PHYSICAL DISORDERS AND HEALTH PSYCHOLOGY

I. Psychological and Social Factors That Influence Health
   A. **Behavioral medicine**, or the study, prevention, and treatment of medical and psychosomatic disorders and of undesirable behaviors, such as overeating and substance abuse, by the application of behavior therapy techniques, such as biofeedback, relaxation training, and hypnosis.

   **Health psychology** - subfield of behavioral medicine that addresses psychological factors important in the promotion and maintenance of health, including improvements in health care systems and health policy formulation.

   B. The DSM-IV codes physical disorders on Axis III and recognizes that psychological factors can affect medical conditions.

   C. Psychological and social factors can affect the basic biological processes that lead to illness and disease (stress).

       Long-standing behavior patterns may put people at risk to develop certain physical diseases.

       1. AIDS is an example of a disease that is influenced by psychological (i.e., stress) and behavioral patterns (i.e., life-style risk behaviors).

       2. As many as 50% of all deaths from the 10 leading causes of death in the United States can be traced to life-style behaviors (e.g., smoking-19% of all deaths, poor eating, lack of exercise, insufficient injury control such as not wearing seat belts).

       3. At present, some of the major contributing factors to illness and death are psychological and behavioral. The textbook illustrates this fact using an example of the relation between genital herpes and stress. (10-15% of pop has it; larger concentration among young people. Pain, itching, sores. 4/year or more. Behavioral factor, plus stress control reduces number of outbreaks and duration.)

   D. **Stress** is the psychological factor that has received the greatest amount of attention in relation to health and disease.

       Hans Selye's early experimental work with rats led to the area of study known as stress physiology. Selye noted that daily injection of substances in rats was sufficiently stressful to cause ulcers and atrophy of the immune system tissue (chemical vs control).
Stress is referred to in this chapter as a *physiological response of an individual to a stressor*. Selye theorized that the body progressed through the following stages in response to sustained stress (*general adaptation syndrome*).

1. The first phase represents a type of *alarm* response to immediate threat or danger.
2. With ongoing stress, the body advances to a second stage of *resistance* where coping mechanisms are mobilized.
3. Finally, if the stress is too intense or lasts too long, the body enters a third stage of *exhaustion* where permanent damage or death may occur.

E. **Physiologically**, stress activates the sympathetic branch of the autonomic nervous system (i.e., fight or flight), including the **HYPAC axis** (*Hypothalamic-Pituitary-Adrenalcortical Axis*).

In addition to changes in the flow of neurotransmitters under stress, much attention has focused on the endocrine system's neuromodulators or neuropeptides that act very much like neurotransmitters in carrying the brain’s messages to various parts of the body.

1. **Corticotropin releasing factor (CRF)** is secreted by the hypothalamus and stimulates the pituitary gland, which in turn, activates the adrenal gland to produce corticosteroids such as the hormone **cortisol**. Because of their close relation with the stress response, cortisol and other related hormones are known as **stress hormones**.
2. The HYPAC axis is closely related to the limbic system. The limbic system contains the **hippocampus**, a structure that is involved in emotional memories and one that is highly responsive to cortisol.

When the hippocampus is stimulated during HYPAC activity, it helps to turn off the body’s stress response. The study of this feedback loop is important because changes in these areas can significantly impact one's mental and physical health.

For example, work with primates has shown that increased levels of cortisol in response to chronic stress may kill nerve cells in the hippocampus, thereby diminishing the body’s ability to stop the stress response cycle, including memory functioning (impairing problem-solving, leading to more stress).

Chronic stress and anxiety can also cause hippocampal cell death in humans (e.g., persons with PTSD).
A. **Psychological and social factors** profoundly influence stress physiology. For example, work with baboons indicates that high levels of cortisol correlate with low social status.

The most likely explanation is excess secretion of CRF by the hypothalamus in subordinate animals combined with a diminished sensitivity of the pituitary gland. Thus, the body system is less efficient in stopping the stress response.

Subordinate baboons also have fewer circulating lymphocytes (white blood cells) -- a sign of immune system suppression -- than dominant males. Also less circulating HDL cholesterol.

The primary benefit conferred on the dominant males seems to be predictability and controllability, with stability and controllability together being the most important factors. (During years when there was active competition between dominant males, their hormone profiles were more like those of subordinate males.

1. Stressful life events combined with psychological vulnerabilities are important in psychological and physical disorders and the same holds for the relation between emotional disorders and physical disorders.
   a. Males who develop psychological disorders such as depression or anxiety, or who were highly stressed, are more likely to develop chronic illness or die at a higher rate than males who are free from psychological disorders. Thus, the same type of stress that contributes to psychological disorders may also contribute to the later development of physical disorders.
   b. The underlying physiology of stress, anxiety, depression, and excitement may be similar, but psychological factors (e.g., sense of control, self-efficacy) seem to differ and lead to different feelings. (See page 249.)
B. **Physiologically**, stress activates the sympathetic branch of the autonomic nervous system (i.e., fight or flight), including the **HYPAC axis** (Hypothalamic-Pituitary-Adrenalcortical Axis).

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C. The immune system and physical disorders

1. The relation between stress (e.g., tests) and increased risk of infection (e.g., respiratory) is established. This relation is mediated by the immune system, whose purpose is to identify and eliminate foreign materials (i.e., antigens) from the body. Stress affects immune system function rapidly.

2. The immune system consists of two main parts (PAGE 251):

   humoral branch, which operates in the blood and other bodily fluids

   cellular branch, which protects against viral and parasitic infections.

White blood cells (i.e., leukocytes) are the primary agents of the immune system. Types of leukocytes include:

a. Macrophages, which are considered the body’s first line of defense. These cells surround identifiable antigens and destroy them. They also signal lymphocytes.

b. Lymphocytes consist of two groups: B and T cells.

   I. B cells operate within the humoral part of the immune system, release molecules that seek out antigens in the blood and other bodily fluids so as to neutralize them, and produce highly specific molecules called immunoglobins that act as antibodies.

      After the antigens are neutralized, memory B cells are created so that the next time the antigen is encountered, the immune system response will be faster. This process accounts for the success of inoculations.

   II. T cells operate in the cellular branch of the immune system and do not produce antibodies.

      One subgroup, killer T cells directly destroy viral infections and cancerous processes, and subsequently produce memory T cells to speed future response to the same antigen.

      T4 cells (i.e., helper T cells) enhance the immune system response by signaling B cells to produce antibodies and by telling other T cells to destroy the antigen.
Suppressor T cells suppress the production of antibodies by B cells when they are no longer needed.

Too many T4 cells lead the immune system to be over-reactive and contribute to it attacking the body’s normal cells rather than antigens (e.g., autoimmune diseases such as rheumatoid arthritis).

Too many suppressor T cells make the body susceptible to invasion by antigens. Human immunodeficiency virus (HIV) directly attacks T helper cells, thereby weakening the immune system and causing AIDS.

D. There are many connections between the nervous system and the immune system. Nerve endings exist in immune system tissues such as the thymus, lymph nodes, and bone marrow.

Psychoneuroimmunology (PNI) is an area that studies psychological influences on neurological and immune system response. Examples include the previously described connection between the brain (CNS) and HYPAC axis (hormonal) and the immune system.

II. Psychosocial Effects on Physical Disorders

A. AIDS has become the highest priority in our public health system.

1. The course of AIDS and AIDS-related complex (ARC) (i.e., HIV infection followed by minor health problems such as weight loss, fever, and night sweats) is variable diagnosis is not made until a severe physical illness is present (e.g., pneumocystis pneumonia, cancer, dementia, wasting syndrome).

   Median time from initial infection to the development of full-blown AIDS is estimated to range from 7.3 to 10 years or more.

2. Investigators have identified a group of people who have been exposed repeatedly to the AIDS virus but have not contracted the disease. The effect is believed to be due, in large part, to the strength of the cellular branch of their immune systems. Efforts to boost the strength of the immune system may help prevent AIDS.
3. The stress associated with learning that one has HIV or AIDS can be devastating. **Stress reduction programs** appear to lessen anxiety and depression associated with learning one has HIV, including **increases in immune system functioning** as measured by T-helper, inducer (CD4), and natural killer (NK) cells, and reductions in antibodies for two herpes viruses that are closely related to HIV.

Two-year follow-up showed less disease progress in the stress reduction group.

Similar results have been shown for symptomatic HIV and AIDS patients in response to a cognitive-behavioral stress reduction program.

Generally, higher levels of stress and low social support are associated with faster progression of HIV and AIDS.

B. **Cancer** is also influenced by psychosocial factors, and acknowledgement of this connection has led to the growing field of **psychoncology**.

Persons with breast cancer who received psychosocial treatment consisting of coping and stress management techniques live twice as long on the average (i.e., about 3 years) as persons who do not receive this form of intervention.

It is believed that such interventions work by fostering **better health habits**, **closer adherence to medical treatment**, and **enhanced social adjustment** and **coping**; all of which improve endocrine functioning in response to stress and thereby enhance immune system functioning.

1. Perceived lack of control, inadequate coping responses, overwhelming stressful life events, use of inappropriate coping responses (i.e., denial) may contribute, in part, to the development of cancer.
2. Psychological factors are also implicated in addressing nausea, and often conditioned nausea associated, with chemotherapy treatment.

Such reactions usually begin by the fourth or fifth treatment and slowly escalate in severity.

Between 18% and 50% of patients report development of conditioned nausea, which can lead to a refusal to continue with chemotherapy regimens.

Relaxation and graduated exposure to cues that trigger conditioned nausea can diminish or eliminate the response.

(Also the taste aversion conditioning, with the strong-flavored ice cream.)

3. Psychological factors are also involved in the treatment and recovery from cancer in children.

Stress and anxiety associated with painful cancer treatments can have detrimental effects on the disease process.

Psychological interventions with child cancer patients include pain and stress management procedures, breathing exercises, information about the procedures, and rehearsal of the procedures with dolls.

C. Cardiovascular problems involve parts of the cardiovascular system, comprised of the heart, blood vessels, and mechanisms for regulating their function.

This system is also intricately involved in alarm responses to threat or danger (sympathetic nervous system activity).

Problems with the cardiovascular system include stroke (i.e., cerebral vascular accidents)—temporary blockage of blood vessels that cause brain damage and loss of functioning.
Cardiovascular problems that are receiving the most attention are hypertension and coronary heart disease. (Textbook case - John)

1. **Hypertension** (i.e., high blood pressure) is a major risk factor for stroke, heart disease, and kidney disease.

   This risk is derived from constriction of blood vessels, which in turn, causes the heart to work harder to force blood to all parts of the body. The result, in turn, is increased pressure.

   Hypertension results in wear and tear of the blood vessels, leading to cardiovascular disease.

   Most cases of hypertension have no verifiable physical cause, and are therefore labeled **essential hypertension**.

   a. **High blood pressure** is in excess of 160/95, with values of 140/90 or above considered borderline, and cause for concern.

      **Systolic blood pressure** is represented by the first value and indicates the pressure when the heart is pumping blood.

      The second value is **diastolic blood pressure**, and represents the pressure between beats when the heart is at rest. Elevations of diastolic pressure are more worrisome in terms of risk of disease.

   b. About 20% of all adults between the ages of 25 and 74 suffer from essential hypertension

      African Americans are twice as likely to develop hypertension as whites.

      Hypertension also runs in families and the biological vulnerability for hypertension is easy to activate. (People with normal blood pressure, whose parents have high BP, have more reactive blood pressure, even in infancy.)

   c. Neurobiological causes of hypertension are linked to the autonomic nervous system and mechanisms regulating sodium in the kidneys, both of which are important in regulating blood pressure.
d. Activation of the sympathetic branch of the ANS constricts blood vessels and more vascular resistance against circulation (i.e., elevations in blood pressure). Such activation is closely related to stress. Retaining too much salt increases blood volume and raises blood pressure.

e. Psychological factors in hypertension are not simply hostility or repressed hostility, but the frequency with which one experiences anger and/or hostility.

2. **Coronary heart disease (CHD)** is a blockage of the arteries supplying blood to the heart muscle or myocardium.

*Angina pectoris* is chest pain resulting from partial obstruction of the arteries.

*Atherosclerosis* is the accumulation of artery plaque (i.e., fatty substances) that causes an obstruction.

*Ischemia* is the term for deficiency of blood supply to a body part caused by a narrowing of the arteries because of too much plaque.

*Myocardial infarction* (i.e., heart attack) refers to the death of heart tissue when a supplying artery is occluded.

Genetic factors are thought to be strongly related to the etiology of CHD.

a. Stress, anxiety, and anger, combined with poor coping skills and low social support, are implicated in coronary heart disease. Stress reduction procedures have been shown to prevent future heart attacks.

b. Clusters of behaviors may place one at risk for CHD include the classic **Type A** behavior pattern, marked by excessive competitive drive, time pressure, accelerated activity, and anger outbursts.

**Type B** behavior is the opposite of Type A. People with Type A behavior are twice as likely to develop CHD as people with Type B.

Yet, more recent studies do not support the relation between Type A and coronary heart disease (because of unreliability of measuring instruments, people with mixed personalities, etc.).
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Source: Cooper's adaptation of the Bortner Type A Scale.

Now score your responses by totaling the numbers circled. The interpretation of your score is as follows:

85 or more - Type A
(You’re coronary prone)

Less than 84 - Type B
(You’re a survivor)

c. Sociocultural differences appear to mediate these findings, and other studies have not replicated earlier results. Instead, the primary Type A behavior associated with CHD is anger, including experience of high levels of negative affect. (Studies of men – those with high hostility and anger showed some calcification of the arteries.)

d. Closely related—anxiety/depression. Those who were depressed were much more likely to die in the year following a heart attack. (Page 260) (But anger seems to produce a worst load on the cardiovascular system.)

D. Pain and chronic pain account for most physician visits and represents a huge cost to the health care system.

1. Two types of clinical pain are delineated in the textbook:
   a. Acute pain typically follows an injury and often disappears once the injury heals or is effectively treated (usually within one month).
   b. Chronic pain may begin with an acute episode but does not decrease over time, even with healing or treatment. Typically, chronic pain is experienced in the muscles, joints, or tendons, particularly the lower back, but may include vascular or other areas such as the head.

2. Clinicians distinguish between the subjective experience (termed "pain") as reported by the patient, and the overt manifestations of this experience (termed "pain behaviors").

Pain behaviors include changing the way one sits or walks, continually complaining about pain to others, grimacing, and most importantly, avoiding activities such as work or recreational pursuits.

Emotional suffering may or may not accompany pain.
3. The severity of chronic pain does not predict one’s reaction to it.

(Athletes w/tissue damage perform, report little pain. Study showed 65% of war veterans wounded in combat reported feeling no pain. Also how pain is dealt with culturally makes a difference—stiff upper lip.)

**Psychological factors** mediate this reaction—same ones that are implicated in the stress response and other negative emotional states, such as anxiety and depression.

Core psychological factor seems to be the person’s general **sense of control** over the situation (i.e., whether the person can deal with pain and its consequences in an effective and meaningful way).

Positive psychological factors are associated with active attempts to cope, such as exercise and other regimens, as opposed to suffering and passivity.

Study of patients w/neck & back pain after injury who were expected to recover quickly:

→ 40% still reported substantial pain 6 months later
→ Most of the other 60% had no pain after 1 month
→ Not predicted by intensity of pain, but by other factors, such as personality, socioeconomic status, and plans to file a lawsuit

Pre-existing anxiety and personality problems predict who will suffer chronic pain.

Generally, the profile that predicts most types of chronic pain:

→ **negative emotion** (e.g., anxiety or depression),
→ **poor coping skills,**
→ **low social support,** and the
→ **possibility of being compensated for pain through disability claims.**
4. **Social factors** also influence the experience of pain. Social forms of pain behavior, such as verbal complaints, facial expressions, and obvious limps or other symptoms, may result in persons becoming more caring and sympathetic as opposed to critical and demanding. This phenomenon is referred to as **operant control of pain behavior** because the behavior is under the control of social consequences.

Positive social support may reduce stress associated with pain and injury and promote more adaptive coping and a sense of control.

Study showed those w/o social support from families reported more pain sites, had more overt pain-related behaviors (staying in bed, etc.), and more emotional distress, WITHOUT reporting more intense pain than those w/social support from families.

Those w/socially supportive families returned to work sooner, relied less on medication, and increased activity levels more quickly.

5. **Gate control theory**

Nerve impulses from painful stimuli make their way to the spinal column that, in turn, controls the flow of pain stimulation to the brain.

Small fibers (that transmit pain info) tend to open the gate, whereas large fibers (that transmit touch) tend to close this gate. (Why rubbing, massaging, etc., can help manage pain.)

The brain sends signals back down the spinal cord and affects this gating mechanism.

Strong negative emotions from the brain seem to potentiate the gating and signals of intense pain. (Pain ties into the fight-or-flight response for obvious reasons. Message from the brain can determine whether to continue to feel the pain or not.)

6. **Endogenous opioids**, similar to other opioid substances such as heroin and morphine, are distributed widely throughout the body. Such natural opioids (i.e., **endorphins** or **enkephalins**) and act very much like neurotransmitters.

Bandura found that people with high self-efficacy had higher tolerance for pain, and increased production of endorphins when confronted with a painful stimulus.
7. **Males and females** seem to experience different types of pain.

   Females suffer more
   
   \[ \rightarrow \text{migraine headaches,} \]
   \[ \rightarrow \text{arthritis,} \]
   \[ \rightarrow \text{carpal tunnel syndrome} \]
   \[ \rightarrow \text{temporomandibular joint pain (i.e., TMJ)} \]

   Males experience more
   
   \[ \rightarrow \text{cardiac pain} \]
   \[ \rightarrow \text{backache} \]

   Men’s endorphin systems may be more powerful.

   Women may have additional pain management based on female hormones, that has evolved to cope with pain associated with reproductive activity.

   *(Observations on men/women pain management?)*

8. Rat studies show pain contributes to death rate.

   \[ \rightarrow \text{Rats undergoing abdominal surgery w/o morphine developed twice the number of lung metastases than rats who did have morphine.} \]

   \[ \rightarrow \text{May result from the interaction of pain with the immune system, reducing the number of NK cells, perhaps because of the general stress response.} \]

E. **Chronic fatigue syndrome** (originally termed neurasthenia, meaning lack of nerve strength, prevalent in the mid 19th century) refers to symptoms of

   \[ \rightarrow \text{lack of energy, marked fatigue,} \]
   \[ \rightarrow \text{pain,} \]
   \[ \rightarrow \text{low-grade fever.} \]

   *(See Table on page 263.)*

Neurasthenia disappeared in the early 20th century in Western cultures, but is still the most prevalent form of psychopathology in China.
Now chronic fatigue syndrome is spreading rapidly throughout the Western world. Originally this condition was attributed to

→ viral infection, specifically Epstein-Barr virus,
→ immune system dysfunction,
→ exposure to toxins, or
→ clinical depression.

No evidence exists to support such causes and no cause has been clearly identified.

1. **Chronic fatigue syndrome is more common in females**

   Speculated that it is related to achievement-oriented lifestyles coupled with a period of extreme stress or acute illness.

   Symptoms of fatigue, pain, and inability to function are misinterpreted as a continuing disease that is worsened by continued activity.

   Results in behavioral avoidance, helplessness, depression, and frustration.

   Worsens due to the resultant chronic inactivity.

2. **Cognitive-behavioral treatment involving procedures to**

   → increase activity,
   → regulate periods of rest,
   → address problematic cognitions,
   → teaching relaxation skills and stress management techniques,

   seems to help diminish fatigue and improve overall level of functioning.
III. Psychosocial Treatment of Physical Disorders

A. **Biofeedback** is a process of making patients aware of specific physiological functions that they would not ordinarily notice consciously (e.g., heart rate, blood pressure, muscle tension, EEG rhythms, and blood flow), and then learning ways of controlling such reactions directly. This is accomplished by connecting a person to physiological monitoring equipment to make the physiological response visible or audible. The person then practices using newly developed skills to reduce their physiological responses.

1. Biofeedback is used for persons suffering from physical disorders or stress-related conditions, such as hypertension and headache.
2. Biofeedback is equally as effective and long-lasting as teaching people to relax in the treatment of headache. (Biofeedback teaches them to relax head and scalp muscles.)
3. Both more effective than placebo (38-63% vs 35%).
4. Some benefit more from biofeedback, others more from relaxation training, so they usually use both, to cover all bases.

B. Several varieties of **relaxation and meditation procedures** have positive effects on headaches, hypertension, and acute and chronic pain, although the results are relatively modest.

Relaxation and meditation are almost always part of a comprehensive pain-management program.

1. **Progressive muscle relaxation** (Jacobson 1938) is designed to increase awareness of bodily tension and to counteract this tension by relaxing specific muscle groups. Often this is accomplished by teaching a client to tense and release various muscle groups.
2. **Transcendental meditation** (**TM**) involves focusing attention on a repeated syllable or use of a mantra.
3. A more specific version of TM is the **relaxation response** (Benson 1975), or repeating a word to eliminate distraction and induce calm.
C. **Comprehensive stress and pain-management programs** include several components or procedures.

1. Teaching a person to monitor stress and identify significant daily and major life stressors (page 267);

   Teaching the person to note bodily and cognitive events related to stress;

   Teaching the person deep muscle relaxation (page 268);

   Cognitive therapy to address exaggerating negative thinking and unrealistic thoughts about stress and their lives;

   Developing new coping strategies such as time management and assertiveness training.

   a. Data suggest that a comprehensive program is better than individual components alone in the treatment of chronic pain, tension headaches, and cancer pain.

   b. Chronic reliance on analgesic medications may lessen the efficacy of comprehensive treatment programs for headache.

      Psychological treatment seems to reduce drug consumption and may reduce the amount of medication needed for hypertension.

D. **Denial or lack of optimism** has many negative effects, including the neglect of symptom variations and pursuit of treatment.

However, denial may be helpful during the initial stressful phase where one learns they may have a serious condition, as denial may allow a person time to develop coping strategies.

Lower levels of corticosteroids also may be found in persons undergoing denial.

The value of denial as a coping mechanism may depend on timing. (Those with high levels of denial spent less time in intensive care, but also were less compliant with rehabilitation programs.)
E. Many lifestyle practices contribute to physical disorders, including

→ unhealthy eating habits
→ lack of exercise,
→ smoking
→ alcohol use.

(table on page 270)

Many of these behaviors contribute directly to diseases and physical disorders such as coronary heart disease, cancer, accidents, cirrhosis of the liver, and respiratory disease such as influenza and pneumonia (both of which are related to smoking and stress). As a result, considerable work is being conducted to study the effects of modifying behaviors to promote health.

1. **Injuries** are the leading cause of death for people 1 to 45, and kill more children than the next six leading causes of death, combined.

Loss of productivity due to injury is greater than from the other three leading causes of death (i.e., heart disease, cancer, and stroke).

Psychological variables are crucial in mediating virtually all factors that lead to injury. People think of injuries being fate, out of their control.

Efforts to prevent injuries in children include teaching about fire safety, how to escape from fire, how to identify and report emergencies, how to safely cross streets and ride bicycles, and how to handle cuts.

Little evidence exists to support the notion that repeatedly warning children or others are effective strategies in preventing injuries. Teaching skills about injury prevention is best.

2. **AIDS** represents a disease that is due exclusively to life-style behaviors and is highly preventable. One of the most successful behavior change programs was carried out in San Francisco.

(Page 271) Such programs teach safe sex practices and foster the instillation of a sense of self-efficacy and control over sexual behavior. Use techniques known to be effective ways of influencing behavior (popular spokespersons, etc.).
3. **China** has one of the most tobacco-addicted populations in the world. Approximately 250 million people in China are habitual smokers; a number that equals the entire population of the United States. Using children as agents of change in their families, researchers have developed an anti-smoking campaign in schools. Children took home antismoking literature and questionnaires for their fathers, and wrote letters to their fathers asking them to quit smoking. About 12% of the fathers in the intervention group quit smoking for at least 6 months.

4. The **Stanford three community study** is one of the best-known and most successful efforts to reduce risk factors for disease. Three communities were studied in central California, and the target of this effort was to reduce risk for coronary heart disease. The program focused on smoking, high blood pressure, diet, and weight reduction. Results were successful in reducing risk for coronary heart disease, with the greatest benefit from those who also received face-to-face contact with a mental health provider.