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A laboratory investigation of personality type and break-taking behavior

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Abstract

The Type A personality trait is characterized by time urgency and competitiveness and has been shown to have an impact on human performance in a variety of settings. A laboratory study was conducted to assess the effect of personality type on the break-taking behavior of participants asked to perform a fatiguing overhead work task. Sixteen subjects (eight classified as Type A individuals and eight classified as Type B individuals) performed 40 repetitions of a simple assembly task in an overhead position and were allowed to take breaks as needed. The dependent measures included the time to complete the experiment, the average cycle time, the number of breaks taken, the total amount of break time, and the average pain level experienced during the whole experiment. The results of this study showed a wide range in the work–rest strategies employed by the participants. Some chose regularly scheduled breaks, others seemed to identify a specific pain threshold at which they would take a break, while still others adopted a strategy of taking a small number of longer breaks. Interestingly, personality type did not have a significant effect on the break-taking behavior of the participants as defined by our dependent measures. Further, an analysis of a cadre of additional potential covariates (upper extremity anthropometric characteristics, pain level at break time, etc.) did not provide any additional predictive ability in the analysis of the break-taking behavior. The results do show that these intra-individual "strategies" that the participants employed in performing this fatiguing task appear to be stable over the duration of the experiment, indicating that there are probably additional individual characteristics that may be driving the response, providing an interesting direction for future research.

Relevance to industry

Work-related musculoskeletal disorders continue to be a considerable problem in many industries. Personal characteristics of the worker may influence their exposures to recognized risk factors, and the evaluation of personality type relative to one component of work style (break-taking behaviors) is the focus of this work.

Keywords: Personality type; Shoulder; Overhead work

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1. Introduction

In many industries, musculoskeletal disorders of the proximal upper extremity (shoulder girdle, shoulder joint and proximal humerus region) pose a significant challenge to the ergonomist. Welders (Herberts et al., 1984; Lowe et al., 2001), farmworkers (Sakakibara et al., 1995), garment workers (Punnett et al., 1985), and sonographers (Russo et al., 2002; Wihlidal and Kumar, 1997) have all been shown to have unusually high prevalence rates of shoulder pain and/or disorders. Some of the physical characteristics that these jobs share are non-neutral shoulder postures, static force exertions with the shoulder musculature, and repetitive motions of the shoulder. Unfortunately, the nature of many of these work environments is such that traditional engineering controls, such as moving the workpiece to a more accessible position, are not feasible and we therefore need a greater understanding of those controls that are available (such as appropriate work–rest cycles) and the impact of these controls on the basic biomechanics and muscle physiology.

From a biomechanical perspective, studies have shown that muscle physiology is impacted by static, awkward shoulder postures—particularly when the muscles are loaded. Sigholm et al. (1984) showed that the activity of the shoulder muscles increases with increasing elevation of the arm. They found that a flexion angle of $=30^{\circ}$ without any hand load increases the intramuscular pressure level to the extent of creating blood circulation disturbances. Jarvholm et al. (1988) showed that both shoulder posture (flexion and abduction) as well as hand-held load had a significant effect on the intramuscular pressure of the supraspinatus muscle. In another study that considered a larger number of shoulder muscles, Jarvholm et al. (1991) showed similar responses in the shoulder musculature to changes in posture and load considering not only the intramuscular pressure, but also the normalized, integrated EMG for these muscles. In summary, these authors note some concern with regard to the reduction in muscle blood flow that accompany these postural and weight-bearing tasks. Collectively, these biomechanical studies illustrate the impact of non-neutral postures and moments about the shoulder on the physiology of the musculature and point to these as being areas of concern for the ergonomist.

In addition to the risk factors of posture and moment about the shoulder, Sommerich et al. (1993) summarized findings of epidemiological, laboratory, and field studies conducted in order to identify occupational risk factors for cumulative trauma disorders of the shoulder region and identified lack of rest pauses as one of the risk factors associated with shoulder pain. The authors state that Burt et al. (1990) found, in their study of shoulder pain in newspaper employees, that cases on average took fewer work breaks than non-cases. Kvarnstrom (1983), investigating assembly workers, reported a prevalence ratio of 5.2, as compared to 0.7 for serial assemblers in the same company doing the same task. The principal difference was that, as a part of the assembly process, serial assemblers also collected parts and read instructions, thus forcing the operator to take a break and allow their muscles to relax. The assembly line workers, on the other hand, experienced no such breaks in their normal work cycle. In some studies, rest pauses, even in the form of small or micro-breaks, were found to be important. Kilbom and Persson (1987) followed two groups of female employees who performed short cycle tasks. They found that the percentage of the work cycle which the workers spent resting (micro-breaks) was inversely related to the occurrence of tendinitis and myofascial syndrome in the second year of employment.

In addition to the physical and task-related risk factors, a significant and growing area of research is in the effect of personal factors on the development of musculoskeletal disorders. While some of these factors are thought to directly impact the biochemical (e.g. gender) or biomechanical (e.g. age) tissue response, others are thought to contribute through an indirect mechanism. The basic concept is that certain individual characteristics (e.g. introvert/extrovert, Type A/B personality) may influence the work technique employed by an individual and thereby influence the level of exposure to the recognized physical risk factors. One of these individual characteristics that has been the focus of work in our laboratory is personality type.