Quantitative Overload: a Source of Stress in Data-Entry VDT Work Induced by Time Pressure and Work Difficulty

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Abstract: It is hypothesized that quantitative overload impacts psycho-physiological attributes of data-entry operators, although previous research has focused primarily on different aspects of VDT work, such as working time and environment, work station, keyboards and so forth. The objective of this study was to examine the influence on psycho-physiological responses of time pressure, task demand and their combined effect as underlying causes of quantitative overload while typing. A total of 12 subjects completed four 1-h typing tasks representing two levels of time pressure and task demand. Levels were manipulated by requiring participants to achieve a least number of character strings during each block, and by changing the number of letters in the character strings. Outcomes were measured in subjective assessment of workload, performance-related and physiological measures. Overall, increased time pressure increased perceived workload, productivity rate and heart rate, and decreased initial response time and typing duration. However, increased task demand increased error rate and initial response time with no change in heart rate. Heart rate variability did not indicate increased levels of time pressure or task demand. Quantitative overload as a consequence of time pressure and task demand influenced the subjective and psycho-physiological measures of data-entry operators to some extent.

Key words: Quantitative overload, Time pressure, Work difficulty, Stress, VDT work

Introduction

A number of occupations require people to use visual display terminals or keyboards extensively over the course of a workday. Although computer technology has changed rapidly, the vast majority of computer input is still supplied by key-driven alphanumeric devices. Nowadays, data-entry jobs are a large part of computerized work which, indeed, is found in all industries. Data-entry jobs are usually classified under either clerical or computer occupations. These kinds of jobs are seen as simplified, narrow, and demanding, while requiring both accuracy and speed1).

Particular properties and characteristics of data-entry jobs which relate to work organization and job content factors are found to be critical sources of stress. One of these characteristics is “Quantitative Overload”1). It is induced when the amount of work to be performed within a certain time frame exceeds the individual’s capabilities1–5). Research on computer users indicate that quantitative overload is a major stressor affecting all computer users and heavy workloads have resulted in mental stress1,2). Quantitative overload was emphasized in a NIOSH study which compared the stress levels of clerical visual display unit (VDU) operators, clerical non-VDU users and professionals using VDUs1,5). Compared with