Stress of Nursing Students Studying Online

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INTRODUCTION

Stress impacts both the quality and length of life (Sapolsky, 1998), but the stress of learning is yet to be understood. Few studies exist in the literature about learning stress. The lack of technology contributed to this deficiency until recently. Invasive technologies made it difficult to study people in vivo. Recent theoretical and technological developments changed this situation. New holistic theories permit the inclusion of biological measurements, brain research developments enable the research of learning physiology, and advanced technology facilitates field-data collection.

Researchers expressed interest in learning stress when the allostatic load theory produced studies indicating normally adaptive body functions can harm over time (McEwen, 1998). Recent research indicates stress over long periods induces a variety of chronic diseases (Kiecolt-Glaser, McGuire, Robles, & Glaser, 2002). Weight gain, hypertension, osteoporosis, immunosuppression, insulin resistance, atherosclerosis, and cardiovascular disease are a few stress-related diseases (Karlamangla, Singer, McEwen, Rowe, & Seeman, 2002). The ultimate implication is death. Since learning begins at a young age and is encouraged to last a lifetime, the management of the stress of learning should be studied. Stress management is vital to the health of the population.

Stress reduction may be an instructional design goal (Molinari, Dupler, & Lungstrom, in press) because educational stress contributes to a number of performance and long-term-physiological complications. Stress prevents learning by limiting perceptions, thinking, and memory capabilities during per-formance. The problems later trigger more stressful performance events (Sapolsky, 1998).

The inability to think or remember concepts, procedures, and methods can threaten lives when demonstrated by professions like pilots, air controllers, nurses, doctors, police officers, firefighters, and armed forces. Learning stress management is vital to saving lives. Instructors can no longer view stress as a normal and uncontrollable side effect of the academic process. The stress-related-disease epidemic begins in childhood (di Fabio & Prosch, 2003; Marano, 1999; Rosenzweig, Breedlove, & Watson, 2004), and the demand for lifelong learning positions stress management as a lifelong issue.

Stress reduces immune function, creating vulnerability to acute illness (Kiecolt-Glaser et al., 2002). Reducing stress could minimize colds, the flu, and mild depressive symptoms that complicate student achievements and relationships. Stress hormone levels can predict future relationship problems according to Glaser, Robles, Malarkey, Sheridan, and Kiecolt-Glaser (2004).

ALLOSTATIC LOAD

Allostasis was first described by Sterling and Eyer (1988) to explain the constant biophysical change occurring to meet perceived and anticipated challenges. McEwen and Stellar (1993) developed a model describing how stress reactions may be both adaptive and life threatening. The model describes the results of repeated stress reactions. The long-term effect of continuous hormone release produces homeostasis in the immediate situation but can wear down the body.

The allostatic-load model links adaptation and survival to disease processes through persistent acute responses to stress. With each perception, neurochemicals are released to activate or restrain bodily functions. This triggers psychological reactions that create further neurochemical responses. When a response to a perceived demand occurs, the body is successful and similar responses are often chosen in future situations. Repeated occurrences that are beneficial in the short run have deleterious effects over time (McEwen, 2002).

The identification of psychobiological responses to learning may provide clues to understanding improved methods for preventing or managing learning disorders. Reducing learning stress theoretically enables more learning, but studies are needed to define how this occurs. What elements of instructional design make a difference? Are there alternative methods of reducing test anxiety besides those commonly used? For instance, do Popsicles, massage, acupressure, or music help? Which is less upsetting, performance testing in isolation with a video camera, with a peer group, or with just an evaluator? How does simulation work in stress reduction?

STRESS INDICATORS

There are many neurochemicals involved in stress and adaptation. A brief glimpse of these is provided to explain their inclusion in the learning allostatis model. Cortisol is a glucocorticoid key to acute adaptations to stress (Stewart, 2000). Cortisol is easily measured in lived experience and its impact on learning needs study. Glucocorticoids enhance amygdala activity. The amygdala is a small area of the central brain that facilitates reactions to fear and other strong emotions. Emotion-related memory is centered here (Charney, 2004). Research indicates information processing begins in the amygdala. Cortisol mobilizes and replenishes energy stores. By impacting the amygdala, the hormone increases arousal, vigilance, focused attention, and memory formation.

Continual and sustained cortisol produces negative effects. Long-term effects include weight gain, hypertension, osteoporosis, immunosuppression, insulin resistance, atherosclerosis, and cardiovascular

disease (Karlamangla et al., 2002). For each reaction in the body, another negative feedback system exists to turn off the reaction. Cortisol is turned off through a complicated system involving other glucocorticoid and mineral corticoid receptors. Measurement of hormones like dehydroepiandrosterone, a corticotropin-releasing hormone, might also impact learning-stress research in the future.

One can measure other variables. The cardiopulmonary systems react immediately to stressors. Norepinephrine and neuropeptide Y impact the body by influencing the cardiovascular system and feelings of anxiety. Epinephrine modulates memory consolidation (Cahill & Alkire, 2003). Overtime, stress can cause cardiovascular problems. Are there differences in reactivity at different ages? If so, how should stress be defined and measured?

Students report psychological stress from preschool through adulthood. Higher education students experience stress-related ailments like ulcers and autoimmune disease (Heath, Macera, & Nieman, 1992; Reid, Mackinnon, & Drummond, 2001) due to the learning environment (Hughes et al., 2003). K-12 students also experience stress-related symptoms like stomachaches and headaches. What variables stress people with what learning styles? There is a lot to study and learn.

ALLOSTATIC LEARNING MODEL

The allostatic learning model (see Figure 1) attempts to explain the complex relationships among genetic, environmental, and physical learning variables as they relate to stress and achievement. Previously, researchers studied variables separately, making it impossible to see how factors are interrelated. There are many important seminal works on individual factors, but few studies incorporate many factors into the same study. The allostatic learning model encourages study of a variety of factors simultaneously.

Measuring stress processes under everyday conditions challenged educational researchers until recently. Self-report methods are considered unreliable due to the filtering that occurs between experience and report (Dinges, 2003; Razavi, 2001). Researchers state biophysical measures are the most reliable reflection of lived experience. Despite this

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