



## Effects of neuroticism and workload history on performance

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### Abstract

This study manipulated workload levels to test Eysenck's theory of neuroticism by examining individuals' differential responses to the stress of sudden shifts in workload. A sample of 194 participants who had completed an inventory to assess neuroticism were randomly assigned to either a High-to-Low or Low-to-High testing condition. Participants performed an auditory vigilance task while reaction time and correct responses were assessed. Multiple regression analyses were conducted and results indicated that higher levels of neuroticism were associated with decreased reaction time in both conditions. In addition, individuals higher in neuroticism evidenced fewer correct responses in the Low-to-High workload condition. Results of this study are generally consistent with Eysenck's theory of neuroticism.

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The concept of neuroticism has received considerable attention in the stress and coping literature as it is believed to be an important predictor of how people deal with stressful events. Although many theories have been proposed to explain this dimension, one of the most widely cited is Hans Eysenck's theory. Eysenck (1967) defined neuroticism as a dimension that ranges from emotional stability to instability and he suggested that individual differences in neuroticism are a result of arousal differences that are mediated by the limbic system. The putative function of the limbic system is to regulate autonomic and emotional reactions, in particular, reactions that are cued by physically or psychologically stressful experiences (Eysenck, 1967). Consequently, individuals who are high in neuroticism, compared with those who are low, are believed to evidence greater activation of the limbic system when responding to environmental stressors. This

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differential autonomic arousal level is believed to form the basis for the behavioral differences observed between those scoring high and low in neuroticism.

Although behavioral differences across the neuroticism continuum have been examined using a variety of approaches, one important strategy used to test Eysenck's arousal-based theory involves the examination of performance differences between high and low neurotics using computer-based human performance tasks. Indeed, several studies have demonstrated that individuals scoring high in neuroticism (and trait anxiety) typically perform more poorly on a variety of tasks compared with those low in neuroticism (Eysenck, 1983; Eysenck & Eysenck, 1985; Spence & Spence, 1966). Typically, the detrimental effects of neuroticism are particularly evident in studies using vigilance and monitoring tasks—tasks that require high levels of attention (for reviews, see Eysenck, 1983; Matthews & Deary, 1998). For example, Newton, Slade, Butler, and Murphy (1992) conducted a study with 123 participants that employed a visual search task requiring participants to scan a random display of letters to determine the presence or absence of a target letter. This study found neuroticism to be significantly related to slower reaction time in the predicted direction, that is, high neurotics evidenced slower reaction times. Although some studies have found an association between neuroticism and improved performance (Eysenck & Calvo, 1992), generally, findings are consistent with Newton et al. (1992) suggesting that neuroticism effectively predicts decrements in performance on vigilance tasks (Darke, 1988; Eysenck, 1992, 1997).

In addition to predicting simple vigilance and monitoring task performance, studies have also demonstrated that neuroticism influences performance on other, more complex, types of tasks. For instance, Mayer (1977) conducted a study manipulating task difficulty while examining the effect of trait anxiety on easy versus difficult tasks. He concluded that although high trait anxiety facilitated performance on easy tasks (requiring simple, rote problems—e.g. searching for the letter “a”), it had a detrimental effect on difficult tasks (e.g. anagram solving).

Although the studies cited earlier have established a link between neuroticism and task performance, to date little is known about the relationship between neuroticism and basic performance *dynamics* such as variability in workload, or changes in task demand. In other words, while previous research seems to be generally consistent with Eysenck's arousal-based theory of neuroticism, most of these performance-based studies lack generalizability because they do not examine parameters associated with real-world work environments, such as changing workload levels. The study of workload history may help to address this problem.

The study of workload history typically involves the manipulation of workload levels over time with individuals moving from either high-to-low, or low-to-high, workload levels. Because performance is examined in this manner, the study of workload history might be considered more ecologically valid than less dynamic approaches (e.g. fixed workload level studies). Currently, little is known about the effects of neuroticism and workload history on performance, however, there is a body of work that has examined the manner in which workload shifts influence general performance. One consistent finding reported in the workload history literature suggests that there is a significant decrement in performance following a sudden decrease in workload level (Cumming & Croft, 1973; Goldberg & Stewart, 1980; Matthews, 1986). In a recent study, however, Cox-Fuenzalida (2000) found that either a sudden decrease or increase in workload level results in a significant performance decrement. One explanation for the performance decrements following both types of workload shift is that any change in workload conditions might serve as a

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