A Psychobiological Framework for Research on Human Stress and Coping

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Endocrine Markers of Stressful Person–Environment Interactions

This chapter is based on research carried out in the author’s laboratory during the past decades. The central theme is the experimental study of how environmental factors influence human health and behavior. Special attention is given to the health hazards associated with demands on human adaptation to the rapid rate of change in modern society. The approach is multidisciplinary, focusing on the dynamics of stressful person–environment interactions, viewed from social, psychological, and biological perspectives.

One of the key notions in our approach to stress is that neuroendocrine responses to the psychosocial environment reflect its emotional impact on the individual. The emotional impact, in turn, is determined by the person’s cognitive appraisal of the severity of the demands in relation to his or her own coping resources.

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M. H. Appley et al. (eds.), Dynamics of Stress
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Advances in biomedical techniques have made it possible to obtain blood samples from human subjects engaged in their daily activities and, thus, to monitor how hormones and other neuroactive compounds change during exposure to various demands (e.g., Dimsdale & Moss, 1980). Other new ambulatory recording techniques enable monitoring of nearly all organs in the body, including the brain, from subjects moving freely while exposed to stressors of different kinds. Thus, the individuals themselves serve as measuring rods, that is, sensitive instruments, which help to identify factors in the environment which increase bodily wear and tear.

An important feature of our research strategy is the combination of laboratory and field studies. In the former type of study, specific problems are extracted from natural settings and brought into the laboratory for systematic examination. The latter takes our laboratory-based experimental techniques into the field and applies them to persons engaged in their daily activities. Both approaches involve examining individual response patterns under controlled environmental conditions, securing concurrent measures of responses at the psychological and biological levels, and relating these to more enduring characteristics of the person, including susceptibility to disease. In this context, techniques for measuring endocrine and other bodily responses are seen as tools by which new insights can be gained into the dynamics of person–environment interactions.

Recent advances in neuroendocrinology pertinent to behavior have brought about a reorientation of research in the stress field. Until recently, the brain and the endocrine system were generally viewed as separate entities. The brain was seen as mediating the organism’s relation to the external environment via behavior. The endocrine system, on the other hand, was seen as oriented toward the body’s internal environment. Thanks to the contributions of Nobel laureates Roger Guillemin (1978) and Andrew Schally (1978), new insights have been gained into the pathways and neuroendocrine mechanisms by which the brain controls the endocrine system. We are now beginning to grasp the coordinated functioning of the nervous and endocrine systems in the adaptation of the whole organism to environmental conditions (cf. Hamburg, Elliott, & Parron, 1982).

In the early days of psychoendocrinology, the common strategy was to study the response of a single hormone to a variety of laboratory and natural stressors. As techniques for assessing different hormones have become available, approaches are gradually changing to studying the patterning of a broad spectrum of endocrine responses. These developments have occurred during the past two decades. In addition to the adrenal-medullary and the adrenal-cortical hormones, a number of pituitary and hypothalamic hormones have been found to be responsive