DAILY HASSLES AND UPPER RESPIRATORY SYMPTOMS INTENSITY
IN COLLEGE YOUNG ADULTS

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Dedication

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ABSTRACT

The experience of stress is an integral part of all daily human experiences resulting in nonspecific internal and external physiological and psychological manifestations. College students may experience increased stress, which threatens the student’s homeostatic equilibrium, and may result in physical illness and maladaptive behaviors. Former studies have linked respiratory illness with increased stress levels. The purpose of this research study is to describe the relationships between perceived stress levels, upper respiratory symptom intensity, and demographics in college students presenting to campus health service. A descriptive, correlational design, with quantitative analysis was used to examine the relationships between college students’ stress levels, upper respiratory symptom intensity, and their demographic characteristics. The Hassles Assessment Scale for Students in College (HASS/Col) and the Visual Analog Scale (VAS) was used to examine students stress levels and upper respiratory symptom intensity. Pearson Product Moment ($r$) correlation coefficients were used to examine associations between stress levels, upper respiratory symptom intensity, and demographic characteristics. A weak, insignificant correlation was found between stress and symptom intensity, while a significant correlation was found between symptom intensity and gender. There was a weak, insignificant correlation between stress scores and age. Results of this study have the potential to influence the care advanced practice nurses and other healthcare providers render to college young adults presenting with upper respiratory symptoms. This study provides further knowledge regarding the relationships between young adult college students’ perceived stress levels, and their upper respiratory
symptom intensity, which may be related to their stressful life events.
CHAPTER 1: INTRODUCTION

The experience of stress is an integral part of all daily human experiences resulting in various nonspecific internal and external physiological and psychological manifestations of the perceived stressor (Seyle, 1976; McEwen, 1998). Seyle stated, however, the development of an all-encompassing definition of stress is a challenge since the experience of stress and its associated meanings are perceived differently by each individual. Simply stated, stress can be defined as the body’s nonspecific responses to physical and psychological demands, which can result in protective or harmful effects to perceived threats or the challenge of adapting to changing environmental factors (Seyle, 1976).

Stress and its psychological and physiological effects on the individual experiencing it have been the focus of numerous research studies (McEwen, 1998; Sarafino & Ewing, 1999; Page & Lindsey, 2003). In particular, psychological impairments in daily and long term coping mechanisms and the ability to adapt to perceived stressors have been investigated (DeLongis, Folkman, & Lazarus, 1988; McEwan, 1998), as well as the effects of stressful life events of physical functioning and illness manifestation (Stone, Reed, & Neale, 1987; Thakkar & McCanne, 2000).

College students may experience increased chronic and daily stress as well as anxiety secondary to knowledge assimilation expectations in higher education; heavy academic workloads required of most college degrees; the anticipation of entering into competition-dominated labor markets; and perceived decreased control over personal situations. These additional stressors pose unique challenges for college populations, that
separately, or combined, can exacerbate the stress response. Increased stress threatens the student’s homeostatic equilibrium, resulting in physical illness and maladaptive behaviors (Heaman, 1995; Vaez & Laflamme, 2003; Seyle, 1976; McEwen, 1998). Additionally, many college students self-impose high academic and personal standards during critical periods of growth and development, such as in early adulthood when many students enter college settings. Compounding this stress is that the student is often away from home for the first time and social support systems are sparse, both of which can exacerbate individual appraisal and subsequent response to a perceived stressor (Benjamin, 1987).

Purpose & Problem Statement

Stress and its associated physical and psychological effects have been the focus of prior research (McEwen, 1998; Sarafino & Ewing, 1999; Page & Lindsey, 2003). Specifically, psychological impairments in coping and adaptation to perceived stressors, as well as the effects of stressful life events on physical functioning and illness manifestation, have been the primary focus of former investigations (DeLongis, Folkman, & Lazarus, 1988; McEwan, 1998).

Young adult college students are particularly vulnerable to stress. In addition to the usual sources of stress, young adult college students experience daily and long-term stress due to academia-related stressors, stage of development, and limited life experiences from which to draw upon for support in coping and adaptation (Barry, 1996; Devney & Abbink, 2000; Vaez & Laflamme, 2003). Former studies have examined the effects of stress in this population in terms of coping, and various physical and
psychological illnesses, but few have examined the stress experienced by this population as a multidimensional process and how a summative process of mixed sources of stress affect the manifestation of physical illness. More specifically, research in this population primarily focused on examining the effects of stressors on physical and mental functioning. Few have examined the relationship between perceived physical symptom intensity and stress levels with regard to considering the stress experience in terms of having periods of subsequent rumination and intrusive thoughts over the stressful event after it had ended (Sarafino & Ewing, 1999).

Former research within the realms of stress and physical illness has revealed a significant relationship between psychological distress and respiratory illness manifestation and exacerbation. Furthermore, the literature indicates that with increased emotional distress, and decreased coping ability, immunological suppression and subsequent increases in upper respiratory disease expression may occur (Cohen, Tyrrell, and Smith, 1991; Evan & Edgerton, 1991; Cohen, Doyle, and Skoner (1999). The purpose of this research study is to describe the relationships between perceived stress levels, upper respiratory symptom intensity, and demographics in college students presenting to campus health service.

Research Questions

1. Is there a relationship between stress levels and upper respiratory symptom intensity in students presenting to campus health service?
2. Is there a relationship between selected demographic variables and level of stress?
3. Is there a relationship between selected demographic variables and upper respiratory symptom intensity?

Significance of Study

Stressful life events have been linked to physical symptom onset and exacerbation (McEwen, 1998; Sarafino & Ewing, 1999). Former studies have revealed that psychological stress may precipitate the development of a variety of physical illnesses (Page & Lindsey, 2003; Stoudemire & Hales, 1995). As previously stated, young adult college students are at increased risk for the development of psychological and subsequent physiological stress with associated physical illness (Devney & Dirksen, 2000; Heaman, 1995). By exploring the relationships between young adult college students’ perceived stress levels and upper respiratory symptom intensity, data would be gained regarding stress levels and specific physical symptom manifestation in this target group. Additionally, this study may provide some of the preliminary data necessary to conduct future research aimed at empowering this population to make connections between their stress levels and physical symptom onset and exacerbation. Furthermore, since there have been few studies examining the relationships between student’s perceived stress levels in coping with daily stressors and their perceptions of symptom intensity, this proposed study would also provide knowledge from which both patients and primary care providers can benefit in terms of designing interventions to decrease college students’ stress levels and associated illness occurrence. Moreover, if this study reveals a positive correlation between stress levels and respiratory symptom intensity, further evidence will be provided to justify interventions on behalf of primary care
providers and other healthcare professionals to teach their college-aged populations to mobilize their internal resources, such as coping abilities, adaptation and stress reduction techniques, so students may empower themselves toward achieving an increased level of wellness, and possibly avoid respiratory illness onset and exacerbation. Results of this study also have implications for healthcare professionals developing wellness programs in that teaching content would emphasize individual control of stress levels in terms of their unique life situations to minimize their risk for respiratory illness development. Economic and temporal benefits to primary care providers, insurance companies, colleges, and students alike stand to benefit from this research in that if college students are made aware of a strong link between their stress levels and symptom intensity, they may be more apt to empower themselves to reduce their stress levels and avoid becoming ill, resulting in an overall decline in healthcare utilization by this population and increased control over healthcare utilization.
CHAPTER 2:
CONCEPTUAL FRAMEWORK AND REVIEW OF THE LITERATURE

In this chapter, the conceptual framework and theoretical underpinnings guiding this study will be presented. Also presented in this chapter is a review of related literature.

Conceptual Framework

The conceptual framework from which this study is guided is Selye’s (1976) Stress and Adaptation Theory. The Stress and Adaptation Theory will serve to direct this research in terms of the exogenous and endogenous modulators of stress with regard to coping and adaptation to physical and psychological stressors in this study’s target population.

Stress Theory

Selye (1976) described the confusion in defining stress because of its different meaning to each individual. Stress is an integral part of daily human experiences associated with a multitude of various problems from surgical trauma, to physical or mental effort, to emotional arousal, pain, fear, and even the readjustments that one must make in response to unexpected success. Stressors are the nonspecific exogenous or endogenous agents that make demands on the human body or psyche and distinguishing between the varying and specific effects of stress and the associated common biological responses to those stressors is key to grasping an understanding of biologic stress (Seyle, 1976; McEwen, 1998). Stress should not be viewed as identical to nervous tension or emotional arousal, but rather the body’s nonspecific response to physical or
psychological demands. Furthermore, stress should not be conceptualized solely as an invariable harmful response, but also as having protective effects or curative value in certain circumstances (Selye, 1976).

Stress can be divided into two main categories, acute and chronic stress. McEwen (1998) characterized acute stress as major life events or the sense of the “fight or flight” sympathetic nervous system response, whereas chronic stress encompasses daily, cumulative stresses, which in themselves may be deemed by the individual experiencing them as “minor”. Both categories of stress have the potential to cause physiologic and psychological illness to an individual; therefore either is not any less detrimental than the other (Sarafino & Ewing, 1999; McEwen, 1998). Although genetic factors play a role, the impact of the internal and external environment contributes to the modulation of stress and the associated physical and psychological responses. Two major factors determining an individual’s response to stressful stimuli are the individual’s overall state of health, determined largely by their genetics, lifestyle and behavioral choices; and the manner in which they perceive the stressful stimulus, whether it be threatening or a mere inconvenience (McEwen, 1998).

*The stress response and the General Adaptation Syndrome.*

Selye (1976) described the stress response in terms of a General Adaptation Syndrome (GAS) whereby the individual responds and deals with a stressor in several stages: the alarm reaction, the stage of resistance, and the stage of exhaustion. Selye’s GAS is illustrated in Figure 1. In the first stage, the individual initially encounters the stressor, while the body manifests various neurohormonal transformations characteristic
of this first time exposure. If the individual’s adaptation response is compatible with the stressor during continued exposure to the stressful event, the stage of resistance begins. In this stage, the body’s unique internal and external manifestations of the stress exposure diminish or disappear all together and bodily resistance exceeds normal. If the same stressor persists, and hence the body is continuously exposed to the stressor, eventually the energy of adaptation is exhausted, the alarm reaction signs disappear, and the individual is said to be in the stage of exhaustion. The exhaustion stage results in decreased wellness, illness, disease, or death (Seyle, 1976). The responsiveness of an individual to a perceived stressor is conceptualized by Page & Lindsey (2003) as a dose-response curve, whereby as the intensity of the stressor increases, the response to the stressor is also increased.

Upon exposure to a stressful stimulus, whether it be physiological or psychological, the hypothalamus is excited, and through hormonal stimulation, results in neuroendocrine cells within the hypothalamus transforming these nervous signals into the release of the chemical messenger, corticotrophic hormone releasing factor (CRF). Once CRF is released, it signals a message to the pituitary gland to release adrenocorticotropic hormone (ACTH) in to the blood stream. ACTH then reaches the adrenal cortex causing it to secrete glucocorticoids, such as corticosterone and cortisol, which fuel gluconeogenesis and the subsequent increased energy requirements for meeting the
demands of the stressor. Additionally, the glucocorticoids exert their effects elsewhere in the body, causing various enzymatic reactions and suppressing inflammation and immunity so that the body can deal with the stressful agent. Simultaneously, pro-inflammatory corticoids are released in lesser amounts, thereby stimulating reactivity and proliferative ability of connective tissue, which enhances the potential of the inflammatory response by providing a strong barrier of connective tissue that protects the body from further pathogen invasion (in the case of a physiologic insult or stressor). Within these processes, catecholamine release also occurs resulting in the further activation of mechanisms necessary for the body to adapt to the stressful event. These aforementioned cascades of events are controlled by several feedback mechanisms modulating hormonal and catecholamine release during the stress response, causing physiological changes within the central and autonomic nervous systems, resulting in various physiologic manifestations including, but not limited to blood pressure, gastrointestinal pH, and metabolism fluctuations; hemodynamic changes in skeletal muscle blood flow; and changes in blood coagulation mechanisms (Selye, 1993). Figure 2 illustrates the physiological events characterizing the stress response.
Figure 2: Mechanisms of the Stress Response.

Key concepts to understanding the stress response are stressor, stress, adaptive response, and homeostasis. Homeostasis refers to the maintenance of the dynamic equilibrium by which existence is possible. Homeostasis is what exogenous and endogenous forces threaten, and ultimately becomes a state of disequilibrium when an individual fails to adapt to a perceived stressor, and where subsequent death and illness may occur (Page & Lindsey, 2003; Seyle, 1936). Additionally, one must acknowledge that the stress response is generally a protective mechanism, or an adaptive function, in which there are various magnitudes of responses. In general, individuals who are already compromised on some level, whether it is physically or psychologically, are at the greatest risk for developing the stress response. Specifically, those individuals with pathophysiological, psychological, or sociological problems are at risk of experiencing a heightened stress response upon encountering an additional insult due to compromised or decreased physiological or psychological reserves (Page & Lindsey, 2003; Seyle, 1976). Also, the lived experience of encountering situational stressors that occur in daily life, such as receiving news of an unexpected nature, trying to find a parking space, exposure to extreme temperatures, or involvement in an accident, all pose threats to homeostasis (Hislop, 1987). In addition to the aforementioned risk factors that place an individual in increased jeopardy for experiencing stress and homeostatic disequilibrium, events occurring along age or developmental continuums, such as navigating successfully through developmental tasks, transitioning between developmental stages, or experiencing anticipated life changes such as adolescent leaving home to attend college
may also create potential threats to one’s ability to adapt to stressful life events, and hence may manifest in physical or psychological illness, or both (Page & Lindsey, 2003).

Although there has been extensive literature published about stress, the central focus of most publications are stress as an injury response; elucidations of stress and coping models; explanations of common stressful life events; and recommendations for stress reduction. Psychologists, physiologists, sociologists and healthcare professionals have extensively examined the effects of numerous stressors, and in so doing have affected each other’s unique disciplines, and the methodologies that discipline uses to influence their approaches to stress-related issues (Page & Lindsey, 2003).

*Reactions to stress & stress-related physical symptoms.*

Humans are sentient beings with health and emotions inextricably linked. A person’s thoughts, feelings, and behaviors collectively influence the overall health and wellbeing of the individual, while unique personality traits as well as internal and external environmental factors interact with a person’s psyche to variably affect manifestations and prognoses of disease processes (Seyle, 1076; Hislop, 1987). In fact, for over a decade researchers in the realms of psychology, pathophysiology, and physiology have attempted to understand, describe and clarify the relationships between life events; cultural mores; environmental and social factors; and individual personality characteristics as they relate to the onset, exacerbation, course, and outcomes of various organic physical and mental illnesses (Hislop, 1987). Psychological variables have been identified in former research as key contributors to illness development and symptom exacerbation. Many “physical” disorders have been linked to a variety of
psychobiological features, much in the same way that numerous psychological illnesses have underlying organic pathologies associated with their cause. Former research reveals that physical disorders can be initiated and exacerbated by stressful emotional events, as well as contribute to relapses of illnesses formerly in remission (Stoudemire & Hales, 1995). Coupled with this, various personality traits such as dependency, sensitivity, and obsessiveness, along with emotional antecedents such as depression or anger, may further predispose an individual to the development of physical illnesses. Although these factors can contribute to one’s susceptibility to a given illness, there is no evidence that they influence specificity, nor do they contribute to differentiating one illness from another (Page & Lindsey, 2003; Hislop, 1987). Psychological variables also contribute to an individual’s perception of their symptoms, the extent of their perception or disability, and the decision to seek medical attention (Hislop, 1987). Similarly, a person’s perceptions of their social ties within their community and support systems; the perception of having few friends or members of their social support network; and problems within their family background all contribute to overall health deterioration, emotional disturbances, and future morbidity (Page & Lindsey, 2003; Hislop, 1987).

As previously stated, the activation of physiologic systems secondary to stress can not only serve as somatic restoration and protection, but also result in physiological damage (Seyle, 1976; McEwen, 1998). Since the age of Hippocrates, a basic assumption central to medicinal practice is the belief that physical symptoms are influenced by psychological factors, and may alter the course of various medical illnesses (Stoudemire & Hales, 1995). In recent years, researchers have been faced with the challenges of
deciphering how stress influences disease development and progression, as well as
determining the underlying causes of vulnerability variations to stress-related illnesses
among individuals who have experienced similar life events. Additionally, researchers
have been challenged to quantify this stress, especially within the realms of physiological
load (Selye, 1993; McEwen, 1998).

Physical functioning & stress: the hypothalamic-pituitary-adrenal axis &
allostatic loads.

The term allostasis refers to the ability of an individual to achieve stability, or
maintain homeostasis, via adaptation or change. This ability is essential to the survival of
any animal, including human beings. It is through allostasis that the hypothalamic-
pituitary-adrenal (HPA) axis, and the metabolic, cardiovascular, autonomic nervous and
immune systems serve to protect the individual through responding to endogenous and
exogenous stress (Selye, 1993). Allostatic load, or the cost of this adjustment to stress, is
the physiologic and psychological deteriorations resulting from chronic underactivity or
overactivity of an individual’s allostatic systems. Unlike homeostatic systems, which
must be maintained within relatively narrow margins (such as serum pH and heart rate),
allostatic, or adaptive systems encompass significantly broader boundaries such as our
ability to respond to, and cope with, our overall physical states such as infection,
exercise, increased noise, hunger, danger or crowding.

Responses involving the HPA axis and sympathetic nervous system (SNS) are the
most frequent allostatic responses, whereby upon activation, catecholamines and
subsequent corticotropin is released which, in turn, mediates cortisol release resulting in
the overall stress response. Conversely, inactivation of the HPA axis and SNS results in these catecholamines and glucocorticoids returning to baseline once the stressor is no longer present. However, if these systems are not completely inactivated, stress hormone overexposure occurs, resulting in increased allostatic load and possible pathophysiologic sequelae manifesting as either physical or psychological symptoms, or both. It is this incomplete inactivation that characterized chronic, sustained stress, rather than acute, episodic events (Selye, 1993; McEwen, 1998).

In addition to the previously discussed physical changes associated with the stress response, former research has also indicated that repeated stress exposure also has an effect on brain function, particularly in the hippocampus, an area with increased cortisol receptors. The hippocampus, as well as glucocorticoids, participates in forming the reliability and accuracy of emotionally laden, contextual events; therefore, hippocampal impairment decreases the accuracy and reliability of those memories, which can undoubtedly exacerbate the stress response through the preventing the individual to access information needed to determine whether a stimuli is actually a threat. Additionally, the hippocampus modulates responses to stress and functions to inhibit the HPA axis response to stress. Therefore, if the hippocampus loses its ability to modulate the stress response, the individual will be placed at increased risk for homeostatic disequilibrium secondary to the neurological deficit (Selye, 1993; McEwen, 1998).

McEwen (1998) describes four circumstances that lead to allostatic loads. First, and perhaps one of the most commonly thought of concepts related to stress, is frequent stress exposure, such as in continuous blood pressure elevations resulting in
atherosclerosis acceleration, or increased myocardial infarction risk. Second, is inadequate adaptation to sustained stress resulting in the individual experiencing prolonged stress with increased exposure to stress-related hormones, as in the case of an individual who is repeatedly challenged to speak in public. Third, is the inability to terminate allostatic responses once the stressor has been removed or terminated, as in the case of a student whose blood pressure remains elevated for several hours after an arithmetic exam, or an athlete who experiences amenorrhea. Additionally, researchers conducting animal studies have postulated that this type of inadequate termination of allostatic responses over one’s lifetime results in hippocampal degradation with subsequent cognitive impairment (Lupien et al., 1994; Seeman, McEwan, Singer, Albert & Rowe, 1997).

The fourth condition leading to allostatic load is characterized by various adaptive systems inadequately responding to a stressor, thereby triggering a compensatory increase in another systems. Hence, the initial system does not provide enough counterregulation, and therefore another must compensate to make up for the difference. For example, if levels of cortisol do not increase in response to stress, or they inadequately increase, then counterregulatory inflammatory cytokines increase, providing the counterregulation required, thereby returning levels to baseline (McEwen, 1998). Former animal research studies have illustrated the negative consequences of increased inflammatory mediator responses, such as in Lewis rats, whereby the rodents are at increased susceptibility for the development of inflammatory and autoimmune disturbances due to their genetic predisposition toward a hyporesponsive HPA axis.
Similarly, Lewis rats being observed for psychosocial living arrangements become subordinate due to their stress-induced hyporesponsive HPA axes (McEwen, 1998).

In summary, there are several categories of allostatic loads: repeated exposures to stress, a prolonged stress response, an inadequate stress response, or an individual’s lack of adaptation to the stressor. Additionally, one or all of these may be present, thereby affecting the overall amount of stress and associated need for adaptation perceived by that individual. A practitioner’s consideration of allostatic load in the consideration of diagnoses and treatments of many illnesses has become increasingly important since allostatic load is crucial in revealing the relationships between and individual’s disease process and chronically stressful events, such as social instability and dangerous living situations (McEwen, 1998). Healthcare providers have the ability to empower their clients to reduce these loads, while assisting their patients to recognize their stress and limitations, develop effective and appropriate coping skills, and reduce their stress levels for the attainment of increased wellness.

Several clinical syndromes, where physiological imbalances in homeostasis and allostatic occur, have been identified as having a psychological component. Many of these illnesses, such as tension headache; various gastrointestinal conditions and pulmonary illnesses; irritable bladder; chronic backache; restless leg syndrome; and irritable heart, have been classified as reversible since, often, there is no pathological tissue involvement (Stoudemire & Hales, 1995; Hislop, 1987). Although direct evidence implicating a cause and effect relationship is lacking, and hence current evidence is one of association, states such as migraine headaches, obesity, hypertension, and
atherosclerosis, which do involve pathological histological states, have also been deemed a pathological consequence of the stress response (Page & Lindsey, 2003). Seyle (1976) reported that those physical illnesses of the body in which a nonspecific stressor elicits the pathogenesis of that illness, are termed stress diseases. Further, he states that since there are no “pure” stressors, there cannot be any “pure” diseases of adaptation, and hence no illness is caused by stress alone. Consequently, the justification for assigning a specific illness in the “stress diseases” category is “directly proportional to the role that maladjustment to stress plays in its development” (Seyle, p. 29, 1976). Since mechanisms by which emotional reactions manifest as somatic disorders is uncertain, practitioners are constantly faced with the daunting task of differentiating these psychophysiological disorders from complex medical diseases, as well as to detect contributing psychological disturbances and treat the complaint appropriately and effectively (Hislop, 1987).

In summary, Figure 3 illustrates this researcher’s perception and understanding of factors contributing to an individual’s overall health and well-being which results in the presence or absence of disease, and ultimately, the individual’s prognosis. From the model, one can see that a person’s thoughts, feelings, and behaviors contribute to their overall state of health and sense of well-being, while their personality and environment (both internal [genotype; phenotype; etc], and external [living situations; resources; etc]) also contributes to their health state. From this, the individual expresses illness.
In summary, there are many aspects of an individual that are constantly changing and interacting with one another to culminate into an overall experience of stress, as well as health, well being, and illness manifestations.

Figure 3: Factors Influencing Health and Well-Being
Review of Literature

Effects of stressful life events on an individual’s physical health has been investigated in numerous studies, with current research approaches revolving around the experiences of chronic, daily uplifts and hassles (Thakkar & McCanne, 2000). In this context, the term “hassles” refers to the daily, cumulative stressors that one may deem as “minor” (Sarafino & Ewing, 2001). Stone et al. (1987), who were among the first investigators to prospectively examine the relationship between infectious illness and daily life events, studied the relationships between stressful life events and various psychological and physical symptoms in 79 middle-aged couples. Data related to daily life events was gleaned from an 80-item checklist completed by each participant, which encompassed categories reflective of work related activities, leisure activities, family and friends. Each item was reported in terms of occurring within the previous 24 hours, followed by participants rating them in the dimensions of desirability/undesirability; meaningfulness, and changing/stabilizing. Additionally, the Daily Health Record adopted from the Health in Detroit Study was used to collect data regarding health-related behaviors and daily symptoms. Results revealed that the frequency of undesirable events increased, with desirable events decreasing three to four days prior to physical symptom onset. Results from this prospective study were the first to illustrate a relationship between health and life events.

The impact of social and psychological mediators of daily hassles on mood and overall health was studied by DeLongis et al. (1988) in their six-month longitudinal investigation examining the relationships between mood, physical symptoms and daily
stress in 75 married couples. Participants in this study completed the Daily Health Record and the Hassles and Uplifts Scale in addition completing six monthly interviews that related to their self-esteem, social support, values, beliefs, health, commitments, perceived life stress, and psychological well-being.

Results of the study indicated a significant relationship between daily stress and the prevalence of various health problems including sore throat, the common cold, backaches, and headaches. Additionally, daily stress was found to have a significant effect on mood during the day the stress occurred, with improvements in mood scores occurring the day following the stressful event. Also, in comparison to subjects with strong social support systems and high self-esteem, those participants with low self-esteem and unsupportive social relationships experienced increased somatic and psychological problems on days the stressor occurred, and on subsequent days. Researchers concluded from this study that individuals with few psychosocial resources are at increased vulnerability to mood disturbances and illness when faced with increased stress levels, regardless of the amount of stress already present in their lives.

In the next section of this proposal, this author will review those research studies related to stress and one of the most commonly affected physical systems that has been linked to increased emotional strain – the respiratory system.

**Stress and Respiratory Studies**

In a prospective study by Cohen, Tyrrell, and Smith (1991), the relationship between psychological stress and common cold frequency among subjects deliberately exposed to respiratory pathogens was examined. Once the 420 healthy participants
completed questionnaires reflective of their levels of psychological stress, 394 participants were administered nasal drops containing a respiratory virus, while 26 participants were given nasal saline drops. After exposure, participants were quarantined and monitored for the development of upper respiratory symptoms and infection as evidenced by increases in viral antibody titers, or confirmation of the presence of the inoculated viral infection.

Results of this study revealed that increases in respiratory infections were positively correlated with increased psychological stress in a dose-response manner. Additionally, the investigators found that these results were unaffected by controls for sex, age, allergic status, weight, education, time of year, number of participants housed together, or participants’ baseline antibody status to the administered virus. Further, white blood cell counts, immunoglobulin levels, and lifestyle choices such as smoking, diet, and exercise were also independent of the association investigators found between illness and stress. The researchers concluded from this study that individuals with increased psychological stress levels were at increased risk for the development of acute respiratory illness, as evidenced by infection rate increases as opposed to increases in symptom frequency after exposure to the pathogen.

In a classic retrospective study by Jacobs, Spilken, and Norman (1962), 58 male college students between the ages of 19 and 20 years were studied to determine if maladaptive reactions to distress served as antecedents to the development of upper respiratory tract infections. 29 of the participants has been seen at campus health within the past 2 weeks, and diagnosed with laryngitis, tonsillitis, bronchitis, or pharyngitis;
while the other half of the subjects were symptom free (validated by an internist) and had claimed to be free from upper respiratory illness symptoms for the past year.

Additionally, all participants claimed that they had never suffered from a psychiatric disturbance. Participants completed the Life Change Inventory to reflect recent life events in the realms of increased personal responsibilities; increased positive achievements; separation from, or loss of a person close to the subject, or that person becoming seriously ill; personal failure experiences; and role crisis. Participants also completed a questionnaire and the Adolescent Conflict Test to determine their coping styles.

Results revealed two separate coping styles of the participants: passive, or compliant whereby the individual submits to distressing circumstances; and active, or defiant where hostility, impulsiveness, and danger-seeking conduct forms the primary response to the distressing event. Further, defiant coping styles and increased unpleasant affects were associated with the upper respiratory illness group. Results also indicated that increased perceived failure, disappointment, and role crisis, was present in the group of subjects with upper respiratory illnesses.

In another classic study by Jacobs, Spilken, Norman, & Anderson (1970), researchers hypothesized that stressful life situations exemplified by unresolved role crisis, social isolation, and failure would be associated with respiratory illness. Participants were 179 males attending college, 106 of them who were seeking medical care at campus health for various respiratory symptoms, with 73 students serving as the control group and having no respiratory illness, and therefore were not seeking medical attention. Among the ill participants, 26 had seasonal allergic rhinitis; 50 had upper
respiratory infections manifested by sore throats; 14 had asthma; and 16 were diagnosed with anxiety or depression. Results supported that those subjects experiencing increased life stress, also experienced more incapacitating illnesses. The results of this research supported that social isolation, failure, and role crisis in the sample was associated with seeking medical treatment for their respiratory complaints. Additionally, researchers found that those who presented for medical care were at increased likelihood (when asked) to report their emotional distress than were subjects in the symptom-free group.

In a prospective study by Graham, Douglas, and Ryan (1986), 235 adults between the ages of 14-57 years were examined for the relationship between stress levels and upper respiratory tract infections. Researchers identified both low and high stress groups among the participants using the Life Events Inventory, the General Health Questionnaire, and the Daily Hassles Scale. These instruments were administered to the participants before and during the six-month period in which the researchers also collected data related to subjects’ respiratory illness symptoms.

Researchers found no statistically significant differences between the low and high stress groups of participants with respect to smoking status (passive or active), sex, age, former air pollution exposure, occupational status, and proneness to acute childhood respiratory infections. Further, investigators found that those participants in the high-stress cohort experienced increased episodes of respiratory symptom exacerbation.

Similarly, in a study by Evan & Edgerton (1991), 100 subjects performed daily end of the day checklists relating to mood, daily events, and health. Researchers then took a sub-sample of participants who had suffered a minimum of one episode of the
common cold during the several weeks in which they had already been providing data via the checklists. Researchers found a lag in the relationship between life events and symptom onset. Further, the frequency of daily uplifts, or desirable events, decreased significantly in the four-day period prior to the cold’s onset, with significant increases in daily hassles, or undesirable events, occurring during the same time frame. Additionally, participants reported increased feelings of anger, skepticism, and tension during the four days prior to the onset of their symptoms. Researchers also contend that the observed lagged relationship, along with subjects serving as their own controls, and the study’s design being partly replicatory in nature, lend support to immuno-psychological hypotheses relating illness to life events.

Evans, Pitts and Smith (1988) studied 65 male and female undergraduate students to determine the role of minor life stressors in the precipitation of acute upper respiratory tract infections, particularly “colds”. Participants completed the Assessment of Daily Experiences (ADE) form that contained three sections: a 12-item mood scale; a daily events schedule encompassing categories related to leisure, study/work, and family/friends; and additional space for participants to write in up to two additional events of their choosing which were not reflected in the aforementioned sections. Events were scored by the participants as having transpired that day, and then rated in terms of the event's meaningfulness and desirability. Subjects also completed a symptom checklist concerning their perceived state of health for that day.

Results of this study showed that in the four days prior to upper respiratory symptom onset, there were significant decreases in the frequency of desirable events.
Conversely, the study’s results also indicated that illness episodes were unrelated to the occurrence of undesirable events.

In a study by Stone, Cox, Valdimarsdottir, Jandorf, & Neale, (1987), researchers examined the daily mood fluctuations and antigen-specific immunoglobulin-A secretion in thirty male dental students. Researchers orally administered a harmless protein to the subjects and observed daily their antibody production in response to the administered protein, while simultaneously having participants record their daily mood throughout an eight-week study.

Researchers found that antibody response was decreased on days when participants experienced increased negative moods, while antibody responses were increased on those days when negative moods were decreased, and positive moods were increased. Researchers concluded from these results that minor life events affect individual health, which is mediated, in part, by the immune system.

Cohen, Doyle, and Skoner (1999) assessed the role of emotional stress in influenza A viral illness expression in 55 adults. Participants were experimentally infected with the virus, quarantined for eight days, and monitored daily for upper respiratory illness symptom manifestation including nasal discharge and congestion; sneezing; sore throat; headache; malaise; chills; and cough. Researchers also monitored interleukin-6 nasal lavage levels and mucous production amounts. Prior to viral exposure, subjects documented their baseline respiratory symptoms, and completed the Perceived Stress Scale.
Results from this experiment revealed that increased psychological stress (assessed prior to infection) was associated with increased mucous production and interleukin-6 levels, as well as increased symptom scores in response to the viral infection. The investigators concluded from this study that emotional stress predicts increased illness expression and production of interleukin-6 in response to viral upper respiratory tract infections.

In summary, prior research has shown a significant relationship between psychological distress and respiratory illness and symptom manifestation and exacerbation. Furthermore, the literature reveals that with increased emotional distress, and decreased coping ability, immunological sequelae can be seen in terms of decreased antibody response to invading pathogens, with subsequent increases in upper respiratory disease expression. Therefore, when evaluating an individual with upper respiratory complaints, it is reasonable to consider the possible simultaneous effects that psychological distress and ineffective coping may be having on the illness and the individual.

*Physical and Psychological Symptom Manifestations of Stress in College Students*

Although quantifying stress remains a challenge for researchers and healthcare practitioners alike, estimations of stress levels can be made for the purposes of predicting one’s allostatic load, which in turn, may imply the individual’s susceptibility to various, non-specific illnesses, or at least be reflective of decreased physiological and psychological reserves (Seyle, 1976; McEwen, 1998). College students, whether it is at the graduate or undergraduate level, frequently experience increased chronic and daily
stress and anxiety secondary to knowledge assimilation expectations in higher education, which can result in physical illness and maladaptive behaviors (Heaman, 1995). Additionally, heavy academic workloads required of most college degrees; the anticipation of entering into competition-dominated labor markets; and perceived decreased control over personal situations can exacerbate the stress response, thereby posing an increased threat to the student’s homeostatic equilibrium (Vaez & Laflamme, 2003; Seyle, 1976; McEwen, 1998). Additionally, often times college students place self-imposed high academic and personal standards on themselves during critical periods of growth and development, while often times this occurs when the student is way from home for the first time and social support systems are sparse (Benjamin, 1987).

As previously discussed, stress can result in several neurohormonal fluctuations, which in turn, can be harmful or beneficial to the individual experiencing them. Specifically, anxiety, worry, and anticipation can all increase catecholamine secretion, resulting in allostatic load, and if sustained, result in a prolonged stress reaction ultimately ending in decreased levels of wellness, or illness. Similarly, intrusive thoughts and memories surrounding stressful events can manifest as chronic stress, which will continue to drive physiologic responses to stress. These thought processes and responses to the stressor can be further exacerbated by the individual’s lifestyle such as smoking status; drug and alcohol use; diet; activity levels; degree of work, school, and personal commitments; and decreased social support (McEwen, 1998). Students entering university settings may also experience shock related to the multiple responsibilities facing them such as time management; relationship changes with others from home;
facing new social interactions and relations; and the process of adapting to living with other students either on campus, or in co-habitant living arrangements (Benjamin, 1987). Although research related to student stress is limited, stretching back to only a two decades ago, evidence shows that the primary stressors of critical importance to students is related to academic achievement via grades and examinations; career decisions; financial concerns; studying; and fear of academic failure (Benjamin, 1987).

In a study by Trockel, Barnes, and Egget (2000), researchers examined the effects of diet; exercise; sleep patterns; perceived stress and mood; time management; work commitments; religious and spiritual habits; coping; and social support on grade point averages in 200 freshman university students residing on-campus at a large university. Results from this study indicated that of all variables examined, sleep patterns accounted for the largest variances in grade point averages, with later wake up times being correlated with lower average grade point averages. Furthermore, increased work hours were associated with lower overall grades. Conversely, exercise and increased spirituality were associated with higher grade point averages. Researchers concluded from this investigation that health promotion interventions emphasizing adequate and regular sleep patterns, are crucial to first-year university students’ academic success, and therefore should be implemented in university counseling and health programs.

In a study by Edwards, Hershberger, Russell, and Markert (2001), researchers examined the effects of negative social exchange and positive social support in relationship to health and stress symptoms in 206 undergraduates attending a large public university. Participants completed the Hassles Scale to assess levels of minor daily
annoyances and major difficulties, as well as the Recent Life Experiences Survey to quantify stress related to life changes. The Social Support Inventory was also completed to reflect levels of perceived social support, while the Test of Negative Social Exchange was used to measure social interactions perceived as non-supportive. The Mental Health Index was also administered to participants to measure psychological distress and wellbeing. Last, subjects were given the Pennebaker Inventory of Limbic Languidness to assess health-related symptoms occurring on a weekly basis.

Results from this study showed that negative social exchange was responsible for increased variances in physiological symptoms, while daily hassles, positive social support, and life-event stress was not related to subjects’ physical symptoms. Additionally, the relationship between physical symptoms and negative social interactions was not related to psychological wellbeing. Researchers concluded from this investigation that negative social interactions are not related to positive social support, yet are related to physical health.

Deckro et al. (2002) examined 128 undergraduate and graduate students in the realms of anxiety, stress perceptions, and psychological distress after the implementation of a 90-minute mind/body intervention aimed at stress reduction. Participants completed the Symptom Checklist-90 revised edition to measure their levels of psychological distress, while also completing the Spielberger State-Trait Anxiety Inventory to quantify their anxiety levels. Subjects also completed the Perceived Stress Scale to assess the degree to which they feel current life situations are stressful. The Health-Promoting Lifestyle Profile II was also administered to the participants to assess behavior reflective
of health-promotion such as nutrition, health responsibility, physical activity, interpersonal relations, and spiritual growth. The Spielberger State-Trait Anxiety Inventory, the Symptom Checklist-90, and the Perceived Stress Scale were administered to the participants before and after the mind/body intervention.

Results from this study showed significant decreases in perceived stress, anxiety, and psychological distress after participation in the intervention compared to those subjects who did not participate. Additionally, although not statistically significant, researchers did uncover a trend toward increased behaviors reflecting health promotion after the intervention. Researchers concluded from this study that mind/body interventions aimed at reducing stress in college students might be a useful tool for the prevention of increased psychological stress, perceptions of stress, and anxiety.

Whitehouse et al. (1996) conducted a prospective study of a self-hypnosis and relaxation intervention for the relief of psychological distress symptoms and for modulation of the reactivity of the immune system in response to examination stress in 35 medical students. 21 of the participants participated in the intervention while keeping a daily diary of sleep, mood, frequency of engaging in the intervention, and physical symptoms, while the 14 other subjects served as a control group and did not participate in the intervention, but did maintain the same daily diaries as those in the experimental group. Prior to the start of the semester; 13 weeks following fall orientation (late in the semester); during final examinations; and three weeks following the close of the semester, all subjects completed the Profile of Mood States, the Brief Symptom
Inventory, and the UCLA Loneliness Scale, while also giving a blood sample to measure immune activity.

Results from this study indicated a significant increase in fatigue and stress during the examination period. Increases in B and T lymphocyte counts, and natural killer cell activity were also observed during the examination period. Further, there were no decreases in immune activity during this time period. Although the control and experimental groups did not differ in immune function, those participating in the intervention reported significantly decreased stress and anxiety levels than those in the control group. Moreover, within the experimental group, the self-rated degree of relaxation experienced while participating in the intervention, was predictive of natural killer cell numbers and activity. Researchers concluded from this study that increased stress and academic demands result in increased immune activity and decreased levels of perceived stress and fatigue.

Frazier (1994) examined the relationship between psychological adjustment and stress levels experienced by 282 female graduate and undergraduate college students between the ages of 17 and 56 years. Participants completed the Psychological Distress Inventory to assess perceptions of stressful life events, while also completing the Sexual Experiences Survey to assess recent or remote sexual victimization experiences. Subjects were also given a questionnaire with one open-ended question requesting them to state the most stressful life event they had ever experienced, and to rate the event in terms of stressfulness. The brief Symptom inventory was used to elicit data regarding
psychological symptoms, while the McPearl Belief Scale was used to assess participants' beliefs about trust, safety, self-esteem, and intimacy.

Results of this study showed that the most prevalent stressor experienced by this group were financial concerns, examination pressures, feelings of rejection by another, and failing an exam. Results from the Sexual Experiences Survey showed that 27% of the total sample had experienced attempted rape, rape, or both at some point in their past. Those participants who had survived rape, or attempted rape, had increased scores than breakup and bereavement groups on depression, obsessive-compulsive, paranoid ideation and hostility subscales. Death of a loved one; parents splitting up; relationship violence and breakups; unwanted pregnancy; and partner infidelity were identified as the most stressful events having occurred in the subjects' lives.

Furthermore, increased in stressor intensity and total stressor numbers were associated with increases in disrupted beliefs and psychological symptoms within the realms of paranoid ideation and psychotic symptoms, while also being associated with loss of control over their lives. Researchers concluded from this study that with increased numbers and intensity of perceived stressful life events, there is also a decrease in psychological adjustment.

In a study by Labbe, Murphy, and O'Brien (1996), researchers examined the psychological variables contributing to 199 college students’ experiences of headache. Participants completed the Headache Questionnaire to reveal data regarding their headache symptoms and frequency, as well as the Head Pain Survey to elicit data about symptoms not contained in the former tool. Additionally, participants used the Headache
Log to monitor head pain frequency, intensity, and duration. The Symptom Checklist-90-R was used to assess subjects’ psychological and emotional distress, while the Health History Questionnaire was completed to assess coping skills and health habits such as smoking and alcohol use.

Results from this study reveal that headache intensity, frequency, and duration can be predicted by the individual’s stress perceptions, gender, and emotional functioning level, while health habits and family history was not predictive of headache activity.

Adams, Bezner, Drabbs, Zambarano, and Steinhardt (2000) examined the relationships between measured psychological and spiritual wellness and perceived wellness in 112 undergraduate college students. Participants were given the Life Attitude Profile to assess spiritual wellness, while also completing the Sense of Coherence Scale and the Life Orientation Test to assess participants’ psychological wellness. Additionally, subjects completed the Perceived Wellness Survey to assess perceived overall wellness.

Results from this study showed that optimism and sense of coherence mediated effects of life purpose on perceived overall wellness. Beyond participant life purpose, sense of coherence and optimism were independent of participants’ perceived wellness. Researchers concluded from this study that meaningful life purpose cultivation enhances overall wellness, while optimistic outlooks need to be present with regard to life purpose to enhance overall wellbeing. The researchers, therefore, recommend from these results that healthcare practitioners and professionals developing wellness programs, should consider teaching college students to mobilize their internal resources, such as sense of
coherence and optimism, so they may further empower themselves toward achieving an increased level of wellness.

In summary, college students frequently experience increased daily and long-term stress due to the expectations of higher education; perceived loss of control over current and anticipated personal and professional situations; and ineffective coping styles, all of which might result in increased physical illness symptoms as well as the development of, or promotion of already existing, maladaptive behaviors. Although former research in this population has examined the effects of various stressors on physical and mental functioning, few studies have examined the relationships between college students’ perceived physical symptom intensity and their stress levels with regard to considering the stress experience in terms of having periods of subsequent rumination and intrusive thoughts after the perceived stressful event had ended.

**Stress Measurement Instruments & The Hassles Assessment Scale for Students in College**

Typically, when researchers measure stress levels, they implicitly or explicitly assume that stress is experienced as a function of several dimensions: stressor frequency, the individuals’ perception to the stress intensity, and the person’s coping skills/processes. Hence, stress increases as the self-appraised intensity and frequency of the stressors increase and effective coping decreases (Sarafino & Ewing, 1999). While most instruments designed to measure stress reflect some degree of the effects of all three of the aforementioned dimensions, some stress measurement tools appear to mirror one of the dimensions more than the others. For example, tools that elicit self-reported psychological or emotional strains and the frequency of those stressors may primarily
reflect the respondents’ coping skills, whereas heart rate and serum corticosteroid levels are primarily indicative of the stress intensity (Sarafino & Ewing, 1999). There are numerous other self-report tools designed to measure a respondent’s stress which is usually obtained in terms of the individuals’ total stress score for broadly stated dimensions reflective of various combinations of the stressors intensity, frequency, and individual coping. Additionally, within these self-report tools, there are two types of stressors, life events and daily hassles, which are considered (Sarafino & Ewing, 1999).

Life events are defined by Sarafino and Ewing (1999) as major changes an individual experiences in their life within the realms of interpersonal relationships, employment, or health. Scales designed to quantify life events usually measure the degree to which the individual adjusts to those events as well as the associated changes in activities required by that individual to accommodate the change. Additionally, these scales consider life events in terms of their occurrence over some time period, such as the preceding year. Scales such as the Social Readjustment Rating Scale, sum stress values for the 43 listed life events that the respondent reports having occurred over the former year, whereas the Psychiatric Epidemiology Research Interview (PERI) Life Events Scale employs a similar method using 102 events (Sarafino & Ewing, 1999).

The expression daily hassles refer to everyday transactions in the environment that cause irritation, annoyances, or frustration, such as misplacing items, interpersonal conflicts, or time pressures (Kanner et al., 1980; Sarafino & Ewing, 1999). There are several validated instruments currently used in scholarly research studies that quantify respondents’ daily hassles encountered within a designated time frame. Among these is
the frequently used Hassles Scale which sums the respondent’s ratings according to severity of 117 items measuring annoyances ranging from minor irritants to significant problems, pressures, or difficulties that occurred over the past month. The severity of the hassles, ranging from “somewhat severe to extremely severe” (Edwards et al., p. 77, 2001) are rated by the respondents on a three-point scale to yield sum totals that are indicative of the severity of the hassles the individual experiences. The higher the score on the Hassle’s scale, the greater the perceived severity of the hassles (Edwards et al., 2001).

Another instrument, designed to measure an individual’s daily hassles, is the Survey of Recent Life Experiences (SRLE) where the respondent rates 51 separate hassles based on how much it has effected their daily lives in the former month (Sarafino & Ewing, 1999). Alternatively, the Unpleasant Events Schedule (UES) has participants report daily hassles, such as speaking in public, as well as major life events, such as employment layoffs, that have affected the respondent in the past month. This scale rates the 320 stressors in two dimensions: aversiveness and frequency. The researcher then calculates the sums for each of the dimensions and the products for each stressors’ rating, thereby obtaining three scores (Sarafino & Ewing, 1999).

The Hassles Assessment Scale for Students in College (HASS/Col) was developed by Sarafino & Ewing (2001) from the original Hassles Scale in response to there being no instruments for measuring stress that considered independent assessments of stressor frequency or intensity and individual coping. Furthermore, there was no coping assessment tool that considered coping in terms of a transactional process. The
need for the development of this type of instrument was supported, in part, by Baum (1990) who reported that assessing an individual’s rumination over stressful life events should be considered when assessing the frequency and intensity of their stress. Baum stated that increased levels of rumination over a stressful event was most likely indicative of difficulty with, or ineffective coping on behalf of the individual experiencing and perceiving the stressor. Furthermore, he reported that intrusive thoughts appeared to propagate health risks and the duration of the stress that was associated with major life events, even once the stressful event was “over”, or no longer physically present. The recollections and cognitive extensions of the perceived stress can replace the physical presence of the stressor, thereby sustaining the stress. Other studies have supported that these types of cognitive extensions of the original stressor, and the resultant increased duration of the overall stress, can increase the individual’s susceptibility to illness and decreased levels of wellness (Cohen, Tyrell, & Smith, 1991). Similarly, cognitive extensions of stress manifested as rumination over daily hassles is also associated with increased illness as evidenced by research revealing heightened cardiovascular strain (activity) in students anticipating examinations (Sausen et. al, 1992).

In addition to the various instruments previously discussed, there are other tools that are specifically tailored to assess stress levels in specific populations, thus increasing the relevance of the instrument’s items to the respondent’s life, while also increasing the assessment’s accuracy. Among these is the Brief College Student Hassles Scale (BCSHS), designed to measure the unique social and academic stressors that face college populations. This tool consists of twenty items in which participants rate the hassles for
its “persistence” (defined as the stressor’s frequency and duration) over the previous month. The Inventory of College Students’ Recent Life Experiences (ICSRLE) is another tool used in this population and is similar to the SRLE and contains 49 items (Sarafino & Ewing, 1999).

Early Adulthood Development

Erickson’s life stages describe the process of psychosocial human development on a continuum beginning with birth and ending with the death of an individual, with four distinct life phases: childhood, adolescence, adulthood, and old age. More specifically, Erickson further divided the four life phases into eight psychosocial stages whereby the individual within that stage must accomplish a series of developmental tasks in order to successfully move to the next stage of development. Since most college students fall into the life phases of adolescence and adulthood, particularly the Adolescence and Early Adulthood phases, this discussion will be limited to those phases.

During the Adolescence Stage, or the Ego versus Role Identity Confusion Phase, occurring between the ages of twelve to twenty years, the individual is challenged to develop a sense of identity and positive self-image, while opening themselves to idealistic views and mentoring relationships. It is during this critical phase of development where the individual acquires qualities of fidelity and devotion, where unsuccessfully resolved stages manifest as self-consciousness and confusion, both of which clearly can exacerbate an individual’s stress levels and ability to cope with daily and chronic stressors (Barry, 1996).
During the Early Adulthood Stage, or the Intimacy versus Isolation Phase, occurring between the ages of twenty and forty, the individual is challenged to commit themselves to meaningful relationships with others, as well as fusing one’s self-identity with those of others, whether it be friends or close intimate relationships. Additionally, during this critical phase of development, the person acquires qualities of love and affiliation, while unsuccessfully resolved stages result in avoidance in, or withdrawal of relationships with others. Failure to master the tasks characterizing this phase of psychological development could result in the inability of the individual to form personal and professional ties, thereby creating a lifestyle of isolation and subsequent depression, while also promoting behaviors of self-absorption, all of which may, ultimately, prove detrimental to the person’s ability to affectively cope and adapt to daily and chronic life events and distressing events (Barry, 1996; Devney & Abbink, 2000).

Levinson’s Theory of the evolution of life structures states that if the pattern of one’s self-system is altered at any point in time (whether it be through judgments, values, or motives), the individual’s interaction with other exogenous systems (such as religion, social events, family or occupation) will also be disrupted and altered requiring the individual to reorganize their life structure. Levinson further defines one’s life structure as dynamic, having predictable changes throughout four major adult life periods: early adulthood (between 21 to 40 years); middle adulthood (between 41 and 60 years); and late adulthood (between 61 and 80); and late-late adulthood (occurring beyond 81). Within these four stages of adult life, the person must face stability, where the individual builds and maintains their intact life structures vital to goal achievement; and transitions
that are periods of change and redirection toward those goals. Levinson described the transition into early adulthood as beginning between 18 and 22 years, with the time between the ages of 22 and 28 being the time to enter into the world of adults (Devney & Abbink, 2000). By examining Levinson’s theory in relation to young adult college students, one can see that with these potentially stressful transitions from familiar situations to domains of change and uncertainty, coping and adaptation are crucial to the individual’s life structure evolution.
CHAPTER 3

DESIGN AND METHODOLOGY

The purpose of this study is to describe the relationships between perceived levels of stress, upper respiratory symptom intensity, and demographics in college students presenting to campus health service. In this section of the paper, the research design, sample, setting, the data collection instruments and procedures for obtaining and analyzing data will be described. Additionally, the protocol for ensuring the protection of human participants will be addressed.

Research Design

A descriptive, correlational design was used to examine the relationships between college students’ stress levels, upper respiratory symptom intensity, and their demographic characteristics. Since stress levels and upper respiratory symptoms were quantified, quantitative analysis is used in this investigation (Lo-Biondo-Wood & Haber, 2002). Specifically, Pearson Product Moment ($r$) correlation coefficients were used to examine associations between stress levels, upper respiratory symptom intensity, and demographic characteristics. This research design responds to the following research questions:

1. Is there a relationship between stress levels and upper respiratory symptom intensity in students presenting to campus health service?

2. Is there a relationship between selected demographic variables and level of stress?
3. Is there a relationship between selected demographic variables and upper respiratory symptom intensity?

Data Collection Methods

Sample and Eligibility Requirements

A purposive, convenience sample consisting of thirty undergraduate students presenting to campus health with upper respiratory chief complaints was used.

Inclusion criteria for this study were:

1. Males and females between the ages of 18-25.
2. United States Citizens.
3. Full-time undergraduate students (defined by the university as students enrolled in at least 12 credit hours for the semester).
4. Students must have presented to the University of Arizona Campus Health Acute Care Clinic (ACC) with an upper respiratory chief complaint.

Setting

The campus health clinic used in this study is located on the main urban campus of a southwestern, accredited, four-year public university with over 36,000 students, most of whom (approximately 26,000) are undergraduate students and who come from the southwest. The university is a top-ranked research university offering undergraduate, graduate, and professional degrees, with four professional colleges, seven distinct academic colleges, and four colleges encompassed within the Health Sciences Center. In addition to its main campus, the university also has locations in two other urban regions.
within the state, as well as a Science and Technology Park and a Cooperative Extension Service.

This university maintains that there are unique stressors present college students and consequently has a variety of resources that serve as support sources for their students. Among these is the Campus Health Counseling and Psychological Services (CAPS), a branch of Campus Health Services, which offers students psychological counseling by licensed professionals to assist students in coping with a myriad of issues such as, but not limited to, mental health promotion; family and relationship problems; attaining success in their educational goals; crisis intervention and treatment; body image distress; eating disorders; post-traumatic stress disorder; depression; anxiety; and substance use. Licensed professionals provide treatment for anxiety, depression, difficulties with relationships, family problems, eating and body image concerns, alcohol and drug concerns, and unanticipated life crises. Additionally, the university offers its students a state-of-the-art Integrated Learning Center (ILC). Located in the heart of the main campus, students have easy access to its advising and instructional resources. The center serves as a unique environment where students, faculty, and technology integrate to promote a supportive and resource-rich environment for the promotion of students’ academic success. The university also supports its students through its own newspaper and over 400 student-centered organizations providing leadership and development in realms specific to the student’s own interests. In summary, the university is a student-centered university offering a wide variety of social and academic support to its attending
students. Among the services provided are Campus Health Services; CAPS; the ILC; numerous and various student organizations; and its own newspaper.

On a whole, the campus health clinic provides medical and psychological primary care services, including an acute care clinic; general and internal medicine clinics; immunization, sports medicine and specialty clinics; on site laboratory, pharmacy, and radiological services; health education classes; health insurance services; after hours assistance; and community outreach programs, while also participating in the development of university health-related policies. The Accreditation Association for Ambulatory Health Care accredits this campus health clinic.

For the purposes of data collection for this research study, the study sample was obtained from the Acute Care Clinic (ACC) within the campus health network. The ACC is staffed with Nurse Practitioners and Medical Doctors, as well as ancillary staff including Registered Nurses. This sector of campus health is available for providing services within the realms of simple acute and stable chronic illnesses that students may encounter. Moreover, the ACC is equipped to deal with those cases requiring immediate attention (urgent care) as well as non-urgent cases. Students are seen on the basis of an appointment or via walk-in.

Data Collection

Procedures

Once an ACC employee read the recruitment script to the student, and the student agreed to speak with the investigator, an interview was conducted composed of screening the student in relationship to the eligibility requirements. If the student met all inclusion
criteria, the researcher gave the student information regarding the study purpose, risks, and benefits. If the student was still interested in participating in the study, informed consent was obtained by having the students sign a consent form outlining the study’s purpose, risks and benefits. Data collection was then initiated. To assess students’ stress levels, the HASS/Col was administered to participants while they waited to be seen by a provider. To assess the students’ perceived intensity of their upper respiratory symptom(s), symptom intensity VAS was given to the student at the time they were given the HASS/Col to complete. Students were allowed additional time if needed, after their appointment was concluded to complete the HASS/Col in a private, quiet room in the ACC with a desk and chair. For example, if a student had not finished completing any part of the study’s tools, they were allowed to remain at the clinic after receiving care, and complete the missing items. Once the participant submitted the tools to this researcher, it was reviewed for completeness. If any aspect of either the HASS/Col or the VAS was incomplete, this researched offered the student an additional opportunity to complete the missing item(s). The student then had the option of completing the missing item(s), or leaving the clinic without completing the missing data. No students were allowed to take any part of the study’s tools out of the clinic with them to be returned at a later time. All data was completed in the ACC at the time of the student’s initial appointment in the clinic.

Instruments

Two separate instruments were used to collect data in this study. The HASS/Col was used to gather data related to students’ perceived stress levels, while the Visual
Analog Scale (VAS) was employed to determine students’ perceptions of their upper respiratory symptom intensity.

*HASS/Col.*

The HASS/Col (Appendix A) is an instrument designed to measure stress levels in college populations, but it is unlike other tools in that it includes 54 hassles in which respondents rate their perceived frequency of the stressor, the level of its intensity (unpleasantness), as well as the transactional process of dwelling (the process of rumination) on the stressor. Additionally, there is a short section on the HASS/Col form that contains demographic data regarding the student’s age; gender; and number of credit hours they are currently enrolled in. Internal consistency for the frequency, dwelling and unpleasantness measures have been found for the HASS/Col, while criterion validity (HASS/Col scores negatively correlated with physical exercise [an activity well-established in the literature as reducing stress levels]) and congruent validity (Inventory of College Students’ Recent Life Experiences [an established tool for assessing hassles in college students] scores positively correlated with HASS/Col scores) of the scale has been demonstrated using correlational analyses. Specifically, as a test of validity, correlations using Pearson Product Moment for the variables contained in the HASS/Col and participants’ exercise data, revealed a significant inverse relationship between students’ exercise and hassle frequency ($r = -.30; p = .05$), hassle severity ($r = -.21; p = .029$), and hassle unpleasantness ($r = -.30; p = .002$). These negative correlations are consistent with former findings in that those who do not exercise report experiencing higher stress levels than those who do. Additionally, “exploratory factor analyses
suggested the possibility that many items on the scale are independent, with each contributing some specific variance to the total variance of the item pool that is not shared with other items” (Sarafino & Ewing, 1999, p. 75). Researchers who developed this scale attempted to maximize the scale’s relevance of items to diverse student experiences and the content validity, while also minimizing the redundancies among the items and the extent to which the scale’s items implied serious physical or psychological symptoms. Furthermore, item generation for the HASS/Col was developed using samples of undergraduate students from a university, thereby further demonstrating this scale’s generalizability for the population used in this study. In summary, the HASS/Col has been shown to be a valid and reliable tool for the assessment of student stress in the dimensions of: frequency and unpleasantness of hassles, and the respondents’ extent of dwelling on the particular stressor.

VAS.

Appendix B illustrates the symptom intensity VAS that students were asked to complete. The scale is 100mm in length, and vertically oriented (versus a horizontal orientation) on the page to facilitate making the VAS easier to use (Scott & Huskisson, 1979). The two ends of the VAS provide anchors for the scale, and represent the extreme lowest and highest points of symptom intensity (i.e. the lowest perceived respiratory symptom intensity, and the highest perceived respiratory symptom intensity). Participants are asked to draw a line on the scale anywhere between the two anchors that correspond to the degree of distress their respiratory symptoms are causing them at the time of completing the scale. The vertical VAS has been validated by Gift (1989) in a study using
both asthmatic and COPD patients in respiratory distress to measure dyspnea. Concurrent validity was established using measurements from both the vertical and horizontal VAS, and peak expiratory flow rates (PEFR) of dyspneic participants. Pearson Product Moment correlations were calculated between the vertical VAS and each of the criterion variables. Vertical and horizontal VAS correlations were \( r = .97 \), while vertical VAS and PEFR correlations were \( r = -.85 \). Therefore, the vertical VAS is a valid tool for the measurement of dyspnea in asthmatic patients, and is easier for patients in this population to use than the horizontal VAS. Gift’s study (1989) also demonstrated the degree to which the vertical VAS measures clinical dyspnea in asthma and COPD patients. This construct validity was established using a contrasted-groups approach with a repeated – measures design, and subjects that were either asthmatic or COPD patients. \( t \)-tests were employed to compare dyspnea scores with patients with mild (PEFR <150 lpm) and severe obstruction (PEFR >150 lpm), and revealed \( t \)-scores in asthmatic subjects of 12.35 (\( p < .01 \)), and 9.73 (\( p < .01 \)) in COPD subjects. Hence, the results from this study demonstrate the construct validity of the vertically oriented VAS as a dyspnea measure in both chronic and acute populations of patients with COPD and asthma. In summary, the vertical VAS as a measure of respiratory distress in acute and chronic dyspnea has been demonstrated and validated for individuals with asthma and COPD, but not for the college population that may only have acute disease.
Data Analysis

Data Set Preparation

The HASS/Col allows for the generation of one overall score to reflect stress levels, or to obtain three separate scores of stress reflective of the tool’s three subscales (stressor frequency, intensity [unpleasantness], and amount of time the individual dwelled on it [rumination]). For the purposes of answering this study’s research questions, only the overall scores from all three subscales were considered, thereby giving this researcher one score indicative of the overall transactional process of stress, rather than scores indicative of only one aspect of the perceived stress experience. To obtain this overall score, or “summed products estimate” (Sarafino & Ewing, p. 78, 1999), participants’ ratings (or scores) from each subscale are multiplied together for each item. For example, if the student scored an item such as “annoying social behaviors of others”, as a 2 for frequency, a 3 for unpleasantness, and a 3 for dwelling, then the score for that item would be 18. Once products are derived by multiplying each of the subscale scores for each of the 54 items on the HASS/Col, they are then added together to yield an overall score indicative of the participant’s perceived stress levels. This combined total “summed products estimate” of the HASS/Col scores can range from 0 to 5400, with higher values being indicative of increased perceived stress.

Data was prepared for statistical analysis, by being numerically coded and consisted of the participants’ number (i.e. participant #1, 2, 3, etc.) and gender (i.e. females = 1; males = 2). Since age; number of credit hours; visual analog and HASS/Col scores are already numeric, coding was not performed for these data. Each participant’s
numerically represented data was entered into a statistical spreadsheet for analysis and
description of the mean, range, and standard deviation for the study’s variables. Sigma
Stat Statistical Software (SPSS) then determined the Pearson Product Moment ($r$)
correlation coefficients among the participants’ demographic variables, the VAS, and the
HASS/Col scores to yield data sets reflective of the study’s research questions.

**Missing Data**

If more than five of the 54 items on the HASS/Col for one participant are missing, the participant was to be dropped from the study. If less than five items were left unanswered, the mean response was to be assigned to the missing data. If a participant did not answer one of the subscale entries within a particular item (for example, if for the item addressing “appearance of self” the subject answered for frequency and unpleasantness but did not respond to the amount of time dwelled on that issue), then the mean response for that subscale across all 54 items will be substituted (i.e. the mean response for all items under the “dwelled” subscale will be used for that missing subscale data). Additionally, the researcher examined the HASS/Col for missing data at the time the participant submitted the instrument. If unanswered items were detected, the researcher asked if the subject wished to complete the item or not. The missing data is described in the results section of this study.

**Human Subjects Approval**

Before the start of any data collection procedures for this research, human subjects approval was obtained from the university’s Human Subjects Institutional Review Board. All participants were given a consent form to read and sign. The consent
stated that participation in the research study was voluntary, and that the decision to
participate would in no way affect the care participants’ received at the ACC. The
consent form also included the study’s purpose, risks and benefits, and the participants’
role in the study, as well as their freedom to withdraw from the study at any time. This
researcher told participants that there are no known risks to participating other than the
possibility that they would feel uncomfortable recalling stressful events. Moreover,
subjects were informed that there were no direct benefits for participating, and that there
was no monetary or other compensation for their participation. The consent also stated to
subjects that any and all data gathered for this investigation would be held in strict
confidence with regard to the participants’ identities, and that the principle investigator
(PI) would be the only one who would know the participants’ identities, and this would
be limited to when the PI had initial contact with the student. Thereafter, there would be
names on the consent forms and identifications numbers only on questionnaires. There
was no list to identify both the participant’s name and identification number, and all
consent forms were secured in a locked box accessible only to the PI.
CHAPTER 4: RESULTS

Sample Description

Thirty students participated in this study; there was no attrition. Descriptive statistics for this study’s sample are summarized in Table 1. The study’s sample characteristics for age, gender, and number of credit hours are illustrated in Figures 5, 6, and 7, respectively. Additionally, participants' raw scores for the HASS/Col, and VAS are illustrated in Figures 8 and 9. The sample consisted of 18 females, and 12 males. The age range of participants was 18 to 23, with the mean age of the participants being 19.8 years. The range of total semester credit hours participants were enrolled in at the time of data collection was 12 to 19 credit hours with the mean number of credit hours 14. HASS/Col scores ranged from 131 to 2216, with a mean score of 766.67 across participants (out of a total possible score of 5,400). VAS values ranged between 2 mm and 96 mm, with a mean value of 66.2 mm.

Table 1: Descriptive Statistics for Sample

<table>
<thead>
<tr>
<th></th>
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<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Median</th>
<th>SD</th>
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<td>18</td>
<td>23</td>
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<td>19</td>
<td>14.33</td>
<td>14</td>
<td>2.155</td>
</tr>
<tr>
<td>HASS/Col Scores</td>
<td>30</td>
<td>131</td>
<td>2216</td>
<td>766.67</td>
<td>667.5</td>
<td>491.10</td>
</tr>
<tr>
<td>VAS Values</td>
<td>30</td>
<td>2</td>
<td>96</td>
<td>66.20</td>
<td>73</td>
<td>25.28</td>
</tr>
</tbody>
</table>
Figure 4: Ages of Participants

Numbers at pie slices
Represent the number of participants
that were within that age group
Figure 5: Participant Gender Distribution

Numbers at pie slices represent the number of participants that were within that gender.
Figure 6: Credit Hours by Participant Numbers

Numbers at pie slices represent the number of participants that were taking that number of credit hours.
Figure 7: Participants’ Raw Scores for HASS/Col

![Bar chart showing participants' raw scores for HASS/Col](image)
Figure 8: Participants’ Raw Scores for VAS
Findings Related to Research Questions

In the following sections of the paper, the results of this study will be presented according to each research question. Table 2 summarizes the correlation (r) and associated significance levels (p) between the HASS/Col used to measure students’ stress levels, and the VAS used to assess upper respiratory symptom intensity, and participants’ demographic variables. Using parameters set forth by Cohen & Cohen (1983), weak correlations are defined as 0.25 and 0.44; moderate correlations between 0.45 and 0.50; and strong correlations >.60.

Research Question 1: Is there a relationship between stress levels and upper respiratory symptom intensity?

There was a weak, and insignificant correlation between stress levels measured by HASS/Col, and upper respiratory symptom intensity measured by the VAS (r = 0.225; p = .231; Table 2). The relationship between stress scores (HASS/Col) and symptom intensity (VAS) was curvilinear when plotted on a scatter plot. Since this lack of linearity is a violation of the assumptions of Pearson Product Moment, the data needed to be transformed. The researcher transformed the stress scale by taking the log of the stress scores (i.e. the log of the HASS/Col). After this transformation, the relationship between these two variables improved, yet the correlation remains insignificant (r = .267; p = .153).
Table 2: Correlations between HASS/Col, VAS, and Demographic Variables

<table>
<thead>
<tr>
<th></th>
<th>Sex</th>
<th>Age</th>
<th># credit hours</th>
<th>HASS/Col scores</th>
<th>VAS</th>
<th>LOGHASS</th>
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</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>r</td>
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<td>.045</td>
<td>.000</td>
<td>.071</td>
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<td>.023</td>
</tr>
<tr>
<td>Sig. (2 - tailed)</td>
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<td>.813</td>
<td>1.0</td>
<td>.710</td>
<td>.002</td>
<td>.904</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>r</td>
<td>1</td>
<td>-.139</td>
<td>.256</td>
<td>.150</td>
<td>.164</td>
<td></td>
</tr>
<tr>
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<td>.171</td>
<td>.428</td>
<td>.387</td>
<td></td>
</tr>
<tr>
<td>Credit hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
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<td>-.002</td>
<td>-.168</td>
<td>-.003</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>.992</td>
<td>.374</td>
<td>.987</td>
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</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
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<td></td>
<td>.225</td>
<td>.927</td>
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<td></td>
</tr>
<tr>
<td>Sig. (2 - tailed)</td>
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<td></td>
<td>.231</td>
<td>.000</td>
<td></td>
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<tr>
<td>VAS</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
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<td></td>
<td></td>
<td>.267</td>
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<td></td>
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<tr>
<td>Sig. (2 - tailed)</td>
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<td></td>
<td>.153</td>
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<tr>
<td>LOGHASS</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sig. (2 - tailed)</td>
<td>-</td>
<td></td>
<td></td>
<td>.133</td>
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</tr>
</tbody>
</table>
Research Question 2: Is there a relationship between selected demographic variables and level of stress?

There was no statistically significant correlation between stress levels (HASS/Col) and participant gender ($r = .071; p = .710$; Table 2). There was a weak correlation between stress scores and age ($r = .256$; Table 2); however, this relationship was not statistically significant ($p = .171$; Table 2). There was no correlation between stress levels and the number credit hours the students were enrolled in ($r = -.002; p = .992$; Table 2). Furthermore, there was no correlation between the transformed stress levels (LOGHASS) and participant gender ($r = .023; p = .904$; Table 2). Nor was there a significant correlation between transformed stress scores (LOGHASS) and the age of the participants ($r = .164; p = .387$; Table 2). Last, there were no significant correlations between the LOGHASS (transformed stress scores) and numbers of credit hours participants were enrolled in ($r = -.003; p = .987$; Table 2).

Research Question 3: Is there a relationship between selected demographic variables and upper respiratory symptom intensity?

There was a statistically significant correlation between symptom intensity (VAS scores) and gender ($r = -.536; p = .002$; Table 2). However, there was not a significant correlation between symptom intensity (VAS scores) and participant age ($r = .150; p = .428$; Table 2). Additionally, there was no significant correlation between symptom intensity (VAS scores) and the numbers of credit hours participants were enrolled in ($r = -.168; p = .374$; Table 2).
Summary of Results

In summary, a weak correlation was found between stress and symptom intensity, however this relationship was not significant. The only statistically significant correlation found in this study was between symptom intensity and gender. Since females and males were numerically coded for statistical analysis data entry (females = 1; males = 2), the $r = -.536$, results reveal female participants reported higher upper respiratory symptom intensity than did the male participants in this study. Finally, there was a weak correlation between stress scores and age; however, this relationship was not statistically significant.
CHAPTER 5: DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This descriptive, correlational study was designed to examine the relationships between stress levels, upper respiratory symptom intensity, and demographic characteristics in college young adults between 18 and 24 years of age. Selye’s (1976) Stress and Adaptation Theory guided the conceptual framework for this study. In this chapter, the study’s findings; strengths and limitations; and conclusions are discussed. Implications for nursing research and practice are also discussed within this chapter.

Discussion of Findings

This study’s findings are viewed within Selye’s (1976) Stress and Adaptation Theory context of an individual’s unique cognitive appraisal of a stressful event. Included in this context is the individual’s perception and evaluation of the stressor; physical and psychological adaptation to the perceived stressor; and any subsequent rumination over the event. This response to stress can be further conceptualized as a variable, protective or harmful response, to both acute and chronic, daily stressors (Selye, 1976). This study specifically examined the stress response in terms of stress encompassing those daily, cumulative stressors, which in themselves may be deemed by the individual experiencing them as minor, everyday hassles. Furthermore, with genetic factors; lifestyle and behavioral choices; and the impact of the internal and external environment playing a role in one’s cognitive appraisal of stress; what one individual may perceive as a stressful event, another may appraise as nonstress-producing. Two major factors determining an individual’s response to stressful stimuli are the individual’s overall state of health, and
the manner in which they perceive and cope with the stressful stimulus, whether it be threatening or a mere inconvenience (Selye, 1976; McEwen, 1998).

A weak, yet insignificant correlation was found between stress levels and upper respiratory symptom intensity. Given that former studies have linked upper respiratory symptom exacerbation with increased stress levels in college populations, this was an unexpected finding. Stone et al. (1987) reported that participants’ frequency of desirable events declined three to four days prior to physical symptom onset, while Cohen, Tyrrell, and Smith (1991) reported a positive correlation between increases in upper respiratory infections and increases in psychological stress. Participants in this study reported their stress levels as being relatively low (mean HASS/Col score was 766.67 out of a possible 5400), and reported relatively moderate symptom intensity (VAS mean of 66.2 mm out of 100). For this sample, stress levels were relatively low. The correlation between participants’ stress scores and symptom intensity may be improved if the study were conducted at a more stressful time of year, e.g., during exams. Furthermore, participants’ choices within the HASS/Col were limited in that there was a narrow range from which to rate their stress across subscales. Also, the HASS/Col scores were interpreted as overall stress scores, and did not examine the stress scores from the individual subscales of the tool. These three aforementioned factors may be responsible for the weak correlation found between students’ stress scores and symptom intensity.

Another possible explanation for there being a weak correlation between HASS/Col and VAS values is that perhaps participants had adequate psychosocial
resources that impacted their perceptions of both their symptom intensity and experiences with daily hassles. Additionally, students may have perceived their stress levels in terms of daily hassles as relatively low due to possessing adequate coping skills, thereby enabling them to experience the stressors and not interfere with their perception of symptom intensity. DeLongis et al. (1988) supports these explanations in that researchers concluded from their study that participants with decreased psychosocial resources are at increased vulnerability to mood disturbances and illness when faced with increased stress levels. Furthermore, given that Cohen, Tyrrell, and Smith (1991), found that with decreased coping ability, and increased emotional stress, immunological suppression with subsequent increases in upper respiratory illness expression can occur, one might expect that since this study’s participants had low overall stress scores, they would have had decreased VAS scores as well. As previously stated, one of the driving forces behind this finding may have been that the students had adequate psychosocial and coping resources, coupled with symptoms that were reflective of more severe illness which were independent of their stress response.

Former studies have reported temporally linked increases in daily hassles, and decreases in desirable events occurring in the four days prior to upper respiratory illness symptom onset (Evan and Edgerton, 1991; Evans, Pitts and Smith, 1988). Therefore, another possible explanation for these findings is that occurrences of desirable events were increased before the participants’ symptom onset, and therefore their symptoms were perceived as less severe. Moreover, it is possible that students did experience increases in daily hassles in the days leading up to their symptom onset, yet these
stresses were not intense enough to reflect high overall stress scores on the HASS/Col. Alternatively, Evans, Pitts and Smith (1988) found that there were significant decreases in desirable events occurring in the days prior to upper respiratory illness onset, but illness episodes were unrelated to the occurrence of undesirable events, thereby supporting this research question’s findings.

Another consideration for these results may be the timeframe when this study’s data was collected. Whitehouse et al. (1996) reported significant increases in stress and fatigue in college students during exam periods, with associated increases in lymphocyte counts. This study’s data collection occurred during the beginning of the semester when midterm and final exams were in the distant, rather than near, future. It is likely that stress levels are lower in college students during this time in the semester versus when exams are drawing near, and therefore HASS/Col reflected lower stress levels. Also, it may be that during times of increased stress near exam time, student’s immune responses increase (as they did in Whitehouse and colleagues’ study), resulting in less immune reserve for student’s ability to fight upper respiratory pathogens. If this were accurate, then perhaps VAS values would be higher during exam time, rather than during the start of the semester when students’ academic-related stress is relatively low.

Another consideration when interpreting these findings is that HASS/Col examines stress over the past month, and does not ask the student to state when the stressor came into existence. Therefore, from HASS/Col scores alone, this researcher was unable to assess whether student stressors emerged recently, or had been present over
time. Last, the HASS/Col, does not address any aspect of desirable events, and therefore, could not be evaluated.

No significant correlation was found between stress levels and participant gender, yet there was a significant correlation between symptom intensity and gender. Specifically, female participants reported higher symptom intensity than did the male subjects. One possible explanation for this may be that female participants waited longer to come into the ACC for care, and therefore their symptoms were worse secondary to delayed treatment. Another explanation for this finding is that the male participants may have sought care sooner than females, thereby presenting to the ACC with decreased symptom intensity, secondary to seeking treatment early on in their illness.

A weak correlation was revealed between stress scores and age, however the relationship was not significant. A possible explanation for this finding is that older participants may have had more time to develop coping styles that are more effective in dealing with daily hassles, whereas younger subjects, whom may have less coping resources and life experiences from which to draw on in times of stress, may perceive daily hassles as more intense, and tend to ruminate over them once they are removed. Therefore, younger participants may be more likely to have higher stress scores than older participants. Similarly, given the various developmental tasks associated with young adulthood, perhaps younger participants were not adept as the older participants in the sample in mastering those tasks, and therefore reported higher stress levels.
Former studies have revealed that heavy academic workloads, and the degree of course work that a college student faces, along with increased responsibilities related to effective time management, and fear of academic failure, all contribute to driving the physiologic stress response upward, resulting in physical illness (McEwen, 1998; Heaman, 1995). Therefore, it was an unexpected finding that no significant correlation existed between stress levels and the number credit hours the students were enrolled in, nor was there a correlation between symptom intensity and number of credit hours. One possible explanation for this is that those students enrolled in more coursework are aware of the increased responsibility of doing so, and therefore anticipate necessary actions (i.e. working less; exercising) needed for academic success, and to manage increased associated stress, thereby reducing their overall stress levels, and avoiding illness.

**Strengths & Limitations**

The data collection setting was a strength in this study. The environment was quiet and comfortable, with ample chairs and tables, thereby making it an ideal environment for completing the study’s tools. Also, because most students were approached by this researcher before seeing a provider, and continued to work on the instruments once they were called back to an exam room and awaiting care/treatment, there was sufficient time for the students to complete the HASS/Col and VAS without having to rush. This may contribute to students responding more thoughtfully to the items, rather than answering haphazardly to leave the ACC sooner, once their business there was concluded. Hence, student responses may more accurately reflect their stress levels and perceived symptom intensity. Similarly, the very nature of the ACC in terms of
the lower acuity patients seen there, lends itself to seeing students whom are not as ill as those seen in the General or Internal Medicine areas of Campus Health. This may be a strength of the study in that, typically, students seen in the ACC may be feeling better, overall, than those seen in higher acuity areas of the health center, and therefore may feel more energy to complete the study’s tools accurately and thoughtfully.

In developing the HASS/Col, researchers used samples of undergraduate and graduate students for item generation to yield items that were more likely to be generalizable to this population. During data collection, several students commented to this researcher that the items contained in the HASS/Col tool addressed aspects of daily life that they had overlooked as contributing to their overall stress levels. Specifically, students stated that some of the items in the HASS/Col, such as “annoying social behavior of others” and “clumsiness”, addressed aspects of daily life that they considered stressful, but rarely thought of trying to avoid through preventative action, or did not recognize until completing the tool that these “minor” annoyances could “add up” to increase overall stress levels. These aforementioned comments made by students completing the HASS/Col may provide further support of the content validity of the HASS/Col in the target population. Furthermore, although the HASS/Col is a relatively new tool, developed in 2001, the instrument was designed specifically for the measurement of daily hassles in college students, while evaluating the stress response not only in terms of frequency and intensity of the stressors, but also within the realms of the cognitive extensions of stress (i.e. rumination). This more thorough, multidimensional approach to daily stressor assessment, encompasses a more holistic aspect of the stress
response, and therefore reflects other aspects of the stress experience that other tools do not. Therefore, the use of the HASS/Col tool in this study to quantify students’ stress levels is another strength of this study.

Although the setting used in this study was an acute care clinic, versus a higher acuity location, the students seen there nevertheless feel ill enough to seek care, and may be inclined to rush through completing the HASS/Col and the VAS if they are not feeling well, or are experiencing fatigue related to their illness. Additionally, the HASS/Col instrument contains 54 separate items each with three separate subscales (or questions) that the students must consider to complete the form. Hence, the lengthy nature of the tool may increase a student’s likelihood to hasten the completion process, thereby decreasing the reliability of the student’s answers being reflective of their true perceptions of stress and symptom intensity.

Another limitation of this study is that several students mentioned to this researcher that the HASS/Col seemed to “repeat itself” in the items it listed. These students stated that it seemed like several items were asking the same thing, only “reworded”. Also, several students stated that they were not really sure what certain items were asking, so they interpreted it the best they could and proceeded with the next item. Although no student asked for clarification of item(s), this confusion regarding the meanings of some of the items, and the students’ subsequently taking their “best guess” as to what it was asking, may serve to limit the findings of the HASS/Col in that some of the student responses may have been based on a question that was not entirely clear.
A further limitation of this study is that the VAS was validated in studies with asthma and COPD patients, rather than patients with upper respiratory illness in general. Hence, the validity studies that this researcher applied to this investigation used a different population than what characterized this study’s sample. Perhaps a tool designed to assess upper respiratory symptom intensity in patients not limited to the asthma or COPD categories would reveal different results regarding the target population’s perceived symptom intensity.

An additional limitation of this study is that it did not address the issue of diagnostic variability when comparing stress levels to respiratory illness symptom intensity. The inclusion criteria for this study stated that students must present to the ACC with an upper respiratory illness chief complaint, but did not account for individual upper respiratory diagnoses. If stress scores were compared with the symptom intensity of a specific upper respiratory illness, more data would be gained as to which upper respiratory illnesses are correlated with stress within the sample population.

A further limitation of this study was the small sample size, which may limit the generalizability of the findings to other young adult college populations. If more students were included in the study, the findings might be more generalizable to other college populations within the 18 to 24 year old age group. Additionally, this study did not include non-US citizens, nor did it give regard to US citizen cultural differences in terms of viewing health and illness; and therefore further limits the study’s generalizability.
Given this study’s unexpected findings, it does not provide evidence of a significant positive correlation between stress levels and upper respiratory symptom intensity. However, results of this study, and similar studies have the potential to influence the care advanced practice nurses and other healthcare providers render to college young adults presenting with upper respiratory symptoms. Specifically, although patient empowerment was not part of the theoretical framework guiding this study, data gained from this study contributes to preliminary data necessary to conduct future research aimed at empowering this population to make connections between their stress levels and physical symptom onset and exacerbation. This study is among the few that have examined relationships between student’s perceived stress levels in coping with daily hassles and their perceptions of their upper respiratory symptom intensity; and therefore provides a broadened nursing knowledge base from which both patients and primary care providers can benefit in terms of designing interventions to decrease college students’ stress levels and their associated perceptions of their illness severity. Additionally, since the stress experience also encompasses positive experiences (Selye, 1976), perhaps future studies can approach the stress experience from a standpoint that encompasses both positive and negative aspects of the stress experience, thereby including more factors that may affect the student’s stress perception. The more insight and understanding a healthcare provider has into the link between stressful life events and physical symptom onset and exacerbation, the more prepared and effective that provider
will be in empowering the patient to take control over their stress, and perhaps reduce their overall symptom intensity, thereby affecting the experience of their illness.

Additionally, this study provides further knowledge regarding the relationships between young adult college students’ perceived stress levels measured from a multidimensional perspective, and their upper respiratory symptom intensity, which may be related to their stressful life events. More specifically, this study provides additional knowledge regarding the relationships between perceived upper respiratory symptom intensity and stress levels with regard to considering the stress experience in terms of having period of subsequent rumination and intrusive thoughts over the stressful event once the stressor had ended. The knowledge gained from this study, coupled with that from former similar studies, directs future nursing research in terms of where efforts should be made to identify relationships between psychological stress and physical illness. Furthermore, it would be interesting if future studies would examine physiologic measurements of stress, as well as subjective psychological measurements, and compare those with subjects’ perceived symptom intensities. This would provide a more objective assessment of students’ stress levels as manifested by physiological indicators, versus self-reported stress levels, which are governed by the individuals’ level of awareness of those stressors.

Benjamin (1987) reported that college students often place self-imposed high personal and academic standards upon themselves during a time of critical growth and development, often times while the student is newly away from home, and support systems may be sparse. Therefore, it may be interesting for future studies to assess for the
presence of these high self-imposed personal or academic standards, and compare them with stress levels and symptom intensity. Additionally, Deckro et al. (2002) reported that college students participating in mind/body interventions experienced less stress. Therefore, it would be helpful if future studies were to examine the presence of these types of stress-reducing activities in the students’ lives, along with students coping mechanisms, in general; and then compare their stress levels to their symptom intensity. Another implication for future research within the realm of college students’ stress levels and physical symptom intensity would be to conduct the study at different times in the semester. As previously noted, this study took place during a time period at the start of the semester when midterm and final exams were distant. If data were collected during times nearing exams, perhaps different results would be revealed. Last, Adams et al. (2000) reported that optimism and sense of coherence medicated effects of life purpose on perceived overall wellness. It would be beneficial if future studies were to examine this trait in college students, and then compare this aspect of the student’s personality with their stress levels and symptom intensity. This may shed more light on students’ mind/body associations, which may affect their perceptions of symptom intensity.

In closing, future studies aimed at revealing the relationships between stress levels and specific illness symptom intensity in this target group, also have implications for healthcare professionals developing wellness programs in that teaching content would be directed toward more emphasis on patients managing their stress levels in terms of their unique life situations to decrease their risk for illness exacerbation, or for experiencing an illness on a more severe level. Additionally, future nursing research within these realms,
and the subsequent development of new patient care interventions based on research findings, presents an opportunity for temporal and economic benefits to primary care providers, insurance companies, colleges, and patients alike. Specifically, if students were made aware of a link between their stress levels and symptom intensity, they may be more inclined to empower themselves to reduce their stress levels and avoid becoming ill, resulting in an overall decline in healthcare utilization by this population.
APPENDIX A

The Hassles Assessment Scale for Students in College (HASS/Col)
<table>
<thead>
<tr>
<th>EVENTS</th>
<th>FREQUENCY</th>
<th>UNPLEASANTNESS</th>
<th>DWELLED</th>
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<tbody>
<tr>
<td>20. Food (e.g., unappetizing or unhealthy meals)</td>
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<td>21. Forgetting to do things (e.g., to tape TV show, send cards, do homework)</td>
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<td>22. Friends/peers: relationship issues, annoyances</td>
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<td>23. Future plans (e.g., career or marital decisions)</td>
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<td>24. Getting up early (e.g., for class or work)</td>
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<td>25. Girl/boyfriend: relationship issues, annoyances</td>
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<td>26. Goals/tasks: not completing enough</td>
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<td>27. Grades (e.g., getting a low grade)</td>
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<td>28. Health/physical symptoms of self (e.g., flu, PMS, allergies, headaches)</td>
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<td>29. Schoolwork (e.g., working on term papers, reading tedious/hard material, low motivation)</td>
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<td>30. Housing: finding/getting or moving</td>
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<td>31. Injustice: seeing examples or being a victim of</td>
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<td>32. Job: searching for or interviews</td>
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<td>33. Job/work issues (e.g., demands or annoying aspects of)</td>
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<td>34. Lateness of self (e.g., for appointment or class)</td>
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<td>35. Losing or misplacing things (e.g., keys, books)</td>
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<td>36. Medical/dental treatment (e.g., implement, time demands)</td>
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<td>37. Money: noticing lack of</td>
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<td>38. New experiences or challenges: engaging in</td>
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<td>39. Noise of other people or animals</td>
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<td>40. Oral presentations/public speaking</td>
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<td>41. Parking problems (e.g., on campus, at work, at home)</td>
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<td>42. Privacy: noticing lack of</td>
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<td>43. Professors/coaches (e.g., unfairness, demands of, unavailability)</td>
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<td>44. Registering for or selecting classes to take</td>
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<td>45. Roommate(s)/housemate(s): relationship issues, annoyances</td>
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<td>46. Sexually transmitted diseases (e.g., concerns about, efforts to reduce risk of STIs/HIV)</td>
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<td>47. Sports team/celebrity performance (e.g., favorite athlete or team losing)</td>
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<td>48. Tedium everyday chores (e.g., shopping, cleaning apartment)</td>
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<td>49. Time demands/deadlines</td>
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<td>50. Traffic problems (e.g., inconsiderate or careless drivers, traffic jams)</td>
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<td>51. Traffic tickets: getting (e.g., for moving or parking violations)</td>
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<td>52. Waiting (e.g., for appointments, in lines)</td>
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<td>53. Weather problems (e.g., snow, heat/humidity, storms)</td>
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<td>54. Weight/dietary management (e.g., not sticking to plans)</td>
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APPENDIX B

The Visual Analog Scale
Instructions: Mark a straight line across the dark (bold) vertical line below at the point that indicates how uncomfortable your symptom(s) are. For this study, intense means how much discomfort your symptoms are. Your mark can occur at any point on the line.
REFERENCES


