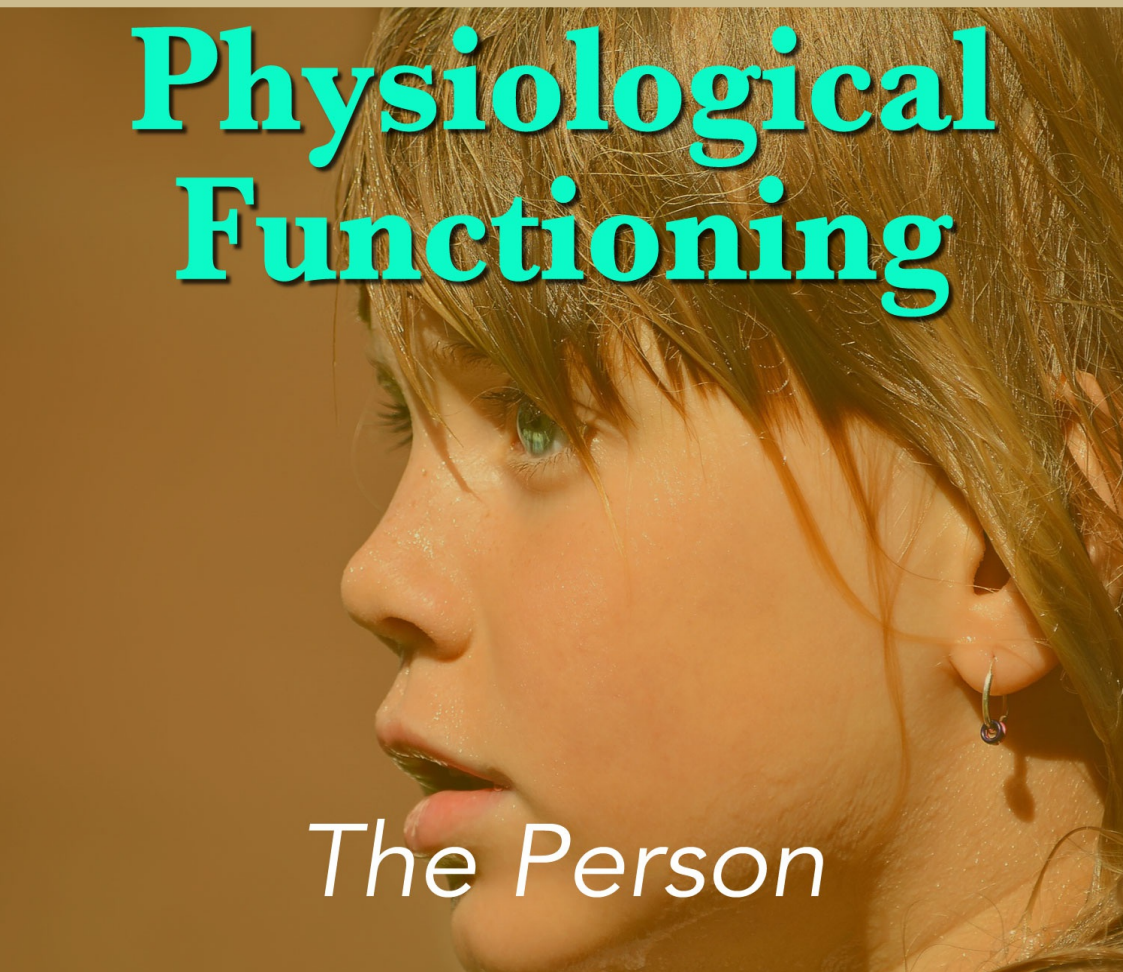
Theodore Lidz

Personality Development and Physiological Functioning



The Person

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From *The Person* by Theodore Lidz

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In this penultimate chapter we must direct our attention, albeit but briefly, to what has been called "the mysterious leap from the mind to the body." Despite the obvious influence of thought upon the body's functioning—the sudden cold sweat, the pounding heart, the penile erection, the urgent defecation—it has been difficult for the philosophically oriented to pass beyond the barrier of the mind-body dichotomy to grasp how the intangible idea or emotional state can influence something real and composed of matter such as the heart or the even more prosaic intestines. We are not, however, primarily concerned with the resolution of an age-old metaphysical dilemma, but enter upon the topic because we cannot understand human functioning without a clear appreciation of how emotions and physiology are inextricably interrelated, and how individuals' personality development influences their body structure and can even determine what constitutes stress for them and creates strains on their physiological apparatus.

The student of medicine's primary interest in personality development may properly derive from the impact of personality functions on physiological functioning, and on the etiology and treatment of disease. Good physicians have always been aware that the majority of patients come to them because of emotional disturbances. It has become increasingly apparent that personality and emotional disorders not only are a major factor in the etiology of the so-called diseases of stress—such as peptic ulcer, ulcerative colitis, asthma, essential hypertension, hyperthyroidism—but may also contribute to the causation or chronicity of almost any illness.[1] Nonmedical persons who are involved in the care or treatment of personality disorders need to be constantly aware of the physiological concomitants and potential bodily repercussions of emotional disturbances. The topics of psychophysiological disturbances and psychosomatic medicine form disciplines in themselves.[2] As the reader is not expected to be versed in physiology and neuroanatomy, we shall seek to present here merely a general orientation that will permit a grasp of the essentials of the topic and of its importance.

Personality development influences the physiological processes in many different ways. There is essentially nothing different about the gastric apparatus of a Hindu and a Mohammedan, and yet the

appetite of the Hindu may be stimulated by pork but not by beef, whereas a Mohammedan neighbor who has inadvertently swallowed some lard may even become sick.

Although the sight of a friend at mealtime may stimulate gastric secretions and improve the appetite, it is not expected to cause one to drool. Yet the author encountered some persons in the South Seas for whom the sight of a stranger entering their village started them salivating even as the ringing of a bell stimulated Pavlov's dogs. Such changes in appetite are, of course, not simply ideas but also alterations in the physiological functioning of the stomach, which is very sensitive to the emotional state of the person who possesses the stomach.[3]

PERSONALITY AND PHSYIQUE

Persons' physiques are commonly considered a product of their heredity, their physical environment, and their nutrition during their developmental years. Yet personality development is also involved. A critical study that changed the conceptualization of Frohlich's syndrome provides an excellent illustration. The syndrome, which consisted of obesity and small genitalia in boys often accompanied by sluggishness or somnolence, had usually been considered to result from some unknown dysfunction of the pituitary gland. Bruch and Touraine (1940) noted, however, striking similarities in the personalities of the mothers of these children and in the ways in which they reared their sons. These mothers were unable to bestow any real affection but gave their sons food instead. To these mothers, who had grown up in deprived homes, food formed a symbol of affection and security. They felt insecure and inadequate as mothers unless the child overate and appeared healthy and well provided for by being obese. In addition, these women were reactively concerned about their sons' safety and needed to keep them in the home and away from play with other children lest they get in trouble or danger. The combination of stuffing a child by making him feel guilty if he did not overeat and preventing expenditure of energy was sufficient to explain the obesity and sluggish inactivity; the genitalia were in fact not small but only appeared so because of the child's obese abdomen and thighs.

The syndrome of anorexia nervosa, in which the person is chronically emaciated, sometimes to the extent of being a "living skeleton" of fifty or sixty pounds, was once thought to be due to a pituitary deficiency. It is, however, due to self-imposed starvation of emotional origin; and, when it starts in early

adolescence, the person often fails to develop secondary sexual characteristics. Oskar Mazareth, the hero, or antihero, of Gunter's Grass's *The Tin Drum,* who stopped growing at the age of three, is only a fictional symbol, but in recent years clear evidence has been found of emotionally induced dwarfism (Blodgett, 1963). Somewhat less dramatic but more common are the decrements in rates of growth and weight gain in children after they are institutionalized, despite the availability of ample nourishment and excellent physical care.

The development of an athletic physique can also depend upon the individual's self-concept and mechanisms of defense. A youth of seventeen was slight, with poor muscular development and a small frame, when he entered college. He sought psychiatric help early in his freshman year because of phobic symptoms. During his therapy he soon became aware of intense feelings of rivalry with his father and his wishes and fears of attacking and injuring him. As he worked through his hostile feelings toward his father, and in seeking some expression for his aggressive impulses that previously had been repressed, he became a member of the college wrestling squad. Exercising daily with various apparatus in the gymnasium as well as wrestling, he became one of the strongest and most massive students in the university by the time of his graduation.

PERSONALITY DEVELOPMENT AND PHYSIOLOGICAL FUNCTIONING

Let us turn now to consider the influence of personality development on physiological functioning. It will be recalled that in discussing the endowment with which the infant enters this world, we noted that relatively early in the evolutionary process the organism developed automatic means of spontaneously preparing for flight or fight when confronted by danger. These emergency responses are part of the organism's patterns of fear and aggressivity. They are not simply emotional states but pervasive changes in the functioning of the entire organism in preparation for coping with the danger and to minimize the effects of any consequent injury. Although the neurophysiological mechanisms that set off and mediate these reactions are very complex, for our present purposes it will suffice to note that they involve secretion of the hormones epinephrine and norepinephrine by the adrenal medulla, and the activation of the autonomic nervous system—of which the adrenal medulla is, in a sense, a part.[4] Almost instantaneously, the person becomes more alert and sensitive to stimuli because of changes in the reticular activating system in the brain; blood flow is shunted to the muscles and brain from the

peripheral vessels and digestive organs, and the heart rate increases to supply more oxygen to the muscles and brain, and to remove waste products; the coagulability of the blood increases to counter bleeding; the peripheral blood vessels constrict not only to shunt blood to the muscles but also to lessen blood loss; sweating helps dissipate the heat generated by muscular activity and makes the body slippery; the pupils dilate, either the better to see in the dark or to make the animal appear more frightening—the list of physiological changes is great and still not fully known. They include mobilization of blood sugar from depots in the liver to provide energy; changes in kidney function to lessen blood volume; alterations in respiration to increase the oxygen-carbon dioxide exchange; a series of changes in the stomach and intestines, including a tendency for immediate evacuation of the bowels; and changes at the synapses in parts of the brain. In addition the adrenal medullary secretions may trigger secretion of adrenocorticotrophic hormone by the pituitary that sets off another major defense system of the organism that will be considered later in the chapter.

Now all of these responses can be highly useful and life-saving when animals, including human animals, confront an enemy from which they must flee or engage in mortal combat, or when all possible resources must be marshaled in overcoming some environmental hazard as in running from a forest fire, but they are not always useful in mastering the enemies and hazards of a civilized world, such as in combating a business opponent, or the need to make a good impression when being interviewed for admission to a graduate school, The physiological responses to danger contribute little toward countering the hostility of a rival for promotion, or to finding a job by means of which a person can indirectly feed his or her family. These physiological responses are of even less value in situations that arouse anxiety, anger, or resentment. Yet, anxiety, as noted in Chapter 8, is related to fear, and anger and resentment to aggression, and these emotions are accompanied, to a greater or lesser degree, by the same fundamental bodily defenses against impending danger. The more acute the anxiety or severe the anger, the more likely that the physiological changes will be severe and diffuse. But anxiety occurs in relation to danger from one's own impulses, or to concerns over loss of significant persons, or to apprehensions about future contingencies—and these can rarely be solved by cither flight or physical combat. Similarly, hostile feelings and resentments can rarely be overcome by fighting and vanquishing the person with whom one is angry. Still, these physiological states create unpleasant and even unbearable feelings, and anxiety impels individuals toward ridding themselves of its source. These states serve useful functions

primarily in motivating a person toward changing the conditions that may be inducing them—if the person consciously knows what they are. As anxiety is most commonly brought about by unconscious factors, it can serve only as a very diffuse type of motivation.

FUNCTIONAL SYMPTOMS

The physiological concomitants of anxiety and hostility, however, particularly when they are chronic, are major sources of so-called functional symptoms. These psychogenic complaints are not imaginary but usually have a firm physiological basis. Persons who suffer from severe headaches for which no "organic" cause can be found—no brain tumor, eyestrain, sinus infection, arthritic vertebrae, or migraine—are not imagining the pain. They usually suffer from "tension headaches" caused by the tensions of the muscles that accompany increased alertness. The pain from the tense neck muscles is felt over the occiput, and from the frontal and oculomotor muscles in the forehead. A pounding heart, sudden abdominal cramps, drenching sweat, can all be part of the physiological response to danger. A syncopal attack—a faint—can occur when the blood vessels in a person's muscles dilate suddenly in preparation for flight; but when the person merely stands instead of running or fighting, the muscles do not pump blood as they do during activity, and insufficient blood reaches the brain. In a state of inaction the individual becomes aware of such physiological responses and may consider them to be symptoms.[5]

It will be recalled (Chapter 9) that the mental mechanisms of defense may be unconsciously brought into operation at the first physiological signal of anxiety. Either the signal leads to cognizance of the threat of danger and directs the person to do something about it, or a mechanism of defense such as repression, isolation, projection, prevents perception of the threat or changes it into something that does not threaten self-esteem or require self-punishment. The mechanisms of defense, then, do not simply help a person to maintain self-esteem—or to alter id impulses into a form acceptable to the superego—but also help to keep the body from responding to potential anxiety provoking situations. These responses would serve little but would disturb the body's physiological equilibrium and thus produce unnecessary strains on the organism. They are thus a means of protecting the body's integrity from the physiological concomitants of anxiety, anger, and resentment.

EMOTIONS AND BODILY DAMAGE

Although the physiological responses to anxiety are usually brief and produce discomfort rather than damage to the organism, an inability to resolve the anxiety-provoking situation or failures of the ego's mechanisms of defense to conceal the threat can lead to untoward effects. A clear and dramatic though unusual example was provided by a twenty-year-old college student who was admitted to a general hospital for intensive study because of a puzzling, life-threatening ailment. Although his blood pressure was generally normal, on three distinct occasions it had soared to extremely high levels and had remained elevated for several days. On one of these occasions a hemorrhage of a retinal blood vessel had temporarily blinded him in one eye. Such abrupt and transitory episodes of hypertension can be caused by a tumor of adrenal medullary cells that pours epinephrine or norepinephrine into the blood stream when the tumor is squeezed by an abrupt change in posture, as in bending. However, very careful studies eliminated the possibility that the patient had a tumor of this type. He was referred to a psychiatrist, and was pleased to have an opportunity to discuss some serious personality problems and the situations in which his hypertensive episodes had occurred.

He related that he had been engaged in a homosexual relationship with a classmate for five or six years; but during the past year they had both determined to terminate the sexual aspects of their relationship. His home life had been unfortunate. His parents, who had been markedly incompatible, had divorced when he was ten, and he had been sent to boarding school. During his vacations he was shifted from one parent to the other, feeling happy with neither. His father was a highly successful surgeon who held rigid and high expectations for himself and his son but who was given to violent rages, during which he sometimes broke furniture and windows. The patient recalled imagining his father's surgery as brutal and sadistic assaults on people. His mother was oversolicitous and worrisome, and conveyed a lack of confidence in herself and her son. Without attempting to portray his complicated and unhappy childhood, it will suffice to say that he was not averse to homosexual seduction in boarding school, and after indulging in such activities with several boys he formed an intense relationship with a classmate who became the only important person in his life.

The first episode of high blood pressure occurred when he was eighteen. When he was examined for induction into the military service, his blood pressure was found to be so high that he was

hospitalized immediately. No cause could be found for the elevation, which disappeared after a few days. The patient knew that he had been extremely upset at the time, indeed had been suffering from almost unbearable anxiety. He did not believe, in retrospect, that he had been anxious about induction but rather was intensely fearful of being separated from and eventually losing his homosexual partner. The second episode might seem humorous were it not for the consequences. The patient and his friend, having become concerned about their homosexuality, had decided to end the sexual aspects of the relationship and make heterosexual adjustments. When resolve did not lead to results, they made a substantial wager about which one would first have sexual relations with a girl. The college year ended with the wager unclaimed. During the summer vacation the young man met a girl who gave ample indication that she was not averse to going to bed with him. After vacillating for several weeks, he mobilized his courage and decided upon a specific date and place. During the day prior to the chosen night, he suffered from severe tension, was unable to eat and occasionally felt faint. He was determined not to back down from his resolve, and he forced himself to drive to the girl's home even though he felt nauseated and unbearable anxious. Just as he rang the doorbell he lost the vision in his left eve. A physician found his blood pressure to be extremely high and discovered a hemorrhage in his retina. He went to the hospital instead of to a motel and once again his blood pressure receded after two or three days, and he soon regained his vision.

The student then made no attempt to win the bet for several months, but when lie returned to college in the fall his friend also could not claim the money, then the young man noted that a park near his college was frequented by women of a professional character, and he decided that he might be able to "make out" with one of them. He again steeled himself for the venture, and finally sat down on a park bench with a woman and arranged to go to her room. When he stood up he became acutely dizzy and could scarcely walk. He took a taxi to his doctor and was again placed in the hospital. On this occasion his pressure was extremely high and his condition became even more serious when his kidneys shut down and did not produce any urine for several days. Once again his blood pressure returned to normal, but then, partly his suggestion, a psychiatric consultant was asked to see the patient.

The genesis of this young man's homosexuality need not be considered here beyond noting that it constituted a pattern established to ward off fears of being overwhelmed and engulfed by women but which also partly masked his incestuous fixations which were terrifyingly dangerous because of his

fantasies of mutilating reprisals by his violent father. His homosexuality eventually became socially unacceptable and threatened his self-esteem. His attempts to change to heterosexuality by determination and his refusal to be stopped by his anxiety and symptoms of fear, and his failure to overcome the problems and fears that had directed him toward homosexuality, left him prey to an intense physiological concomitant of anxiety.

Such devastating effects of the physiological responses to fear, anxiety, or hostility are uncommon.[6] The more lasting bodily disturbances related to these emotions usually occur when the physiological defenses against threat and danger chronically interfere with the homeostatic functions mediated by the autonomic nervous system.

THE DUAL FUNCTIONS OF THE AUTONOMIC NERVOUS SYSTEM

Let us look at the problem a little more closely. The reader will recall that the entire evolutionary process has had to do with finding new ways to preserve the cell and assure its reproduction (Chapter 1); and that when higher and more complex forms of life arose, complex mechanisms were required to make certain that the tissue fluids surrounding the cells retained their chemical composition with the remarkable constancy needed for maintenance of the cells. It may seem eccentric and even cynical to suggest that all of the complexities of personality development and the human life cycle that form the subject of this book are concerned with a unique way of preserving the germinal cell—at least when regarded from an evolutionary perspective. The body fluids must remain very constant, for slight change in the acidity of the blood, the oxygen and carbon dioxide tensions, the concentrations of sodium, potassium, calcium, and other ions, or in the body temperature are incompatible with proper physiological functioning and the survival of cells, tissues, and the life of the individual. The internal environment is maintained relatively constant by means of complicated chemical buffering systems and various checks, balances, and feedback systems. Humans must rely upon what Walter Cannon (1963) termed "the wisdom of the body" to handle itself, for it far surpasses conscious human intellectual abilities. Now what concerns us here is simply that a great deal of the nervous control of these homeostatic mechanisms is mediated by the autonomic nervous system, the same system and pathways that are involved in the preparation of the body to flee or fight when the person is confronted by danger or, as we have seen, when the person becomes anxious or hostile.[7] When, for example, the body

temperature begins to fall, the autonomic nerves carry impulses that cause constriction of the peripheral blood vessels to conserve heat loss from radiation. If the carbon dioxide tension in the blood rises, respiration automatically deepens. Heart rate and constriction of various blood vessels van' in accord with the needs of exertion and the maintenance of a proper blood pressure. The secretions of the digestive juices in the stomach, the state of the blood vessels in the lining of the stomach, and the motility of the stomach are influenced by the autonomic nervous system. There is no need to attempt to convey the sweeping and important homeostatic functions of the sympathetic and parasympathetic nervous systems.

What ensues when these two functions of the autonomic nervous system conflict? As the reactions to danger are emergency functions, they are usually short-lived and usually do not interfere for long. When fear, anxiety, aggressivity, or hostility become chronic, or occur repetitively, then the smooth regulation of the body's maintenance of its homeostasis can be impaired. Under some conditions such disturbances can lead to more permanent changes, including illnesses such as peptic ulcer, hyperthyroidism, or bronchial asthma.[8] A middle-aged woman is sent into the hospital with a severe skin condition, an atopic dermatitis, that has affected her face particularly severely. The condition started a month after her second marriage and steadily worsened over the ensuing two months despite various therapeutic regimens. She is clearly depressed and when the resident physician, in seeking to learn what might be disturbing her, inquires about her recent marriage, the woman begins to cry. She reluctantly relates that she made a serious mistake in marrying again. Soon after the marriage, it became clear that her new husband was interested only in a type of perverse sexual relationship. When she had refused to participate, he had asked why she would not, saying that her sister had always enjoyed it. The patient had complied but felt humiliated and ashamed—and perhaps even more ashamed and angry to learn that her sister, who was married, had been having an affair with her new husband for many years. She did not know what to do or how she could even continue to see her sister. As she discussed her problem and eventually decided on what she might do about it, her skin healed and remained normal. The vascularity of her skin apparently had been chronically affected by her reactions of shame and buried rage.

LIFE PATTERNS AND PHYSIOLOGICAL IMBALANCE

The life pattern of a person and particularly the repetitive ways of reacting and relating can have

much to do with creating a state of physiological strain or imbalance. It will be recalled that in our discussion of the influence of oral fixation on character formation at the end of the chapter on infancy, we presented the problems of a man suffering from peptic ulcer. He had remained closely tied to his mother, insecure of his capacity to support and feed himself, and afraid of reexperiencing a traumatic episode in his childhood, when his family had been threatened by poverty and starvation. He was an obese man who habitually overate when he felt insecure and suffered from frequent episodes of heartburn. He had married a motherly woman when he realized his mother was getting old. He suffered his first attack of bleeding from a peptic ulcer while awaiting induction into the army, and a second serious episode when his wife unexpectedly became pregnant. The theme that ran through his life, and which was repeated in many variations according to his age and the specific circumstances, concerned the need for assurance of "oral supplies" of food and nurturing protection. Never able to venture beyond his dependency on maternal figures, this man found even the ordinary course of life to be filled with threatening, anxiety-provoking situations that could upset his physiological functioning—and perhaps because of his oral fixation his gastric functioning in particular.[9] Any threat of separation from his mother and any need to become self-reliant provoked anxiety which he never overcame because a phobic defense against traveling kept him from leaving his small native town. He needed to earn more money as a married man in order to feel secure. He had the intelligence and training to hold a far better position than the one he had; he often thought of changing jobs or starting a business of his own, but when he did he became anxious and suffered from stomach upsets and convinced himself that his health did not permit him to change jobs. But then he would resent that his boss did not appreciate his abilities and promote him, and he would suffer from indigestion again. A new job could not offer him an enjoyable challenge and a sense of accomplishment; going into the army could not provide new adventure; his marriage provoked as much anxiety as it did happiness, despite his having found a considerate and nurturant wife; the prospect of becoming a father was an ordeal rather than an anticipation of fulfillment. The minor, almost daily upsets that helped keep his gastric functioning disturbed can readily be imagined. As the defensive pattern of his life was concerned with an unrealistic and unattainable search for complete security, it contained in it the sources of repetitive episodes of anxiety and frustration.

Sometimes the defensive pattern of life opens the way for serious emotional trauma that can have a devastating effect upon the person's emotional stability and physiological functioning. The impending

induction into the army of the man we have been discussing was more than an anxiety-provoking episode. It threatened the core of his security operations. He would no longer be able to have a mother or mothering wife at hand; his phobia of traveling would be unable to protect him from being removed from them; he would be cast out on his own into a hard world that did not supply sustenance. As he had neither gradually gained confidence in his ability to care for himself, provide for himself, and survive on his own nor had lie developed various mechanisms of defense that could serve to buffer the anxiety and perhaps change the perception of the danger into a more containable form, he reacted to the threat of induction with all of the physiological intensity of a child who loses his mother or who is faced by some overwhelming danger. It was at this juncture of his life that he developed his peptic ulcer and bled from it. Similarly, a woman who seeks security against feelings of abandonment by her mother by becoming the essential loyal child who will care for her mother after the other children leave eventually loses her mother by death or finds herself resentfully burdened with a helpless old person. If, as a part of the pattern, she seeks to bind a son to her by lavishing on him an overprotectiveness she believes she would have liked as a child, then the son is likely to rebel in a desperate effort to gain his freedom and his own identity, and flee from his mother rather than remain in a filial relationship to her. Then, when this trauma that has been feared since childhood occurs, she, too, responds with a profound and even devastating physiological reaction as if to an overwhelming danger: perhaps as she did in childhood when the sensitizing event originally occurred. Indeed, it was at this juncture in her life that a woman in this situation developed hyperthyroidism.

Misfiring of Mechanisms of Defense

We must note, too, that, although the mechanisms of defense usually serve to lessen the physiological impact of situations that are potentially anxiety-provoking, they can also increase the person's vulnerability. If, for example, a defensive mechanism prevents awareness of a situation that is actually dangerous, reality may eventually force recognition of the serious dilemma and the physiological response to the shock of recognition of danger can be profound. A man whose entire way of life rested upon his devotion to his wife and children managed to forgive his wife when she confessed to having an affair, but stated definitely that any further infidelities would lead to a divorce. Several years later he managed to use various mechanisms of defense to keep himself from realizing that his wife was

proving La Rochefoucauld's epigram, "There are many wives who have never been unfaithful but none who have been unfaithful once." When he was abruptly and unexpectedly forced to recognize the actual situation, he suffered a serious coronary occlusion.

Furthermore, mechanisms of defense can go astray, so to speak, and become sources of severe anxiety. Thus, a woman managed to repress her hostility toward her husband and her wishes to be rid of the child who tied her to the marriage with the aid of various mechanisms of defense including undoing, reaction formation, and obsessive oversolicitude for her child. She eventually worked herself into an unbearable position. She became fearful of ever leaving her child alone, unable to sleep unless the child was sleeping beside her, fearful when he walked to school, and she could scarcely bear the anxiety of waiting for his return, fearing some harm had befallen him. She was unable to tolerate any prolonged separation from her son, which led to difficulties with her husband. when it became necessary for her to remain in the hospital, she insisted on leaving to accompany her son to a picnic, for he might drown while swimming unless she were present to watch, even though she could not swim. Such decompensated defenses are not uncommon, and when chronic they can become a major factor in the etiology of psychosomatic disorders.

THE ALARM REACTION AND THE GENERAL ADAPTATION SYNDROME

There are various other ways in which adverse life situations and serious emotional disturbances affect physiological functioning and the integrity of the body which do not depend so greatly upon dysfunction of the autonomic nervous system. One major set of interrelated physiological responses to severe stress involves the defensive activity of the adrenal cortical hormones. Rather than preparing the organism for action against danger as by flight or fight, these hormones provide a strengthening of physiological defenses against bodily injury, but the reactions also come into play following emotional stress, at least after severe emotional trauma. Epinephrine triggers the secretion of adrenocorticotrophic hormone (ACTH) by the pituitary, which in turn stimulates secretion of the adrenal cortical hormones (cortisone and related hormones). A continuation of the trauma can overstimulate the physiological defenses and lead to permanent changes in various organ systems, or exhaust the defenses, which can also cause profound structural damages. The physiologist Hans Selye, who has been a primary investigator of these types of responses to stress, has termed one set the *alarm reaction* and certain of its

more continued physiological consequences the *general adaptation syndrome*.[10] The changes that occur seem to help explain the etiology of some illnesses such as rheumatoid arthritis, some types of kidney ailments, and various types of "collagen disease." Although the adaptation syndrome may primarily be a defense against physical injury, it can also occur in response to severe emotional trauma. Thus, Selye found that the entire reaction leading to death from adrenal cortical exhaustion could be produced in rats by tying their legs—a procedure which produces extreme fright in these animals. Death ensued with typical changes in many organ systems, even though the animals were carefully shielded against injuring themselves during their struggles. The endocrine, neuroanatomic, and neurophysiological interrelationships involved in the adrenal cortical defenses are under intensive study by many investigators.

Although emotional factors appear to influence the individual's resistance to illness, including infectious illnesses, the area has been very difficult to investigate carefully.

PHYSIOLOGICAL RESPONSES TO HOPELESSNESS AND HELPLESSNESS

Engel and his coworkers (1962) have focused their investigations upon physiological reactions accompanying a person's withdrawal of emotional involvement, particularly following the loss of a significant person, and have sought to differentiate between the reactions of helplessness and those of hopelessness. These are considered means of conserving energy and preventing the emotional and physiological impact of unbearable loss or overwhelming threat. The patterns are related to those of apathy and depression. At present, most of the evidence of profound physiological change is indirect, and the nature of the changes remains uncertain.

We have been considering the impact of emotions on physiological functions and how personality development influences the physiology of the individual. Although it is but one aspect of the involved and highly technical subject, we focused attention particularly on the automatic defenses against danger mediated by the autonomic nervous system, and on how such emergency functions can conflict with the homeostatic functions of the autonomic system and produce a variety of dysfunctions. The individual life patterns, particularly a defensive life patterning, can lead to repetitive triggering of the physiological defenses against danger, and undermining of the life patterns can create overwhelming emotional stress

accompanied by severe strains on the integrity of the organism. The mental mechanisms of defense serve not only to defend the ego and maintain self-esteem but also to protect against anxiety which triggers the physiological defenses against danger; but at times, such mechanisms can go astray and provoke emotional states that create strains on the physiological defenses.

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Notes

1 Including fractured bones because of "accident-proneness," and acute infectious diseases such as pneumonia through style of life, unconscious neglect of reasonable precautions, etc. Thus, a man who suffered from lobar pneumonia three times in one year had almost courted such illnesses after serious family arguments. Me would emerge from the very hot furnace room in which he worked all day, go to a bar, and take three-shots of whiskey, which dilated his peripheral blood vessels still further as well as dulled his feelings about his enraged wife, then would walk for hours in freezing weather rather than go home, occasionally stopping for another drink of whiskey, which would interfere further with his body's ability to conserve heat.

2 At least three journals in English are specifically devoted to studies in the field, Psychosomatic Medicine, Journal of Psychosomatic Research, and Psychosomatics. For a more physiologically oriented introduction, the reader is referred to the author's chapter in the first edition of the American Handbook of Psychiatry. Psychosomatic Medicine, by Franz Alexander, furnishes a good general approach to clinical problems.

3 Scientific studies of the effects of emotion on gastric physiology started when one of the heroes of American medicine, William Beaumont (1833), made direct observations of the interior of the stomach and of its secretions; he concomitantly demonstrated that a good scientist can function under almost any circumstances or find material for study wherever he may be. As an army surgeon stationed on the frontier in 1829, Beaumont saved the life of a trapper, Alexis St. Martin, who had suffered an accidental gunshot wound in the abdomen. St. Martin was left with a fistula between the stomach and the exterior abdominal wall, which permitted direct observation of the interior of the stomach, its activity, and the sampling of its secretions. Beaumont hired St. Martin and carried out careful studies of his unique subject for many years, which included observations of the effects of emotional states on gastric physiology.

Another series of classic studies of the stomach, carried out by Stewart Wolf and Harold Wolff (1943) on another man with a gastric fistula, was directed specifically at elucidating the effect of emotions on gastric functioning. The experimental subject, known only as Tom, suffered from atresia of the esophagus—not from ingestion of lye as is usually the case, but, as a good Irishman, from inadvertently swallowing a cup of scalding chowder. Since he was unable to eat, a fistula into his stomach was created surgically. The researchers gave Tom a job doing chores around the laboratory so that they would have him available for their studies. They observed their subject's stomach as he spontaneously experienced a variety of emotional states and they learned how to induce various emotional states in him to further their studies. The proper digestive functioning of the stomach depends upon the harmonious integration between acid and pepsin secretion, motility, the degree of dilation of the blood vessels in the mucosal lining, and the proper opening of the entrance to the duodenum. In brief, they found that when Tom was anxious or fearful the motility of the stomach decreased, the mucosal lining of the stomach became pale, but acid secretion continued; when he was angry the mucosa became engorged, the acid secretion might double, and the stomach which could be overactive was also friable and easily injured. Both patterns disrupted the harmoniously integrated patterns of motility, acid and pepsin secretion, and vascular engorgement of the mucosa conducive to proper digestion. Other investigators disagree with these precise findings, but all have found significant alterations in motility, secretions, and vascularity with various types of emotional stress.

Another highly significant study has been carried out by Engel and Reichsman (1956) on a young child, Monica, who was born with an esophageal atresia and had a gastric fistula made surgically. The study has particular importance in relating the effects of apathy and depression to gastric functions.

4 It has often been considered that epinephrine primarily prepares for flight and norepinephrine for fight. It has been suggested that animals

who tend to flee secrete more epinephrine than norepinephrine and the opposite occurs in those more apt to fight than flee. Some evidence as summarized by Engel (1962) suggests that epinephrine is the major secretion during the period of alarm and anxiety without action; but that with action, be it either flight or fight, norepinephrine secretion becomes greater, automatically shifting the physiological patterns for action.

5 Although the physiological responses to anxiety and hostility are diffuse, individuals usually become conscious of one or more specific manifestations, and these seem to become the primary symptoms of anxiety or fear for the individual. It is not clear how this occurs. In World War I, for example, many soldiers, particularly in the British Army, were incapacitated by the "effort syndrome" or "neurocirculatory asthenia"—the heart beat very forcefully and rapidly and the soldier became short of breath with very slight exertion. Considerable attention was paid to the syndrome. In World War II, during the Solomon Islands campaign, numerous soldiers had similar symptoms but together with the full gamut of physiological responses to danger—hyperalertness, sweating, diarrhea, slightly elevated blood pressure, etc.—and when special effort was made to prevent them from focusing on their heart symptoms rather than on their anxiety, only a very few developed the "effort syndrome," which clearly seemed a residue of the more diffuse anxiety state and could be relieved by blocking the sympathetic nerves to the heart.

6 How uncommon remains uncertain. In any event, hyperthyroidism sometimes follows directly upon a terrifying experience about which the person can do little (Lidz and Whitehorn, 1950). Thus, a black man who was raised in the deep South was terrified after he killed a white man in an auto accident. He had nightmares of a lynching he had witnessed as a child and soon became hyperthyroid. Another man became hyperthyroid after watching his farmhouse burn with his wife and child in it, being restrained from attempting to rescue them because it was hopeless. The thyroid hormone sensitizes to epinephrine and has something to do with mobilization for severe chronic stress as well as the regulation of metabolism. Sudden death after acute fright has also been reported by various observers. The author believes that he knows of coronary occlusions, including several deaths from such heart attacks, that followed upon the patient's experiencing unbearable anger and frustration.

7 A great deal more is involved than the autonomic nervous system, of course, including virtually all of the endocrine glands, but the secretion of epinephrine plays an important role in triggering some of these secretions, and the autonomic nervous system is intimately connected with the various visceral centers in the brain.

8 In some of the diseases of stress it is clear that other factors are essential. Peptic ulcer, for example, occurs predominantly in persons who constitutionally tend to have high levels of pepsin secretion—as well as emotional problems. Most persons with bronchial asthma are severely allergic, yet some are not allergic at all but have only a certain type of emotional difficulty; many will have asthma only when exposed to the proper allergen, and the severity of the asthma depends on both the severity of the exposure to the allergen and the degree of emotional upset. Asthmatic patients often cease being asthmatic when they are removed to the hospital, away from a difficult home situation. Similarly, the blood pressure of patients with essential hypertension usually becomes lower after they are placed in the hospital and without any other therapeutic measures.

9 The influence of life patterns, particularly defensive life patterns, is particularly important in the study of the "psychosomatic disorders." Many investigators in this field strongly believe that each of the major psychosomatic disorders occurs in persons who are sensitized to similar types of problems and perhaps whose life patterning leads to specific types of conflict. The patient being discussed is rather typical of many patients who suffer from peptic ulcer. Patients with ulcerative colitis are even less mature and more childishly dependent and have grave difficulties in making decisions; hypertensive patients may well show a different configuration which leads them to feel chronically enraged hut rarely able to express their feelings, and so on. The "specificity" of such configurations is a matter of considerable dispute. A good presentation of this general orientation can be found in Franz Alexander's *Psychosomatic Medicine*

10 Selye (1946) became interested in the physiological responses that are common to many illnesses and may also accompany injury: such as the shifts in the number and types of white cells circulating in the blood, fever, changes in blood pressure and volume, changes in vascular permeability, etc. Many such responses hinge upon the .secretion of adrenal cortical steroids. In a general way, a primary response to trauma is the alarm reaction, in which increased corticoid secretion decreases vascular

permeability and diminishes fluid loss from blood vessels into the tissues, which together with other measures helps prevent shock. Following the alarm reaction, a state of resistance follows, accompanied by tissue changes, and when trauma is severe may eventually lead to death. The type and extent of these defensive tissue changes depend upon such factors as severity, spread, and duration of the trauma as well as constitutional factors. However, even relatively early in the adaptation response, growth can be inhibited, the gonads can undergo involution, lactation in nursing mothers ceases, and ulcerations occur in the gastrointestinal tract. Later, tissue changes such as are found in the various "collagen diseases" occur. The total reaction involves a profound shift in balance of the entire neuroendocrine system and cannot be presented here.