychosomatic' really mean? A historical and semantic inquiry. In M. J. Christie & P. G. Mellett (Eds.), *The psychosomatic approach: Contemporary practice and whole-person care* (pp. 17–38). New York: Wiley.
- Little, R. E. (1998). Public health in Central and Eastern Europe and the role of environmental pollution. *Annual Review of Public Health*, 19, 153–172.
- Logue, A. W. (1991). *The psychology of eating and drinking: An introduction* (2nd edn.). New York: Freeman.
- Lundberg, U. (1999). Coping with stress: Neuroendocrine reactions and implications for health. *Noise and Health*, 4, 67–74.
- Maddux, J. E., Roberts, M. C., Sledden, E. A., & Wright, L. (1986). Developmental issues in child health psychology. *American Psychologist*, 41, 25–34.
- Manne, S. L., Bakeman, R., Jacobsen, P. B., Gorfinkle, K., & Redd, W. H. (1994). An analysis of a behavioral intervention for children undergoing venipuncture. *Health Psychology*, 13, 556–566.
- Marx, M. H., & Hillix, W. A. (1963). *Systems and theories in psychology*. New York: McGraw-Hill.
- Matarazzo, J. D. (1982). Behavioral health's challenge to academic, scientific, and professional psychology. *American Psychologist*, 37, 1–14.
- Matthews, K. A. (1988). Coronary heart disease and type A behaviors: Update on and alternative to the Booth-Kewley and Friedman (1987) quantitative review. *Psychological Bulletin*, 104, 373–380.
- Matthews, K. A., Owens, J. F., Kuller, L. H., Sutton-Tyrrell, K., Lassila, H. C., & Wolfson, S. K. (1998). Stress-induced pulse pressure change predicts women's carotid atherosclerosis. *Stroke*, 29, 1525–1530.
- McCarty, D. (1985). Environmental factors in substance abuse: The microsetting. In M. Galizio & S. A. Maisto (Eds.), *Determinants of substance abuse: Biological, psychological, and environmental factors* (pp. 247–281). New York: Plenum.
- McGinnis, J. M. (1994). The role of behavioral research in national health policy. In J. A. Blumenthal, K. Matthews & S. M. Weiss (Eds.), *New frontiers in behavioral medicine: Proceedings of the national conference* (pp. 217–222). Washington, DC: National Institutes of Health.
- Meichenbaum, D., & Cameron, R. (1983). Stress inoculation training: Toward a general paradigm for training coping skills. In D. Meichenbaum & M. E. Jaremko (Eds.), *Stress reduction and prevention* (pp. 115–154). New York: Plenum.
- Melzack, R., & Wall, P. D. (1965). Pain mechanisms: A new theory. *Science*, 150, 971–979.
- Melzack, R., & Wall, P. D. (1982). *The challenge of pain*. New York: Basic.
- Menkes, M. S., Matthews, K. A., Krantz, D. S., Lundberg, U., Mead, L. A., Qaqish, B., & Liang, K.-Y. (1989). Cardiovascular reactivity to the cold pressor test as a predictor of hypertension. *Hypertension*, 14, 524–530.
- Miller, N. E. (1978). Biofeedback and visceral learning. *Annual Review of Psychology*, 29, 373–404.
- Miller, S. M. (1979). Controllability and human stress: Method, evidence and theory. *Behaviour Research and Therapy*, 17, 287–304.
- Miller, W. R., & Hester, R. K. (1980). Treating the problem drinker: Modern approaches. In W. R. Miller (Ed.), *The addictive behaviors: Treatment of alcoholism, drug abuse, smoking, and obesity*. New York: Pergamon.
- Monti, P. M., Rohsenow, D. J., Rubonis, A. V., Naiura, R. S., Sirota, A. D., Colby, S. M., Goddard, P., & Abrams, D. B. (1993). Cue exposure with coping skills treatment for male alcoholics: A preliminary investigation. *Journal of Consulting and Clinical Psychology*, 61, 1011–1019.
- Morley, S., Eccleston, C., & Williams, A. (1999). Systematic review and meta-analysis of randomized controlled trials of cognitive behaviour therapy and behaviour therapy for chronic pain in adults, excluding headache. *Pain*, 80, 1–13.
- Myers, H. F., Kagawa-Singer, M., Kumanyika, S. K., Lex, B. W., & Markides, K. S. (1995). Panel III: Behavioral risk factors related to chronic diseases in ethnic minorities. *Health Psychology*, 14, 613–621.
- National Association of Social Workers (2000). *Social work careers*. Retrieved (4 March 2000) from <http://www.naswdc.org>.
- National Center for Health Statistics (2000). *Health, United States, 1999*. Retrieved (21 March 2000) from <http://www.cdc.gov/nchs>.

- National Institute on Alcohol Abuse and Alcoholism (1993). *Alcohol and health* (8th Special Report to the US Congress; Publication no. 94-3699). Washington, DC: US Government Printing Office.
- Nezu, A. M., Nezu, C. M., & Perri, M. G. (1989). *Problem-solving therapy for depression: Theory, research, and clinical guidelines*. New York: Wiley.
- Ostrove, J. M., Feldman, P., & Adler, N. E. (1999). Relations among socioeconomic status indicators and health for African-Americans and whites. *Journal of Health Psychology, 4*, 451–463.
- Ouimette, P. C., Finney, J. W., & Moos, R. H. (1997). Twelve-step and cognitive-behavioral treatment for substance abuse: A comparison of treatment effectiveness. *Journal of Consulting and Clinical Psychology, 65*, 230–240.
- Parrish, J. M. (1986). Parent compliance with medical and behavioral recommendations. In N. A. Krasnegor, J. D. Arasteh & M. F. Cataldo (Eds.), *Child health behavior: A behavioral pediatrics perspective* (pp. 453–501). New York: Wiley.
- Pomerleau, O. F., & Pomerleau, C. S. (1989). A bio-behavioral perspective on smoking. In T. Ney & A. Gale (Eds.), *Smoking and human behavior* (pp. 69–90). New York: Wiley.
- Powell, L. H., & Friedman, M. (1986). Alteration of type A behaviour in coronary patients. In M. J. Christie & P. G. Mellett (Eds.), *The psychosomatic approach: Contemporary practice of whole-person care* (pp. 191–214). New York: Wiley.
- Prescott, C. A., & Kendler, K. S. (1999). Genetic and environmental contributions to alcohol abuse and dependence in a population-based sample of male twins. *American Journal of Psychiatry, 156*, 34–40.
- Prochaska, J. O., & DiClemente, C. C. (1984). *The transtheoretical approach: Crossing traditional boundaries of therapy*. Homewood, IL: Dow Jones/Irwin.
- Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. *American Psychologist, 47*, 1102–1114.
- Quinlan, K. B., & McCaul, K. D. (2000). Matched and mismatched interventions with young adult smokers: Testing a stage theory. *Health Psychology, 19*, 165–171.
- Rand, C. S., & Weeks, K. (1998). Measuring adherence with medication regimens in clinical care research. In S. A. Shumaker, E. B. Schron, J. L. Ockene & W. L. McBee (Eds.), *The handbook of health behavior change* (2nd edn., pp. 114–132). New York: Springer.
- Reddy, D. M., Fleming, R., & Adesso, V. J. (1992). Gender and health. In S. Maes, H. Leventhal, & M. Johnston (Eds.), *International review of health psychology* (Vol. 1, pp. 3–32). New York: Wiley.
- Reker, G. T., & Wong, P. T. P. (1985). Personal optimism, physical and mental health. In J. E. Birren & J. Livingston (Eds.), *Cognition, stress, and aging*. Englewood Cliffs, NJ: Prentice-Hall.
- Retchin, S. M., Wells, J. A., Valleron, A.-J., & Albrecht, G. L. (1992). Health behavior changes in the United States, the United Kingdom, and France. *Journal of General Internal Medicine, 7*, 615–622.
- Robbins, L. (1994). Precipitating factors in migraine: A retrospective review of 494 patients. *Headache, 34*, 214–216.
- Robinson, L. A., & Klesges, R. C. (1997). Ethnic and gender differences in risk factors for smoking onset. *Health Psychology, 16*, 499–505.
- Rodin, J. (1986). Health, control, and aging. In M. M. Baltes & P. B. Baltes (Eds.), *The psychology of control and aging* (pp. 139–165). Hillsdale, NJ: Erlbaum.
- Rosen, J. C., Grubman, J. A., Bevins, T., & Frymoyer, J. W. (1987). Musculoskeletal status and disability of MMPI profile subgroups among patients with low back pain. *Health Psychology, 6*, 581–598.
- Rosenstock, I. M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly, 44*, 94–127.
- Roskies, E. (1983). Stress management for type A individuals. In D. Meichenbaum & M. E. Jaremko (Eds.), *Stress reduction and prevention* (pp. 261–288). New York: Plenum.
- Roter, D. L., & Hall, J. A. (1989). Studies of doctor-patient interaction. *Annual Review of Public Health, 10*, 163–180.
- Roter, D. L., Hall, J. A., Mersica, R., Nordstrom, B., Cretin, D., & Svarstad, B. (1998). Effectiveness of interventions to improve patient compliance: A meta-analysis. *Medical Care, 36*, 1138–1161.
- Rotter, J. B. (1966). Generalized expectancies for the internal versus external control of reinforcement. *Psychological Monographs, 90*, 1–28.
- Rozin, P. (1989). The role of learning in the acquisition of food preferences by humans. In R. Shepherd (Ed.), *Handbook of the psychophysiology of human eating* (pp. 205–227). Chichester: Wiley.
- Runyan, C. W. (1985). Health assessment and public policy within a public health framework. In P. Karoly (Ed.), *Measurement strategies in health psychology* (pp. 601–627). New York: Wiley.
- Sacks, D. A., & Koppes, R. H. (1986). Blood transfusion and Jehovah's Witnesses: Medical and legal issues in obstetrics and gynecology. *American Journal of Obstetrics and Gynecology, 154*, 483–486.

- Sallis, J. F., & Owen, N. (1999). *Physical activity and behavioral medicine*. Thousand Oaks, CA: Sage.
- Sanson-Fisher, R. (1993). Primary and secondary prevention of cancer: Opportunities for behavioural scientists. In S. Maes, H. Leventhal & M. Johnston (Eds.), *International review of health psychology* (Vol. 2, pp. 117–146). New York: Wiley.
- Sarafino, E. P. (1997). *Behavioral treatments for asthma: Biofeedback-, respondent-, and relaxation-based approaches*. Lewiston, NY: Mellon.
- Sarafino, E. P. (1999). *Health psychology: An overview and focus on nonrational processes in decisions about health*. Paper presented at the Iowa Psychological Association Convention in Pella, Iowa, October.
- Sarafino, E. P. (2001). *Behavior modification: Principles of behavior change* (2nd edn.). Mountain View, CA: Mayfield.
- Sarafino, E. P. (2002). *Health psychology: Biopsychosocial interactions* (4th edn.). New York: Wiley.
- Sarafino, E. P., & Goldfeder, J. (1995). Genetic factors in the presence, severity, and triggers of asthma. *Archives of Disease in Childhood*, 73, 112–116.
- Sarason, I. G., & Sarason, B. R. (1984). *Abnormal psychology* (4th edn.). Englewood Cliffs, NJ: Prentice-Hall.
- Schachter, S., Silverstein, B., Kozlowski, L. T., Perlick, D., Herman, C. P., & Liebling, B. (1977). Studies of the interaction of psychological and pharmacological determinants of smoking. *Journal of Experimental Psychology: General*, 106, 3–40.
- Scheier, L. M., & Botvin, G. J. (1997). Expectancies as mediators of the effects of social influences and alcohol knowledge on adolescent alcohol use: A prospective analysis. *Psychology of Addictive Behaviors*, 11, 48–64.
- Scheier, M. F., & Bridges, M. W. (1995). Person variables and health: Personality predispositions and acute psychological states as shared determinants for disease. *Psychosomatic Medicine*, 57, 255–268.
- Scheier, M. F., & Carver, C. S. (2001). Adapting to cancer: The importance of hope and purpose. In A. Baum & B. L. Anderson (Eds.), *Psychosocial interventions for cancer* (pp. 15–36). Washington, DC: American Psychological Association.
- Schneider, A. M., & Tarshis, B. (1975). *An introduction to physiological psychology*. New York: Random House.
- Schuckit, M. A. (1985). Genetics and the risk for alcoholism. *Journal of the American Medical Association*, 254, 2614–2617.
- Schutz, H. G., & Diaz-Knauf, K. V. (1989). The role of the mass media in influencing eating. In R. Shepherd (Ed.), *Handbook of the psychophysiology of human eating* (pp. 141–154). Chichester: Wiley.
- Schwartz, G. E. (1982). Testing the biopsychosocial model: The ultimate challenge facing behavioral medicine? *Journal of Consulting and Clinical Psychology*, 50, 1040–1053.
- Selye, H. (1956). *The stress of life*. New York: McGraw-Hill.
- Selye, H. (1976). *Stress in health and disease*. Reading, MA: Butterworth.
- Shadel, W. G., Shiffman, S., Niaura, R., Nichter, M., & Abrams, D. B. (2000). Current models of nicotine dependence: What is known and what is needed to advance understanding of tobacco etiology among youth. *Drug and Alcohol Dependence*, 59 (Supp.), S9–S22.
- Shiffman, S., Paty, J. A., Gnys, M., Kassel, J. D., & Elash, C. (1995). Nicotine withdrawal in chippers and regular smokers: Subjective and cognitive effects. *Health Psychology*, 14, 301–309.
- Skolnick, A. S. (1986). *The psychology of human development*. San Diego: Harcourt Brace Jovanovich.
- Stone, A. A., Neale, J. M., Cox, D. S., Napoli, A., Valdimarsdottir, H., & Kennedy-Moore, E. (1994). Daily events are associated with a secretory immune response to an oral antigen in men. *Health Psychology*, 13, 440–446.
- Stone, G. C. (1979). Health and the health system: A historical overview and conceptual framework. In G. C. Stone, F. Cohen & N. E. Adler (Eds.), *Health psychology: A handbook* (pp. 1–17). San Francisco: Jossey-Bass.
- Stunkard, A. J., Foch, T. T., & Hrubec, Z. (1986). A twin study of human obesity. *Journal of the American Medical Association*, 256, 51–54.
- Theorell, T., & Rahe, R. H. (1975). Life change events, ballistocardiography, and coronary death. *Journal of Human Stress*, 1, 18–24.
- Thompson, S. C. (1981). Will it hurt less if I can control it? A complex answer to a simple question. *Psychological Bulletin*, 90, 89–101.
- Thoresen, C. E. (1984). Overview. In J. D. Matarazzo, S. M. Weiss, J. A. Herd, N. E. Miller, & S. M. Weiss (Eds.), *Behavioral health: A handbook of health enhancement and disease prevention* (pp. 297–307). New York: Wiley.
- Tortora, G. J., & Grabowski, S. R. (2000). *Principles of anatomy and physiology* (9th edn.). New York: Wiley.
- Totman, R. (1982). Psychosomatic theories. In J. R. Eiser (Ed.), *Social psychology and behavioral medicine* (pp. 143–175). New York: Wiley.

- Turk, D. C., Meichenbaum, D., & Genest, M. (1983). *Pain and behavioral medicine: A cognitive-behavioral perspective*. New York: Guilford.
- US Bureau of the Census (1999). *Statistical abstracts of the United States: 1998* (118th edn.). Retrieved (28 February 2000) from <http://www.census.gov>.
- US Department of Health and Human Services (1982). *Changes in mortality among the elderly: United States, 1940–78* (Publication no. PHS 82–1406). Washington, DC: US Government Printing Office.
- US Department of Health and Human Services (1987). *Vital statistics of the United States, 1984: Life tables* (Publication no. PHS 87–1104). Washington, DC: US Government Printing Office.
- Vedhara, K., Cox, N. K. M., Wilcock, G. K., Perks, P., Hunt, M., Anderson, S., Lightman, S. L., & Shanks, N. M. (1999). Chronic stress in elderly carers of dementia patients and antibody response to influenza vaccination. *Lancet*, 353, 627–631.
- Velicer, W. F., Prochaska, J. O., Fava, J. L., LaForge, R. G., & Rossi, J. S. (1999). Interactive versus noninteractive interventions and dose–response relationships for stage-matched smoking cessation programs in a managed care setting. *Health Psychology*, 18, 21–28.
- Vertinsky, P., & Auman, J. T. (1988). Elderly women's barriers to exercise, Part I: Perceived risks. *Health Values*, 12, 13–19.
- Wallston, B. S., Alagna, S. W., DeVellis, B. M., & DeVellis, R. F. (1983). Social support and physical illness. *Health Psychology*, 2, 367–391.
- Wallston, K. A. (1993). Health psychology in the USA. In S. Maes, H. Leventhal & M. Johnston (Eds.), *International review of health psychology* (Vol. 2, pp. 215–228). Chichester: Wiley.
- Weinstein, N. D. (1987). Unrealistic optimism about susceptibility to health problems: Conclusions from a community-wide sample. *Journal of Behavioral Medicine*, 10, 481–500.
- Weiss, G. L., Larsen, D. L., & Baker, W. K. (1996). The development of health protective behaviors among college students. *Journal of Behavioral Medicine*, 19, 143–161.
- Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine*, 337, 869–873.
- Williams, C. J. (1990). *Cancer biology and management: An introduction*. New York: Wiley.
- Williams, D. R., & Rucker, T. (1996). Socioeconomic status and the health of racial minority populations. In P. M. Kato & T. Mann (Eds.), *Handbook of diversity issues in health psychology* (pp. 407–423). New York: Plenum.
- Wills, T. A. (1984). Supportive functions of interpersonal relationships. In S. Cohen & L. Syme (Eds.), *Social support and health* (pp. 61–82). New York: Academic.
- Winters, R. (1985). Behavioral approaches to pain. In N. Schneiderman & J. T. Tapp (Eds.), *Behavioral medicine: The biopsychosocial approach* (pp. 565–587). Hillsdale, NJ: Erlbaum.
- Wittrock, D. A., & Myers, T. C. (1998). The comparison of individuals with recurrent tension-type headache and headache-free controls in physiological response, appraisal, and coping with stressors: A review of the literature. *Annals of Behavioral Medicine*, 20, 118–134.
- Woods, A. M., & Birren, J. E. (1984). Late adulthood and aging. In J. D. Matarazzo, S. M. Weiss, J. A. Herd, N. E. Miller & S. M. Weiss (Eds.), *Behavioral health: A handbook of health enhancement and disease prevention* (pp. 91–100). New York: Wiley.
- World Health Organization (1998). *Tobacco epidemic: Health dimensions*. Retrieved (28 February 2000) from <http://www.who.org>.
- World Health Organization (1999). *World health report*. Retrieved (28 February 2000) from <http://www.who.org>.
- Wright, R. J., Rodriguez, M., & Cohen, S. (1998). Review of psychosocial stress and asthma: An integrated biopsychosocial approach. *Thorax*, 53, 1066–1074.

Epidemiology of Health and Illness: A Socio-Psycho-Physiological Perspective

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The primary determinants of disease are mainly economic and social, and therefore its remedies must also be economic and social.

(Geoffrey Rose, 1992: 129)

INTRODUCTION

When we were invited to write this chapter, one of the editors sent us an e-mail stating that 'this chapter is supposed to include everything that a health psychologist needs to know about the epidemiology of health and illness, so it will be quite a challenge'. We agree that this is a challenge, both for us and for the reader, but we think that it is a challenge worth taking.

So, what does a health psychologist need to know about epidemiology? We will start with a definition. Epidemiology can be defined as the study of the distribution and determinants of health and illness in populations and of the action that is necessary to prevent disease and promote health. Based on this definition, epidemiology can be differentiated into three

dimensions: in *descriptive epidemiology*, studies show how health and illness are distributed; in *analytic epidemiology*, research investigates the determinants of health and illness; and in *intervention epidemiology*, strategies are studied to prevent disease and promote health. We will address all three dimensions in this chapter.

Following this introduction, we will give an overview of the distribution of health and illness, that is, life expectancy in different parts of the world, its changes over time and the identification of the diseases that present the greatest burden today. We will then discuss historical and theoretical considerations of epidemiologic research on the determinants of health and illness, and we will introduce a conceptual model for an interdisciplinary, socio-psycho-physiological perspective on this issue. After this, we will present recent and classical findings from analytic and intervention epidemiology studies, and will discuss several important controversies. The chapter ends with some final thoughts on the importance of an interdisciplinary and 'upstream' perspective.

Table 2.1 *Life expectancy (years) at birth in WHO member states, estimates for 2000*

	Men		Women	
1	Japan	77.5	Japan	84.7
2	Sweden	77.3	Monaco	84.4
3	Andorra	77.2	Andorra	83.8
4	Iceland	77.1	San Marino	83.8
5	Monaco	76.8	France	83.1
6	Switzerland	76.7	Switzerland	82.5
7	Australia	76.6	Italy	82.4
8	Israel	76.6	Spain	82.3
9	San Marino	76.1	Australia	82.1
10	Canada	76.0	Sweden	82.0
11	Italy	76.0	Iceland	81.8
12	New Zealand	75.9	Canada	81.5
13	Norway	75.7	Norway	81.4
14	Greece	75.4	Austria	81.4
15	Malta	75.4	Netherlands	81.0
16	Netherlands	75.4	New Zealand	80.9
17	Singapore	75.4	Belgium	80.9
18	Spain	75.4	Finland	80.9
19	France	75.2	Greece	80.8
20	Austria	74.9	Luxembourg	80.8
21	Cyprus	74.8	Malta	80.7
22	United Kingdom	74.8	Israel	80.6
23	Belgium	74.6	Germany	80.6
24	Germany	74.3	Singapore	80.2
25	Denmark	74.2	United Kingdom	79.9
26	Kuwait	74.2	Ireland	79.7
27	Ireland	74.1	USA	79.5
28	Luxembourg	73.9	Chile	79.5
29	USA	73.9	Slovenia	79.4
30	Cuba	73.7	Portugal	79.3
188	Burkina Faso	42.6	Burkina Faso	43.6
189	Lesotho	42.0	Namibia	42.6
190	Central African Rep.	41.6	Central African Rep.	42.5
191	Democratic Rep. Congo	41.6	Lesotho	42.2
192	Burundi	40.6	Burundi	41.3
193	Zambia	39.2	Rwanda	40.5
194	Rwanda	38.5	Zambia	39.5
195	Mozambique	37.9	Mozambique	39.5
196	Malawi	37.1	Sierra Leone	38.8
197	Sierra Leone	37.0	Malawi	37.8

Data source: WHO (2001). *The world health report 2001. Mental health: New understanding, new hope.* Statistical annex, Table 1. Geneva: World Health Organization. Also available at: <http://www.who.int/whr/2001/main/pdf/whr2001.en.pdf> (accessed 16 June 2002).

DISTRIBUTION OF HEALTH AND ILLNESS

An excellent source of information on the distribution of health and illness is the World Health Organization of the United Nations (WHO) and its epidemiologic databank system WHOSIS (World Health Organization Statistical Information System). It is freely accessible through the

World Wide Web (<http://www.who.int/whosis>). Among other things, WHOSIS provides information on life expectancy, cause of death and burden of disease in the WHO member states.

Life Expectancy

Table 2.1 shows life expectancy at birth for the 30 countries with the highest and the 10

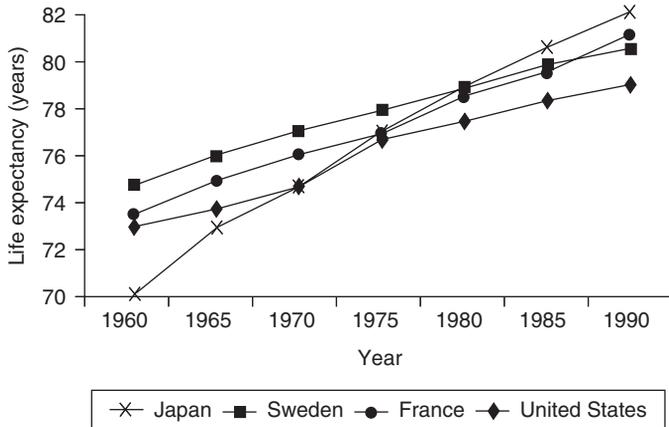


Figure 2.1 Changes in female life expectancy between 1960 and 1990 in selected countries [Data source: Schieber, G. J., Poullier, J. P., & Greenwald, L. M. (1992). U.S. health expenditure performance: An international comparison and data update. *Health Care Financing Review*, 13, 1–87]

countries with the lowest life expectancy. The differences are enormous. A newborn boy in Japan can expect to live 40 years longer than his counterpart in Sierra Leone, while a newborn girl in Japan has an advantage of 47 years over a girl born in Malawi (World Health Organization, 2001). It is obvious from the table that life expectancy is not randomly distributed around the globe, but follows a distinct pattern. Almost all of the countries at the top of the list are highly industrialized, wealthy countries, with a high gross domestic product per capita (GDPpC), such as Japan, Australia, New Zealand, Singapore, Canada and numerous countries of the European Union. The 10 countries at the bottom of the list are all non-industrialized countries in sub-Saharan Africa with very low GDPpC. However, while the wealth of a country is in general an excellent predictor of life expectancy, there are some remarkable exceptions. The United States, which has one of the highest GDPpC in the world, is ranked only 29th and 27th (males and females respectively) with a male life expectancy comparable to Cuba and a female life expectancy comparable to Chile.

Changes in Life Expectancy

One of the most fascinating findings in research on life expectancy is that it can exhibit

relatively rapid change over time. Figure 2.1 shows changes in female life expectancy between 1960 and 1990 in Japan, Sweden, France, and the United States (Evans, 1994; Schieber, Poullier & Greenwald, 1992). Among these four countries, Japan had the lowest life expectancy in 1960, approximately 70 years, which was 3 years less than the United States and 5 years less than Sweden. In only 30 years, Japanese women gained almost 12 years of life expectancy, surpassing all other countries, which gained only 5 to 7 years during this period. Male life expectancy showed a similar pattern of change during this time period (for details, see Evans, 1994; Schieber et al., 1992).

The reason for the impressive increase in Japanese longevity is not clear. Certainly, genetics cannot be responsible for an increase in such a short time. Japan does not spend more money on health services and does not have more rigorous standards for protecting the environment from pollution than other industrialized countries (Evans, 1994; Marmot & Davey Smith, 1989). Unique features of Japanese diet (e.g., low in meat, high in fish) and social relationships (e.g., less individualistic, more group oriented) have been discussed as possible explanations. However, these diet and social relationships have not changed much during the years in which Japan saw this

substantial improvement in life expectancy. Evans has pointed out that the only thing that certainly changed was 'the hierarchical position of Japanese society as a whole, relative to the rest of the world. These observations demonstrate the extremely large influence of "macroenvironmental" factors, both social and physical, on illness patterns. They also show that disease patterns and health status can change rapidly, and by a large amount, when these external factors change' (1994: 18).

A recent powerful example of how sensitive life expectancy is to changes in the macro-environment can be found in Eastern Europe where countries rapidly transformed from socialist planned economies to capitalistic market economies during the 1990s. The most dramatic changes were observed for the region that constitutes Russia today, which was a part of the Soviet Union until 1991. After the breakup of the Soviet Union, Russia underwent drastic social and economic changes. Numerous factories were closed, a large number of people became unemployed, and the government was no longer able to pay salaries to civil servants and pensions to retirees on time. The average income per capita decreased by almost two-thirds, while the number of families living in poverty rose from 2 per cent to 38 per cent. In addition, public services, including law enforcement and health services, were no longer functioning efficiently (Notzon et al., 1998). The health consequences of these social and economic changes were dramatic. In the 5-year period between 1990 and 1994, life expectancy at birth declined for men from 63.8 to 57.7 years, and for women from 74.4 to 71.2 years. The mortality rate for men between the ages of 35 and 44 increased by almost 100 per cent. Analyses showed that more than half of the decline in life expectancy was due to either cardiovascular disease or fatal injuries, including road traffic accidents, suicides and homicides (Notzon et al., 1998).

While life expectancy in Russia and in the whole Soviet Union was already considerably lower than in Western Europe before 1990 (it actually slowly declined for men and stagnated for women from the mid 1960s to the mid 1980s), the decrease of 6.1 years and 3.2 years

for men and women respectively between 1990 and 1994 was unprecedented for an industrialized country in the twentieth century. Several possible explanations have been discussed in the literature. Among them are the crumbling of the health care system, and a deterioration in health behaviors, especially increases in excessive alcohol consumption, but also the impact of heightened psychosocial stress, in particular the experience of loss of control and a rise in depression and hopelessness (Marmot & Bobak, 2000; Notzon et al., 1998). These factors are not mutually exclusive and are probably connected to each other (e.g., hopelessness may contribute to binge drinking). A detailed debate about possible pathways for the declining life expectancy in Russia and other Eastern European countries can be found in the special issue of the journal *Social Science and Medicine* on 'The health crisis in Russia and Eastern Europe' (*Social Science and Medicine*, 1 November 2000, Volume 51, Issue 9).

Cause-Specific Mortality and Burden of Disease

In addition to life expectancy, statistics on cause of mortality are important for understanding the distribution of health and illness. Table 2.2 shows data from WHOSIS on causes of death in Europe and Africa. The two leading causes of death in Europe are ischemic heart disease (also called coronary heart disease) and cerebrovascular disease, followed by cancers of the respiratory system. In Africa, infectious diseases are the most dominant cause of death, especially HIV and AIDS, but also included are other infectious or infectious-related diseases like lower respiratory infections, malaria, diarrhea (often caused by infections with cholera and other waterborne pathogens), measles, and tuberculosis.

Statistics on cause-specific mortality provide important information to compare the health status in specific regions and also to analyze changes over time. However, the usefulness of these data in understanding the burden of disease is restricted in two ways. First, these statistics do not take into account that diseases often occur at different ages in life. Measles, for