

A Short Note on Application of Ergonomics in Psychophysiology

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DESCRIPTION

Ergonomics is defined as the science of man and his work, encompassing the anatomical, physiological, and mechanical principles that influence the efficient use of human energy. Ergonomics is the applied science of workplace equipment design that aims to maximize productivity by reducing operator fatigue and discomfort. The term is derived from the Greek words *ergon* (labour, work) and *nomos* (law, rule), and it simply means work rules. During World War II, ergonomics developed into a distinct scientific discipline. The goal of ergonomics is to optimize the human-machine-environment system by adjusting working conditions to a human's physical, psycho-physical, and physiological nature, while taking into account relevant differences between humans in relation to their jobs and workplace. Ergonomics improves a man's health, safety, and comfort in his working environment while increasing the efficiency and productivity of a production or business system.

Psychophysiology is the branch of physiology concerned with the relationship between mental (psyche) and physical (physiological) processes; it is the scientific study of mind-body interaction. The work of the physicians, psychologists, biochemists, neurologists, engineers, and other scientists is incorporated into the field of psychophysiology. A psychophysiological disorder is distinguished by the physical symptoms that are exacerbated in part by emotional factors. Stress, fear as well as anxiety are some of the more common emotional states that contribute to the development of illness. The field of psychophysiology is guiding the way for ongoing research into the complexities of the mind/body relationship. By observing and recording data on physiological processes such as sleep rhythms, heart rate, gastrointestinal functioning, immune response, and brain function, applied psychophysiology focuses on the effects of

emotional states on the central nervous system. This significant and expanding sub-discipline of psychology has been found to be extremely useful in applied areas such as human factors and ergonomics.

The overall goal of applying psychophysiological methods to human factors and ergonomics or related areas such as engineering psychology is often to improve the design of a system in terms of both system effectiveness and human well-being. Two types of human responses are of interest in these applied settings: mental responses (e.g., ratings of comfort, well-being, effort, perceived complexity of the human-machine interaction) and psychophysiological responses. Choosing appropriate psychophysiological measures in ergonomics applications is similar to the challenge of selecting appropriate scales (dimensions) in survey design. While some measures are task-specific, such as using eye movements to track how operators use computer displays, others, such as heart rate, can be used as an indirect indicator of behavioural changes, such as tracking emotional state with heart rate.

The advantages of psychophysiological methods, particularly electrophysiological methods, are twofold: (1) they are objective, and (2) they can be collected in real time that is, at the same time as a critical behaviour, with a time resolution of milliseconds in the case of event-related brain potentials. Furthermore, measuring psychophysiological responses allows for the detection of reactions to task environments that are frequently hidden from human factors professionals, allowing for more holistic evaluations of specific design environments. For example, one can determine the effects of background noise on operator state when the operator may be unaware that this noise is having a negative impact.

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