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Recommended Citation

Melvin L. Selzer, *Psychological Stress and Legal Concepts of Disease Causation*, 56 Cornell L. Rev. 951 (1971)
Available at: <http://scholarship.law.cornell.edu/clr/vol56/iss6/3>

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PSYCHOLOGICAL STRESS AND LEGAL CONCEPTS OF DISEASE CAUSATION

Melvin L. Selzer, M.D.†

The relationship of emotional stress to the development of disease is a relatively new area of interest to both lawyers and physicians. There was little room for such an esoteric concern during medicine's pre-scientific years. Prior to the twentieth century, most illnesses were attributed to evil thoughts or spirits. The current century brought with it a burgeoning scientific spirit followed by a host of real and meaningful disclosures. In the first burst of discovery, every finding appeared conclusive, each a total answer that stood alone. Only later did many of these revelations lead to additional and more sophisticated inquiry. The early work of Koch and Lister, for example, left no doubt that certain diseases were the result of infectious processes, of bacteria invading the host organism. Later investigators pondered the fact that many people did not develop disease despite similar bacterial contact. Many persons, for example, harbored the tuberculosis bacillus in their respiratory systems yet never developed tuberculosis. While it will always remain true that one cannot develop tuberculosis absent the bacillus, other factors such as the host organism's nutritional state, living conditions, and hereditary endowment play a role in whether or not the individual will develop the disease. What appeared to be a simple "germ-meets-man" mechanism proved to be somewhat more complex than originally envisaged. Illnesses are invariably more mystifying under closer scrutiny, particularly if one is seeking simple one-to-one etiological explanations.

I

WHAT IS STRESS?

Stress will be defined herein as any circumstance, situation, or event that causes or accelerates the development of human emotional or physical disability or disease. Physical trauma or physical disease as a precipitating stress is excluded; the emphasis will be on psychological

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stress. However, physical injury or illness is also emotional stress and not infrequently results in emotional illness the severity of which exceeds that of the precipitating physical disorder. The relation of stress to emotional illness and physical disease will be dealt with separately in this article although the division may be spurious. Every significant deleterious physical alteration must have an emotional accompaniment or reaction. One does not usually sustain a physical injury or suffer a significant physical illness without some change from the pre-existing emotional state. Similarly, emotional changes often produce a related physiological or metabolic alteration, albeit evanescent, reversible, or as yet undiscovered.

II

ACUTE VERSUS CHRONIC STRESS

Unfortunately, both courts and medical specialists have limited the concept of stress related illness, at least for purposes of legal causation, to physical or emotional illness that immediately follows the stress. Since little is known about psychological stress, and its introduction tends to create controversy in the courtroom, one can understand why a concept of *chronic* stress would meet considerable resistance. The relative acceptance of acute stress (defined as stress of sudden and/or unexpected origin) as causative and the denial or near denial of the idea that stress can be chronic leads to paradoxical interpretations.

A distinguished committee of the American Heart Association has held that myocardial infarction¹ following coronary artery occlusion² shall be considered related to physical or emotional exertion only if the myocardial infarction occurs *during* an actual period of stress clearly unusual for the individual.³ The conclusion that physical stress must immediately precede the myocardial infarction seems superficially rea-

¹ Myocardial infarction (the common "heart attack") involves the death (necrosis) of heart muscle resulting from an interruption of the coronary blood flow. For an extensive treatment of the subject of cardiac infarction, see Ray, *Angina Pectoris and Coronary Occlusion*, in 8 *TRAUMATIC MEDICINE AND SURGERY FOR THE ATTORNEY* ¶ 1908 (P. Cantor ed. 1962).

² A coronary artery occlusion (thrombosis) denotes the blockage of the arteries of the heart. The resultant deficiency in blood supply passing to the heart muscle (myocardium) often leads to myocardial infarction. *Id.* at ¶¶ 1905, 1907.

³ Council on Community Serv. & Educ., Am. Heart Ass'n, *Report of the Committee on the Effect of Strain and Trauma on the Heart and Great Vessels*, 26 *CIRCULATION* 612 (1962).

sonable. However, a coronary artery occlusion is usually the end result of an atherosclerotic process,⁴ a long term development in which layers of fatty material are deposited in the arterial lumen.⁵ The final closure of the artery may indeed result from a sudden physical exertion or mental shock, but the effect of chronic stress during the preceding years on the atherosclerotic process itself should not be dismissed.

Evidence exists linking coronary occlusion to both environmental and intra-psychoic chronic stress. In one study, Russek⁶ polled 100 subjects under forty years of age who had suffered coronary occlusions to determine if there had been any prior prolonged emotional strain associated with job responsibility. Ninety-one percent of the coronary victims reported prolonged strain as contrasted to only twenty percent of the non-coronary control group. In the coronary group, twenty-five percent had been holding down two jobs and another forty-six percent had worked sixty or more hours per week for prolonged periods immediately preceding the onset of symptoms. In almost every instance the coronary patient was a victim of overwork, often as a result of an unrelenting drive, an intense desire for recognition, or a profound sense of obligation to his employer, his family, or others. Such findings raise questions about an individual's own personality structure creating internal stress, or making him a "stress seeker."

Not surprisingly, other investigators have noted that coronary victims tend to be drawn from the ranks of men who are intensely ambitious, competitive, and characterized by constant preoccupation with deadlines and an enhanced sense of time urgency.⁷ Sufficient data exist to make credible the possibility that chronic stress resulting from the relationship between the individual and his environment plays a significant long term role in the accelerated deposition of the fatty plaques which slowly occlude the coronary artery. Nevertheless, most compensatory awards for coronary occlusion are confined to situa-

⁴ Atherosclerosis (hardening of the arteries) is the most common etiological agent of coronary heart disease. In the atherosclerotic process a fat-like material (plaque) is deposited throughout the cardiovascular system. The lifelong accumulation of plaque may eventually lead to myocardial infarction. While high cholesterol and lipoprotein concentrations in the blood may be elements in the causation of atherosclerosis, hypertension, heredity, stress, disease, and trauma have been suggested as other causative factors. Ray, *supra* note 1, ¶ 1907, at 303-06.

⁵ Arterial lumen is the inside of the artery—the opening through which the blood passes.

⁶ Russek, *Role of Heredity, Diet, and Emotional Stress in Coronary Heart Disease*, 171 J.A.M.A. 503 (1959).

⁷ See, e.g., Rosenman, Friedman, Straus, Wurm, Jenkins & Messinger, *Coronary Heart Disease in the Western Collaborative Group Study*, 195 J.A.M.A. 86 (1966).

tions where obvious stress immediately preceded the onset of illness.⁸ If one accepts, however, the possibility that chronic stress may play a role in coronary artery disease, then in certain cases it may be irrelevant whether the coronary victim was arguing with his foreman or asleep in bed when afflicted.⁹

III

STRESS AND PSYCHIATRIC ILLNESS

The causative link between acute or sudden emotional stress and psychiatric disability has been accepted by most legal jurisdictions and compensation boards. Originally, claims involving psychiatric illness were honored only when attributable to physical injury,¹⁰ and it is still impossible in many jurisdictions to have claims accepted in the absence of physical injury or physical illness.¹¹ Typically, the legally successful non-physical injury cases have involved a sudden unpleasant or frightening event with subsequent psychiatric disability.

In an early case, a claimant was frightened by an electric flash caused by a short circuited motor.¹² The claimant fainted and was caught by another employee. As a result of the mental association, she fainted the next time she saw her co-worker and it became impossible for her to work. A similar case in which compensation was awarded involved a woman who developed a hysterical paralysis of her left side after being frightened by lightning which had struck the building in which she worked.¹³ Not surprisingly, it has not been possible to devise systematic studies of mental illness caused by acutely stressful events. Animal studies of stress have not been convincing for obvious reasons.

In contrast to the relative acceptance of the immediate cause and

⁸ Hellmuth, Rodey, Johannson & Belknap, *Work and Heart Disease in Wisconsin: I. Medical Basis for Workmen's Compensation Awards over Ten Years*, 198 J.A.M.A. 9 (1966).

⁹ In actual practice most coronary claims are made only on the basis of physical exertion or physical injury immediately preceding symptom onset. In light of the absence of reliable criteria for emotional stress, it is quite understandable that experts would tend to avoid evaluating such stress in relationship to coronary artery disease.

¹⁰ See W. PROSSER, *HANDBOOK OF THE LAW OF TORTS* § 55 (3d ed. 1964).

¹¹ See, e.g., *Amaya v. Home Ice, Fuel & Supply Co.*, 59 Cal. 2d 295, 379 P.2d 513, 29 Cal. Rptr. 33 (1963).

¹² *Burlington Mills Corp. v. Hagood*, 177 Va. 204, 13 S.E.2d 291 (1941).

¹³ *Charon's Case*, 321 Mass. 694, 75 N.E.2d 511 (1947). In a recent case, the Massachusetts Supreme Judicial Court held that a tort cause of action existed where the plaintiff had suffered two heart attacks resulting from emotional distress caused by the defendant's extreme and outrageous conduct. The defendant, a department store creditor, had intimidated and unduly harassed the plaintiff, a debtor's mother, in attempting to collect the debt. *George v. Jordan Marsh Co.*, — Mass. —, 268 N.E.2d 915 (1971).

effect relationship of acute stress and psychiatric illness, the question of the recognition of emotional illness caused by chronic stress remains unanswered. One of the few cases where compensation was granted for what appears to have been an emotional illness following chronic stress was decided by the Michigan Supreme Court in 1960, and has since generated considerable controversy. In *Carter v. General Motors Corp.*,¹⁴ compensation was awarded to an assembly line worker for a schizophrenic illness resulting from emotional pressure encountered on his job. His tasks required him to carry an engine assembly from a nearby table to his work bench, complete his work on the assembly, then place it on a conveyor belt. He was unable to keep up the pace unless he took two assemblies at a time to his bench. His foreman objected because the assembly parts then became mixed and admonished him to take one assembly at a time. If he took one assembly he again fell behind and was reprimanded. After this had continued for an undisclosed period of time, Carter suffered a mental illness which was diagnosed as paranoid schizophrenia. Denied compensation, he ultimately appealed to the Supreme Court of Michigan where the claim was upheld in a split decision.

It is the dissenting opinion, arguing against compensation, that has been widely quoted by members of both the medical and legal communities concerned that the *Carter* decision might presage the unwarranted removal of the barriers to recovery for chronic stress.¹⁵ Briefly, the minority opinion stressed that no special hazard existed on the job and that Carter's disability resulted neither from a single physical injury nor a distinct mental shock as had been the case in prior decisions.¹⁶ The dissenting opinion also emphasized that Carter was only subjected to ordinary work pressure. The dissent's emphasis on the necessity for a distinguishable precipitating event implies that a single incident is more traumatic than many stressful incidents or continuous stress. On the contrary, there is reason to believe that chronic or repetitive emotional stress can bring about serious emotional problems as well as physical alterations.¹⁷

The question of whether or not "unusual" stress was present will depend upon construction of the term "usual." That the stress was constant did not make it less unusual—nor less stressful. For Carter, the

¹⁴ 361 Mich. 577, 106 N.W.2d 105 (1960).

¹⁵ Brill & Glass, *Workmen's Compensation for Psychiatric Disorders*, 193 J.A.M.A. 345, 346-47 (1965).

¹⁶ The dissent contended that Carter's disability was due to a preexisting mental condition. 361 Mich. at 596-97, 607-08, 106 N.W.2d at 114-15, 120-21.

¹⁷ See, e.g., W. GRACE, S. WOLF & H. WOLFF, *THE HUMAN COLON* 204-05 (1951).

foreman's admonitions may well have been an unusual stress even though the foreman's actions were justified. It is difficult to determine whether Carter was under "ordinary work pressure." There are jobs and job contexts which generate enormous amounts of tension in some employees and not in others. Sometimes these tensions are unavoidable and result from such diverse phenomena as deadlines, promotions, new supervisors, or new work schedules. "Ordinary" work pressures or living situations can subtly become extraordinary, with or without the awareness of those directly affected.

A case reaching the Michigan Supreme Court in 1962¹⁸ is of interest because the stress involved appears to fall between that recognized as caused by sudden, single events and that of the chronic variety. Trombley was a thirty-seven-year-old attendant at a state home for mentally retarded patients. A patient in one of the cottages where he worked sustained injuries in an undisclosed manner. The patient's relatives caused investigations to be made including one by a legislative committee. Trombley was among a number of employees who were interrogated by the committee on several occasions. As a result of the questions put to him, he felt he was being unjustly accused of misconduct in his duties. Thereafter he became depressed and, following a television broadcast indicating that the legislative committee was preparing to resume its investigation at the training home, he shot himself in the chest with a rifle. Although one of the dissenting judges contended that the mental condition which it was claimed resulted in Trombley's suicide was not the result of a physical injury or occupational disease compensable under the workmen's compensation laws, the majority accepted the causal relationship between the emotional stress on Trombley and his suicide and affirmed the award to his widow.

At this point it must be acknowledged that an occasional case where chronic stress is related to emotional illness gives very little statistical credence to the concept that chronic emotional stress is uniformly causative in psychiatric illness. One can seldom be absolutely certain in sporadic cases what the role of extraneous current or antecedent factors may have been. It is impossible to control critical human variables as one would in laboratory experimentation.

In lieu of controlled experiments, psychiatric investigators have attempted to study certain populations that were subjected to stresses beyond their control in an attempt to evaluate the role of stress in causing illness. Probably the most striking example of emotional illness

¹⁸ Trombley v. Coldwater State Home & Training School, 366 Mich. 649, 115 N.W.2d 561 (1962).

caused by "chronic stress" is the plight of those who survived the persecutions and deprivations of the Nazi concentration camps during the period 1933-1945.¹⁹ Severe depression and anxiety, extreme difficulty in forming meaningful relationships with others, and truly disruptive psychosomatic illness characterized these victims long after their ordeal ended. Their chronically disturbed emotional state was partly attributed to depression stemming from "survivors' guilt" since not infrequently the victims were sole survivors of entire families. It must be acknowledged, however, that the experience of concentration camp victims is hardly a prototype for chronic stress. The fearful degradation and deprivation of their experience was so total as to fall outside the realm of usual human experience.

A different group of Europeans was a subject for study in 1956-1957.²⁰ This group consisted of sixty-nine Hungarians who had fled Hungary following the anti-communist revolt that took place in that country in October 1956. Almost all had either taken up arms or verbally supported the brief uprising against the Communist regime. Of interest was the relationship between the general health of the refugees and their experience with the police state aspects of their environment during the ten years preceding the revolution of 1956. During those ten years the rate at which they experienced episodes of illness of all types—both emotional and physical—was considerably higher than that seen during any comparable period in any other group studied by the researchers. Most of the refugees had experienced difficulty in making an adaptation to the new Communist social environment, most notably during periods when they felt insecure, frustrated, and threatened because of their position in that unfamiliar society. This increase in illness appeared to be largely the result of physiological and psychological changes associated with attempts to adapt to an extremely difficult life situation, rather than the result of fatigue, poor diet, or other physical aspects of the environment. These efforts led to a profound degree of insecurity and frustration in a rigid, unpredictable, and danger-laden atmosphere where many events were totally beyond the control of the individual.

It should be noted, however, that some individuals had lived through remarkably demanding life situations while in Hungary with very little illness; others experienced many illnesses in settings that

¹⁹ Ostwald & Bittner, *Life Adjustment After Severe Persecution*, 124 AM. J. PSYCHIATRY 1393 (1968).

²⁰ Hinkle, Kane, Christenson & Wolf, *Hungarian Refugees: Life Experiences and Features Influencing Participation in the Revolution and Subsequent Flight*, 116 AM J. PSYCHIATRY 16 (1959).

appeared to be much more benign. Hence, to some extent the differences in susceptibility to illness appeared dependent upon characteristics that were partly determined by the subject's personality and psychological mechanisms and how they permitted him to perceive and cope with a threatening environment.

IV

STRESS AND PHYSICAL DISEASE

A relatively small number of studies makes it clear that physical illness is frequently related to chronic stress. One of the first documented studies concluded that most physical illness was related to specific interpersonal crises in the lives of those who became ill.²¹ The study involved 3000 men in three population groups, each group as different as possible, with complete records of all illness occurring in their adult lives. One significant finding was that sickness disability was not distributed at random among subjects. In two of the groups, one-fourth of the men experienced more than half of all the illness and upwards of seventy-five percent of the total days of disability. It was thus clear that some factor other than chance determined the distribution of illness. Another finding was that those who had the greatest amount of sickness disability experienced a wide variety of illnesses of various etiologies involving a number of body systems. It was also found that those having the greatest number of bodily illnesses, regardless of etiology, experienced a greater number of disturbances of mood, thought, and behavior.

The most remarkable finding in the study related to the time distribution of illness. It was found that sickness episodes usually appeared in clusters and were not distributed at random throughout a lifetime. Typically, an informant would have periods of relatively good health alternating with years in which he would have a number of illnesses of a variety of etiologies involving different body systems. This clustering phenomenon occurred among those who had small and intermediate amounts of illness as well as among those who had many illnesses. Some illnesses and accidents did appear as isolated phenomena but most occurred in clusters in all three groups. Faced with the clustering phenomenon, the investigators concluded that the factors which affected the susceptibility of their informants to illness did not exert a constant influence at all times. In addition, there were no predictable

²¹ *Studies in Human Ecology*, 114 AM. J. PSYCHIATRY 212 (1957).

periods of life when illness clusters appeared. The researchers hypothesized that the factors causing illness probably arose out of some changing and unpredictable relationship between each individual and his environment. They sought to determine which features present in the individual's environment could be associated with fluctuations in health.

Their data indicated that physical hardship, geographic and climatic change, and exposure to toxic or infectious agents were not significant variables. They did find that clusters of illness were usually associated with periods when their subjects were attempting to adapt to difficult life situations. In general these appeared to be periods of demonstrable conflict with parents or spouse, threats to social position, loss of significant emotional supports, or excessive demands created by the illness or aggressive behavior of family members or close associates. These difficulties in relationship to the social and human environment were usually experienced by the subject as agonizing or unpleasant. The authors concluded that the relationship of the subject to his social environment had a critical influence on the occurrence of the clusters of illness. There were, however, instances where informants lived in difficult life situations with no observable evidence of illness, and conversely, some clusters of illness appeared among individuals existing in what objectively appeared to be benign life situations.

In a related but somewhat different approach, another group of researchers explored the hypothesis that many diseases have their origin in a setting of frequent social stress.²² Patients suffering from a variety of diseases were studied and compared with healthy controls. The most salient finding was that members of the illness group had experienced marked changes in their personal and economic status during the two-year period preceding the onset of their illness. The reported changes involved such events as loss of close friends or relatives, severe financial hardships, changes in family constellation, and residence changes. The investigators concluded that the life crises represented by the various social changes described were "a necessary but not sufficient precipitant [*sic*] of major health changes."²³ A subsequent study of fifty subjects²⁴ demonstrated that the greater the degree of change in a subject's life during the previous year, the higher the risk of subsequent illness.

²² Rahe, Meyer, Smith, Kjaer & Holmes, *Social Stress and Illness Onset*, 8 J. PSYCHOSOMATIC RESEARCH 35 (1964).

²³ *Id.* at 43.

²⁴ Rahe, McKean & Arthur, *A Longitudinal Study of Life-Change and Illness Patterns*, 10 J. PSYCHOSOMATIC RESEARCH 355 (1967).

Similarly, the greater the degree of change, the greater the likelihood of severe rather than minor illness.

To underscore the complexity of the biological interactions between men and their environment, Christenson and Hinkle²⁵ compared the illness history of two groups of men engaged in similar non-hazardous work. All were managerial employees in a corporation, lived and worked in comparable environments and were in the same age range (twenty-two to thirty-two years). Fifty-five of the men were recent college graduates (group *C*) hired as managers while eighty-four were high school graduates (group *H*) who had risen from the ranks to similar positions. All 139 men were studied for a period of one year. The men in the non-college group had significantly more disabling illnesses and days of disability, defined as days they could not work because of illness. The non-college group had approximately twice as many episodes of such illnesses during the observation year as well as a greater number of chronic active illnesses.

The social and ethnic backgrounds of both groups were explored in an effort to clarify the difference in illness experience. The *C* group men were largely fourth-generation Americans, sons of managers, proprietors, and white collar workers. The group *H* men were the sons and grandsons of immigrants whose fathers had been skilled and unskilled laborers. In effect, it could be said that the *C* group men were living and working in a social environment with which they had a lifetime familiarity, while the *H* group men were living in an environment relatively different from that of their early environment, one which they may have perceived as unfamiliar and more challenging. The current life situations of the *H* group revealed more domestic, financial, and interpersonal difficulties—more illnesses in the family, more deaths, domestic discord, and dependent relatives. The researchers emphasized that the interactions between these groups of men and the world in which they lived was so complex that health change could not be attributed to one or two variables without considering the potential role of other variables. They suggested that the relative ill health of the high school group might be regarded as part of the price that they were paying for "getting ahead in the world."²⁶

An important inference can be drawn from the Christenson and Hinkle study. Although susceptibility to certain stresses is an individual phenomenon, it may be inescapable in certain contexts for specific

²⁵ Christenson & Hinkle, *Differences in Illness and Prognostic Signs in Two Groups of Young Men*, 177 J.A.M.A. 247 (1961).

²⁶ *Id.* at 253.

populations. In addition, other reports reveal that there are universal stresses to which few can remain immune.²⁷ Adverse response to stress is probably linear in that the greater and more frequent the stress, the higher the frequency of illness response irrespective of individual background.

CONCLUSION

It is clear from the foregoing that a variety of stresses—personal, social, and environmental—contribute to human mental and physical illness. Most of the researchers cited in this article, however, were only alert to specifically identifiable types of stress, probably to the exclusion of other types. Consequently, most of the reported disease-related stresses were those that were overtly and subjectively distressing to the affected individual. This awareness offered the individual at least a theoretical opportunity to avoid the stress or to solve its underlying conflicts. But what of stresses not perceived or recognized as stressful by either victims or researchers? Such stresses may be unavoidable since their effect is so subtle that they are neither perceived nor experienced as stressful. Even if the individual does consciously experience some stress response, he might tend to attribute this to a more obvious, though incorrect, source. Potential sources of such “imperceptible” stresses are exemplified by growing urban environmental problems such as increasing noise levels, overpopulation, and, in general, the rate of cultural change.²⁸

While physicians generally are not called upon to define or measure stress, lawyers are often directly confronted with its problems. The lawyer's interest is encouraged because the courts do not require proof of statistical significance but only sufficient evidence to demonstrate a high degree of probability. Furthermore, in workmen's compensation proceedings, any significant contributory event is usually held to be causative. This relatively uncomplicated approach is valuable not only because it provides legal redress to individual claimants, but also because it can and does lend itself to protecting the public welfare. For example, successful products liability suits against a manufacturer may bring product changes where public protest and indignant letters fail.²⁹

²⁷ Leopold & Dillon, *Psycho-Anatomy of a Disaster: A Long Term Study of Post-Traumatic Neuroses in Survivors of a Marine Explosion*, 119 AM. J. PSYCHIATRY 913 (1963).

²⁸ See A. TOFFLER, *FUTURE SHOCK* 11-44, 289-326 (1970).

²⁹ It should be recognized, however, that this legal causation scheme does not necessarily conform to medical reality.