

INCREASING RESILIENCE IN ADOLESCENT NURSING STUDENTS

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Abstract

Nursing students not only face the same developmental challenges as other college students, but also experience unique stressors that contribute to increased risk for negative outcomes. The intimate nature of patient care, the exposure to workplace adversity, death and dying, and the chaotic nature of healthcare can have cumulative negative effects on students' health and well-being. Increased resilience could prove useful in helping students confidently face challenges and successfully move forward. The lack of empirical evidence regarding resilience-enhancing interventions with nursing students supports the need for examining the effectiveness of an educational intervention to increase resilience in adolescent baccalaureate nursing students. The purpose of this study was to: (1) determine the effectiveness of an educational intervention delivered via Twitter to increase resilience and sense of support, as well as decrease perceived stress, in a sample of adolescent baccalaureate nursing students, and (2) to describe the personal characteristics of this sample of nursing students. Ahern's model of adolescent resilience, as adapted from Rew and Horner's youth resilience framework, was the guiding theoretical model for the study. The study was a multisite experimental repeated measures design with a follow-up email survey. Participants were a sample of 70 randomly assigned junior-level baccalaureate nursing students, ages 19-23, at two state-supported universities in the southeastern United States. Both groups completed three instruments, the Perceived Stress Scale (PSS), Sense of Support Scale (SSS), and Connor-Davidson Resilience Scale (CD-RISC) at three times of measurement. Multilevel modeling was used to examine growth trajectories over time. Both groups

showed a decline in perceived stress, but the control group demonstrated a greater decrease in scores at follow-up. No statistically significant difference was detected between groups in terms of sense of support. The experimental group demonstrated an increase in resilience from pretest to posttest, but declined at follow-up. Despite these unexpected findings, results of the email survey indicate the intervention was beneficial to some students. Strengths of the study include the innovative intervention using Twitter, the use of repeated measures, the use of multilevel modeling to analyze longitudinal data, and the first known use of Ahern's model as a guiding framework.

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CHAPTER I: INTRODUCTION

Nursing students often find the culture of nursing school to be quite different from their expectations and many will experience stress and adversity early in their clinical experiences (Thomas & Burk, 2009). These experiences have been linked to high attrition rates for nursing students and new graduates (Bowden, 2008; Deary, Watson, & Hogston, 2003; Goff, 2011; Jeffreys, 2007; McLaughlin, Moutray, & Muldoon, 2008). Nursing students face the same developmental challenges as most college students, but they also experience unique stressors that contribute to added stress and/or perceived adversity. For many, the intimate nature of patient care, the exposure to horizontal/vertical violence, death and dying, and the chaotic nature of the healthcare environment can have cumulative negative effects on students' health and well-being. In addition to these stressors, nursing students experience the added stress of anticipating the National Council Licensure Examination for Registered Nurses (NCLEX-RN). Goff (2011) reports many college students do not readily identify their stressors and do not pursue assistance or counseling.

Adolescent nursing students are particularly vulnerable to negative effects of stress due to their immature coping abilities and lack of experience in dealing with conflict issues. Many are unprepared to deal with the emotional and physical demands of a healthcare profession. As a result, many will adopt negative coping and adaptive responses or succumb to negative influences.

This multisite experimental study explores the effectiveness of an educational intervention delivered via Twitter to increase resilience and sense of support and decrease perceived stress in a sample of adolescent baccalaureate nursing students. Descriptive statistics are used to describe the personal characteristics, including risks and protective factors, of the sample.

This chapter will begin with definitions of terms, an overview of the problem and a review of current resilience research efforts, particularly those relevant to this study. I will briefly discuss my personal interest in this topic. An overview of the purpose and aims of the study will be given, including a brief discussion on the use of Twitter as the intervention delivery method. Research questions will be stated as well as study limitations and delimitations. The chapter will conclude with a discussion of the significance of this study to nursing education and the profession of nursing as a whole.

Definition of Terms

The following definitions are offered to clarify the use of selected terms for this study.

Adolescent Nursing Student

Healthy People 2020 (HP2020, U.S. Department of Health and Human Services, 2011) defines adolescents as ages 10 to 19 and young adults as ages 20 to 24. For the purposes of this study, the term *adolescent nursing student* will include ages found within both groups, specifically 19 to 23.

Adolescent Resilience

Ahern's (2006) definition of adolescent resilience is used for theoretical and conceptual congruence. She defines adolescent resilience as a "process of adaptation to risk that incorporates personal characteristics, family and social support, and community resources" (p. 181). Resilience is measured in this study using the total score of the Connor-Davidson Resilience Scale (CD-RISC) (Connor & Davidson, 2003).

Risk

Rew and Horner (2003) define risk factors as "internal or external hazards or threats that increase an individual's vulnerability or susceptibility to negative health outcomes" (p. 379). These authors note risk factors are present throughout a person's life and vary according to context, developmental stage, and individual characteristics. For this study, risk will be explored by measuring perceived stress and identifying selected personal characteristics (e.g. health risk behaviors) from the demographics questionnaire.

Perceived Stress

Perceived stress is defined as the degree to which situations in one's life are appraised as stressful. For this study, it is measured by the total score of the 10-item Perceived Stress Scale (PSS) (Cohen & Williamson, 1988).

Health Risk Behaviors

Health risk behaviors for this study are defined as those behaviors of the adolescent baccalaureate nursing students that may compromise their health and well-

being. These were measured by the total number (0-10) of self-reported behaviors on the researcher-developed demographics questionnaire.

Protective Factors

Rew and Horner (2003) define protective factors as “individual responses to hazards that buffer the impact of risk factors” (p. 382). These are commonly described attributes of individuals found to be resilient and include personal characteristics (age, gender, race, etc.), family and social support, and community resources.

Personal Characteristics

For this study, personal characteristics (age, gender, race, marital/children status, employment status, living situation, housing, activities, study habits, religion/faith, grade point average, etc.) are identified on the self-report demographics questionnaire.

Sense of Support

Sense of support is defined as the “interpersonal transactions that include one or more of the following: the expression of positive affect of one person toward another; the affirmation or endorsement of another person’s behaviors, perceptions or expressed views; the giving of symbolic or material aid to another” (Frank-Stromberg & Olson, 2004, p. 176). Sense of support is measured using the total score of the 21-item Sense of Support Scale (SSS) (Dolbier & Steinhardt, 2000). Additionally, participants were asked to identify sources of financial and emotional support on the demographics questionnaire.

Problem

Nursing students experience many stressors that can negatively affect their health. Psychological distress results from various stressors, including intrapersonal, academic, interpersonal, and environmental. These stressors, combined with an often immature coping ability, make this population particularly vulnerable to psychological and physical health problems. During the college years, students experience a time of developmental transition and are particularly vulnerable to environmental/contextual influences. Several important public health and social problems are noted to start or peak during these years and include homicide, depression, motor vehicle crashes, substance use and abuse, smoking, sexually transmitted infections, unplanned pregnancies, and homelessness. Nursing students are not immune to these risks. For many, the beginning of clinical experiences introduces a new set (often unexpected) of stressors. Among those students still transitioning to young adulthood and learning to live independently from their parents, many will make poor choices as they attempt to deal with stress. Rew and Horner (2003) report that the presence of many risk factors and the lack of protective factors make adolescents vulnerable to adverse health outcomes. These authors argue many health-risk behaviors have their origins in adolescence and are linked to risk factors such as increased stress. Ahern and Norris (2011) observed the tendency for college students to engage in risky behaviors as a coping and adaptive response to stressors. These health-risk behaviors can lead to long-term adverse health outcomes that are costly to both the individual and society.

Resilience

Resilience is a popular topic within the literature of a variety of disciplines. The nursing discipline most often focuses on the human applications of the concept; while discussing it within other contexts, such as ecology and microbiology. Until recently, resilience has been both broadly defined and generally applied resulting in much confusion due to the ambiguity of the various definitions and descriptions. Despite the variations, several common elements are seen within the definitions. Many refer to a state of recovery or a return to a previous state after a time of stressful transition or an adverse event. According to the *Oxford English Dictionary* (“resilience”, 2010), resilience originates from the Latin *resilia* meaning the “action of rebounding”. Atkinson, Martin, and Rankin (2009) describe resilience as the “capacity to recover from the extremes of trauma, deprivation, threat, or stress” (p. 137). Gillespie, Chaboyer, and Wallis (2007) use similar terms in their description of the concept, but further describe resilience as “an ongoing process of struggling with hardship and not giving up” (p. 133). More authors are now in agreement that resilience can be developed or taught at any time during a person’s life, which differs from past interpretations of resilience as a personality trait. Previous publications commonly used the terms “invulnerable” to describe this concept (Rutter, 1985) until Rutter (2006) defined resilience as “an interactive concept that is concerned with the combination of serious risk experiences and a relatively positive psychological outcome despite these experiences” (p. 2). He explains the focus of the definition is the individualized responses to similar adversities.

As with many concepts, resilience has evolved over time and is now commonly clarified according to context and population (e.g. adolescent resilience).

Resilience Research

The philosophical roots of resilience lie within the psychological (coping) and physiological (stress) bodies of work. Historically, resilience most often has been studied in relation to adversity, trauma, and transitions of greatest stress (Ahern & Byers, 2008; Hodges, Keeley, & Troyan, 2008; Tusaie & Dyer, 2004). Luther, Garmezy, and Rutter were three of the pioneers leading the early work in resilience. As research continued, several authors developed models of resilience, including: (a) Rutter, (b) Wolin and Wolin, (c) Masten, and (d) Richardson.

Within the context of health and illness, resilience emerged as an important concept from the studies of children at risk. Early studies of resilience explored the ability of certain individuals to cope better than expected after adversity. Werner's (1993) landmark study following children born in Kauai, Hawaii over four decades is cited by many and contributed valuable knowledge to the study of resilience. This research led to an exploration of characteristics, described as protective factors, which assisted individuals to thrive after experiencing trauma or adversity. The general focus of resilience literature turned from negative outcomes to a better understanding of how positive outcomes were achieved, leading to the current emphasis on the development and/or enhancement of protective factors to increase resilience in individuals (Grafton, Gillespie, & Henderson, 2010; McAllister & McKinnon, 2009).

While resilience has been associated most often with periods of transition, disaster, or adversity, some researchers are beginning to explore the concept of resilience in healthy, well-adjusted individuals (Ahern, 2006). For these individuals, the concept of resilience is believed to help with everyday stressors and challenges, as opposed to the larger traumatic events most often explored in resilience literature. Development of resilience assists healthy, well-adjusted individuals to better cope with everyday hassles preparing them for future challenges and possible adversity. Recent adversities such as natural disasters, 9/11, and school shootings have shown the need to foster resilience in our students to better prepare them for their futures. In addition to these events, we are hearing of students who are taking their own lives at young ages due to pressures from bullying. I propose that increasing nursing students' resilience will better prepare them to face challenges and adversity and not only survive, but also thrive, facing additional life events and challenges with hope and optimism for future successful outcomes, including improved health and career longevity.

Much has been written about resilience in the nursing literature, with many qualitative studies and concept analyses. Other authors focus on the evaluation or creation of resilience measurement instruments. There has been much interest in the concept of resilience as applied to nursing students, both in the United States and abroad. Recurring themes within the literature relevant to nursing student resilience include: (a) the importance of personal characteristics, (b) professional socialization, and (c) social support. Although many researchers advocate the development of initiatives designed to increase or promote resilience with this population, few intervention studies have been

published. Outcomes of the development of resilience include: (a) effective coping, (b) positive adaptation, (c) self-esteem, (d) longevity, (e) improved physical and mental health status, (f) career success, (g) self-transcendence, (h) confidence, (i) mastery, (j) quality sense of life, and (k) sense of well-being (Ahern, 2006; Atkinson et al., 2009; Earvolino-Ramirez, 2007). Several researchers have recommended resilience education programs and interventions be utilized to help students deal more effectively with the everyday frustrations, disappointments, and crises (Ahern, 2009; Burnham, 2009; Hodges, Keeley, & Troyan, 2008).

In addition to the benefits for individual students, there are implications for the profession of nursing. Nursing education is poised for many future challenges as we work to take a leadership role in the transformation of America's health care. We need to produce strong, capable leaders who are able to withstand the challenges of an often-tumultuous healthcare environment. A proactive approach in teaching students how to increase their own resilience will ultimately aid in the progression of the profession. Students will be better equipped to assume their roles as new graduates with hope, optimism, and confidence that they will succeed despite challenges and obstacles. The results of this study contribute to the body of knowledge on adolescent nursing student resilience and support the use of social media as an intervention delivery method with this population. As we learn more about the use of innovative educational interventions with this population, we are better equipped to transform nursing education to meet the future needs of our profession.

Personal Interest

I have been interested in nursing students and new graduate nurses since I was one myself. Even though I have been a professional registered nurse for over 24 years, I still remember how it felt to experience certain situations as a student and new graduate. I recall the overwhelming sense of stress and frustration, combined with the shocking realities of the healthcare environment. I was surprised to find not all preceptors and nursing professionals were eager to work with me and teach me the ropes. I was surprised to find less-than caring attitudes toward patients and family members. Overall, I found the incivility and attitudes of disdain and apathy to be discouraging. However, I soon realized these individuals, while visible and vocal in the healthcare setting, were not the majority. I learned to seek out positive influences and mentors who exhibited the personal and professional behaviors I expected and desired to demonstrate. I vividly remember making a promise to myself that I would never forget what it felt like to be a nursing student and new graduate. I vowed to work diligently to make the experiences of others better than my own.

Through the years, I have worked in various nursing arenas, including nursing education. I have worked closely as a preceptor and developed a preceptor training program. When I had the opportunity to pursue my Master's in Nursing degree (MSN), I became intrigued with the concept of new graduate attrition. As I began to explore this concept, I noted the repeated mention of resilient nurses. New graduates, who were able to persevere and not succumb to the high attrition rate, were often described as resilient. I began to wonder if it would be possible to be proactive in the

development/enhancement of resilience in nursing students to help them face periods of stress and adversity as students and on into their lives as new professionals.

Following a personal tragedy in the midst of my MSN program, and after beginning my study of resilience, I was in a unique position to simultaneously explore the concept of resilience while living through an adverse experience. As I examined my own protective factors and critically reflected on my own journey to resilience, I found many of the theoretical assumptions to be true, which strengthened my interest and resolve to pursue this research with adolescent nursing students. It is my sincere desire to assist students in increasing their own resilience and realizing their own potential and encourage them to pass on this knowledge to their clients, family members, and peers.

Purpose of the Study

The purpose of this study is to answer the following research questions: (1) Is an educational intervention delivered via Twitter effective to increase resilience and sense of support, as well as decrease perceived stress, in a sample of adolescent baccalaureate nursing students? (2) What are the personal characteristics, including risks and protective factors, of this sample of students? Descriptive statistics are used to describe the personal characteristics, based on information provided on the demographics questionnaire, of individuals in both the experimental and control groups. Ahern's (2006) model of adolescent resilience, as adapted from Rew and Horner's (2003) youth resilience framework, will be used as the guiding theoretical framework. The research questions and hypotheses are designed to reflect the experimental and descriptive nature of this study.

Hypotheses

H1: Students receiving the educational intervention will show a statistically significant increase in resilience scores and sense of support scores compared to students in the control group at posttest and follow-up measurements.

H0: There will be no significant difference in resilience scores and sense of support scores between the experimental and control groups at posttest and follow-up measurements.

H2: Students receiving the educational intervention will show a statistically significant decrease in perceived stress scores compared to students in the control group at posttest and follow-up measurements.

H0: There will be no significant difference in perceived stress scores between the experimental and control groups at posttest and follow-up measurements.

Twitter

Twitter, a form of social networking, is used as the intervention delivery method for this study. Social networking is considered a useful means of communication, particularly with college students and young adults, and has been used for the dissemination of health information, including smoking cessation programs for college students (Junco, Heibergert, & Loken, 2011; Obermeyer, Riley, Asif, & Jean-Mary, 2004). The decision to use social media was based on current literature exploring the characteristics of this generation, often referred to as *millennials* (Hansen & Erdley, 2009; Hoover, 2009; Keeter & Taylor, 2009; Thielfoldt & Scheef, 2004). These individuals are those born from 1981 to 2000 (Keeter & Taylor, 2009) and commonly described as

technologically savvy, creative, innovative, preferring real-time communication, multitaskers, self-inventive, like to be entertained, get bored easily, and desire instant responses and access to information (Hansen & Erdley, 2009; Hoover, 2009; Thieboldt & Scheef, 2004; Trueman & Miles, 2011). Hansen and Erdley describe an added benefit of using social media, such as Twitter, as the ability to reach many individuals at a distance to enhance collegiality.

Trueman and Miles (2011) note the millenials prefer teaching/learning formats that are “fast, relative, and succinct” (p. 183). They are accustomed to being rewarded for successes and expect immediate feedback, which is consistent with Prensky’s (2001) description of *digital natives*, current students who have grown up using technology in most, if not all, aspects of their lives. Prensky suggests these students not only expect to use multiple forms of technology in their education, but also may have different brain structures because of a lifetime use of technology. Whether or not their brain structures differ from those of non-digital natives, it is apparent their thinking processes are different. Among other proposals, Prensky suggests educators must adapt to students’ needs for teaching/learning methods that parallel their learning and communication styles. Twitter is proposed as an effective means to meet these expectations and to meet this generation’s need for collaborative learning while boosting student engagement.

Twitter is a free microblogging service that allows users to post and read 140-character (or less) messages or “tweets” (Ovadia, 2009). It can be accessed by mobile devices (e.g. phone, iPad, iPod, etc.) and via computer. Nursing students often complain about a lack of time and it was my desire to not place an additional burden on students by

asking them to attend face-to-face sessions (e.g. support groups). Students in this study were intrigued by the use of Twitter and expressed interest in participation based on this factor. Several students at both institutions, who did not meet the age criteria, requested to be included in future similar studies. Additional information on the use of Twitter, as well as the results of its use in this study, will be discussed in greater detail in Chapters IV and V.

Significance to Nursing

Several recent publications and initiatives support the need for the development of resilience in our adolescent nursing students. Of particular relevance are the Healthy People 2020 initiative (U.S. Department of Health and Human Services, 2011), the American College of Health Associations' recent reports (2009, 2011), the MIT Young Adult Development Project (Simpson, 2008), and two recent publications by the Institute of Medicine (IOM, 2011) and The Carnegie Foundation for the Advancement of Teaching (Benner, Sutphen, Leonard, & Day, 2010).

HP2020 was launched in December 2010 to identify the health improvement priorities and research needs for the next 10 years. One of the new 13 topics is adolescent health. The goal of this initiative is to “improve the healthy development, health, safety, and well-being of adolescents and young adults” (U.S. Department of Health and Human Services, 2011, para1). The HP2020 website emphasizes the importance of addressing health-risk issues and assisting individuals in the adoption of healthy behaviors to ensure a healthy and productive future adult population.

The MIT Young Adult Development Project (Simpson, 2008) was created to explore the new research findings on the internal and external changes (including brain development) during young adulthood. These findings support the belief that young adulthood is a legitimate stage of development, one that continues on with the changes begun in adolescence. Depending on multiple circumstances (e.g. learning disabilities, previous trauma, drug/alcohol use, abuse/neglect, etc.), the individual may be significantly delayed in reaching this stage of development. College students, in particular, will demonstrate evidence of these internal/external changes at different rates and may appear to regress when confronted with multiple stressors and life transitions. The researchers involved in the project recommended several strategies for assisting these individuals as they transition from adolescence into young adulthood and beyond. These strategies include understanding the vast developmental range for these individuals and the key factors that can affect levels of functioning (sleep deprivation, environment, practice, and support). Resilience is a concept that addresses many of these considerations.

The American College of Health Association's (ACHA, 2009) report indicates students rank stress, sleep difficulties, and depression/anxiety as the highest impediments to their health. Robotham and Julian (2006) found these and other stressors can negatively impact adolescent college students' health and well-being as well as their academic performance. Ahern and Norris (2011) observed the tendency for college students to engage in risky behaviors as a coping and adaptive response to stressors. Resilience research efforts, like this study, assist in critically examining nursing programs

to identify specific needs of nursing students, evaluate ways we can better encourage positive health behaviors, and avoid contributing to negative behaviors.

Two recent publications, *Educating Nurses: A Call for Radical Transformation* (Benner et al., 2010) and *The Future of Nursing: Leading Change, Advancing Health* (IOM, 2011), focus on the need for radical change within nursing education to better support students and prepare them as professionals. The authors of these publications and initiatives, along with other researchers, advocate many concepts that are congruent with the attributes and outcomes of resilience (e.g. engagement, social support, sense of belonging, etc.).

Theoretical Framework

Haase (2009) describes resilience as a complex, multidimensional construct, which has led to much confusion and ambiguity in the various definitions and terminology. Many researchers have realized the need to clarify the concept for a specific population or context, including adolescents. Within the study of adolescent resilience, three researchers have been recognized for their work in theory development: Haase (2004), Rew and Horner (2003), and Ahern (2006).

Haase (2004) developed the adolescent resilience model to be used primarily with adolescents diagnosed with cancer and other chronic conditions. Rew and Horner (2003) introduced the youth resilience framework to focus on at-risk adolescents, particularly the homeless. Their model (Figure 1) was developed to address the individual and sociocultural risks and protective factors that promote or hinder both positive and negative outcomes in adolescents. Those individuals identified as having good outcomes

despite high risk are described as resilient. Rew and Horner (2003) theorize adolescents can be taught to access and mobilize their protective factors to offset risks. These researchers advocate early interventions, designed to enhance protective factors, be developed and tested to promote the health and well-being of adolescents.

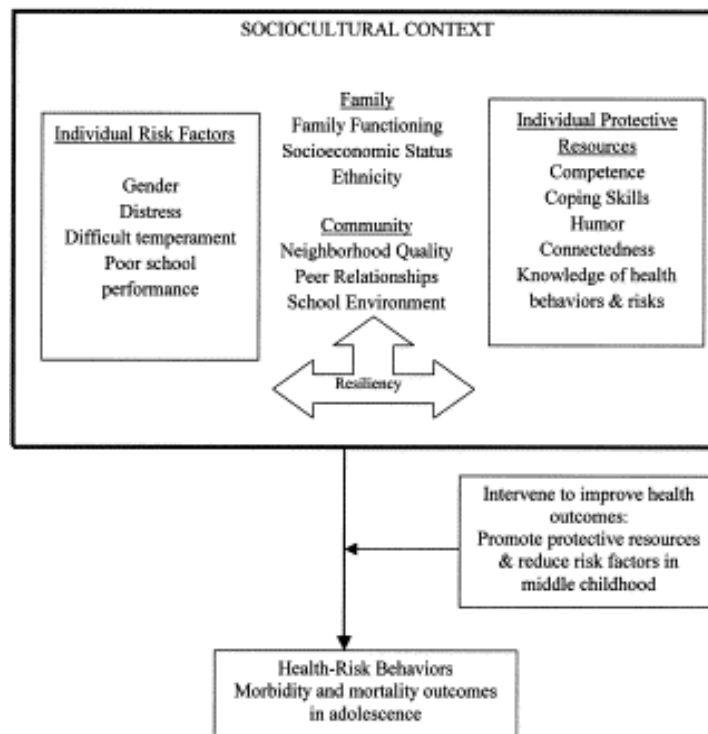


Figure 1. Youth Resilience Framework (Rew & Horner, 2003)

Ahern's (2006) model of adolescent resilience (Figure 2) is an adaptation of Rew and Horner's youth resilience framework, modified to include interventions. Ahern's model proposes the development of resilience as a preventive measure for the healthy, well-adjusted adolescent and is particularly relevant when considering resilience in the adolescent baccalaureate nursing student. The model depicts adolescent resilience as the outcome of the triadic influences of risk, protection, and interventions. The model includes a continuum with two poles (1) risk (internal and external factors), and (2) protection (individual and sociocultural). The model clearly depicts the potential interaction of internal and external factors as well as the influence of family, community, and individual support systems/relationships. Ahern argues a person's resilience can vary with stages of development and advocates research efforts to identify the processes that enhance resilience in adolescents as preparation for life transitions and periods of adversity. She reports a lack of research with healthy adolescents who are confronted with everyday stressors and she has made several recommendations for future studies, including the study of risks and protective factors in these individuals. She also has noted the need to identify risk factors for specific adolescent populations, to assess protective factors (including social support), and to assess resiliency in adolescents of differing ages, situations, and settings, including nursing students.

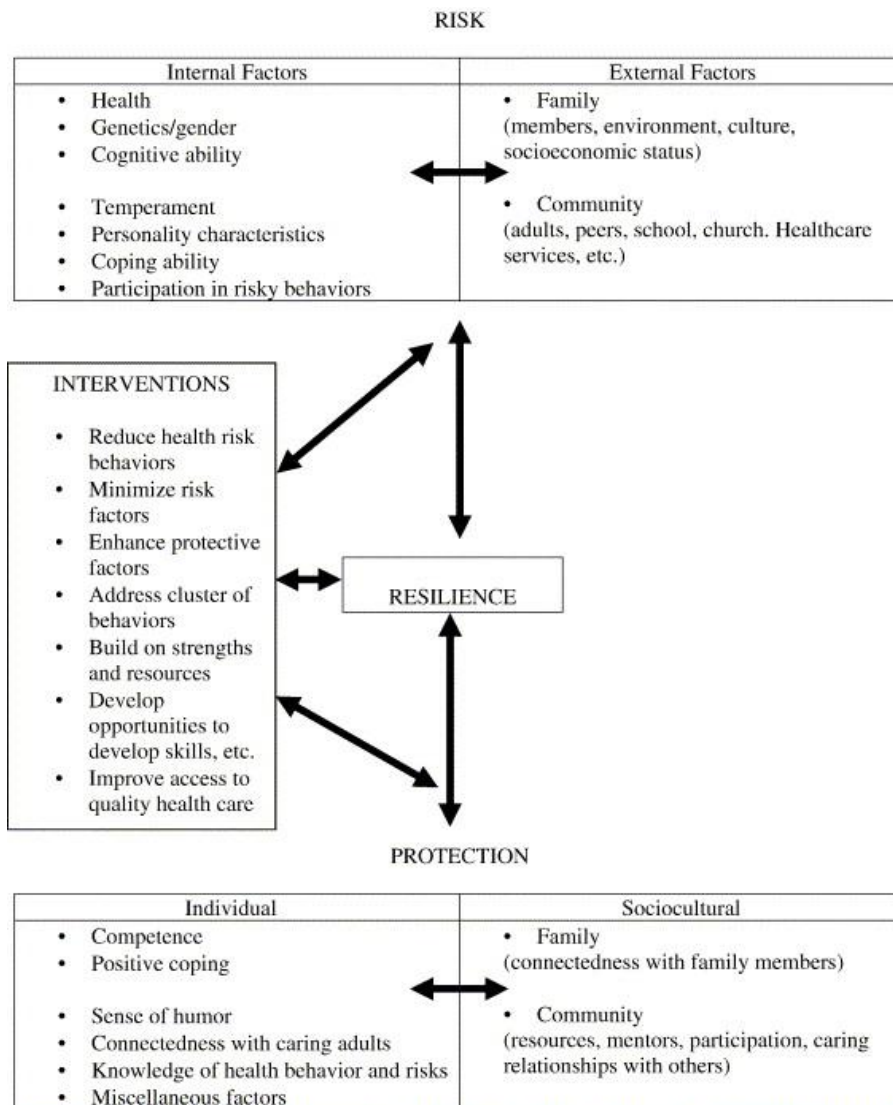


Figure 2. Ahern's Model of Adolescent Resilience (Ahern, 2006).

As part of her model's design, Ahern advocates the development of interventions to increase resilience and promote protective factors. Protective factors are believed to modify the response or buffer the impact of stress. Ahern's model is used to guide this

experimental study to describe the personal characteristics of the sample and explore the effectiveness of an educational intervention to increase resilience in a sample of baccalaureate nursing students, and to determine the effect(s) of the intervention on perceived stress (risk) and social support (protective factor).

Study Limitations

1. The use of self-report data collection
2. Limited geographic region
3. Repeated use of same instruments
4. Gender and race limitations (predominately white females)

Study Delimitations

1. Literature review limited to English language publications
2. Sample limited to 19-23 year old baccalaureate nursing students enrolled full-time and in clinical nursing course
3. Population limited to those with an active mobile phone account and the ability to send/receive text messages
4. Intervention delivered via Twitter requiring participants to have Twitter account

CHAPTER II: LITERATURE REVIEW

Introduction

The purpose of this literature review is to provide an overview of the literature found to be cogent to the study of nursing student resilience and to explore the major concepts within the model of adolescent resilience (Ahern, 2006). It will begin with a review of a concept clarification, followed by a discussion of the topics relevant to this study, including the risks and protective factors found to be critical to the development of resilience in adolescent nursing students. This chapter will conclude with an overview of the current resilience research in nursing education.

McAllister and Lowe (2011) describe a resilient individual as someone who has not only survived adversity, but also learned from the experience with resulting personal growth. In their book, *The Resilient Nurse*, these authors propose resilience is an essential skill needed by nurses to find meaning in their experiences and to better moderate their reactions to stressors faced in the work environment. Citing numerous sources of stress for the young nursing student, McAllister and Lowe (2011) note the importance of understanding and appropriately responding to stress. They define resilience as “a process of adapting to adversity that can be developed and learned” (p. 6). Ahern (2006) explains the importance of clarifying the concept for adolescents because of the variation in risks and protective factors at different stages of development.

A comprehensive review of the literature was conducted using the CINAHL, Health Reference Center, Health and Wellness Resource Center, Health Source:

Nursing/Academic, MEDLINE, PsycArticles, PsycINFO, and PubMed databases. Key terms used to identify relevant publications include: resilience, stress, adolescents, protective factors, college students, coping strategies, nurse educators, attrition, retention, dropout, nursing school culture, horizontal/vertical violence, support, risk, adolescent health, and nursing student(s). These key terms were searched individually and in various combinations. Inclusion criteria consisted of: (a) English language publication, (b) peer-reviewed journals, dissertations, and books, (c) research studies and/or conceptual publications, and (d) recent publication (with exceptions made for seminal material). Descendancy search methods were conducted using the articles chosen for review. Eighty-two sources were reviewed and 58 were chosen for inclusion. The references chosen were found to be cogent to this study and to include recent and/or significant contributions to the study of adolescent nursing student resilience.

Adolescent Nursing Student Resilience

Resilience is an important concept to consider when working with nursing students. In addition to the typical life changes most traditional adolescent college students face, nursing students must adapt and cope to challenges specific to their chosen vocation. Patient care places them in many “first” situations that may cause anxiety or discomfort, including the intimate care of both male and female patients, death and dying, diverse lifestyles, exposure to communicable diseases, etc. While resilience has most often been associated with periods of transition, disaster, or adversity, Ahern (2006) has emphasized the need to explore the concept in healthy, well-adjusted adolescents. In her doctoral dissertation, Ahern (2007) explored the concept of resilience in adolescent

community college students. She explains these individuals experience various forms of stressors, often related to normal developmental changes and transitions, which place them at risk for adverse outcomes due to immature coping abilities. Those identified as resilient were found to possess protective factors that served to buffer or minimize the effects of stress. She proposes that interventions designed to increase resilience through the enhancement of protective factors may serve to better prepare the students for future adversity, as well as avoid negative outcomes from current stressors.

Stephens (in press) recently clarified the concept of nursing student resilience to better assist those interested in resilience research with this population. She used the Norris (1982) method of concept clarification to advance and develop descriptions of this phenomenon relating to the unique purpose and perspective of nursing practice. The intent of Norris's method is to increase levels of abstraction through the collection and analysis of empirical data (Lorenz, 2007). Using concept clarification to provide additional information specific to nursing student resilience, the phenomenon is described through its antecedents, attributes, and consequences, as identified by previous authors (Ahern, 2006; Atkinson et al., 2009; Earvolino-Ramirez, 2007; Gillespie et al., 2007).

Antecedents

Antecedents describe things or events that must occur prior to something's development. Gillespie et al. (2007) identified four antecedents to resilience: (a) adversity or trauma, (b) the situation is interpreted as traumatic, (c) there is a realistic

worldview, and (d) there is sufficient cognitive ability to interpret an event as adverse. Adversity is identified as the primary antecedent to resilience by Earvolino-Ramirez (2007), and she describes “change, challenge, and disruption” (p. 78) as aspects of adversity commonly noted prior to development of resilience. Likewise, Atkinson et al. (2009) speak of periods of adversity or stress prior to the development of resilience. Ahern (2006) describes the presence of a risk or risks that trigger a protective mechanism. Based on the literature reviewed, adversity and stress are the most commonly cited antecedents for resilience.

Adolescent baccalaureate nursing students often experience both of these while also facing the added stressors of a rigorous nursing curriculum. While they may voice their distress or complain of feeling “stressed”, many may not be able to identify specific experiences or adverse events. The cumulative effects of these stressors may lead to feelings of frustration and result in student attrition (either voluntary or from academic failure) or other negative outcomes. Many students who persevere will face additional, and often unexpected, stressors when beginning their clinical courses. Students are often unprepared for the scheduling of clinical hours and the emotional toll created by the demands of patient care, as well as the often negative interactions with healthcare professionals, preceptors, and/or nursing faculty.

Attributes

Protective factors are often cited as the attributes necessary for the development of resilience and are commonly noted in individuals who have been identified as resilient

(Dyer & McGuinness, 1996). Johnson and Wiechelt (2004) emphasize that protective factors, while important in predicting resilience, are individualized and dependent upon context and situation. However, there is sufficient evidence in the literature to confirm their importance when exploring ways to increase or develop resilience in individuals.

Commonly identified attributes of resilience include self-efficacy, hope, positive coping, self-determination, social support, flexibility, sense of humor, etc. (Gillespie et al., 2007; Earvolino-Ramirez, 2007). Ahern (2006) has focused much of her research in resilience on adolescents and describes protective factors as individualized and varying according to stages of development. Her model of adolescent resilience describes many of the same attributes, which she groups within three categories: (a) personal characteristics, (b) family and social support, and (c) community resources.

Atkinson et al. (2009) write about the various researchers' opinions regarding the attributes of resilience and the ongoing debate of whether resilience is a personality trait or an acquired skill. Stephens (in press) proposes it is a combination of both. While there are some inherent traits (intelligence, sense of humor, etc.) that certainly contribute to the development of resilience, others like problem-solving ability and effective coping can be learned or enhanced.

Despite the various semantic opinions, the following categories of attributes for resilience can be applied to the concept of resilience for the adolescent nursing student population: (a) personal characteristics (age, gender, race, academic competence, positive emotions, etc.), and (b) social support. These two categories include both external and internal factors that can be individualized based on person and context.

Consequences

Consequences, or results, of resilience include: (a) personal growth, (b) personal control, (c) effective coping, (d) positive adaptation, (e) self-esteem, (f) longevity, (g) confidence, (h) improved physical and mental health, (i) career success, (j) enhanced quality of life, and (k) sense of well-being (Ahern, 2006; Atkinson et al., 2009; Earvolino-Ramirez, 2007; Gillespie et al., 2007). These consequences illustrate some of the reasons for the scholarly interest in resilience and the value seen in the ability to aid in its development.

Operational Definition

Norris (1982) defined an operational definition as one that answers at least one question, “How will I know the concept when I see it in operation?” (p. 16). Unlike other researchers, Norris does not emphasize measurement in her method (Lackey, 2000). Because of the lack of agreement on various aspects of the phenomenon, it is difficult to find an operational definition of resilience within the literature. In the past, the most commonly cited definitions referred to the ability to “bounce back” from an adverse situation. However, more recent literature describes a pattern of personal growth or improvement. Some authors have suggested resilience occurs because of the adversity, not in spite of it (Gillespie, et al., 2007). In other words, growth or progression occurs as a result of a traumatic event and may not have occurred if adversity were not present. This notion of personal growth as a result of adversity is a common thread seen throughout much of the current literature devoted to resilience.

Learned Resilience

There has been a long-standing debate as to whether or not resilience can be taught/learned. Antonovsky, as cited in Wijk and Waters (2008), first described salutogenesis as based on three assumptions: (a) all people fall somewhere between total terminal illness and total wellness as opposed to totally diseased or totally healthy, (b) stressors may have positive consequences as opposed to the assumption that all stressors are bad, and (c) there is a focus on the salutary factors (something unwelcome or unpleasant that produces a beneficial effect), not the risks. Antonovsky describes a sense of coherence (SoC) as a key element in his salutogenic model. Based on the belief that all people are continuously exposed to stressors, SoC is a general way of cognitively and affectively appraising the world, associated with effective coping, health-enhancing behaviors, and better social adjustment. He proposes SoC as a lasting outlook on life, not a particular coping style. Its development assists individuals in selecting appropriate strategies to deal with their stressors. Using the salutogenic model in an interview process with naval officers, Wijk and Waters (2008) found it led to increased self-awareness, the development of skills to appraise life situations and challenges, and the development of appropriate coping skills. These results lend support to the proposition that resilience can be developed and/or enhanced in nursing students through purposeful interventions and education efforts.

Based on the literature reviewed, Stephens (in press) proposed the following operational definition of nursing student resilience:

Nursing student resilience is an individualized process of growth and development that occurs through the use of personal protective factors to successfully navigate perceived stress and adversities. Cumulative successes lead to enhanced coping/adaptive abilities and well-being, which enable the nursing student to better face future challenges within the academic and clinical environments.

Resilience in Adolescence

Ahern (2006) defines adolescent resilience as the “process of adaptation to risk that incorporates personal characteristics, family and social support, and community resources”, (p. 181) and conceptualized as a “composite of attributes, including characteristics of the adolescent, sources of social support, and available resources” (p. 183). It is important to recognize there are specific risks and protective factors at each stage of an individual’s life that contribute to his/her resilience. Adolescent nursing students are an interesting population to consider for resilience studies. As previously noted, most resilience research has focused on individuals in the midst or following severe adversity or tragedy. While nursing students may be assumed to be generally healthy and well-adjusted, they are experiencing multiple stressors and life transitions that can have cumulative negative effects on their health and well-being. Adolescent students enter a nursing program with varying levels of experience with stress and coping. Many have relied on parents or other authority figures to assist them when dealing with challenges. As students are transitioning into young adults, they may find it difficult to cope and adapt without their previous sources of support.

Risk

Nursing students experience various personal and/or academic stressors that contribute to risks for attrition, negative health behaviors, and psychological distress. As described earlier, adolescents perceive adversity and stress at varying levels and for various reasons at different times and stages of their lives. Much research is devoted to the study of nursing student stress and several factors are identified as leading contributors of perceived stress and adversity that put the adolescent nursing student at risk for negative outcomes (Ahern, 2009; Clement, Jankowski, Bouchard, Perreault, & Lepage, 2002; Hamrin, Weycer, Pachler, & Fournier, 2006; Rew & Horner, 2003). In Ahern's model of adolescent resilience, possible risks include the internal factors/characteristics of the adolescent (e.g. health, genetics, gender, cognitive ability, temperament, personality characteristics, coping ability, and participation in risky behaviors). Risks also are associated with negative sociocultural support systems within the family (e.g. individual family members, environment, culture, and socioeconomic status) and community (e.g. adults, peers, school, church, healthcare services, etc.). For the adolescent nursing student, stress is a commonly noted risk.

Stress

Higher levels of stress occur during the initial clinical experiences than at any other time during a nursing student's educational experience (Admi, 1997; Hamrin et al., 2006; Jimenez, Navia-Osorio, & Diaz, 2010; Jones & Johnston, 1997). Admi reports nursing students' stressors include experiencing new clinical situations, intimate care of

both male and female patients, handling patients' emotional problems, being critically evaluated by self and others, dissonance between what is experienced in the clinical environment and what is taught in the academic setting, and dealing with death/dying. Many of these experiences will be "firsts" for students who may be unprepared to adequately appraise the situation and respond appropriately. Admi's findings from a longitudinal exploratory study revealed that stressful situations for these students were often the result of not knowing how or being unsure of the way(s) to meet certain demands. These included not knowing answers to patient questions, being asked to do something by a staff nurse that goes against what was taught at school, and providing intimate care (e.g. baths) to a patient of the opposite sex. Jones and Johnston (1997) observed similar stressors, as well as interpersonal conflicts with nursing staff, insecurity and fear of failure, interpersonal problems with patients, work overload, and concerns about performance of certain nursing procedures (e.g. female catheterizations). These clinical stressors were experienced along with multiple academic stressors, including multiple examinations, long hours of study, assignments/grades, lack of free time, and faculty response (or lack of). Admi found students' perceptions of these stressful events changed over time with beginning nursing students' perceptions different from those of more experienced students. As students gained more information and expertise, and were better able to cope, they interpreted the same situations differently than the original encounter. These findings indicate the importance of preparing our new nursing students for the situations they will face in the clinical settings and assisting them in ways of coping with what they perceive as stressful.

Adolescent college students experience stress related to both daily hassles and major life events. In her doctoral dissertation, Ahern (2007) explored the relationships among high-risk behaviors, resilience, and stress in adolescent community college students. Her findings reveal the study sample possessed moderate levels of resilience in spite of exposure to the stresses of daily hassles and major life events. Much of the stress experienced by these students related to making the transition to college life. Ahern found personal characteristics (age, gender, race, etc.) significantly contributed to the prediction of stress. She emphasized the importance of understanding more about stress and coping in this population and whether resilience influences stress. These findings encourage future research focused on efforts to increase resilience in order to reduce emotional stress and improve coping skills. Burnham (2009) writes educators can support their students with day-to-day matters and help them deal more effectively with frustrations, disappointments, and crises by endorsing resiliency skills. She emphasizes educators must first be informed about the concept of resilience as well as be willing to assist students in the identification and enhancement of protective resources (factors). She advocates a proactive approach by creating supportive environments that foster the growth and development of resilience.

In Rew and Horner's (2003) youth resilience framework, they define risk factors as "internal or external hazards or threats that increase an individual's vulnerability or susceptibility to negative health outcomes" (p. 379). According to these authors, risk factors are present throughout a person's life and vary according to context, developmental stage, and individual characteristics. Risk comes in many forms, often

broadly categorized as “stress” for the nursing student, including horizontal/vertical violence and cognitive dissonance. These stressors can lead to physical, psychological and spiritual distress.

Cognitive Dissonance. Nursing students often find the healthcare environment to be very different from their expectations. Workplace incivility, horizontal/vertical violence, and the stress of patient care are often unanticipated and disheartening for students. Many face negative attitudes from preceptors and clinical staff who are overworked and/or unprepared to work with adolescent nursing students. These negative influences combined with other stressors, put students at risk for negative physical, psychological, and academic outcomes.

Hodges et al. (2008) reported approximately 60% of new graduate nurses leave their first job before the end of their first year of employment. While other studies explored the reasons for this high attrition rate, these researchers sought to find ways to prevent it by assisting student nurses in the development of resilience. The purpose of their qualitative study was to explore the nature of professional resilience in new baccalaureate-prepared nurses (BSN) in an acute care setting and to develop pedagogical strategies to support resilience and retention. Study results confirm previous findings that reveal new graduates’ initial experiences are marked with anxiety, ambiguity, and a sense of dissonance between the school and work environments. Findings are beneficial to nurse educators who seek to assist their students in developing resilient behaviors prior to graduation and entering the professional world. Interpretive hermeneutic phenomenology analysis of narratives explored their feelings about beginning practice to better

understand their experiences. Purposive and network sampling was used to recruit 11 new BSN nurses, ages 23 to 31, in a southeastern city of the United States. Data collection occurred over a period of nine months and consisted of an initial focus group, individual interviews, and critical incident questions. Findings revealed the importance of assisting students and new graduates in the reconciliation of the discrepancies between their own assumptions of professional nursing and the realities of the workplace. The authors interpreted this reconciliation as a developmental turning point in the new graduates' lives. Professional socialization and intentional support of others were found to be critical in the development of resilience and successful navigation of the professional environment.

Many students enter the nursing profession because of a sincere desire to help others and often experience a sense of dissonance and frustration when practicing professionals do not meet their expectations. While researchers have explored the reasons for nursing student attrition and retention, few studies have been published about students' motivation for entering a program. McLaughlin, Moutray, and Moore (2010) explored this question as a possible means of assistance in recruitment and retention of nursing students. Their preliminary qualitative study in Northern Ireland explored the motivation of nursing students, their reasons for entering nursing, and the perceived influence of others in their decision-making. The authors report a mismatch between students' expectations and the realities of the profession. A convenience sample of 68 undergraduate nursing students volunteered to participate by completing an essay on two of six topics. Using a grounded theory approach, two categories emerged from the

analysis: (1) The past, the present, and the future, and (2) The influence of significant others. Influence of significant others (family, friends, and former teachers) was found to be an important factor in students' decision to choose nursing as a career. These authors found one of the most common motivating factors for entering the nursing profession is the desire to care or provide care for others. McLaughlin et al. advocate that more detailed information on the content of nursing education and nature of nursing work be provided to potential students. This may help alleviate attrition attributed to the mismatch between expectations and reality. It may also help attract those students who have not considered nursing due to a misconception about the profession (e.g. not technical or academically challenging).

Recent reports indicate our new nurses are leaving school unprepared to effectively deal with the challenges of the work environment (Bowden, 2008; Cowin & Hengstberger-Sims, 2006; Hwang, 2004; Jeffreys, 2007; Kelly & Ahern, 2008). Rudman and Gustavsson (2011) report higher levels of severe burnout among younger new graduate nurses, which supports other findings indicating younger professionals are inadequately prepared for their occupational role. Educational initiatives have been recommended to help student nurses identify resources and develop skills to manage and reduce the impact of stress.

Horizontal/Vertical Violence. One factor linked to nursing student stress and attrition is that of incivility and violence within the clinical setting, specifically horizontal or vertical violence. Horizontal violence has been described as an act of aggression against a colleague (Longo, 2007). Violent acts may be physical, verbal, or emotional.

Horizontal violence has often been referred to as the phenomenon of *nurses eating their young*. Longo (2007) surveyed senior baccalaureate nursing students' experiences of horizontal violence in the practice setting. An 18-item anonymous survey was distributed to a convenience sample of senior nursing students enrolled in two nursing courses. Forty-seven students (60%) completed the three-part survey. Survey questions focused on demographics, personal experiences of horizontal violence, and observations and responses to horizontal violence. Results showed 25 respondents (53%) had experienced at least one form of horizontal violence during their clinical experiences. Sixteen participants (34%) reported observing an act of horizontal violence between a staff member and a classmate. Several students did not report the acts of horizontal violence at the time of occurrence, which is a concern for nurse educators. The authors recommend faculty strengthen the lines of communication with students and be proactive to increase students' awareness of the issue of horizontal violence as well as the measures effective in dealing with these behaviors. A limitation of the study was the use of yes-or-no questions to elicit student responses about their personal experiences of horizontal violence. Additional limitations include the selection of a small sample from one nursing program. Study strengths include the contribution to the body of knowledge on horizontal violence in nursing through confirmation of the need for educators to openly discuss this unacceptable behavior with their students before they begin practice. Staff development educators can use the results to encourage nursing staff to consider the effects of their behaviors.

Vertical violence, as experienced by beginning nursing students, was explored in a study by Thomas and Burk (2009). The authors used the term “vertical violence” to describe instances of violence/abuse occurring between individuals with unequal power (i.e. student and staff nurse). A convenience sampling method was used to elicit narratives from junior nursing students enrolled in a leadership course at a public state university in the Southeastern United States from 2004-2007. A total of 248 narratives were submitted, but 27 were eliminated because they did not pertain to the role of nursing student. Content analysis of the remaining 221 narratives, revealed that the main cause of student anger in the clinical environment was perceived injustice (unfair or unjust treatment). Two broad themes emerged: (a) unfair treatment of the students themselves, and (b) violation of patient rights. Excerpts from the student narratives were independently categorized according to severity, as conceptualized on a continuum by the researchers. The themes of injustice include: (a) Level One: “We were unwanted and ignored”, (b) Level Two: “Our assessments were distrusted and disbelieved”, (c) Level Three: “We were unfairly blamed”, and (d) Level Four: “I was publicly humiliated”. According to the students, most clinical instructors responded to these injustices with empathy and support. Unfortunately, there were instances when the clinical instructor stood by silently and did not confront the abusive registered nurse. Other instructors made excuses for the nurses’ behaviors. These findings are consistent with previous studies revealing the continued proliferation of vertical violence from one generation of nurses to the next. Thomas and Burk recommend nurse educators begin to use preventive strategies and interventions, and not just rely on methods to deal with the results. These

strategies include a “zero tolerance” policy on violence of all types, mandatory reporting of violent incidents, teaching students assertive responses and anger management techniques, confronting abusers, and including information on these issues within the nursing curriculum.

Not surprisingly, personal resilience has been explored as a strategy for responding to workplace adversity. Jackson, Firtko, and Edenborough (2007) reviewed the literature related to workplace adversity in an effort to identify strategies to enhance resilience in nurses. They define resilience as the “ability of an individual to adjust to adversity, maintain equilibrium, retain some sense of control over their environment, and continue to move on in a positive manner” (p. 3). These authors describe resilience as an active process, shifting from vulnerability to resilience. They suggest the development or enhancement of resilience can reduce an individual’s vulnerability to risk and negative outcomes. Because the work of nurses will always contain elements of stress, hardship, and adverse/traumatic situations, Jackson et al. (2007) propose resilience is essential and must be developed and/or enhanced for the individual nurse to survive challenging and difficult working environments. These authors propose five specific strategies for building resilience in nurses: (1) building positive nurturing professional relationships and networks, (2) maintaining positivity through laughter, optimism, and positive emotions, (3) developing emotional insight to better understand one’s own risk and protective factors, (4) achieving life balance and spirituality to give one’s life meaning and coherence, and (5) becoming more reflective to enhance emotional strength, meaning making, and moving beyond the present adversity (Jackson et al., 2007).

Recommendations are made for resilience-building efforts to be incorporated into nursing education to better prepare nursing students for the workplace environment.

Jackson et al. (2011), explored nursing students' struggle for legitimacy within the clinical environment. Their qualitative study used open-ended survey questions to explore undergraduate nursing students' experiences of negative behaviors in the clinical environment. The authors concluded that exposure to aggression and bullying in the clinical setting places nursing students in a vulnerable position and at risk for long-lasting psychological effects. Their findings confirm that nursing students are often confronted with images of nursing contrary to their beliefs and what they are taught in the educational setting. Many times the organization supports hostile behaviors via organizational aggression to "ensure the compliance to the prevailing institutional image of students as Other; that is, marginal and less worthy" (p. 103). Of particular interest is the finding that nursing students demonstrating well-developed personal resilience were better able to discern and respond to negative behaviors in a productive and active manner, as opposed to the commonly observed harmful or passive response seen in many nursing students.

These studies reinforce what has been found in previous studies examining adversity in nursing students. While nurse educators cannot control the healthcare environment or limit its chaotic and rapidly changing nature, they can assist students in developing skills and behaviors to more effectively deal with these situations when they arise. These studies suggest that nurse educators be proactive in creating an open, honest, and supportive climate within programs. Efforts to improve the students' ability to

handle stress and adversity should begin upon entrance to the program and continue throughout.

Health Risk Behaviors

The American College of Health Association's (ACHA, 2009) report indicates college students rank stress, sleep difficulties, and depression/anxiety as the highest impediments to their health. Robotham and Julian (2006) found these and other stressors negatively affect adolescent college students' health and well-being as well as their academic performance. Ahern (2007, 2009) and Ahern and Norris (2011) explored the health risk behaviors of adolescent community college students. Ahern and Norris reported the tendency for college students to engage in risky behaviors as a coping and adaptive response to stressors. While facing many stressors and challenges during their academic experience, nursing students also are continually exposed to healthcare information and, thus, have a greater chance of avoiding risky behaviors due to their own learning process. As students learn about positive health behaviors and are involved in planning and teaching patients about these, they may begin to translate these behaviors into their own lives. Of particular interest to the current study are the health risk behaviors associated with a lack of time that have been found especially problematic in the adolescent nursing student (sleep, diet, and exercise).

Clement et al. (2002) explored the health behaviors of nursing students in a three-year longitudinal study. They found certain tendencies associated with a lack of time: too little sleep, not eating breakfast, and lack of exercise. These authors examined nine

selected health behaviors (sleep, eating breakfast, physical activity, tobacco use, alcohol consumption, seat belt use, breast self-examination, clinical breast examination, and cervical cancer screenings) of 52 undergraduate Canadian nursing students over a three-year period. Comparing the results to those from the general population revealed significant differences in the nursing students' behaviors. The nursing students demonstrated consistent behaviors during the three years of study. After two years in the program, nursing students still failed to get the recommended seven hours of sleep per night, omitted breakfast, and lacked physical exercise regimens. Results indicated 90% of the nursing students did not smoke and 93% drank little or no alcohol. The authors attribute the nursing students' exposure to health information via their academic studies and current trends in Canadian laws to attempt to reduce harmful behaviors (e.g. smoking in public places, drinking while driving) as possible reasons for the reduced number of smokers and alcohol consumption. Clement et al. propose an academic environment that supports and fosters desirable health behaviors, including time for adequate sleep (at least seven hours per night), eating breakfast daily, and exercising regularly.

The presence of health risk behaviors and the lack of protective resources make the adolescent vulnerable to adverse health outcomes (Ahern & Norris, 2011; Rew & Horner, 2003). Many of these health-risk behaviors originate in adolescence and are linked to risk factors such as increased stress. Not immune to the negative effects of stress, adolescent nursing students are susceptible to the development of negative health risk behaviors, which in turn, further contribute to perceived stress. Mareno and James (2010) propose that the identification of deficiencies in dimensions of wellness can assist

in the creation of interventions specific to the needs of the student population being studied. Their findings support the need for further research to assess health and wellness in individual college student populations to better address their specific high priority needs. The current study describes some of these health risk behaviors (sleep, diet, exercise, etc.) in this sample of adolescent baccalaureate nursing students.

Protective Factors

As with risks, protection includes both individual and sociocultural influences. In Ahern's model, protective factors include both individual (personal characteristics) and sociocultural (family and community) factors. Positive sociocultural influences contributing to protection include positive family support system (e.g. connectedness with family members) and positive community support system (e.g. resources, mentors, active participation, caring relationships with others, etc.) (Ahern, 2006). McAllister and Lowe (2011) write that protective factors applicable to nurses/nursing students may be learned or enhanced through positive learning experiences. They emphasized everyone should be proactive about resilience in the workplace environment to moderate the effects of stress and adversity in the lives of the workers. The nature of health care work is chaotic, emotionally demanding, and unpredictable, which, according to these authors, requires more than just good coping mechanisms. Nurses must learn to develop or enhance their own resilience to "change the situation or change their reaction" (p. 18).

Social Support

The increasingly difficult demands of nursing curricula combined with the personal aspects of role acculturation reinforce the need to re-examine the framework of the nursing education program and create environments that are nurturing, caring, respectful, and supportive for both faculty and students.

Several studies have explored the effectiveness of support groups for nursing students. Hamrin et al. (2006) explored the effectiveness of an innovative strategy using peer-led support groups to decrease stress and anxiety in nursing students. These voluntary, short-term, peer-led support groups met for one hour per week for nine weeks. The researchers concluded this group model was effective in decreasing anxiety and creating a sense of belonging for entry-level graduate nursing students. The authors observed the most common coping strategy for nursing students experiencing stress in the clinical setting was seeking social support. Their study explored the educational and experiential benefits for graduate nursing students as both leaders and members of a peer-led support group. Findings significant in their study show the less-experienced nursing students benefited from increased collegiality as a result of the support. The authors advise supporting a sense of belonging through appropriate social support can enhance academic performance. While Hamrin et al.'s study focused on graduate nursing students, the authors recommend it be replicated with baccalaureate nursing students to provide benefits for both group leaders and entry-level nursing students.

Hughes et al. (2003) conducted one of the few quantitative studies in nursing to identify strategies for creating a nurturing learning environment. They investigated the

effects of an informal peer group experience on baccalaureate nursing students' emotional well-being and professional socialization as caring practitioners. The authors used a randomized two-group pretest-posttest design using an intervention similar to, but not a replication of, caring groups. For this reason, informal peer group experience was used rather than caring groups to describe the intervention. The guiding theoretical framework for their study was Noddings' conceptualization of the components of a moral education. This conceptualization proposes students must be given opportunities to engage in meaningful interpersonal relationships to develop as morally responsible individuals who both demonstrate and respond to caring behaviors. The behaviors essential to these meaningful relationships are compassion, respect, and consideration.

The target population was all full-time students enrolled for the first time in junior courses at a single baccalaureate school of nursing. Inclusion and exclusion criteria were used to select 128 participants who were assigned sequentially to both an experimental and control group in this crossover research design. Students assigned to the peer group during the fall semester were treated as the control group during the spring semester and vice versa. The intervention was designed to assist in the creation of a healing and caring environment and was guided by three assumptions: (a) effects of the academic experience on learning are holistic, (b) learning is shaped by classroom experiences as well as by experiences outside the classroom, and (c) peers along with faculty play a role in students' learning. Small groups of nine to twelve students met for five 2-hour sessions during a single academic semester. All students at that institution transfer from other institutions into the upper-division nursing courses (junior year). Therefore, the peer

group sessions were initially composed of students who were mostly unfamiliar with each other. Attendance was not mandatory, but highly encouraged. Group sessions were student driven and no specific topic was identified prior to the meetings.

Findings failed to indicate participation in an informal peer group experience was effective in promoting students' emotional well-being and professional socialization as caring practitioners. These findings could be the result of various study limitations, including small sample size, participant attrition, and study duration of only one semester. The authors determined the participants did not have enough time to develop as a cohesive group that could function as a source of meaningful support for its members. Findings did suggest the group experience was beneficial to some students. Many students commented they liked having the opportunity to meet informally with their faculty mentor and considered them a positive source of comfort and support. Others later reported they were continuing to maintain relationships established as a result of the group sessions. While the findings were not statistically significant, there was evidence to support future research initiatives with social support efforts based on the evidence suggesting the group experience was viewed as beneficial by some students.

Levett-Jones, Lathlean, Higgins, and McMillan (2008) explored nursing students' sense of belonging. The authors describe *belongingness* as a personal experience that evolves as a result of the degree to which that individual feels (a) secure, accepted, included, valued, and respected, (b) connected with or integral to the group, and (c) that their professional and/or personal values are consistent with the group's. According to these authors, nursing students who lack a sense of belonging can experience many

detrimental effects including: stress, anxiety, depression, diminished self-esteem, and impaired cognition. These may lead to affiliative behaviors (i.e. acquiescence and conformity) as well as negative physical and psychological manifestations. A mixed method, multi-site case study approach was used with an anonymous online survey. Students were recruited through advertisements placed on Blackboard at three universities (two in Australia and one in the United Kingdom). In the original survey, 362 undergraduate students completed the Belongingness Scale-Clinical Placement Experience (BES-CPE). Eighteen of these students were selected via purposive sampling to participate in in-depth semi-structured interviews for the qualitative portion of the study. Results indicated that the duration and structure of clinical placements was an important factor in the students' sense of belonging, which in turn was directly related to their self-concept, degree of self-efficacy, confidence, resilience, willingness to question or conform to poor practice, career decisions, and capacity and motivation to learn. These findings support previous recommendations for using fewer clinical placements of longer duration to: (a) encourage a sense of belonging, (b) help to establish collegial relationships, and (c) improve the learning experience. It was determined that placement in negative environments nonconducive to learning or where students feel unwelcome are of little benefit, regardless of length.

Montes-Berges and Augusto (2007) analyzed the relationship between perceived emotional intelligence (PEI) and coping, social support, and mental health variables in first year nursing students. A sample of 119 first year students at the University of Jaen, Spain were chosen to participate during their second cuatrimester (4 month term) in

which initial placements occur. The authors define emotional intelligence (EI) as the “skill to perceive, understand, and express emotions”. PEI was measured by the Trait Meta-Mood Scale (TMMS), the Coping Scale, Vaux’s Subjective Social Support Scale, the Objective Social Support Scale, and the Mental Health 5 Scale. Results indicate positive correlations between clarity and social support, social support and repair, and social support and mental health. Findings emphasize the importance of students being able to recognize stress and their reactions to stressful events to improve retention and develop successful interpersonal skills. The authors conclude EI and other personal factors are crucial in the development of good working relationships. They suggest nursing curricula include opportunities to develop students’ skills and behaviors related to these interpersonal and intrapersonal factors. Some suggestions for nursing academia include reflective learning experiences, supportive supervision and mentoring, modeling, development of empathy, and emotional competency.

Lessard, Fortin, Marcotte, Potvin, and Royer (2009) report the importance and benefits of students having a supportive social support system. These researchers conducted a narrative study of 60 former high school students, ages 19 to 22 years, who were identified as being resilient. Participants were selected from a larger, longitudinal Canadian study spanning the years 1996 to 2007. Participants in the parent study were contacted twice a year for five years to answer questionnaires and participate in interviews. One-hundred-thirteen students previously identified as being at-risk for dropping out of school (based on personal, family, and/or school risk factors) who received a high school diploma were identified as resilient. All 113 students were

contacted by the researchers and invited to tell their story, with 60 volunteering to participate. Students were asked to: (1) describe the challenges they faced in their lives, and (2) what made them stay in school. Findings revealed the significance of the interplay between risks and protective factors for students. Unsupported by their own parents, many students in this study found support from other family members, friends, teachers, coaches, or other supportive adults. The ability to identify and seek out sources of support is an important consideration for the adolescent nursing student. This finding could be useful for future resilience intervention studies. The presence of positive emotions and self-efficacy are demonstrated by a student's belief in their own abilities. Even when confronted with failure, they hope for a better future outcome and believe they can ultimately succeed.

The students in Lessard et al.'s (2009) study demonstrated an ability to problem-solve and seek and obtain help when needed. In addition to seeking help, self-efficacy includes the ability to avoid negative influences and to learn from previous mistakes. While participants were not nursing students, findings are useful to nursing education research due to the similarities in age and context. The experiences of the resilient students identified in their study illustrate the importance of certain protective factors, including personal characteristics, social support, and positive emotions. These findings support those of Martin and Marsh (2006), who found students demonstrated self-efficacy by their conscious decisions regarding their friends, their behaviors, and their activities. They were goal-oriented and driven to succeed by dreams of their future and persistence to continue despite adversity.

Stress-related growth and posttraumatic growth are newer terms often used when discussing resilience. These terms refer to the positive changes in individuals after traumatic or adverse events. Both, like resilience, indicate a higher level of adaptive functioning following the adversity. Steinhardt and Dolbier (2008) explored the effectiveness of a four-week educational intervention to enhance resilience, coping strategies, and protective factors during a period of increased academic stress in a group of college students. Findings indicate significantly increased total growth supporting future efforts to enhance or develop resilience in college students. In this pilot study, 64 college students were recruited and randomly assigned to experimental ($n = 31$) and wait-list control ($n = 33$) groups. Seven participants did not complete the post intervention survey, leaving the final sample size of 57 (30 experimental, 27 wait-list control). The students in the experimental group attended weekly intervention sessions for four weeks (2 hours each). The resilience intervention, *Transforming Lives Through Resilience Education*, was delivered to students during a period of increased academic stress (i.e. the final weeks of classes). The first session focused on typical responses to stress and two broad categories of coping (e.g. problem-focused and emotion-focused). Session two focused on taking responsibility for one's behavior. Session three focused on teaching students to change their disempowering thoughts into empowering interpretations. Session four focused on creating meaningful connections with friends and loved ones. This session also explored the connection between personal health and well-being and social connections and self-leadership.

Measures of resilience, coping strategies, protective factors, and symptomatology were administered pre- and post intervention to both groups. Results indicated the experimental group had significantly higher resilience scores, higher scores on protective factors, more effective coping strategies, and lower scores on symptomatology (e.g. depressive symptoms, negative affect, perceived stress) post intervention than the control group. These findings support the belief that resilience education can be useful as a stress-management and stress-prevention intervention for college students. While results were positive and indicated effectiveness of the intervention, not all were statistically significant (nonsignificant Group x Time effect for support coping, $F [1,55] = 0.02, p = .90$; correlations among protective factors yielded a nonsignificant main effect for group, $F[4, 51] = 1.00, p = .41$; symptomatology dependent variables repeated measures ANOVA yielded a nonsignificant main effect for group, $F[4, 52] = 0.32, p = .86$). The authors attributed these nonsignificant results to small sample size, lack of randomization, and inconsistency of frame of reference with instruments. Additionally, intervention implementation and maximization of participant retention could be improved in future studies by using alternate intervention delivery methods that did not require as much time from the students (e.g. online or social media).

Personal Characteristics

Rew and Horner (2003) describe an individual's personal protective factors as resources that modify or buffer the impact of risk(s), and include several personal characteristics commonly identified in resilient individuals (e.g. positive emotions,

gender, school performance, coping skills, sense of humor, connectedness, social support, and knowledge of health behaviors and risks). These authors, as part of their youth resilience framework, advocate interventions designed to enhance protective factors with the goal of increasing resilience. Several resilience-based educational initiatives like the *Penn Resiliency Project* (PRP, 2011) and Virginia's *Reach In. Reach Out.* (NCVC, 2011), focus on growth and development of clusters of personal characteristics, recognizing they vary among individuals, contexts, and developmental stages.

McAllister and Lowe (2011) write about the influence of the positive psychology movement on resilience research. They write optimism, as well as other personal characteristics, can be learned based on the works of Seligman and Charney. The characteristics of resilient people that can be learned or developed, according to these authors, include (a) optimism, (b) cognitive flexibility, (c) personal moral compass, (d) altruism, (e) choice of positive role model(s), (f) adeptness at facing fears, (g) positive coping skills, (h) strong social support system, (i) physical fitness, and (j) sense of humor.

Resilience Research in Nursing Education

McAllister and McKinnon (2009) explored the application of resilience research to nursing education in their literature review and explain resilient individuals possess protective factors, which enable them to more effectively cope with challenges. These authors cite convincing evidence that individuals can learn resilient skills. They propose the teaching of resilience be incorporated into evidence-based educational programs to give students strength, focus, and endurance.

Several theoretical frameworks have guided research related to the concept of resilience. Parse's human science theory, the Human Becoming School of Thought (HBST) is explored by Hodges, Keeley, and Grier (2005) as a means of guiding nursing education practices. The authors discuss various aspects of resilience and the HBST, including: (a) curricula and teaching approaches, (b) today's teachers and students, (c) professional resilience for career longevity, (d) Parse's theory for educational practice, (e) developing reflective practitioners, (f) survivors' pride, (g) reflection, connection, and resilience, and (h) implications for research. Parse's theory, when adapted to nursing education, promotes the students' quality of life and professional identity through intentional teaching of skills and behaviors identified with resilience. These skills and behaviors include the ability to work through emerging difficulties and integrate crisis experiences into one's sense of well-being.

Parse advocated the use of her theory in nursing education, but on the graduate level. These authors propose it as a useful tool in the undergraduate setting to: (a) assist in the development of clear professional values and resilient workers, (b) to create a healthy profession of nursing, and (c) develop nurses who are able to confront change with a strong professional role identity. Because of the unpredictable and often chaotic nature of the healthcare world, there is a need for educators to assist their students in the development of resilience. According to these authors, resilience can be learned, and they advise educators to be innovative in finding new ways to guide students to a more resilient professional identity. This innovation requires reexamination of teaching/learning methods.

Often, teachers teach as they were taught. This is no longer effective with today's students. According to Hodges et al. (2005), teachers must create a partnership with students, often not possible in the traditional pedagogy used in nursing programs. Efforts must be redefined with a focus on engagement, which is a central theme in Parse's theory. Parse's theory transforms the educator's role into one of guide, where the faculty and student work together to create a dynamic relationship based on reflective knowledge. As co-participants in this journey, the faculty guide the discussions and together, with the student, co-create meaning together. Strategies proposed for application in the baccalaureate setting include: (a) reflective writing, (b) identifying assumptions, (c) storytelling, (d) values clarification, (e) faculty seeking to learn how students learn and what students know, (f) challenging assumptions, (g) visioning the future, and (h) team-building exercises that focus on emergent performance as group. The authors describe the resilient nurse as someone who can transform a disastrous day into a growth experience and move forward. Educators can emphasize skills that focus on solutions rather than problems. To do this, these strategies are introduced prior to and during difficult and challenging experiences to enhance students' ability to move forward and develop "survivors' pride", described as the "well-deserved feeling of accomplishment that results from persisting in the face of hardship or adversity" (p.552). Often, it is not immediately recognized and educators tend to focus on the adversities, not the resulting accomplishment. Students are better assisted by switching the focus to the success of overcoming through perseverance and stamina. As a result of these efforts, the authors explain that educators assist students to become nurses who stay in nursing,

respect themselves and others, respect their profession, like what they do, and transmit a better profession to the next generation.

Summary

This review of the literature examined the concept of resilience and the issues related to its development in adolescent baccalaureate nursing students. Consistent with Ahern's model of adolescent resilience, there is evidence that nursing students can be taught to develop or enhance their own personal resilience through interventions designed to decrease risk and/or increase protective factors. It is hoped increased resilience will enhance students' lives and professional identities, lead to greater academic success and satisfaction, improved health and well-being, and future career longevity. This study tests an intervention designed for this purpose.

CHAPTER III: MATERIALS AND METHODS

The purpose of this chapter is to provide a thorough description of the materials and methods used, including sources of data, data collection, and the analysis of the data. This chapter begins with a discussion of the philosophical worldview and fundamental assumptions guiding this research. Research questions are restated with corresponding hypotheses, followed by a discussion of the experimental research design and chosen method. After a description of the three measurement instruments, the sample and setting will be explained. Next, the data collection techniques and statistical analysis will be described in detail, followed by the ethical considerations for the study. I conclude this chapter with a brief discussion of the pilot testing of the demographics questionnaire and measurement instruments.

Philosophical Worldview

Post-positivism emerged as an attempt to overcome some of the elements of positivism that were deemed incompatible with research. Much of the criticism focused on the lack of both subjectivity and attention to social, spiritual, and interpretive aspects of the individual and their relationships (Clark, 1998). Like positivism, post-positivism is based on realism and the belief in universal truths. Post-positivists differ with their positivist counterparts by their assumption these universal truths may not be accessible to everyone, thus allowing for subjectivity (Weaver & Olson, 2009). Post-positivism has become the preferred empiricist view for nursing research based on its ability to link the observable with the unobservable to suggest causal factors (Gortner, 2009). This realist

perspective of science has a greater predictive value and allows for inclusion of both qualitative and quantitative methods (Clark, 1998). While the post-positivist view is seen in qualitative research, it is primarily quantitative in nature and often referred to as “scientific research” or the “scientific method” (Creswell, 2009). While positivists seek to verify hypotheses and replicate findings, post-positivists focus on the falsification of hypotheses and the establishment of probable truth (Weaver & Olson, 2009).

Post-positivism is both deterministic and reductionist. Creswell (2009) explains problems explored via a post-positivist worldview focus on the identification and assessment of causes that influence outcomes (e.g. experiments). These ideas are reduced into a smaller set of variables to be tested (e.g. hypotheses and research questions). This is accomplished through development of numerical measurements of the observations to verify or refine theory (Creswell, 2009), which makes the post-positivist view an appropriate choice for this study.

Research Questions and Hypotheses

The research questions and hypotheses are designed to reflect the experimental and descriptive nature of this study.

Research Questions

- (1) Is an educational intervention delivered via Twitter effective to increase resilience and sense of support, as well as decrease perceived stress, in a sample of adolescent baccalaureate nursing students?

- (2) What are the personal characteristics, including risks and protective factors, of this sample of students?

Hypotheses

H1: Students receiving the educational intervention will show a statistically significant increase in resilience scores and sense of support scores compared to students in the control group at posttest and follow-up measurements.

H0: There will be no significant difference in resilience scores and sense of support scores between the experimental and control groups at posttest and follow-up measurements.

H2: Students receiving the educational intervention will show a statistically significant decrease in perceived stress scores compared to students in the control group at posttest and follow-up measurements.

H0: There will be no significant difference in perceived stress scores between the experimental and control groups at posttest and follow-up measurements.

Assumptions

Several assumptions can be made based on the literature reviewed and Ahern's model of adolescent resilience. These assumptions combine various aspects of the model's primary concepts: risk, protection, and resilience.

1. Risk factors and protective factors are present throughout an individual's life.
2. Nursing students experience stress and adversity early in their clinical experiences.

3. Adolescent nursing students are vulnerable to negative effects of stress due to immature coping abilities and lack of experience in dealing with conflict.
4. Protective factors differ during different stages of development.
5. Resilience processes and developmental processes are interactive and endure over time with supportive environments.
6. Protective factors modify the response to hazards that carry a risk of adverse outcomes or buffer the impact of risk factors on the adolescent.
7. It is possible to enhance protective factors through interventions and thereby foster resilience.
8. Interventions that provide opportunities for the adolescent to develop skills and therefore increase their competence or build connections with school or community will enhance the adolescent's protective factors.

Research Design

This multisite study is a true experimental design with random assignment to conditions with pre-test, post-test, and follow-up measurements. It explores the effectiveness of a six-week educational intervention delivered via Twitter to increase resilience and social support and decrease perceived stress in a sample of adolescent baccalaureate nursing students. It also describes the personal characteristics (risks and protective factors) of this sample. A convenience sample of volunteer participants from two university colleges of nursing was randomly assigned to one of two groups: (1) experimental group, or (2) attention placebo control group. The control group received

the same number of tweets designed to mimic the time and attention given to the experimental group without intended effect or change.

The dichotomous independent variable is the subject's membership in either the experimental or control group. The three dependent variables (resilience, perceived stress, and sense of support) were measured at three times (baseline, post-test, and follow-up). A brief follow-up survey was sent via email using an online survey tool (SurveyMonkey) to assess the participants' opinions about the intervention.

Measurement Instruments

Demographics

The demographics questionnaire consisted of 27 items and was designed to verify inclusion criteria, describe the sample, and measure personal characteristics targeted for this population (individual risks and protective factors) (Appendix A). Questions included: school, class year, full-time status, email address, age, information regarding mobile phone/texting abilities, gender, race, marital/children status, type of high school education, current grade point average (GPA), employment status, sources of financial and emotional support, housing, social activities, study habits, religious preference, faith, and health behaviors. Items assessing health-risk behaviors were adapted from the Center for Disease Control's National College Health Risk Behavior Survey (Centers for Disease Control [CDC], 2009) and prior research. Descriptive statistics were computed for all variables for the total sample. Frequency counts and percentages describe categorical, nominally- and ordinal- scaled characteristics. Interval- and ratio-scaled

variables were summarized using measures of central tendency (mean and median) and dispersion (standard deviation and range).

Perceived Stress Scale

Perceived stress was measured using the 10-item Perceived Stress Scale (PSS, Cohen & Williamson, 1988) (Appendix B). Each item is rated on a five-point Likert-type scale, with responses ranging from 0 to 4 (*never to very often*). Total scores were obtained by reversing the scores on the four positive items (4, 5, 7, & 8) and summing across all items. Potential scores range from 0 to 40, with higher scores indicating greater perceived stress. The PSS measures the subjective evaluations of the stressfulness of situations experienced in the past month. The instrument has been used extensively with various populations, including college students. Good psychometric properties have been reported, including internal reliability of Cronbach's $\alpha = 0.88$ (Wilks & Croom, 2008), discriminant validity (Cohen, Kamarck, & Mermelstein, 1983), concurrent and predictive validity, and construct validity (Cohen & Williamson, 1988).

Sense of Support Scale

Sense of support was measured using the 21-item Sense of Support Scale (SSS, Dolbier & Steinhardt, 2000) (Appendix C). The SSS is a brief, concise tool designed to measure an individual's general perceived availability of the quantity and quality of social support (Frank-Stromberg & Olsen, 2004). Items are rated on a 4-point Likert-type scale, from 0 (not at all true) to 3 (completely true). Seven of the items are negatively worded to control for response bias and these items (4, 6, 12, 15, 18, 20, 21)

were reverse-scored. Potential scores range from 0-63, with higher scores indicating greater perceived sense of support. Item number 10 was modified with permission from the author to read “friends from school” to replace “friends from work” (permission granted from Steinhardt, September 21, 2011).

The authors report the instrument was developed to be “consistent with the newly conceptualized approach to social support as a general view of the social world” (Dolbier & Steinhardt, 2000, p. 177). It has been tested with undergraduate college students and has demonstrated good internal consistency (Cronbach’s $\alpha = 0.86$), test-retest reliability ($r = .91$), convergent validity with significant relationships to hardiness and approach-coping, and divergent validity by significant inverse relationships to avoidance-coping, perceived stress, and symptoms of illness. Concurrent validity was supported by significant relationships to two measures of social support (Social Provisions Scale = 0.72, and Interpersonal Support Evaluation List = 0.78), as well as their individual subscales (Dolbier & Steinhardt, 2000).

Connor-Davidson Resilience Scale

The total score of the Connor-Davidson Resilience Scale (CD-RISC, Connor & Davidson, 2003) was used to measure resilience for this study. Tested in the general population as well as clinical samples, the instrument has been shown effective in measuring resilience and assessing response to interventions. According to Tusaie and Dyer (2004), the CD-RISC has been used extensively with many populations to identify levels of resilience as well as quantify changes in resilience during therapy. Connor and

Davidson (2003), the scale's authors, credit several influential resources including: (a) Kobasa's work with the construct of hardiness, (b) Rutter's work on resilience, coping, adapting to change, stress, and problem-solving abilities, (c) Lyons' work on patience and the ability to endure stress or pain, and (d) Shackleton's work on faith and the spiritual component of resilience.

The CD-RISC is a 25-item self-report scale and items are rated on a five-point Likert scale (0-4). Participants were asked to choose the most appropriate rating (0-4) based on how he/she felt over the past month. The total score ranges from 0-100, with higher scores indicating greater resilience. Factor analysis yielded five factors consistent with the theoretical framework (Cronbach's alpha for total scale = 0.93). Factor I (items 24, 12, 11, 25, 10, 23, 17, & 16) indicates personal competence, high standards, and tenacity. Factor II (items 20, 18, 15, 6, 7, 19, & 14) is relevant to trust in one's instincts, tolerance of negative affect, and strengthening effects of stress. Factor III (items 1, 4, 5, 2, & 8) relates to the positive acceptance of change, and secure relationships. Factor IV (items 22, 13, & 21) relates to control. Factor V (items 3 & 9) relates to spiritual influences (Connor & Davidson, 2003).

Since its development in 2003, the scale has been widely used with many populations, including adolescents. In a review of instruments measuring resilience, Ahern, Kiehl, Sole, & Byers (2006) noted good internal consistency with Cronbach's alpha of .89 and good test-retest reliability, which is consistent with the authors' evaluation. Construct validity has been confirmed. Convergent validity has been assessed with other measures of perceived stress, hardiness, stress vulnerability,

disability, and social support (Connor & Davidson, 2003). Multiple studies have confirmed the CD-RISC's ability to predict and reflect responses to treatment indicating the scale is sensitive to change and confirming resilience as a quantifiable concept (Vaishnavi, Connor, & Davidson, 2007).

The scale was purchased directly from the authors and was used for this study according to the written terms of agreement (Appendix D). According to the agreement, the scale may not be published; therefore, it will not be included as an appendix to this document; however, the individual items comprising the scale are depicted in Appendix E.

Follow-Up Email Survey

A brief, three-item follow-up survey was sent via an online survey tool (SurveyMonkey) to all study participants to assess their opinions about the intervention (Appendix F). Two surveys, each containing the same content, were sent separately to each group to differentiate responses.

Pilot Testing of Instruments and Questionnaire

A pilot testing of the demographics questionnaire and measurement instruments was done with baccalaureate nursing students at a college of nursing not associated with either study site. Six volunteers, between the ages of 19 to 23, participated in this pilot test and provided valuable information. Of the six, all had active mobile phone accounts with text-messaging ability, and two had active Twitter accounts. Students were given a brief description of the purpose of the study and asked to complete the demographics

questionnaire and three measurement instruments and provide feedback on the readability of the forms and their comfort in answering the questions posed. These students were given the same instructions for completion of forms as planned for the actual study participants. All students completed all the instruments/questionnaire within 20 minutes and stated the questions were easy to read and understand. No student voiced concerns or discomfort with the subject matter or phrasing of the questions. When I reviewed the data, these issues were noted:

- Not all students included their assigned identification number on each page. This was noted as something to reinforce with study participants.
- One student did not include age on demographics form. This illustrated the need to ask students to check for completion of all questions prior to placing into envelope.
- Students were talking to each other during completion of forms and may have looked at each other's responses. This illustrated the need to ask students to utilize the cover sheets and to make use of any additional classroom space, as available, for privacy.
- Several students noted religion as "other – Baptist or Christian", ignoring the "Protestant" option. As a result, the demographics form was changed to include a clarifier for "Protestant".
- Several students noted employment hours, but did not include "employment" as part of financial support. This resulted in the demographics form being adapted to include a clarifier for these items.

Sample and Setting

Sample

Participants in this study were all junior-level baccalaureate nursing students enrolled full-time in a nursing program at one of two state-supported universities in Tennessee and currently enrolled in a clinical course. Based on inclusion criteria, participants were ages 19-23 and had an active mobile phone account with the ability to send/receive text messages. A preferred sample size ($N = 111$) was predetermined via a power analysis using the G*Power 3.1 software (Faul, Erdfelder, Lang, & Buchner, 2007) with medium effect size (0.30), $\alpha = .05$, power = 0.80, 2 groups, and 3 measurements.

Setting

The setting for this study included two universities in the southeastern United States, known as Institution One and Institution Two from this point forward. Institution One has a Carnegie designation of L4/R (large four-year, primarily residential), with a most recent reported enrollment of 444 undergraduate and 146 graduate nursing students (University of Tennessee Office of Institutional Research and Assessment, 2011). Institution Two has a Carnegie designation of L4/NR (large four-year, primarily nonresidential), with a most recent report of enrollment of 734 undergraduate and 250 graduate nursing students (East Tennessee State University Office of Planning and Institutional Effectiveness [ETSU PIE], 2011). Institution One reported 96 full-time, junior-level traditional baccalaureate nursing students enrolled at time of the study.

Institution Two reported 102 full-time, junior-level traditional baccalaureate nursing students enrolled at time of the study. Both nursing programs are designated as *colleges of nursing* and offer undergraduate, graduate, and doctoral nursing programs.

Recruitment and Enrollment

Following Institutional Review Board approval at both sites, I visited both universities within a one-week period, at the beginning of a regularly scheduled class, pre-arranged with appropriate administrative personnel and faculty, to recruit and enroll participants and collect baseline data. At both institutions, all junior-level baccalaureate nursing students meet together once or twice weekly for class, which granted me access to all junior students at the same time. The same procedure for enrollment and consent was used at both sites. A description of the study was given, including inclusion criteria, and students were invited to participate. Students agreeing to participate were moved to a separate section of the auditorium. Participants were given a study packet consisting of a pre-coded, sealable envelope containing a demographics form, three measurement instruments (PSS, SSS, and CD-RISC), and a cover sheet. The contents of the study packet are shown in Figure 3 and the front of the study packet is shown in Figure 4. The consent form (Appendix G) was attached to the outside of the envelope (Figure 5). The students were asked not to remove the contents of the envelope until the consent form was completed. They were given time to thoroughly read the consent form and ask questions. Signing of the consent form confirmed their agreement to be a participant in the study.

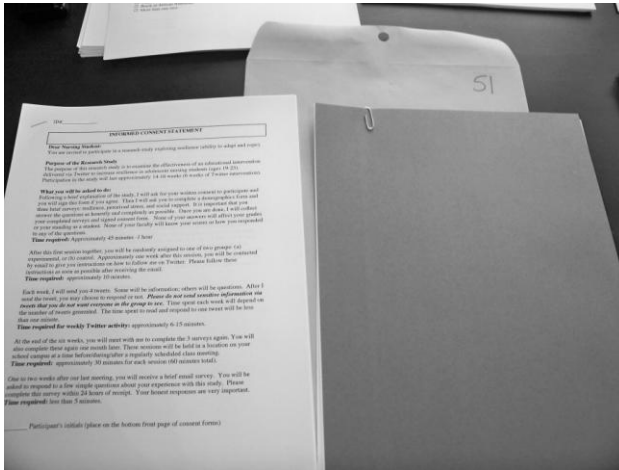


Figure 3. Contents of Study Packet.

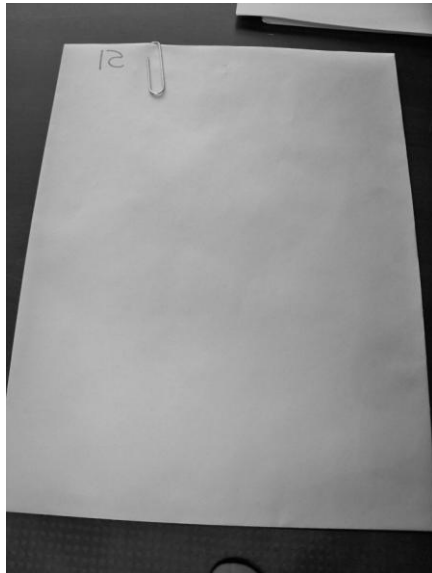


Figure 4. Front of study packet.

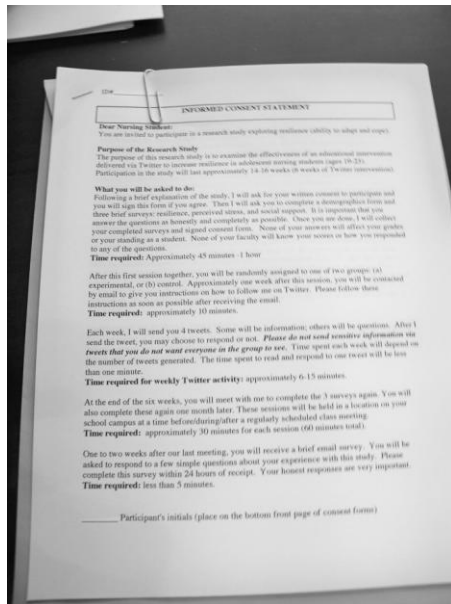


Figure 5. Consent form attached to study packet.

All participants were required to meet the following inclusion criteria: (a) full-time status at one of the two universities, (b) enrolled in a clinical course, (c) between the ages of 19-23, (d) currently have an active mobile phone account, (e) currently have the ability to send/receive text messages, and (f) have Twitter account or be willing to establish one prior to beginning of the study. Students were entered into the study upon signing of the consent form. Additionally, students were asked to provide a separate signature/date if they agreed to be contacted for future research studies. A computerized random number generator (www.randomizer.org) was used to randomly select half the participating students at each institution as the experimental group and half as the attention placebo control group.

Data Collection

Time One Data Collection

All research data were collected and maintained by me. After obtaining signed informed consent, participants were asked to write the code number (from envelope) on the consent form and place inside the envelope. They were then asked to remove the demographics questionnaire and three measurement instruments (PSS, SSS, and CD-RISC), write the same code on all pages of these forms, and to carefully read and answer all questions. Individual codes were used to link their name in a separate, password-protected database on my personal computer. Participants were provided pencils (if needed) and a cover sheet to protect their privacy while completing the forms/surveys. Students were encouraged to arrange their seating (as possible) to provide maximum privacy during data collection. I remained in the classroom to answer any questions and monitor the procedure. After completion of the measurement instruments, students were asked to: (1) make sure their identifier code was on all forms, (2) place all forms into the envelope, (3) seal envelope, and (4) return the sealed envelope to me. Study packets were secured by me and transported to my private home office in a locked portable file cabinet. Participants were given a copy of the study information sheet (Appendix H) and a list of available resources for their respective school (Appendix I) and encouraged to contact me with any questions and/or problems. I informed students to expect an email from me with Twitter instructions and to follow these as soon as possible after receiving the email. This procedure was completed at both universities within a one-week period.

Participants were emailed detailed Twitter instructions within 72 hours of randomization (Appendix J). This email contained information on how to follow me on Twitter and this information was also provided as an email attachment.

Time Two and Time Three Data Collection

Posttest (Time Two) and Follow-up (Time Three) data collections followed the same procedures as Time One, with the exception that participants did not complete another consent form or demographics questionnaire. Realizing students may not remember their code number, an index card bearing the name of participant and corresponding code number was attached by paperclip to the outside of the study packet. Study packets for Times Two and Three data collections are depicted in Figure 6.

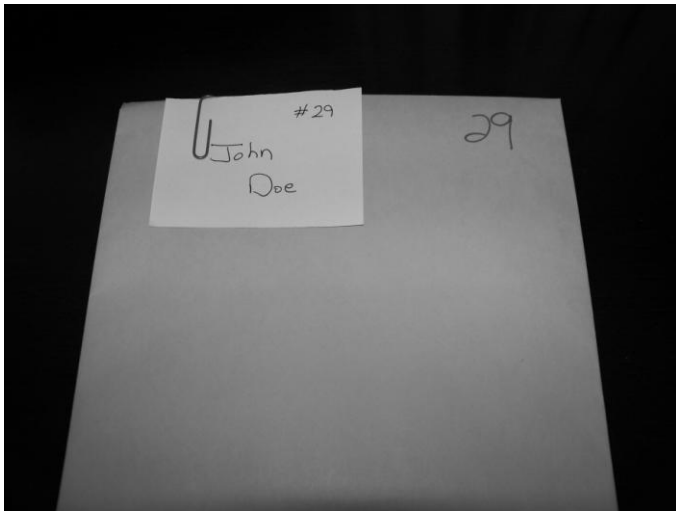


Figure 6. Study packet for Times Two and Three data collections.

The envelope and all three forms were precoded with the matching code number. Students were asked to verify that the name and number on the index card corresponded with those on the envelope and forms, and were instructed to remove the index card and place it inside the envelope with the completed forms prior to sealing the envelope. Index cards were separated from the forms after the data collection was complete. These sessions were coordinated with the undergraduate directors and faculty assigned to the respective classes and I was given time at the end of class for data collection. Prior to these sessions, a reminder email was sent to all participants reminding them of the data collection times/procedure and asking them to notify me if they would not be able to attend on the scheduled date/time.

Posttest (Time Two) data collection for both sites occurred within one week following the last tweet. Three students at Institution Two were unable to attend Time Two data collection at the scheduled time and a make-up time was arranged with students and faculty for that same week. The same procedure for data collection was used for this time as with all others. A total of six students (8.6%) did not complete data collection at Time 2, and a total of eight students (11.4%) did not complete data collection at Time 3.

Follow-up (Time Three) data collection for both sites occurred one month following Time Two data collection.

Follow-Up Survey

A follow-up survey was sent via SurveyMonkey, an online survey tool, immediately prior to Time Three data collection. This brief survey was used to obtain

participants' thoughts and opinions about the intervention. Students were encouraged to complete the survey by the Time Three data collection.

Intervention

Twitter, a form of social networking, was chosen as the delivery method for the six-week educational intervention. The following paragraphs will give additional information about the use of Twitter, followed by a detailed account of the intervention itself.

Twitter

Social media includes social networking sites such as Facebook and Twitter, as well as text messaging. Social networking has risen rapidly in popularity during the last few years and is seen as a useful means of communication within many disciplines (Hawn, 2009; Skiba, 2008). Many researchers use social media as a means of disseminating health information and as a delivery mode for behavioral interventions (e.g. smoking cessation). Social networking has been found to be a successful method of information delivery within the college age group due to its popularity and prevalence of use within this population (Junco et al., 2011).

Twitter is a free, social media, microblogging service that allows users to post and read 140-character status messages or "tweets" (Ovadia, 2009). According to the Pew Internet & American Life Project, a nonprofit organization that monitors people's technology-based habits, Twitter use is dramatically on the rise (Smith, 2011). According to their most recent report, 13% of online adults use Twitter, which is a

significant increase from the 8% identified as users in November 2010. Additionally, those in the age group 18 to 29 are the highest users of the service (18%), which makes it an appropriate choice for this study.

Junco et al. (2011) note Twitter has been found to be more amenable to an ongoing, public dialogue for this population than Facebook because of its microblogging characteristics in addition to its social networking capabilities. Their study explored the use of Twitter as part of an educational intervention related to student engagement. A total of 125 students enrolled in pre-health professional majors courses (seven sections) participated in this experimental study. Students randomly assigned to the experimental group received Twitter messages as a means of continuing class discussions and to offer a low-stress way to ask questions. In addition to these activities, students in the experimental group were also given four required Twitter assignments. Analysis of Twitter activity indicates students in the experimental group were motivated and actively engaged with thoughtful and meaningful conversation about course topics. The authors also note (a) improved contact between students and faculty, (b) cooperation among students, (c) promotion of active learning, (d) ability to provide prompt feedback, (e) maximization of time on task, (f) ability to communicate course expectations, and (g) respect for diversity. Results indicate Twitter is effective as an educational tool to help college students reach desired outcomes, which for their study included increased student engagement and improvement in grades.

Following on the heels of Junco et al. (2011), other researchers explored the effectiveness of Twitter as a pedagogical tool (Rinaldo, Tapp, & Laverie, 2011) and a

method to enhance student learning (Lowe & Laffey, 2011) within a marketing course. Findings from both of these studies report various benefits of the use of Twitter within the academic setting, but note its novelty may impede usage due to faculty reluctance to embrace the new technology because of their own inexperience. Both sets of researchers report Twitter's potential to increase student engagement, involvement, satisfaction, and academic performance, as well as better prepare them for the social media-rich work environment. They also report some of the problems experienced and offer recommendations to others using Twitter in future studies or as an academic tool. Many of their findings can be generalized to college students in general, including nursing students. Their findings will be compared to those of this study in greater detail in Chapter IV.

Scanfeld, Scanfeld, and Larson (2010) note the rapid growth of the use of Twitter with a 1460% increase in global audience between June 2008 and June 2009, with the majority of users between 18 and 34 years of age. In their review of the literature, they found 13 out of 14 studies on behavior change interventions delivered via mobile telephone short-message service reported positive behavior change outcomes. In their study examining the effectiveness of a smoking cessation program using mobile phone text messaging, Riley, Obermayer, and Jean-Mary (2008) recruited 31 daily smokers, ages 18-24, from a large public university in Washington, DC. Participants were sent one to three text messages per day, over a six-week period, which encouraged users to experiment with refraining from smoking in specific situations to increase self-efficacy and mastery over smoking urges. Six weeks after program initiation, 42% of participants

were abstinent, and continued smokers reported reduced smoking rates and nicotine dependence. The authors report the participants were highly in favor of the program delivery method and note it as a useful modality for the delivery of a range of health promotion interventions to college students and young adults.

While text messaging is still widely used as an effective intervention delivery method, Twitter was chosen as the mode of delivery for this study's intervention based on a review of recent publications on both forms of social media (Berkman, Dickenson, Falk, & Lieberman, 2011; Bristol, 2010; Cole-Lewis & Kershaw, 2010; Obermayer, Riley, Asif, & Jean-Mary, 2004; Riley, Obermayer, & Jean-Mary, 2008; Richardson, Littrell, Challman, & Stein, 2011). Reasons for choosing Twitter include: (1) It is free and easily accessible; (2) It is more amenable to an ongoing, interactive dialogue (Ebner, Lienhardt, Rohs, & Meyer, 2010); (3) Accounts can be created for individuals or groups and adapted for privacy of content; (4) It can be used with a simple mobile phone and does not require a web browser or applications; (5) It can be accessed by mobile phone or computer; (6) Accounts are easier and quicker to establish than a Facebook account (Tagtmeier, 2010); and (7) It allows senders to include links to web-based media.

Experiment

Two protected Twitter accounts (Research Group 0 and Research Group 1) for the control and experimental groups, respectively, were created and maintained on two separate user accounts on my personal password-protected computer. A protected account allows strict privacy settings to be established so the account owner approves

every person who may view that account's tweets. Additionally, while general Twitter accounts allow followers to "retweet" (forwarding the tweet to other users outside that account's followers), a protected account prohibits this action. Protected accounts also provide an extra measure of privacy so only those the account owner approves can "follow" him/her. To do this, I sent an email invitation to participants asking them to "follow me" on the respective account. When they did this, I received a notification email and was able to "approve" them as a follower of that account.

After much trial and error in establishing practice Twitter accounts and practice runs of the intervention, I determined it would be more efficient and easier to maintain privacy and separation of groups if both Twitter accounts were linked to private user accounts, each with their own private email address, etc. This assured I would not inadvertently send a resilience intervention tweet to the wrong Twitter group and vice versa. It also assured the research Twitter accounts would not be confused with any of my personal social media accounts linked to other email addresses. While each action with each group required me to log out of my personal account and into the appropriate research group account, it gave me a sense of security and assurance in maintaining privacy and confidentiality for study purposes.

The educational intervention began after all participants were sent an email with detailed Twitter instructions and given time (within two weeks) to establish a Twitter account and follow their assigned group (experimental or control). Participants were provided my contact information, including cell phone number and email address and encouraged to contact me with any questions, concerns and/or problems in establishing

their Twitter account. The six-week timeframe was based on subject/site availability and literature reviewed on the use of Twitter as an education delivery method with college students.

Students in the experimental group received four educational messages and/or questions (tweets) each week that were designed to promote resilience. Students in the attention placebo control group received four tweets that mimicked the time and attention given to the experimental group without intended effect. These tweets consisted of nursing trivia or questions related to basic nursing knowledge. Tweets to the control group were designed to mimic the style of those sent to the experimental group (e.g. questions or statements). Tweets were sent on varying days of the week and at varying times to avoid a predictable schedule. Participants were told they may choose to respond or not to any of the tweets and that I would not be participating in any conversations beyond issuing the four weekly tweets. Participants were instructed to limit private information to email or telephone communication methods and to not tweet anything they would not want the entire group to see. While the contents of the replies to tweets are not discussed in this study, this information was gathered for use in a possible future study. I monitored the Twitter activity on a daily basis and kept a detailed record of all tweets sent by me and replies initiated by students.

The intervention was loosely based on the National Center for Victims of Crime (NCVC, 2011) Virginia resilience project, *Reach In. Reach Out. Finding Your Resilience*. Information delivered to the experimental group via Twitter focused on enhancing protective factors found to be important in the development and/or enhancement of

resilience: (1) social support, (2) positive emotions, (3) humor, (4) knowledge of health behaviors, (5) self-knowledge, and (6) effective coping. Some tweets asked participants to reflect on/respond to questions, while others gave information relating to that week's theme. A detailed account of the Twitter script is provided in Appendix K.

Data Analysis

All data were screened for accuracy and assessed for distributions and missing items. Data analysis occurred via use of the SPSS Version 19.0 and reviewed for accuracy by myself and a statistical expert on the dissertation committee, as well as one statistical consult from the University of Tennessee. Descriptive statistics were computed for all variables for the total sample, including demographics. Frequency counts and percentages were used to describe categorical, nominally- and ordinal- scaled characteristics. Interval- and ratio-scaled variables were summarized using measures of central tendency (mean and median) and dispersion (standard deviation and range). Multilevel modeling (MLM) was used to describe the relationships between groups and within subjects across time in the longitudinal dataset. Repeated measures of the Connor-Davidson Resilience Scale (CD-RISC), Perceived Stress Scale (PSS), and Sense of Support Scale (SSS) were taken at baseline (Time 1), post-test (Time 2), and follow-up (Time 3). MLM allows for group means as fixed effects while simultaneously modeling for individual subject variables as random effects. A significance level of 0.05 or less was accepted for this study. Descriptive statistics were used to describe the personal characteristics (risks and protective factors) of all participants. The follow-up survey was

sent to all participants via an online survey tool (SurveyMonkey.com). Content analysis was used to analyze the survey data.

According to Krueger and Tian (2004), MLM can be used to describe nonlinear relationships across time in a longitudinal dataset with multiple missing data points. This method was chosen over the repeated measures analysis of variance (RM ANOVA) because the MLM can accommodate flexible time schedules, missing data points and because of its emphasis on patterns of change. It also has the ability to: (1) characterize group and individual behavior, (2) acknowledge both group and individual differences, and (3) incorporate additional covariates (Krueger & Tian, 2004). While efforts were taken to prevent missing data points by scheduling data collection sessions around regularly scheduled class meeting times, it was expected that some students might miss one of these sessions and/or leave some items blank on the instruments/questionnaire. Nine items (Time 2) and one item (Time 3) were determined to be missing at random and were replaced via missing value imputation methods using the expectation maximization (EM) approach. Munro (2005) defines a random pattern as “values missing in an unplanned or haphazard fashion throughout the dataset” (p. 58). The EM method was used to compute missing values for the appropriate scale at the specified time for the missing items. Imputed values were rounded to the nearest whole number and the maximum likelihood estimation was computed as though there were no missing data. The follow-up email survey was analyzed via content analysis.

Study Considerations

In experimental design research, it is important to control variances and extraneous influences on the study. Four issues were considered in planning and conducting this study: bias, manipulation, control, and validity (internal and external).

Bias

Bias was controlled by: (a) selecting the appropriate instruments, (b) random sampling, (c) use of a Twitter script, (d) use of pre-designed intervention plan, and (e) strict adherence to plan and study design.

Manipulation

Following baseline data collection, participants were randomly assigned to one of two groups: (a) experimental, or (b) attention placebo control. Random assignment was done by a computer-generated randomization of the identifier codes, which allowed the cause-and-effect relationship between the independent and dependent variables to be examined.

Control

Random assignment and the use of a control group was used to eliminate subject bias and contribute to equivalence of groups. Half the students from each site were randomly assigned to the experimental group and the other half to the control group. As a result, both groups included students from both sites to contribute to homogeneity within groups.

Threats to Validity

Internal validity refers to the ability to accurately attribute the results of the study to the action of the independent variable (Wood & Ross-Kerr, 2011). For this study, random assignment of participants to groups should minimize threats to internal validity. Potential threats to internal validity in this study include a testing effect and experimental mortality. With repeated measures, it is possible for participants to become familiar with the instruments and remember their previous responses creating a potential testing effect. Also, certain items on a questionnaire may increase an individual's sensitivity to certain issues, which may affect his/her responses (Tappen, 2011). I controlled for this by not repeating the measurements until the end of the study and participants were instructed to base their responses on their current or most recent state (depending on instrument instructions).

Experimental mortality refers to the differences that may occur due to the loss of subjects in the treatment group compared to the control group (Tappen, 2011). In this study, six participants did not complete the data collection at Time 2 (three from the control group and three from the experimental group), and eight participants did not complete the data collection at Time 3 (three from the experimental group and five from the control group). Two participants did not complete the data collection because they dropped out of the nursing program and another student stated she never took the time to set up her Twitter account. The other students did not give a reason for not completing the data collection.

External validity refers to the ability to generalize the findings of the study to the target population (Wood & Ross-Kerr, 2011). The small sample size, limited geographic region, and the timing of the measurements may limit this study's generalizability.

An additional limitation of this study is the inability to control for students' participation in the intervention (intervention fidelity). Twitter was chosen as the intervention delivery method based on the literature reviewed showing it as an effective and well-received method for the college-aged population. While students were encouraged to have their Twitter account linked to their mobile phone account (to assure immediate delivery of tweets and encourage the reading of the tweets) and to read all tweets, it is not known if this was done and/or if all participants read all tweets.

Protection of Human Subjects

Verbal approval was obtained from the appropriate administrative personnel at both universities early in the planning process. Letters of support were provided by the Director of the undergraduate nursing program (Institution One) and the Dean of the college of nursing (Institution Two) two months prior to initiating steps for IRB approval. IRB approval was granted by both institutions prior to the recruitment of participants and any data collection. Data collection sessions (Times 1, 2, and 3) were scheduled to coincide with regularly scheduled class meetings to respect the participants' time. Written informed consent was obtained from all participants prior to initiation of the intervention. The consent form was explained in its entirety and time was allowed for questions. Participants were informed: (a) there were minimal risks from participating in the study, (b) their participation was completely voluntary, (c) they could refuse to

participate, and (d) they could withdraw from the study, without consequence, at any time for any reason. Each participant was given a study information sheet containing contact information for myself and the compliance officer within the office of research at Institution One.

Confidentiality

Participants were assured of the use of rigorous procedures to protect their confidentiality to the full extent of the law. Confidentiality was maintained by identity coding with all data securely maintained on my password-protected computer in my secured, private home office during the course of the study. All email communication sent to participant groups (e.g. experimental or control) utilized blinded names. After completion of the study, data will be securely maintained in the dissertation chair's office for three years and then destroyed. Subject names and any other personal identifiers linked to data will be purged as soon as feasible. Participants were informed that no personal or identifying data would be shared with anyone not approved for access, including faculty; and choosing to participate or not to participate would not affect their grades or student standing in any way. Participants were asked for permission for me to contact them for future potential studies. Those agreeing to this signed and dated a separate section on the consent form. Participants were informed their signature does not obligate them to participate in any future research studies.

Incentives and Benefits

Participants were informed that they might experience increased resilience, increased sense of support, and/or decreased stress, but no benefit could be guaranteed. A \$10 Wal-Mart gift card was provided to participants at the conclusion of the study as compensation for their time. As an additional incentive to participate, students were encouraged to note their participation in a research study in their student portfolio and on their resumes and job/graduate school applications.

Risks

While this study posed minimal risks to participants, some students may have realized the need to improve or enhance certain personal characteristics and/or health behaviors based on the information they received during the intervention. This may have resulted in embarrassment or the desire to change certain aspects of his/her life. No student disclosed personal information that caused me concern or indicated the student was experiencing emotional and/or physical distress. In preparation for these possibilities, students were provided a list of available resources for each site.

CHAPTER IV: RESULTS

The results of the study are detailed in this chapter, beginning with a restatement of the research questions. A detailed description of the sample follows, including characteristics relevant to the study of resilience (e.g. risks and protective factors). Multilevel modeling and measures used in this study are described. Results are presented, along with any additional results of note.

Research Questions

This study seeks to answer the following questions: (1) Is an educational intervention delivered via Twitter effective to increase resilience and sense of support and decrease perceived stress in this sample of adolescent baccalaureate nursing students?, and (2) What are the personal characteristics, including risks and protective factors, of this sample of students?

Description of Sample

The sample consisted of 70 junior-level, full-time, baccalaureate nursing students from two state-supported universities in the southeastern United States, Institution One and Institution Two. Based on inclusion criteria, participants were ages 19-23, enrolled full-time, and currently enrolled in a clinical course. Thirty-six students from Institution One and 34 students from Institution Two agreed to participate in the study. Participants were randomly assigned via a computer-generated randomizer (www.randomizer.org) to one of two groups: experimental ($n = 35$) or attention placebo control ($n = 35$). Half of

the participants from Institution One were randomly assigned to the experimental group and half to the control group. The same procedure was followed at Institution Two.

Of the experimental group, 18 (51.4%) were from Institution One and 17 (48.6%) were from Institution Two. Of the control group, 18 (51.4%) were from Institution One and 17 (48.6%) were from Institution Two. There were three times of testing: Time One (T1), Time Two (T2), and Time Three (T3). Time 1 was the collection of demographics and pre-testing of all three instruments for both groups. Time 2 was post-test measurement of all three instruments for both groups. Time 3 was a follow-up measurement of all three instruments for both groups.

All 70 participants completed T1 data collection. A total of 61 participants completed data collection at all three times (87.14%). A total of six students did not participate in T2 data collection, three from the experimental group (8.6%) and three from the control group (8.6%). A total of eight students did not participate in T3 data collection, three from the experimental group (8.6%) and five from the control group (14.2%). One student not completing T2 completed T3 data collection. Missing values analysis (MVA) for all three dependent variables at all three times of measurement was done to observe any patterns of missing data and determined them to be missing completely at random (MCAR). Patterns of missing values for PSS are shown in Table 1 (Time 2) and Table 2 (Time 3). Patterns of missing values for SSS are shown in Table 3 (Time 1), Table 4 (Time 2), and Table 5 (Time 3). Patterns of missing values for CD-RISC are shown in Table 6 (Time 1), Table 7 (Time 2), and Table 8 (Time 3). There were no missing values for PSS at Time 1, so no table is provided.

Table 1
Patterns of Missing Values for PSS at Time 2

[illegible]

a. Variables are sorted on missing patterns.

b. Number of complete cases if variables missing in that pattern (marked with X) are not used.

Table 2
Patterns of Missing Values for PSS at Time 3

[illegible]

Table 3

Patterns of Missing Values for SSS at Time 1

Number of Cases	Missing Patterns ^a														
	SSS2t	SSS3t	SSS4t	SSS6t	SSS7t	SSS8t	SSS9t	SSS10	SSS11	SSS12	SSS13	SSS14	SSS15	SSS16	SSS17
	1	1	1	1	1	1	1	t1	t1	t1	t1	t1	t1	t1	t1
68															
1															
1															

Number of Cases	Missing Patterns ^a						Comple te if ... ^b
	SSS18t	SSS19t	SSS20t	SSS21t	SSS1t1	SSS5t1	
68	1	1	1	1			68
1					X		69
1					X		69

Table 4

Patterns of Missing Values for SSS at Time 2

Number of Cases	Missing Patterns ^a														
	SSS1t	SSS2t	SSS3t	SSS4t	SSS5t	SSS6t	SSS7t	SSS8t	SSS9t	SSS10	SSS11	SSS12	SSS13	SSS14	SSS15
	2	2	2	2	2	2	2	2	2	t2	t2	t2	t2	t2	t2
64															
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Number of Cases	Missing Patterns ^a						Comple te if ... ^b
	SSS16t	SSS17t	SSS18t	SSS19t	SSS20t	SSS21t	
	2	2	2	2	2	2	
64							64
6	X	X	X	X	X	X	70

Table 5

Patterns of Missing Values for SSS at Time 3

	Missing Patterns ^a														
Number of	SSS1t	SSS2t	SSS3t	SSS4t	SSS5t	SSS6t	SSS7t	SSS8t	SSS9t	SSS10	SSS11	SSS12	SSS13	SSS14	SSS15
Cases	3	3	3	3	3	3	3	3	3	t3	t3	t3	t3	t3	t3
62															
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

	Missing Patterns ^a						Comple te if ... ^b
	SSS16t	SSS17t	SSS18t	SSS19t	SSS20t	SSS21t	
Number of Cases	3	3	3	3	3	3	
62							62
8	X	X	X	X	X	X	70

Table 6

Patterns of Missing Values for CD-RISC at Time 1

Number of Cases	Missing Patterns ^a														
	CDRS 1t1	CDRS 2t1	CDRS 3t1	CDRS 4t1	CDRS 5t1	CDRS 6t1	CDRS 8t1	CDRS 9t1	CDRS 10t1	CDRS 11t1	CDRS 12t1	CDRS 13t1	CDRS 15t1	CDRS 17t1	CDRS 18t1
67															
1															
1															
1															

Number of Cases	Missing Patterns ^a										Comple te if ... ^b
	CDRS1 9t1	CDRS2 1t1	CDRS2 2t1	CDRS2 3t1	CDRS2 4t1	CDRS2 5t1	CDRS7t 1	CDRS1 6t1	CDRS2 0t1	CDRS1 4t1	
67											67
1										X	68
1									X		68
1							X	X			68

Note. CDRS = CD-RISC

Table 7

Patterns of Missing Values for CD-RISC at Time 2

Number of Cases	Missing Patterns ^a														
	CDRS 1t2	CDRS 2t2	CDRS 3t2	CDRS 4t2	CDRS 5t2	CDRS 6t2	CDRS 7t2	CDRS 8t2	CDRS 9t2	CDRS 10t2	CDRS 12t2	CDRS 13t2	CDRS 14t2	CDRS 15t2	CDRS 17t2
61															
1															
1															
1															
6	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Number of Cases	Missing Patterns ^a										Complete if ... ^b
	CDRS1 8t2	CDRS1 9t2	CDRS2 0t2	CDRS2 2t2	CDRS2 3t2	CDRS2 4t2	CDRS2 5t2	CDRS1 6t2	CDRS2 1t2	CDRS1 1t2	
61											61
1										X	62
1									X		62
1								X			62
6	X	X	X	X	X	X	X	X	X	X	70

Note. CDRS = CD-RISC

Table 8

Patterns of Missing Values for CD-RISC at Time 3

Number of Cases	Missing Patterns ^a														
	CDRS 1t3	CDRS 2t3	CDRS 3t3	CDRS 4t3	CDRS 5t3	CDRS 6t3	CDRS 7t3	CDRS 8t3	CDRS 9t3	CDRS 10t3	CDRS 11t3	CDRS 12t3	CDRS 13t3	CDRS 14t3	CDRS 15t3
61															
1															
8	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Number of Cases	Missing Patterns ^a										Comple te if ... ^b
	CDRS1 6t3	CDRS1 7t3	CDRS1 8t3	CDRS1 9t3	CDRS2 0t3	CDRS2 2t3	CDRS2 3t3	CDRS2 4t3	CDRS2 5t3	CDRS2 1t3	
61											61
1										X	62
8	X	X	X	X	X	X	X	X	X	X	70

Note. CDRS = CD-RISC

A dichotomous variable (Datacomp) was created to analyze data for the participants who completed all three times of data collection (1) and those who did not complete all three times of data collection (0). This variable was used in a *t*-test to see if these groups differed at pretest on any of the three dependent variables (DV). No statistically significant differences were observed for any of the measurements. Results of the *t*-test for the PSS were $t(68) = 2.88, p = .63$, for the SSS were $t(68) = 1.78, p = .85$, and the CD-RISC were $t(68) = .58, p = .78$.

The mean age for the total sample was 20.9 years ($SD = 0.95$). The sample was predominately white, $n = 69$ (98.6%), with one black/African American participant (1.4%), and female, $n = 62$ (88.6%). The majority of the sample participants were single, $n = 64$ (91.4%), with the remaining six identified as “married” (8.6%). Two participants (2.9%) had children. Table 9 compares control and experimental groups on age.

Table 9

Age Comparisons by Group

		Age					Total
		19	20	21	22	23	
Control	Count	1	14	13	4	3	35
	% of Total	1.4%	20.0%	18.6%	5.7%	4.3%	50.0%
Experimental	Count	0	12	15	5	3	35
	% of Total	.0%	17.1%	21.4%	7.1%	4.3%	50.0%
Total	Count	1	26	28	9	6	70
	% of Total	1.4%	37.1%	40.0%	12.9%	8.6%	100.0%

An independent samples *t*-test was used to determine if there were statistically significant differences between the experimental and control groups on age. Results indicate there were no statistically significant differences, $t(68) = .47, p = .49$. Chi-square analysis was used to determine if there were statistically significant differences between control and experimental groups on race and gender. DePoy and Gitlin (2005) explain the Chi-square test is the nonparametric analog of the *t*-test and appropriate when seeking to evaluate group differences with nominal data. According to the chi-square analysis, there were no statistically significant differences between control and experimental groups on race, $\chi^2(1, N = 70) = 1.01, p = .31$; and there were no statistically significant differences between control and experimental groups on gender, $\chi^2(1, N = 70) = .56, p = .45$. A summary of sample demographic attributes of gender and race for control and experimental groups is provided in Table 10.

Table 10

Race and Gender Comparisons by Group

	Control				Experimental			
	Male	Female	Black	White	Male	Female	Black	White
Frequency	3	32	1	34	5	30	0	35
Percent	8.6%	91.4%	2.9%	97.1%	14.3%	85.7%	0%	100%

High School Education

Participants were asked to indicate the type of high school education they had prior to entering college. The majority of participants attended a public high school ($n = 48$, 68.6%). The remainder indicated they attended a private high school ($n = 14$, 20%), participated in dual enrollment in both high school and college courses ($n = 7$, 10%), and one participant (1.4%) noted participation in a combination of both public and private high school as well as dual enrollment.

Employment and Participation in Extracurricular Activities

Participants were asked to identify their participation in extracurricular activities and employment status. The majority of students indicated they participate in church activities ($n = 43$, 61.4%), followed by volunteer/service activities ($n = 38$, 54.3%), and a club/organization ($n = 36$, 51.4%). A detailed summary of the responses is provided in Table 11. The total number of activities was calculated for each participant, with a possible score of 0-7 (range = 5, mean = 2, SD = 1.14). The majority of participants indicated they are not employed ($n = 36$, 51.4%), with 21 (30%) responding they work 1-10 hours/week, nine (12.9%) working 11-20 hours/week, and four (5.7%) working more than 20 hours per week.

Table 11

Participation in Extracurricular Activities

	Count	Percentage
Sports	3	4.3%
Club/organization	36	51.4%
Church	43	61.4%
Music/Art/Theatre	2	2.9%
Volunteer/Service	38	54.3%
Other Community	12	17.1%
Other Academic	10	14.3%

Study Habits and GPA

Participants were asked to indicate the number of hours per week (on average) they spent studying and working on homework and asked to list their current grade point average (GPA). The mean GPA was 3.56 (*Mdn* = 3.53, *Range* = .65, *SD* = .18). The majority of students (*n* = 36, 51.4%) indicated they spend 11-20 hours per week (on average) on schoolwork. A detailed summary of the study habits is provided in Table 12.

Table 12

Study Habits

Study Habits	Frequency	Percentage
1-10 hours per week	24	34.3%
11-20 hours per week	36	51.4%
More than 20 hours per week	10	14.3%

Living Situation

Participants were asked to indicate whether they lived on or off campus and with whom they resided. The majority of participants lived off campus ($n = 59$, 84.3%). Most lived with a friend/roommate ($n = 47$, 67.1%), followed by nine who lived alone (12.9%), eight living with a spouse/significant other (11.4%), five with parents/family (7.1%), and one living in a fraternity/sorority house (1.4%).

Health Risk Behaviors

Health risk behaviors (HRB) were self-identified by students on the demographics questionnaire. Students were asked to select from a list of ten behaviors, with positively worded items reverse scored to create a total number of health risk behaviors (range = 0-10), with higher values indicating more risk. As previously noted, these behaviors were selected and adapted from the CDC College Health Risk Behavior Survey and current evidence on nursing student behaviors/risks to reflect commonly noted HRBs of nursing students. Table 13 lists the 10 behaviors and their corresponding response totals and percentages for the sample. Table 14 shows the descriptive statistics for the total number of health risk behaviors for this sample of students.

Table 13

Health Behaviors by Count and Percentage

	Count	Percentage
Smoke cigarettes or use other forms of tobacco	1	1.4%
Sleep at least 7 hours/night (on average)	45	64.3%
Eat breakfast every day	38	54.3%
Exercise at least 3 times per week, 20-30 minutes per session	34	48.6%
Consistently wear seatbelt when riding/driving in a car	61	87.1%
Have time to relax at least 20-30 minutes each day	49	70.0%
Drink more than 2 alcoholic beverages per day (including beer)	0	.0%
Use street drugs (even if occasionally), including marijuana	0	.0%
During the past month, have had unprotected sex with someone outside committed relationship	2	2.9%
During the past month, have ridden in a car in which the driver (you or someone else) had been drinking alcohol	12	17.1%

Table 14

Health Risk Behaviors Descriptives

	N	Minimum	Maximum	Mean	Median	Std. Deviation
HRBTtotal	70	0	6	1.97	2.00	1.142

Support

In addition to the SSS instrument measurements, participants were asked to provide additional information related to their sources of financial and emotional support. These were totaled to represent the number of sources of support for that individual, with a possible range of 0-6 (financial) and 0-8 (emotional). The majority of participants

noted they rely on parents/family ($n = 59$, 84.3%) and scholarships ($n = 57$, 81.4%) for financial support. The majority of participants indicated they rely on friends/classmates ($n = 67$, 95.7%) followed closely by parents ($n = 66$, 94.3%) for emotional support. The mean number of sources of emotional support was 3.56 and mean number of sources of financial support was 2.66. Sources of financial support are depicted in Table 15 and sources of emotional support in Table 16. Descriptive statistics for sources of support are shown in Table 17.

Table 15

Sources of Financial Support

	Count	Percent
Grants	13	18.6%
Loans	28	40.0%
Work-study	5	7.1%
Scholarship	57	81.4%
Parental/Family	59	84.3%
Employment	24	34.3%

Table 16

Sources of Emotional Support

	Count	Percent
Parent(s)	66	94.3%
Other family members	40	57.1%
Friends/classmates	67	95.7%
Spouse/significant other	39	55.7%
Teacher/professor	8	11.4%
Coach	3	4.3%
Pastor/clergy/minister	16	22.9%
Other adult	12	17.1%

Table 17

Descriptive Statistics for Sources of Support

	N	Minimum	Maximum	Mean	Std. Deviation
EmotSupTotal	70	1.00	7.00	3.5857	1.30209
FinanSupTotal	70	1.00	5.00	2.6571	1.03400

Personal Tragedy, Religious Status, and Faith

The majority of participants ($n = 36$, 51.4%) indicated they have experienced a personal tragedy/trauma. Participants were asked to indicate their religious status and the level of their dependence on spiritual faith when facing stress or problems in their life.

The majority of participants indicated they are of the Protestant faith ($n = 62$, 88.6%),

followed by Catholic ($n = 5$, 7.1%), Other ($n = 2$, 2.9%), and Jewish ($n = 1$, 1.4%). When facing stress or problems, 42.9% of the participants ($n = 30$) indicated they “always” rely on spiritual faith, followed by “most of the time” ($n = 25$, 35.7%), “sometimes” ($n = 14$, 20%), and “never” ($n = 1$, 1.4%).

Dependent Variables

All three instruments used to measure the dependent variables have been used extensively and proven to have good psychometric properties in previous research. Internal consistency reliability of these instruments was evaluated for this study by calculating Cronbach’s alpha using Time 1 measurements. Frank-Stromberg and Olsen (2004) explain this measure of internal consistency is used to determine the extent to which “performance on any one item in an instrument indicates performance on any other item in that instrument” (p. 8). These authors note the importance of recalculating these coefficients each time an instrument is used, especially if on a different population, to verify the instrument’s quality and aid in appropriate interpretation of the data. Cronbach’s alpha reliability coefficient can range from 0 to 1, with values closer to 1 indicating greater internal consistency. According to Nunnally and Bernstein (1994), a Cronbach’s alpha of .70 indicates a modest degree of homogeneity. Item-total statistics were calculated to reveal the relationship of each item to the overall scale. The corrected item-total correlation and the alpha if item deleted measures are reported to indicate the correlation between an item and the total score excluding that particular item and the change in Cronbach’s alpha if the item is deleted, respectively.

Perceived Stress Scale (PSS)

As previously noted, the Perceived Stress Scale (PSS) is a 10-item, five-point Likert-type scale. Item responses range from 0 to 4 (*never* to *very often*), with items 4, 5, 7, and 8 reverse scored. Scores are obtained by summing across all items, with potential scores ranging from 0 to 40, with higher scores indicating greater perceived stress. This instrument has been used extensively with various populations, including college students, with good psychometric properties. Cronbach's alpha for the entire instrument was .87. Item-total statistics (Corrected Item-Total Correlation and Cronbach's alpha-if-deleted values) for the PSS at Time 1 is depicted in Table 18.

Table 18

PSS Item-Total Statistics Time 1 (N = 70)

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
PSS1t1	.69	.85
PSS2t1	.66	.85
PSS3t1	.44	.87
PSS4t1	.45	.87
PSS5t1	.51	.86
PSS6t1	.71	.85
PSS7t1	.55	.86
PSS8t1	.56	.86
PSS9t1	.59	.86
PSS10t1	.72	.85

Note: PSS is the Perceived Stress Scale, followed by each individual item number each at Time 1.

Sense of Support Scale (SSS)

As noted in previous chapters, the SSS is a 21-item, 4-point Likert-type scale designed to measure an individual's general perceived availability of the quantity and quality of social support (Frank-Strombert, & Olsen, 2004). Items are rated 0 to 4 (*not at all true to completely true*), with seven items (4, 6, 12, 15, 18, 20, 21) reverse-scored. Potential scores range from 0-63, with higher scores indicating greater perceived sense of support. Cronbach's alpha for the entire instrument at Time 1 was .87. Item-total statistics (Corrected Item-Total Correlation and Cronbach's alpha-if-deleted values) for the SSS at Time 1 is depicted in Table 19.

Table 19

SSS Item-Total Statistics Time 1 (N = 70).

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
SSS1t1	.394	.863
SSS2t1	.606	.855
SSS3t1	.548	.857
SSS4t1	.309	.867
SSS5t1	.613	.859
SSS6t1	.517	.858
SSS7t1	.226	.872
SSS8t1	.570	.859
SSS9t1	.361	.866
SSS10t1	.656	.855
SSS11t1	.722	.854
SSS12t1	.210	.870
SSS13t1	.592	.856
SSS14t1	.487	.860
SSS15t1	.419	.862
SSS16t1	.319	.864
SSS17t1	.596	.857
SSS18t1	.494	.859
SSS19t1	.531	.859
SSS20t1	.541	.858
SSS21t1	.650	.857

Note. SSS is the Social Support Scale, followed by each individual item number each at Time 1

Connor-Davidson Resilience Scale (CD-RISC)

As previously noted, the CD-RISC is a 25-item self-report scale using a five-point Likert scale (0-4). Participants were asked to choose the most appropriate rating (0-4) based on how he/she felt over the past month. The total score ranges from 0-100, with higher scores indicating greater resilience. Cronbach's alpha for the entire instrument at Time 1 was .93. Item-total statistics (Corrected Item-Total Correlation and Cronbach's alpha-if-deleted values) for the SSS at Time 1 is depicted in Table 20.

Table 20

CD-RISC Item-Total Statistics Time 1 (N = 70).

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
CDRS1t1	.725	.920
CDRS2t1	.284	.926
CDRS3t1	.352	.926
CDRS4t1	.674	.920
CDRS5t1	.567	.922
CDRS6t1	.608	.922
CDRS7t1	.536	.923
CDRS8t1	.664	.921
CDRS9t1	.493	.923
CDRS10t1	.477	.924
CDRS11t1	.578	.922
CDRS12t1	.593	.922
CDRS13t1	.609	.922
CDRS14t1	.615	.921
CDRS15t1	.388	.926
CDRS16t1	.686	.920
CDRS17t1	.748	.920
CDRS18t1	.481	.924
CDRS19t1	.596	.922
CDRS20t1	.522	.923
CDRS21t1	.607	.922
CDRS22t1	.524	.923
CDRS23t1	.451	.924
CDRS24t1	.651	.921
CDRS25t1	.519	.923

Note. CDRS is the Connor-Davidson Resilience Scale, followed by each individual item number each at Time 1

Instrument Correlations

The Pearson product-moment correlation (Pearson r) was used to determine the strength and direction of the relationship between the three variables explored in this study (PSS, SSS, and CD-RISC). According to DePoy and Gitlin (2005), these relationships may be positive, negative, or zero (no linear relationship). A positive correlation indicates the numerical values of both variables will increase or decrease in the same direction. A negative correlation indicates the values for one variable increases as the values for the other decreases. These directions are indicated by a positive (+) or negative (-) sign. The magnitude or strength of the relationship ranges from -1 to +1, with values of +/- 1 indicating a perfect linear relationship (values for each variable change at the same rate). The closer the value to 1 (both negative and positive), the stronger the linear relationship. The following standards will be used to describe the correlation values for this study:

.10: small

.30: medium

.50: large

Correlations among three instruments were computed at Time 1, 2, and 3. PSS scores showed a medium negative, statistically significant correlations with SSS scores at Time 1 ($r = -.32, p = .006$), Time 2 ($r = -.38, p = .002$), and at Time 3 ($r = -.32, p = .011$). The correlation between PSS and CD-RISC scores showed a large negative, statistically significant correlation at Time 1 ($r = -.54, p < .001$) and Time 3 ($r = -.56, p < .001$), and a medium to large negative, statistically significant correlation at Time 2 ($r = -.43, p < .001$).

The correlation between SSS and CD-RISC scores showed a large positive, statistically significant correlation at Time 1 ($r = .64, p < .001$) and Time 3 ($r = .52, p < .001$), a medium to large, positive, statistically significant correlation at Time 2 ($r = .45, p < .001$). Results of the correlations between instruments at Time 1 are shown in Table 21, Time 2 in Table 22, and Time 3 in Table 23.

Table 21

Instrument correlations at Time 1

		PSS1Total	SSS1Total	CDRS1Total
PSS1Total	Pearson Correlation	1	-.323**	-.537**
	Sig. (2-tailed)		.006	.000
	N	70	70	70
SSS1Total	Pearson Correlation	-.323**	1	.638**
	Sig. (2-tailed)	.006		.000
	N	70	70	70
CDRS1Total	Pearson Correlation	-.537**	.638**	1
	Sig. (2-tailed)	.000	.000	
	N	70	70	70

**, Correlation is significant at the 0.01 level (2-tailed).

Table 22

Instrument Correlations at Time 2

		SSS2Total	PSS2Total	CDRS2Total
SSS2Total	Pearson Correlation	1	-.376**	.453**
	Sig. (2-tailed)		.002	.000
	N	64	64	64
PSS2Total	Pearson Correlation	-.376**	1	-.431**
	Sig. (2-tailed)	.002		.000
	N	64	64	64
CDRS2Total	Pearson Correlation	.453**	-.431**	1
	Sig. (2-tailed)	.000	.000	
	N	64	64	64

** . Correlation is significant at the 0.01 level (2-tailed).

Table 23

Instrument Correlations at Time 3

		SSS3Total	PSS3Total	CDRS3Total
SSS3Total	Pearson Correlation	1	-.322*	.518**
	Sig. (2-tailed)		.011	.000
	N	62	62	62
PSS3Total	Pearson Correlation	-.322*	1	-.558**
	Sig. (2-tailed)	.011		.000
	N	62	62	62
CDRS3Total	Pearson Correlation	.518**	-.558**	1
	Sig. (2-tailed)	.000	.000	
	N	62	62	62

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Group Comparisons

Descriptive statistics for the experimental (Group 1) and control (Group 0) groups on all three dependent variables used in this study are shown in Table 24 (Time 1), Table 25 (Time 2), and Table 26 (Time 3).

Skewness and kurtosis values were used to indicate the symmetry of the distribution. Each of these measurements was divided by their respective standard error to determine univariate skewness/kurtosis. Any value beyond ± 1.96 indicates the distribution is either positively or negatively skewed (skewness) and/or kurtotic (Munro, 2005). These calculations were completed for skewness and kurtosis values for each

group. From these calculations, the Time 1 measurements for SSS revealed the skewness value (-3.00) for experimental group exceeded the allowable value of ± 1.96 , and the SSS kurtosis value (1.97) for the experimental group is slightly over the allowable value of ± 1.96 . For the Time 2 measurements, the PSS skewness value (2.14), SSS kurtosis value (2.44), and SSS skewness value (-3.37) for the experimental group are over the allowable value of ± 1.96 . For the Time 3 measurements, the SSS skewness value (-2.81), the PSS skewness value (-2.20), and the PSS kurtosis value (2.10) for the experimental group all exceeded the allowable value of ± 1.96 .

Table 24

Descriptive Statistics for Groups 0 and 1 at Time 1.

	Group 1 Experimental			Group 0 Control		
	PSS	SSS	CD-RISC	PSS	SSS	CD-RISC
Mean	20.23	51.69	75.23	20.37	50.91	74.46
Median	21	54	78	18	52	74
Range	29	36	56	25	30	40
SD	6.37	8.08	13.17	5.89	7.48	11.06
Skewness	.102	-1.195	-.505	.241	-0.717	-.077
	(.398)	(.398)	(.398)	(.398)	(.398)	(.398)
Kurtosis	.394	1.536	-.088	-.312	.123	-.979
	(.778)	(.778)	(.778)	(.778)	(.778)	(.778)

Note: () denotes Standard Error

Table 25

Descriptive Statistics for Groups 0 and 1 at Time 2

	Group 1 Experimental			Group 0 Control		
	PSS	SSS	CD-RISC	PSS	SSS	CD-RISC
Mean	15.72	52.03	77.84	15.78	50.59	76.59
Median	14.00	54.00	77.00	15.50	52.50	77.50
Range	27	31	54	23	33	40
SD	6.49	7.24	12.72	5.36	8.74	11.24
Skewness	.887	-1.396	-.563	.461	-.779	-.064
	(.414)	(.414)	(.414)	(.414)	(.414)	(.414)
Kurtosis	.167	1.976	.162	.199	-.214	-.938
	(.809)	(.809)	(.809)	(.809)	(.809)	(.809)

Note: () denotes Standard Error

Table 26

Descriptive Statistics for Groups 0 and 1 at Time 3

	Group 1 Experimental			Group 0 Control		
	PSS	SSS	CD-RISC	PSS	SSS	CD-RISC
Mean	18.63	53.25	74.72	15.80	51.33	79.13
Median	19.00	56.00	71.00	15.50	52.00	77.50
Range	26	29	53	16	30	38
SD	5.41	8.34	13.39	4.03	7.86	11.09
Skewness	-.913 (.414)	-1.162 (.414)	.102 (.414)	-.057 (.427)	-.525 (.427)	.371 (.427)
Kurtosis	1.695 (.809)	.449 (.809)	-.630 (.809)	-.200 (.833)	.131 (.833)	-.871 (.833)

Note: () denotes Standard Error

Multilevel Modeling

Often the results of designs such as the one used in this study are analyzed using repeated measures analysis of variance (RM ANOVA). However, RM ANOVA assumes sphericity, an assumption that often is not met in practice. Sphericity is often described in terms of compound symmetry. This assumption is often not met with repeated measures designs because it assumes the variances of measures at each time are the same, and also assumes the covariances between all pairs of the repeated measures are equal

(Heck, Thomas, & Tabata, 2010; Hox, 2010; Kwok et al., 2008). Research participants often demonstrate different rates and patterns of variance/covariance over time.

Multilevel modeling was chosen for this study because: (1) it does not require the assumption of sphericity, (2) it is capable of analyzing incomplete data, and (3) it provides the ability to determine if the direction and rate of change is different for different people. Because of a small sample size, it was not possible to examine random effects (e.g. the extent to which different students differed in the direction and rate of change), therefore only the fixed effects were examined (e.g. where there are different overall patterns of change over time for students in the experimental and control groups in terms of the three dependent variables examined). While there are other possibilities when the sphericity assumption is violated, the MLM has the advantage of being able to model the variance-covariance matrix directly from the observed data without having to assume homogeneity of variance or homoscedasticity, nor about compound symmetry/sphericity (Quene & van den Bergh, 2004). An unstructured variance-covariance was used for this study to allow estimation of every variance and covariance from the data.

For this study, 17% of the 210 total measurements (3 measurements each for 70 participants) were missing due to student attrition at T2 and T3. This is not unusual with longitudinal data, but is often difficult to handle. Often all of the participant's data is removed from analysis even if it is missing for only a single time period (e.g. listwise deletion). This results in a loss of statistical power and precision in longitudinal research and can result in biased estimates of population parameters (Kwok et al., 2008). MLM is

able to statistically include all data, even if incomplete. MLM of repeated measures with missing data assumes the data are missing at random (MAR), while RM ANOVA typically assumes data are missing completely at random (MCAR). Using maximum likelihood estimation, multilevel analysis of data that are MAR with MLM analysis leads to unbiased estimates, as opposed to using listwise deletion with RM ANOVA which can lead to biased estimates (Hox, 2010). This is accomplished with SPSS by constructing a long data set, which will be further explored in another section.

Hox (2010) and Peugh (2010) also recommend the intraclass correlation (ICC) be calculated to confirm the choice to use MLM. The ICC measures the amount of dependency between observations using within- and between- subject variances, and usually ranges between 0 and 1. Kwok et al. (2008) define the ICC as “average relation between any pair of observations within a cluster” (p. 8). The ICC is calculated by dividing the between-individual variance (Level 1), which is listed as the intercept variance, by the sum of the between- and within-individual variances (Level 2), which are listed as the intercept variance and residual variance, respectively, of an outcome variable. Peugh (2010) warns there are violations of the independence assumption as the ICC value increases, indicating the observations are correlated within subjects. Hox (2010) recommends the following values when assessing the ICC in general cases: small (.05), medium (.10), and large (.15). ICC measurements for this study were PSS (.41), SSS (.81), and CD-RISC (.74), indicating all were high and verifying the need for MLM. The estimates of the covariance parameters for PSS are shown in Table 27, for SSS in Table 28, and for CD-RISC in Table 28.

Table 27

Estimates of Covariance Parameters for PSS

					95% Confidence Interval		
		Estimate	Std. Error	Wald Z	Sig.	Lower Bound	Upper Bound
Residual		21.053372	2.642798	7.966	.000	16.461584	26.925993
Intercept	Variance	14.551106	3.874607	3.756	.000	8.634589	24.521687
[subject = id]							

[subject = id]

a. Dependent Variable: PSS.

Table 28

Estimates of Covariance Parameters for SSS

					95% Confidence Interval		
Parameter		Estimate	Std. Error	Wald Z	Sig.	Lower Bound	Upper Bound
Residual		11.405725	1.435218	7.947	.000	8.912787	14.595945
Intercept	Variance	50.046233	9.195628	5.442	.000	34.911568	71.741993
[subject = id]							

[subject = id]

a. Dependent Variable: SSS.

Table 29

Estimates of Covariance Parameters for CD-RISC

					95% Confidence Interval		
			Wald		Lower	Upper	
Parameter		Estimate	Std. Error	Z	Sig.	Bound	Bound
Residual		38.477059	4.848976	7.935	.000	30.056008	49.257509
Intercept	Variance	108.227008	20.875011	5.185	.000	74.157390	157.948994
[subject = id]							

[subject = id]

a. Dependent Variable: CD-RISC.

Using SPSS for data analysis with MLM requires the creation of a long data set (also known as vertical, stacked, or univariate), which differs from the more commonly known wide data set (also known as multivariate), most often used in SPSS data analysis. In a long data set, each row represents a specific time point for each participant. For this study, each individual has three rows of data lines to represent the three different time measures (T1, T2, and T3). Measurement occasions are numbers 0, 1, and 2, to ensure zero is part of the range of possible values, which assures the intercept is interpretable. Time 1 measurements are considered the intercept and represented by zero. A portion of the long data set is depicted in Table 30.

Table 30

Portion of Long Data Set

ID	Group	HRBTotal	Time	PSS	SSS	CDRS	QuadTime
1	0	3	0	27	51	75	0
1	0	3	1	21	49	84	1
1	0	3	2	16	52	80	4
2	0	3	0	18	53	73	0
2	0	3	1	20	52	73	1
2	0	3	2	16	53	74	4
3	0	0	0	23	46	53	0
3	0	0	1	8	50	63	1
3	0	0	2	18	51	64	4
7	0	2	0	27	52	71	0
7	0	2	1	19	59	77	1
7	0	2	2	23	62	74	4
11	0	2	0	13	54	90	0
11	0	2	1	8	60	88	1
11	0	2	2	12	59	100	4

Central tendency and descriptive statistics were computed for the long data set and shown in Table 31. Results represent values averaged across all participants and all time periods.

Table 31

MLM Descriptive Statistics for Both Groups

Group		PSS	SSS	CDRS
control	Mean	17.44	50.94	76.61
	N	97	97	97
	Std. Deviation	5.601	7.951	11.181
	Median	17.00	52.00	76.00
	Range	25	33	47
	Kurtosis	.143	-.133	-.787
	Std. Error of Kurtosis	.485	.485	.485
	Skewness	.470	-.679	.060
	Std. Error of Skewness	.245	.245	.245
experimental	Mean	18.25	52.30	75.91
	N	99	99	99
	Std. Deviation	6.338	7.850	13.038
	Median	18.00	54.00	75.00
	Range	32	36	57
	Kurtosis	-.045	.987	-.370
	Std. Error of Kurtosis	.481	.481	.481
	Skewness	.110	-1.171	-.311
	Std. Error of Skewness	.243	.243	.243

Skewness and kurtosis values were used to evaluate the symmetry of the distribution. Each of these measurements was divided by their respective standard error to determine univariate skewness/kurtosis. Any value beyond ± 1.96 indicates the distribution is either positively or negatively skewed and/or kurtotic (Munro, 2005). These calculations were completed for skewness and kurtosis values for each group. From these calculations, the SSS skewness value (-2.77) for the control group and the SSS skewness value (-4.82) for the experimental group exceeded the allowable value of ± 1.96 . The kurtosis value for SSS (2.05) for the experimental group is slightly over the allowable value of ± 1.96 .

Model Specification and Analysis

In MLM, the lowest level of data is the specific measurement at a particular time and is referred to as “Level-1” data. Each Level-1 measurement is nested within a particular research participant, who is recognized as the “Level-2” data. Time periods are nested within students, and students are nested within groups. With this 2-level model, there are 70 participants, each having three times of measurement on three different dependent variables (PSS, SSS, and CD-RISC). This model specification allows the researcher to answer the question, “Do the groups have different patterns of change over time?”. A copy of the syntax used to create the MLM is provided in Appendix M.

The first level of the model allows the researcher to assess both linear and quadratic components of change. Since the T1 measurement was coded as 0, the intercept parameter is the individual’s score at pretest. The slope parameters represent the change over time. The linear component is the rate of change per unit of time

(measurement) and the quadratic component is the change in the rate of growth and can be an acceleration or deceleration (Heck et al., 2010). Testing was done to determine if there was a significant interaction effect (e.g. the effect of time was different for students in different groups). Quadratic relationships were assessed first. Heck et al. (2010) define a quadratic trend as a “change in the rate of change (i.e. accelerating or decelerating) over an interval of time” (p. 143). If there was no significant relationship, linear relationships were assessed. Linear trends are defined as “the rate of change over an interval of time” (Heck et al., 2010, p. 143). A linear trend indicates a constant rate of change (growth or decline) over time; while the quadratic trend indicates the rate of individual growth or decline varies over time. These represent the model’s fixed effects and are the focus of this study’s data analysis. Each measurement will be discussed separately in the following sections.

PSS Results

Data analysis revealed a non-significant quadratic growth rate for the PSS between groups ($F = 1.29, p = .261$). Therefore, the model was adjusted to assess linear growth rate, which was significant ($F = 4.65, p = .035$). The quadratic model for PSS is shown in Table 32 and the estimates of fixed effects for this model is shown in Table 33. The linear model for PSS is shown in Table 34 and the estimates of fixed effects for this model are shown in Table 35. A graph depicting the linear model is shown in Figure 7, depicting the unexpected results for this test. While both the control group and the experimental group showed a decline in perceived stress over time, the control group

actually showed a greater decrease at follow-up (T3) measurement than the experimental group.

Table 32

Tests of Fixed Effects for PSS – Quadratic Model

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	70.000	397.110	.000
Time	1	66.050	14.163	.000
QuadTime	1	63.489	7.677	.007
Group	1	70.000	.010	.922
Time * Group	1	66.023	.264	.609
QuadTime *	1	63.198	1.286	.261
Group				

a. Dependent Variable: PSS.

Table 33

Estimates of Fixed Effects for PSS – Quadratic Model

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	20.371429	1.022271	70.000	19.928	.000	18.332573	22.410284
Time	-6.759151	1.796021	66.050	-3.763	.000	-10.344973	-3.173328
QuadTime	2.289937	.826462	63.489	2.771	.007	.638633	3.941241
Group	-.142857	1.445709	70.000	-.099	.922	-3.026234	2.740519
Time * Group	-1.303109	2.538321	66.023	-.513	.609	-6.370998	3.764779
QuadTime *	1.323761	1.167170	63.198	1.134	.261	-1.008498	3.656020
Group							

a. Dependent Variable: PSS.

Table 34

Tests of Fixed Effects for PSS – Linear Model

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	70.270	392.294	.000
Time	1	69.992	16.907	.000
Group	1	70.252	.125	.725
Time *	1	69.158	4.646	.035
Group				

a. Dependent Variable: PSS.

Table 35

Estimates of Fixed Effects for PSS – Linear Model

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	19.774432	.998385	70.270	19.806	.000	17.783351	21.765514
Time	-2.028538	.493341	69.992	-4.112	.000	-3.012477	-1.044599
Group	-.499230	1.411832	70.252	-.354	.725	-3.314863	2.316402
Time *	1.489919	.691227	69.158	2.155	.035	.111014	2.868823
Group							

a. Dependent Variable: PSS.

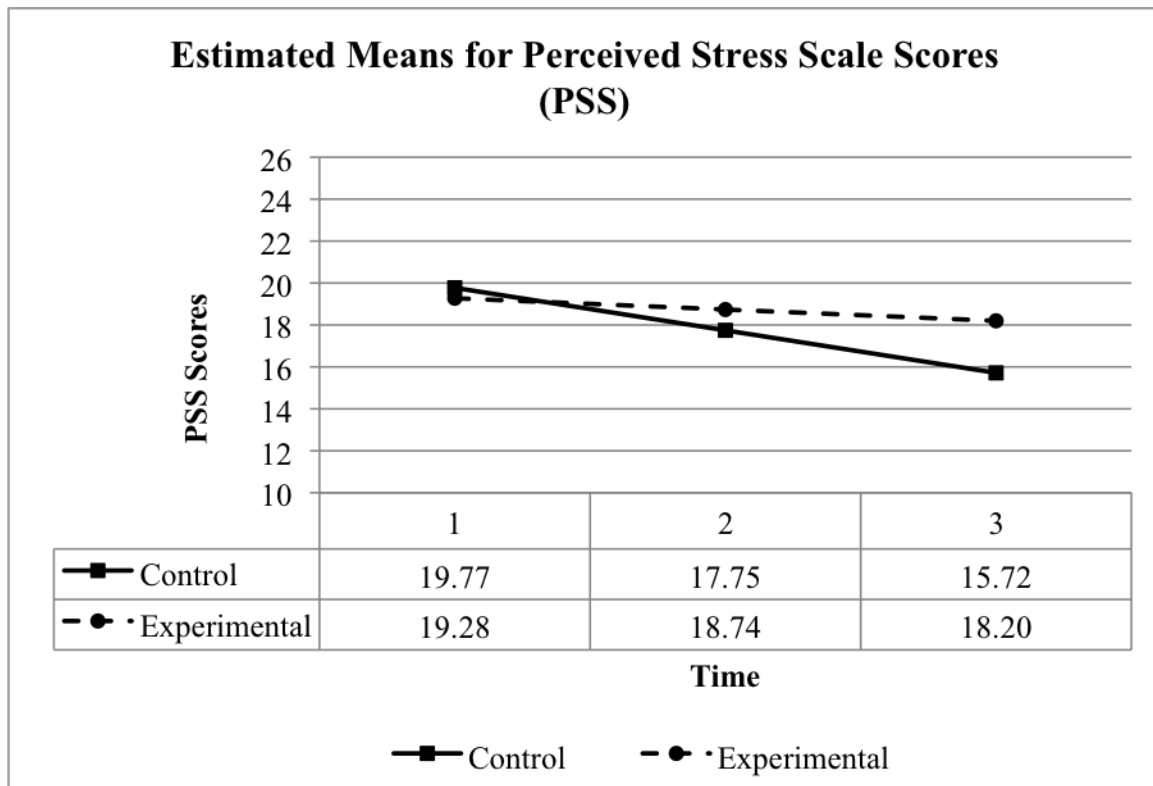


Figure 7. PSS estimated means for both groups at Times 1, 2, & 3.

SSS Results

Data analysis revealed a non-significant quadratic growth rate for the SSS between groups ($F = .08, p = .778$). Therefore, the model was adjusted to assess linear growth rate, which was also non-significant ($F = 1.39, p = .243$). The quadratic model for SSS is shown in Table 36 and its corresponding estimates of fixed effects in Table 37. The linear model for SSS is shown in Table 38 and its corresponding estimates of fixed effects in Table 39.

Table 36

Tests of Fixed Effects for SSS – Quadratic Model

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	70.000	1540.662	.000
Time	1	64.305	.641	.426
Group	1	70.000	.177	.675
QuadTime	1	64.646	.959	.331
Time * Group	1	64.400	.330	.568
QuadTime *	1	64.320	.080	.778
Group				

a. Dependent Variable: SSS.

Table 37

Estimates of Fixed Effects for SSS – Quadratic Model

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	50.914286	1.297137	70.000	39.251	.000	48.327227	53.501345
Time	-1.257039	1.570520	64.305	-.800	.426	-4.394227	1.880149
Group	.771429	1.834429	70.000	.421	.675	-2.887225	4.430083
QuadTime	.715586	.730883	64.646	.979	.331	-.744239	2.175411
Time * Group	1.273484	2.218189	64.400	.574	.568	-3.157328	5.704295
QuadTime *	-.291693	1.031794	64.320	-.283	.778	-2.352740	1.769355
Group							

a. Dependent Variable: SSS.

Table 38

Tests of Fixed Effects for SSS – Linear Model

Source	Numerator Denominator		F	Sig.
	df	df		
Intercept	1	70.112	1593.353	.000
Time	1	63.956	.317	.575
Group	1	70.091	.239	.626
Time *	1	63.594	1.387	.243
Group				

a. Dependent Variable: SSS.

Table 39

Estimates of Fixed Effects for SSS – Linear Model

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	50.651596	1.268928	70.112	39.917	.000	48.120869	53.182322
Time	.229356	.407097	63.956	.563	.575	-.583925	1.042637
Group	.877857	1.794392	70.091	.489	.626	-2.700863	4.456576
Time *	.668823	.567954	63.594	1.178	.243	-.465935	1.803582
Group							

a. Dependent Variable: SSS.

CD-RISC Results

Data analysis revealed a significant quadratic growth rate for the CD-RISC between groups ($F = 4.13, p = .046$), therefore no linear test was performed. As expected, the experimental group demonstrated an increase in scores at T2, but showed a decline at T3 as opposed to the control group, which continued to increase. Table 40 shows the results of the quadratic model tests, and Table 41 shows its corresponding estimates of fixed effects. A graph depicting these unexpected results is shown in Figure 8.

Table 40

Tests of Fixed Effects for CD-RISC – Quadratic Model

Source	Numerator df	Denominator df	F	Sig.
Intercept	1	70.000	1350.03	.000
Time	1	64.945	.034	.855
Group	1	70.000	.072	.789
QuadTime	1	64.433	.412	.523
Time * Group	1	65.077	1.605	.210
QuadTime *	1	64.152	4.126	.046
Group				

a. Dependent Variable: CDRS.

Table 41

Estimates of Fixed Effects for CD-RISC- Quadratic Model

Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	74.45714	2.026443	70.000	36.743	.000	70.415529	78.498757
Time	.507734	2.768250	64.945	.183	.855	-5.020933	6.036401
Group	.771429	2.865824	70.000	.269	.789	-4.944276	6.487133
QuadTime	.782845	1.219546	64.433	.642	.523	-1.653163	3.218853
Time * Group	4.950246	3.907505	65.077	1.267	.210	-2.853405	12.753896
QuadTime *	-3.496246	1.721178	64.152	-2.031	.046	-6.934538	-.057954
Group							

a. Dependent Variable: CDRS.

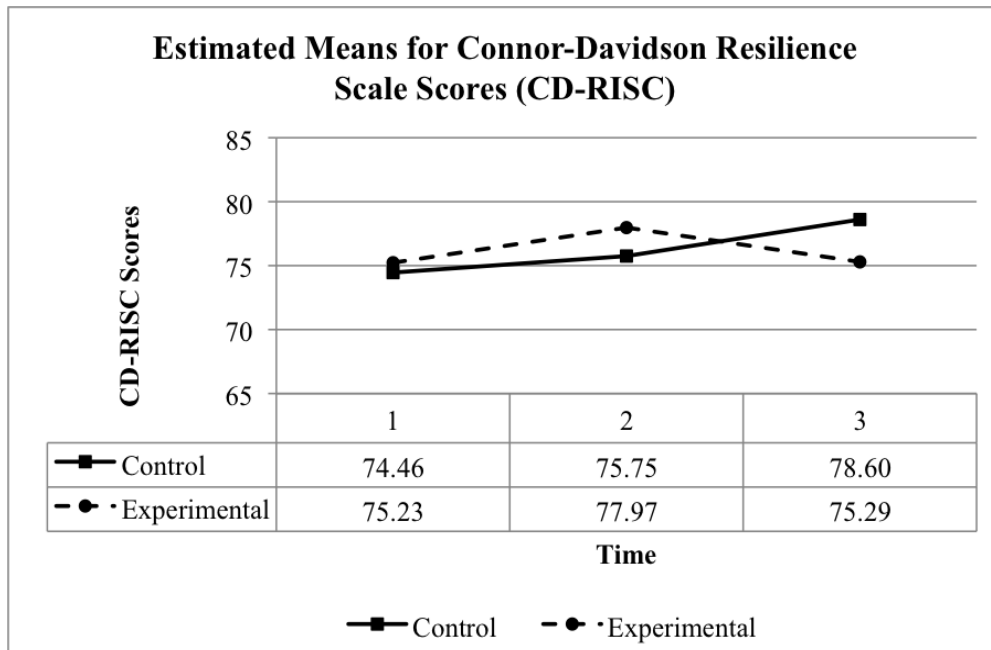


Figure 8. CD-RISC estimated means for both groups at Times 1, 2, and 3.

Summary of Results

While both the control group and the experimental group showed a decline in perceived stress over time, the control group actually showed a greater decrease at follow-up (T3) measurement than the experimental group. There was not a statistically significant difference between groups in terms of social support. Resilience increased in the experimental group from pretest to posttest, but then declined at follow-up and was lower at T3 for the experimental group as compared to the control group.

Email Follow-Up Survey

A follow-up email survey was sent via an online survey tool (SurveyMonkey) the week of T3 data collection. Two surveys, both containing identical items, were sent separately to the experimental and control groups to allow differentiation of the anonymous responses between the two groups. While the content of the tweets sent to the control group had no intended effect, it was of interest to know the participants' opinions about the use of Twitter. Twenty-three participants (34%) completed the email survey, including eight (23%) from the experimental group and fifteen (43%) from the control group. Content analysis was used to analyze these data.

Participants were asked if they considered the Twitter messages to be helpful and were asked to explain "why" or "why not". They were also asked to tell what they liked and did not like about the experience. Data analysis revealed a positive response to the intervention by both the experimental (87.5%) and control (80%) groups. The content analysis will be described in the following paragraphs and organized by the two themes:

(1) positive aspects of the experience, and (2) negative aspects of the experience. A detailed report of the email survey responses is provided in Appendix L.

Positive Aspects of Research Experience

Participants in both the experimental and control groups voiced positive feelings about the use of Twitter. Several participants noted they were regular users of Twitter and found it a fast and easy method for receiving information. One participant commented, “It was a simple study that didn’t take up much time and only required reading tweets. The study consisted of something I did everyday (reading tweets) so it wasn’t like I had to remember to do something everyday for the study.” Several participants in the experimental group noted the tweets were helpful in handling stress. One participant noted, “They made me take a few minutes to really reflect on who/what makes me happy and helps to relieve my stress”. Others commented, “It allowed me to think more positively even when I was stressed”, and “It made me think more about my life and the stress in it and reminded me to relax, take time for myself, and do things that make me happy”.

Even though the tweets sent to the control group were not designed to have an effect and contained only basic nursing trivia, several participants in that group voiced positive comments. Several remarked that the tweets helped them remember course content or helped them to remember things they had forgotten. One participant noted the tweets were “helpful because they gave me information I didn’t know or information I should know and I researched the answer”. Several commented the tweets caused them

to reflect on topics; “They were quick bits of information and made me think”, “Got me thinking about things”, and “They made me think and reminded me of things I had been learning about.”

When asked what they liked most about participating in the study, participants from both groups responded they liked the use of Twitter. Comments from the experimental group included, “Responding to the tweets and seeing how others responded to the same questions”, “The positive thoughts it brought to the surface”, “Receiving daily messages”, “I liked receiving the tweets the best. It also allowed me to look at my attitudes and support system when under stress.” One participant from the experimental group added, “It gave me insight about myself and how I cope with stress.” Participants from the control group liked the “laid back process and resourceful information obtained” and the fact it “was not time consuming”. One participant added they enjoyed the novelty of participating in a study using Twitter and “I have never participated in a study done this way before”, while others commented, “I loved that it was on Twitter”, “It was easy”, and “Easy to follow”. One participant indicated the receipt of a giftcard was a positive aspect of participation.

Negative Aspects of Research Experience

Very few negative comments were made about the experience, and those were primarily related to having to complete the forms on multiple occasions and not being familiar with Twitter. One student remarked she “was not a user of Twitter and never took the time to understand it”, while another commented, “I could not get into the habit

to check my account on a regular basis as I am not in the habit of doing so.” Several commented on the lack of participation; “No one responded so sometimes I didn’t see the point”, and “Needs more interaction”. Many participants responded “Nothing” (or similar) when asked what they liked least about the study. Others commented, “There wasn’t anything I didn’t like”, and “Nothing. I thoroughly enjoyed it!”

CHAPTER V: DISCUSSION

This study evaluated the effectiveness of an educational intervention delivered via Twitter to increase resilience in a sample of junior-level baccalaureate nursing students. The study also explored the effects of the intervention on perceived stress and sense of support. A detailed demographics questionnaire was utilized to gain valuable information on the characteristics (e.g. risks and protective factors) of this sample of students. Resilience, perceived stress, and sense of support were measured using the CD-RISC, PSS, and SSS, using a pretest/posttest/follow-up design with 70 randomly assigned participants from two state-supported universities in Tennessee. I hypothesized that students in the experimental group would demonstrate increased resilience and sense of support, and a decrease in perceived stress, following a six-week educational intervention, when compared to students in the attention placebo control group. This chapter presents my interpretation of the results, strengths and limitations of the study, theoretical implications, significance to nursing education, practice, and research, and recommendations for future studies.

Group Membership Description

Participants from each university were randomly assigned to one of two groups: experimental or attention placebo control. Students were offered an incentive of a \$10 gift card to participate in the study. They were also encouraged to note this participation in future job applications, graduate school applications, and on their resumes. Many students not meeting the inclusion criteria voiced interest in participating in future similar

studies and expressed interest in both the concept of resilience in nursing students and the intervention delivery method (Twitter). Equal numbers of participants were assigned to each group ($n = 35$). Attrition at T2 and T3 resulted in a loss of 8 participants (11.4%), three from the experimental group (8.6%) and five from the control group (14.3%). Based on the results of the follow-up survey, there are several possible explanations for student attrition. These include not wanting to take the time to learn to use Twitter, the need to complete multiple forms three times, and the lack of interaction/participation in the Twitter dialogue. Two students from Institution One dropped out of the nursing program prior to study completion.

Participant Demographics

By design, the sample was limited to nursing students ages 19-23, enrolled full-time in a baccalaureate nursing program and currently enrolled in a clinical course. This sample of nursing students was predominately white (98.6%) and female (88.6%), which is neither unusual for East Tennessee nursing professionals nor unusual for the settings. According to Institution One's 2010 statistics, 90% ($n = 400$) of the undergraduate nursing students were female and 89% ($n = 396$) were white ((University of Tennessee Office of Institutional Research and Assessment, 2011). Institution Two did not report race and gender statistics specific for majors, but the overall university enrollment was predominately female (56%) and white (84.4%). Based on my observations at Institution Two, the nursing program is consistent with overall university statistics on race, but not gender, having many more females than males in their undergraduate program.

The majority of students were not employed (51.4%, $n = 36$), with 30% ($n = 21$) working 1-10 hours/week, and 84.3% living off campus ($n = 59$) with a friend/roommate (67.1%, $n = 47$). Most students were involved in at least two extracurricular activities, with church activities being the most common (61.4%, $n = 43$), followed by volunteer/service activities (54.3%, $n = 38$) and participation in a club/organization (51.4%, $n = 36$). The findings describe a busy group of students who are conscientious about their academic performance, with an overall sample GPA mean of 3.56 and most students (51.4%, $n = 36$) indicating they spend at least 11-20 hours per week on school work.

These findings are consistent with what has already been reported about the multiple demands on nursing students, which can significantly contribute to perceived stress. Students living off-campus, as well as those participating in on-line/distance programs, need to feel a sense of belonging/support, but may find it hard to find the time to participate in on-site activities. This further supports the use of online communities to provide a supportive presence as well as minimize additional demands on time and energy. These are important considerations when considering resilience- and support-enhancing, as well as stress-reduction, efforts.

Sources of Support

Findings from the demographics questionnaire confirm the strong reliance on parents for support. While these students are in transition to young adulthood, they still seek assistance from parents/family when facing stress and/or adversity. Many

universities have recognized this and have created parental resources (e.g. newsletters, social media sites, websites, etc.) to involve parents and family members in assisting their young adult during this time of transition. Nursing education could benefit from similar measures by providing information to parents on the nature of nursing school and the healthcare environment, and the challenges their child may face as a nursing student. Parents and/or family members could be beneficial in resilience-enhancing and stress-reduction efforts if they are educated and informed of the specific needs of their students (e.g. risks and protective factors) and the endeavors being pursued by the nursing program.

Of particular relevance to nursing education is the finding that only eight participants (11.4%) consider a teacher/professor as a source of support. With many studies devoted to increasing faculty-student engagement and many programs implementing student support initiatives, this finding suggests we have much work to do in this area. As nurse educators, we spend a great deal of time with our students, both in the classroom and clinical settings, which provides many opportunities to provide support. The use of Twitter and/or other forms of social media could be a feasible means of increasing a supportive presence and providing encouragement to our students.

Faith/Spirituality

Many authors/researchers have noted the relationship between faith/spirituality and resilience. The findings of this study reveal this sample of students relies heavily on these when confronting stress/adversity. Nurse educators wishing to implement

population-specific interventions could utilize such findings by including prayer, Scripture, spiritual quotes/poetry/multimedia, etc. in their efforts to increase resilience. It may also be beneficial to increase the presence of faith-based services within the nursing school/college (chaplain, counselors, etc.).

Health Risk Behaviors

The results of this study are consistent with those by Clement et al. (2002), who explored the health behaviors of 52 baccalaureate nursing students in a three-year longitudinal study. These authors found a high percentage of students always wearing seatbelts (88% to 94%) as compared to 87.1% ($n = 61$) for this study. Clement et al. (2002) found the majority of their study participants did not smoke (88% to 90%), which is similar to the results of this study, which found only one student indicating a use of tobacco (1.4%). These results may be partially attributed to Tennessee state laws banning cigarette smoking in public places and mandating the use of seatbelts for all drivers and passengers in motor vehicles, as well as general content of nursing curricula on healthy behaviors and health risks. Other similarities of findings between studies are a low use of alcohol, with no students from this study reporting drinking more than two alcoholic beverages a week, and 80% to 93% of those in the Clement et al. (2002) study indicating little or no alcohol use. The low use of tobacco and alcohol is inconsistent with findings from *National College Health Assessment's* most recent report, which revealed over half (65.9%) the nation's college students had used alcohol at least once in the last 30 days, and 15.9% indicating they used alcohol at least 10 of those days and

15.2% smoking cigarettes within the last 30 days. (American College Health Association, 2011).

For this study, only 54.3% ($n = 38$) of students indicated they eat breakfast everyday, which has been linked to good health status (Breslow & Breslow, 1993; Wiley & Camacho, 1980; Wingard, Berkman, & Brand, 1982). This is a much lower percentage than found by Clement et al. (2002), with 79% to 88% indicating they eat breakfast everyday. Similar results were found with sleep and exercise, with only 48.6% ($n = 34$) of students in this study indicating they engage in regular moderate exercise, compared to 67% to 81% in the other study, and 64.3% ($n = 45$) of students from this study responding they get at least seven hours of sleep per night (on average), compared to 71% to 73% of participants in the other study.

While this study's findings are positive concerning the use of alcohol, tobacco, and seatbelts, there are several areas that need improvement (e.g. sleep, exercise, diet). Of particular concern is the finding that 17.1% ($n = 12$) had ridden in a car in which the driver had been drinking. Nurse educators can benefit from this type of knowledge informing them of the particular needs of their students to better assist them in developing and/or maintaining positive health behaviors. As we teach our students to identify positive and negative health behaviors with their clients, we can encourage them to critically examine and reflect on their own behaviors, which is an important aspect of resilience (self-knowledge). We also have the opportunity to implement health-promotion activities within nursing programs to encourage healthier living for faculty, staff, and students.

Data Collection

Academic Environment

While every effort was taken to assure the best possible conditions for data collection, there were some unforeseen issues that should be considered for future studies. For this study, data collection times were scheduled to coincide with regularly scheduled class times to avoid having to ask students to add another item to their already busy schedule. Data collections occurred either immediately before/after a regularly scheduled class. These times were pre-arranged with the undergraduate directors and course faculty at both institutions. Dates and times were scheduled in advanced and confirmed prior to the scheduled data collection time. Despite these efforts, there were interruptions and distractions that occurred during these meetings. Because of the design of the nursing course schedules at the two universities, students were only in classroom settings one or two days each week. This requires long days of sitting in a classroom, with little time for breaks and/or meals. Additionally, I observed many individuals attempting to meet with students or groups of students during these limited breaks. Many of these were unscheduled and occurred during times of data collection. The multiple demands on the students' time, as well as the heavy amount of information being taught in one sitting, combined with exams and other academic stressors, could have influenced student responses on the instruments. Students may have felt rushed to complete the forms and may not have considered their responses as carefully as instructed. These stressors may have also contributed to students not completing data collection at T2 and

T3. Future studies would benefit from the use of online data collection methods to avoid these issues.

Perceived Stress Results

Results indicate relatively high Time 1 PSS scores, as compared to the recent study by Steinhardt and Dolbier (2008), for both the experimental group ($mean = 20.23$, $SD = 6.37$) and the control group ($mean = 20.37$, $SD = 5.89$). Steinhardt and Dolbier reported baseline scores of PSS for the experimental group ($mean = 6.83$, $SD = 3.6$) and control group ($mean = 6.48$, $SD = 3.5$). For this study, both groups demonstrated a reduction in perceived stress at Time 2 and Time 3, but the control group demonstrated a greater reduction at Time 3 as compared to the experimental group. While the reason for this is not known, it could be a spurious effect or an ironic rebound effect as described by Wegner, Schneider, Carter, and White (1987). These authors first described this phenomenon and proposed certain thoughts or emotions, when suppressed for a specific period of time, may resurface, often at greater intensity, at a later time. They propose individuals become more sensitive to the thoughts and/or emotions (e.g. anger, anxiety) they are attempting to suppress and this sensitivity causes them to be more aware of these which leads to the rebound effect.

Martin and Tesser (1996) found the ironic rebound effect could be restricted if positive feedback is provided to the individuals acknowledging they have at least partially met their goals, indicating this rebound effect may be due to the individual's perception he/she was unsuccessful in fulfilling their goal to suppress the thought or emotion. Interestingly, Yap and Tong (2009) explored the ironic rebound effect with

appraisal suppression. These authors found this ironic mental process to affect the daily thinking and feeling of participants, particularly with emotion regulation, and may not occur until much later, after the suppression phase. The ironic rebound effect is something to be considered, especially in light of the positive comments revealed in the email survey.

Questions to consider include, “Did the intervention cause the participants to be more aware of the stressors in their lives and, therefore, answer the survey questions more thoughtfully and honestly?”; “Did the participants feel a sudden increase in their stress level as a result of not having the regular tweets?”; and “Did the researcher’s lack of participation in the Twitter dialogue negatively impact the results?”. My lack of participation (e.g. providing feedback) during the Twitter activity could be a plausible explanation based on what is known about millennials and their need for immediate feedback and timely response (Martin & Tesser, 1996). It is possible my lack of feedback was interpreted as negative or caused the participants to believe I was not interested in their responses, even though they were informed I would not be replying to their tweets.

None of these questions can be answered with this study and the limited number of comparable studies did not include a follow-up (Time 3) measurement. Similar studies were descriptive (only one time of measurement) or pre-test/post-test design with only two times of measurement. It is also possible the unexpected results at follow-up are simply spurious results. This is a topic for future studies and may warrant inclusion of a qualitative portion to further explore the participants’ perceptions of the intervention and

their fluctuations in stress and resilience levels. Future studies may also utilize a longer study length with additional times of measurement to observe trends in trajectory changes. A larger sample size would allow examination of random effects, which may reveal contributing factors.

High levels of perceived stress are consistent with the literature on nursing student stress and support the need for interventions and/or initiatives aimed at assisting students in developing effective coping behaviors and stress management skills. Ahern's (2006) model notes the importance of enhancing or developing protective factors to assist students during times of stress. As we cannot always control perceived stress and nursing students will face numerous stressors during school and as professionals, it is wise to engage in efforts that acknowledge the presence of stress while actively pursuing methods to more effectively cope that do not result in negative outcomes.

Sense of Support Results

Participants from both groups showed similar high levels of sense of support at Time 1 and scores for both groups remained relatively stable for Times 2 and 3, without significant effects for time or group. Time 1 SSS scores for this study are very similar to those found by Dolbier and Steinhardt (2000) in their study with undergraduate college students. The overall SSS mean for their study was 49.3 ($SD = 8.8$) compared to this study's Time1 SSS means of 51.69 ($SD = 8.08$) for the experimental group and 50.91 ($SD = 7.48$) for the control group.

These results indicate this sample of students perceive they have a strong support system. Future studies may explore the effectiveness of these sources of support, the use

of sources of support (self-efficacy), and their influence on both positive and negative health behaviors.

Resilience Results

As with sense of support, the resilience scores were fairly high at Time 1 for both groups and remained relatively stable for Times 2 and 3. Time 1 CD-RISC scores for the experimental group ($mean = 75.23$, $SD = 13.17$) and control group ($mean = 74.46$, $SD = 11.06$) were consistent with those found by Steinhardt and Dolbier (2008) in their recent study with undergraduate students. Their baseline data also revealed fairly high initial scores on the CD-RISC for both the experimental group ($mean = 67.70$, $SD = 10.05$) and the control group ($mean = 70.56$, $SD = 12.29$). However, like the PSS measurements, Time 3 CD-RISC measurements for this study showed a statistically significant unexpected effect for time, indicating the experimental group experienced an accelerated rate of decline in scores at follow-up as compared to the control group.

The reason for this is not known, but could also be attributed to the ironic rebound effect as described earlier or simply a spurious result. Did the intervention make them more conscious of the lack of protective factors in their own life which caused critical reflection post-intervention and led to decreased CD-RISC scores? Did they feel abandoned after treatment ended? Would a longer intervention with a gradual tapering of tweets be more effective? These questions cannot be answered with this study, but could be considerations for future studies. This unexpected finding, however, does support Ahern's (2006) argument that resilience levels can vary for individuals at various stages of development. Future studies may benefit from increased length of intervention time

with additional times of measurement to observe any trends in score fluctuations and trajectory changes.

Despite the unexpected results, there is evidence the experiment was beneficial to some students based on survey results, which supports future research efforts, particularly those that further explore the participants' perceptions of the intervention. Future studies may explore the participants' perceptions of their own resilience before and after the intervention.

Use of Twitter for Intervention Delivery

There was minimal participation within groups during the Twitter intervention. The first week showed the largest participation for both groups with eighteen replies to tweets from eight participants. For the entire six-week intervention, only nine participants (12.86%) engaged in Twitter dialogue (five from the experimental group and four from the control group). It is interesting to note that eight of the nine participants (89%) were from Institution Two. Both the experimental and control groups showed similar activity throughout the intervention, with participants mostly making a single response to the tweet without response to other participants. Participation for both groups was almost identical, both overall and as compared on a weekly basis. For both groups, participation was at its highest the first week, with nine responses within each group, and there was a steady decline thereafter, with the least participation noted in the last two weeks of the study when students began a new semester. Of particular interest is the small number of students engaging in the Twitter dialogue. For the entire six-weeks, five students in the experimental group made a total of 19 replies, and four students in the

control group made a total of 20 replies. Therefore, only nine students were actively engaged in the Twitter dialogue. Despite the lack of interaction, one participant noted she “did not feel comfortable posting her feelings, so she just thought about the information”. This indicates the intervention may have had the intended effect and created critical reflection/thinking in some participants even if they did not engage in the activity. Therefore, a lack of participation cannot be assumed to indicate the intervention was not received as intended.

Current literature on millenials and the use of Twitter with college students emphasizes the importance of regular delivery of tweets, which was done with this study, and frequent interaction/feedback to encourage continued/increased activity, which was not done. The design of this study utilized a Twitter script, which did not include my participation in Twitter dialogue beyond initiating the weekly tweets. It is possible timely feedback and increased activity may have increased the participants’ level of participation and possibly changed the study results.

Beyond increasing dialogue with the Twitter accounts, it is necessary to assure the intervention is delivered as intended. While participants were confirmed as followers of the Twitter accounts, it cannot be known if they read every tweet (if any). Students were encouraged to activate the mobile account option to assure the timely delivery of tweets and increase the assurance of them being read. There are also multiple mobile applications available that provide various Twitter account services making it easier to read/send tweets. Participants who did not use any of these options would need to log

into their Twitter accounts to read the tweets, which could contribute to lack of compliance.

Even though the content of the tweets sent to the control group were not designed to produce an effect, the survey results indicate it could be a useful and effective means of delivering information related to course content, timely announcements, supportive/encouraging messages, healthy living tips, etc. Future studies may utilize Twitter in a more flexible way by adapting tweets to address daily needs/topics of interest for a particular population. In this study, I did not respond to replies generated by participants. Future studies may benefit from increased dialogue between the researcher and participants by reflecting on comments and providing additional responses/questions to replies. The researcher could also incorporate the use of encouraging and/or uplifting comments when students express feelings of stress and/or anxiety.

Population Specific Interventions

The results of the demographic questionnaire reveal the importance of identifying the specific needs of each population. Because of multiple possible differences in groups of students, due to geographic location, cultural nuances, etc., there may be significant risks and/or protective factors that should be considered as a focus of the intervention, as recommended by Ahern (2006). For instance, this population indicated they did not consider faculty a means of support. A future study could explore the relationship between resilience and faculty-student engagement, using Twitter to encourage dialogue and communication between the two. Ahern (2006) recommends adapting resilience

studies to address the specific needs of each population (e.g. risks and/or protective factors). This study's results support this notion and provide additional evidence of the need to identify particular risks and/or protective factors that need to be addressed for individual populations/groups.

Email Survey Results

While the results of the intervention did not yield the expected results, the findings from the email survey indicate the intervention was beneficial to some of the participants. Additionally, results of the email survey lend support to future use of Twitter as an intervention delivery method, as well as an adjunct to teaching/learning methods. Students in both the experimental and control groups expressed positive responses to the use of Twitter. Responses from the participants in the experimental group indicate the intervention had the intended effect, even if not statistically evident. This supports future efforts to increase resilience in nursing students and also supports the use of Twitter as an intervention delivery method, with added strategies to increase participation. Participants reported they found Twitter to be fun and quick, both of which are desirable when working with millennials. Strategies to encourage and increase participation in the Twitter activity could lead to participants realizing the effort required is not as time-consuming and/or difficult as assumed, and, instead find Twitter to be a convenient and easy method of communication and engagement with fellow students and faculty.

Significance to Nursing Education

One of my goals for this study was to conduct research that will be useful to the practice of nursing education and easily replicated by other nurse educators/researchers wishing to implement resilience-enhancing interventions within their nursing curriculum. This study supports previous findings indicating a need for increased efforts to improve faculty-student engagement and nursing student support. To adequately support our students and address their specific needs, it is necessary to understand them as individuals. Nurse educators can use the information gained from this study to design descriptive studies with their own student populations to better understand the needs of their own students and to design individualized research studies to focus on the risks and protective factors needed for their respective population(s). The findings of this study can also contribute to future efforts to use social media within the classroom and nursing curricula to increase faculty-student engagement, provide social support, and increase a sense of belonging/connectedness for students and new graduates. Faculty may find the use of Twitter and other forms of social media an advantageous mechanism to reinforce classroom topics and increase critical reflection. Faculty wishing to implement resilience-enhancing initiatives within their own nursing programs may use this study's findings to implement Twitter as an additional means of support and communication for all students within their program.

Significance to Nursing Practice

The results of this study contribute to the body of knowledge on adolescent resilience and may be beneficial to nurses in practice who care for this population,

particularly those practicing within college/university settings. It is important for these nursing professionals to actively assess this population for risks and to realize the impact of stress on their lives. Being cognizant of the vulnerability of nursing students and the need to enhance or develop protective factors, the professional nurse can observe for risks, recognize opportunities for interventions, and focus efforts on increasing protective factors while assisting the student nurse in critically evaluating their individual needs for resilience enhancement. While nursing students are generally viewed as adults when being seen by healthcare practitioners, it is important to realize they are in transition to adulthood and at various stages of development. Many may have come to the college experience without any prior experience facing stress/adversity without parental intervention. For these students, it is important to assist the student in the transition to greater independence and in the development/enhancement of protective factors that better equip them to cope with the stress and perceived adversity they face as nursing students. Parents must also learn to adjust to their new role in their child's life, one that is less involved, but still a strong source of support. The findings of this study confirm the majority of students still rely heavily on their parents for financial and emotional support. For this reason, practitioners may find it beneficial to explore strategies to better educate parents of the needs of their college students and assist them in providing healthy support for their child.

Significance to Nursing Research

The results of this study offer several contributions to nursing research. This study is the first known experimental study using Ahern's (2006) model of adolescent

resilience as a guiding framework. The use of multilevel modeling offers a unique perspective of data analysis for this type of study, revealing findings that may not be discovered with the use of the traditional RM ANOVA. The results of this study demonstrate the value in adding an additional time of measurement, beyond the traditional pretest/posttest design. The descriptive portion of the study confirms the benefit of understanding the unique personal characteristics (e.g. risks and/or protective factors) of the population and confirms the need for the creation of an instrument designed to measure the health risk behaviors of nursing students. Additionally, the pilot study of the demographics questionnaire provided helpful feedback that resulted in the editing of several items prior to use in the study. The innovative intervention delivery method (Twitter) proved to be a feasible method for this population and an effective means of information delivery. Finally, the inclusion of the follow-up survey proved to be of great benefit for the data analysis. Findings from the survey contributed valuable information that would not have been available from the quantitative data.

Strengths and Limitations

Strengths of this study include the initial testing of a theoretical model and the innovative intervention delivery method (Twitter). Additional strengths include the use of repeated measures multilevel modeling, multiple sites, and the inclusion of a follow-up survey to obtain valuable data.

Limitations include the small sample size, limited geographic region, and homogeneity of sample (race, gender, faith), which may limit generalizability to other groups of nursing students. However, the dynamic and multidimensional aspects of the

concept of resilience necessitate the need to identify the risks and protective factors of individual populations of nursing students, as was done in this study.

Generalizability

While the results of this study may not be generalizable to all nursing students, the findings contribute to the body of knowledge on resilience in adolescent nursing students. As noted by Ahern (2006), resilience interventions should be tailored to meet the specific needs of each population. If the objective is to increase resilience in our nursing students, it should be understood that nursing student needs will vary according to the student's developmental stage and present situation. For instance, in this study, faith and family were confirmed as high priorities with this sample of students. However, this may not be true in a broader sense and studies using larger samples from multi-sites from throughout the United States may find significant differences in the demographic make-up of participants. While future studies with larger and more varied samples may contribute to generalizability and provide valuable information on adolescent nursing students as a whole, there is value in the population-specific information gained in this study.

As a nurse educator, it is my desire to meet the needs of my students and assist them in identifying their particular risks and protective factors to best meet their individual needs. To accomplish this, I would recommend future studies identifying these needs, based on the information obtained in the demographics questionnaire, and then tailoring the intervention to address specific needs identified.

Timing of Intervention

The timing of the intervention provided both benefits and detriments. The six-week intervention began near the end of a semester when students were preparing for final exams and the holiday break. Time 1 measurements were taken during a time when students normally experience increased stress and/or anxiety. The intervention began near the end of the semester and continued during a time of break from school for the holidays. This allowed students time to reflect on the information delivered via tweets during a time of reduced school-based stress. Finally, the last weeks of the intervention occurred during the beginning of a new semester, which was ideal for continuing the resilience education to reinforce protective factors that may be useful in dealing with the normally anticipated stressors that occur with a new semester. Stress levels may have been increased at the T2 data collection due to the beginning of a new semester and responses may not have been carefully considered due to extraneous environmental influences. While other study plans may incorporate different times and experiences during the intervention period, this study benefited from the intervention lasting through various fluctuations during the usual nursing student's academic schedule. A longer study may allow more time for critical reflection and increase the effectiveness of the intervention.

Population

Some of the limitations are related to the use of adolescent college students. Their interpretation of stressful events, possible developmental immaturity, social

desirability, and the nature of the nursing school experience may introduce potential issues with data collection. The timing of data collections may have coincided with times of added stress which could have influenced the responses of the participants and/or caused attrition at T2 and T3.

Recommendations for Future Studies

A moderate amount of qualitative data was gathered from this study and needs to be analyzed. This study used the combined score of the CD-RISC to measure resilience growth. Future studies could explore the various subscales within this instrument for a more detailed exploration of the concept. Multilevel modeling revealed unexpected results at T3, which supports the need for future exploration, including longer spans between times of data collection, possible addition(s) of data collections times, and a qualitative component to more thoroughly assess participants' views. A larger sample would also allow the examination of random effects with the MLM. There is also a need for instrument development to measure health risk behaviors of nursing students.

Following on the heels of the IOM's (2011) report to increase the number of BSN graduates to 80% by 2020, we are seeing increasing numbers of RN-BSN and second-degree programs within colleges/schools of nursing. As with adolescent nursing students, these students have their own risks and protective factors that need to be examined to develop/increase resilience. Many students who did not meet the age criteria for this study approached me with requests to be included in future studies with older nursing students. They expressed interest in both the purpose of the study (increasing resilience) and the method of delivery (Twitter). Future studies could use a similar

format to explore the needs of these populations and the effectiveness of the use of Twitter (or other forms of social media) to increase resilience within these groups. As with older students, future studies could also explore resilience-increasing interventions and the specific characteristics of male nursing students, minority students, and/or students who are married/have children.

Future studies could benefit from increasing the length of the intervention to span an entire year of nursing school or even a longitudinal study following participants throughout their nursing program. Additionally, the measurement of biological markers (e.g. blood pressure, weight, stress cortisol levels, etc.) could provide valuable information on the effectiveness of the resilience-enhancing intervention and any relationships between these variables and perceived stress and/or sense of support. As previously discussed, Twitter participation in both groups dwindled during the last two weeks of the intervention, when students began a new semester. This could be due to the normal stressors involved in beginning new courses and clinical rotations and the increased activity normally seen on campus at the beginning of a new semester. An increased length of intervention may be beneficial to observe these trends more closely and compare to an entire year (or more) of school. Additionally, it may be beneficial to incorporate additional measurements of perceived stress to coincide with specific events during a school year to determine times when stress-reduction measures may be beneficial and to explore curriculum alternatives.

The use of web-based data collection tools could be of benefit in future studies to eliminate some of the problems encountered with data collection (e.g. missing data,

scheduling conflicts/delays, and environmental issues during the data collection sessions). It would also address the complaints voiced by some of the students regarding the negative aspects of completing multiple forms.

Twitter was found to be a convenient, cost-effective, and enjoyable means of intervention delivery for the researcher. Most of the participants in this study indicated they already had Twitter accounts, but a few needed assistance in establishing their accounts. For this study, I sent instructions via email, provided assistance by telephone/email, and provided a link to a Twitter help site. While the use of a protected Twitter account provided notification when participants had successfully followed the appropriate research group, it is not known if all tweets were read by all participants. Only nine participants engaged in the Twitter dialogue and there was no interaction between participants. This leads me to believe not all participants received the intervention as intended, which would explain a lack of significant increase in scores over time.

In two separate studies, Lowe and Laffey (2011) and Rinaldo, Tapp, and Laverie (2011) explored the use of Twitter with college students in marketing education courses. Lowe and Laffey (2011) found, as in this study, that students did not interact much with the tweets, but still found the use of Twitter to be very effective for those who did participate. They found several students were reluctant to adopt the new technology, and emphasize students need to be convinced of the benefits of using it, and advise researchers/educators provide a short “Twitter briefing” (p. 189) to introduce the basics of Twitter. They also recommend: (a) using a Twitter app (mobile application) to route

the tweets through a mobile phone, (b) tweet three-to-five times per week, and (c) reinforce tweet content during class to encourage participation/involvement.

Rinaldo, Tapp, and Laverie (2011) made similar recommendations. Their study found Twitter an effective means to enhance social interaction through out-of-class interactions, which could contribute to resilience-enhancing and social support initiatives. These authors found students were less motivated to participate in a Twitter activity if it was not a regular part of a course. They recommend that educators/researchers explore strategies to encourage participation because students need to engage in the Twitter dialogue to reap the benefits. Results revealed distinct differences in those students who used Twitter and those who did not, indicating it is important to utilize strategies to improve/encourage participation, confirming Kolb's theory of experiential learning, which was the framework for their study. Student resistance was found to be a barrier to student adoption and the authors recommend using creative methods to convince students of the benefits of using Twitter early in the process. Students may feel it will take too much time to learn the technology or that it will not be worth their efforts. They note the importance of finding ways to increase engagement/usage and recommend researchers look for ways to entice students to want to participate.

For this study, my lack of participation in the Twitter activity could have inhibited participation. As previously mentioned, millennials expect immediate feedback and prefer collaborative learning. If they do not get a response from their action, they may not feel it is worthwhile to continue participation. Future studies could explore strategies to increase participation and interaction. As with any new technology, there is a learning

curve. Rinaldo, Tapp, and Laverie (2011) found participants in their study, who expressed initial hesitance with learning the Twitter technology, declared it to be much easier to learn and use than expected. This supports the use of Twitter in future studies and encourages researchers to explore strategies to encourage early adoption by participants. For future studies, the researcher may want to consider a tutorial that can be easily accessed and reviewed by students illustrating the basics of Twitter use and/or a live session to assist students in the creation and navigation of a Twitter account.

Conclusions

This study was based on a post-positivist worldview and explored the effectiveness of an educational intervention delivered via Twitter to increase resilience and sense of support and decrease perceived stress in a sample of baccalaureate nursing students. Using Ahern's model of adolescent resilience as a guiding framework, the intervention focused on various protective factors identified for this population, and sought to develop and/or enhance these in the participants. The findings suggest that the intervention was not effective to decrease stress and increase resilience under these study conditions. In fact, the control group demonstrated a greater reduction in perceived stress and higher resilience scores at T3 measurement compared to the experimental group. It is not known if the results are spurious or due to small sample, length of the study, environmental factors during data collection, a rebound effect, or problems with the intervention delivery. Most likely, it is a combination of these. Situational effects must also be considered, such as added stressors on days of data collection. Despite these

unexpected results, there is some evidence, based on the email survey, that the intervention was beneficial to some students.

Results of this study add to the body of knowledge on the use of Twitter as an educational intervention delivery method, as well as its use as an adjunct to teaching/learning methods. The descriptive portion of the study confirms the importance of identifying specific risks and protective factors for individual populations to better design resilience-enhancing interventions/initiatives to minimize risk and negative outcomes.

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APPENDICES

Appendix A: Demographics Questionnaire

Please indicate the ONE response (unless otherwise indicated) that best represents you.

1. Initials: _____
2. School: _____
3. Year (junior or senior): _____
4. Are you a full-time student: ☐Yes ☐No
5. Email (school and/or personal): _____
6. How old were you on your last birthday? _____
7. Do you currently have a working mobile phone with active contract?
 ☐Yes ☐No
8. Do you currently use text messaging on your mobile phone?
 ☐Yes ☐No
9. Do you currently have a Twitter™ account?
 ☐Yes ☐No

 If yes, what is your account name? _____
10. Gender: ☐ Male ☐ Female
11. Race:
 ☐ American Indian/Alaska Native
 ☐ Asian
 ☐ Pacific Islander
 ☐ White
 ☐ Black or African American
 ☐ More than one race
12. Marital Status:
 ☐ Single
 ☐ Married
 ☐ Divorced
 ☐ Separated
 ☐ Living with spouse/significant other

13. Do you have children?

☐Yes ☐No

If yes, how many? _____ What are their ages? _____

14. High School Education Type: ☐ Public High School

☐ Private High School

☐ Home School

☐ Dual Enrollment

☐ Combination of above (please explain)

15. Current GPA: _____

16. Employment:

☐ None

☐ 1-10 hours per week

☐ 11-20 hours per week

☐ More than 20 hours per week

18. What are your sources of financial support? (Check all that apply.)

☐ Financial aid- grants

☐ Financial aid – loans

☐ Financial aid – work study

☐ Scholarships

☐ Parental/Spouse/family support

☐ Employment

19. Living situation:

☐ On-campus

☐ Off-campus

20. With whom do you live?

☐ Live alone

☐ Live with parents/family

☐ Live with spouse/significant other

☐ Live with friend(s)/roommate(s)

☐ Fraternity/Sorority house

21. Activities (check all that apply):

☐ sports team

☐ college club/organization

☐ church activities

☐ music/art/theatre activities

☐ volunteer/service activities

☐ other community activities

☐ other academic activities

22. Study habits (check the one that most closely represents your time spent studying and/or working on school projects):
- ☐ None
 - ☐ 1-10 hours per week
 - ☐ 11-20 hours per week
 - ☐ More than 20 hours per week
23. What is your religious status?
- ☐ None ☐ Protestant
 - ☐ Catholic ☐ Muslim
 - ☐ Hindu ☐ Jewish
 - ☐ Other (specify) _____
24. As a nursing student, how often do you rely on spiritual faith when faced with stress or problems in your life?
- ☐ Always
 - ☐ Most of the time
 - ☐ Sometimes
 - ☐ Never
25. Have you ever experienced a personal tragedy/trauma?
- ☐ No
 - ☐ Yes
26. Please check all that apply to you:
- ☐ Smoke cigarettes or use other forms of tobacco
 - ☐ Sleep at least 7 hours/night (on average)
 - ☐ Eat breakfast every day
 - ☐ Exercise at least 3 times per week, 20-30 minutes per session
 - ☐ Consistently wear a seatbelt when driving/riding in a car
 - ☐ Have time to relax at least 20-30 minutes each day
 - ☐ Drink more than 2 alcoholic beverages per day (including beer)
 - ☐ Use street drugs (even if occasionally), including marijuana
 - ☐ During the past month, have had unprotected sex with someone outside committed relationship
 - ☐ During the past month, have ridden in a car in which the driver (you or someone else) had been drinking alcohol
27. Who can you count on for emotional support? (Please check all that apply)
- ☐ Parent(s)
 - ☐ Other family member(s)
 - ☐ Friend(s)/Classmates
 - ☐ Spouse/Significant other
 - ☐ Teacher/professor
 - ☐ Coach
 - ☐ Pastor/clergy/minister
 - ☐ Other adult

Appendix B: Perceived Stress Scale

ID: _____ Date: _____

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last four weeks**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

Item	Never	Almost Never	Sometimes	Fairly Often	Very Often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and “stressed”?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Appendix C: Sense of Support Scale

Read each item carefully and circle the number that best describes what is generally true for you today.

Item	Not at all true	Usually not true	Usually true	Completely true
1. I participate in volunteer/service projects.	0	1	2	3
2. I have meaningful conversations with my parents and/or siblings.	0	1	2	3
3. I have a mentor(s) in my life I can go to for support/advice.	0	1	2	3
4. I seldom invite others to join me in my social and/or recreational activities.	0	1	2	3
5. There is at least one person I feel a strong emotional tie with.	0	1	2	3
6. There is no one I can trust to help solve my problems.	0	1	2	3
7. I take time to visit with my neighbors.	0	1	2	3
8. If a crisis arose in my life, I would have the support I need from family and/or friends.	0	1	2	3
9. I belong to a club (e.g. sports, hobbies, support group, special interests).	0	1	2	3
10. I have friends from school that I see socially (e.g. movie dinner, sports, etc.).	0	1	2	3
11. I have friendships that are mutually fulfilling.	0	1	2	3
12. There is no one I can talk to when making important decisions in my life.	0	1	2	3
13. I make an effort to keep in touch with friends.	0	1	2	3

14. My friends and family feel comfortable asking me for help.	0	1	2	3
15. I find it difficult to make new friends.	0	1	2	3
16. I look for opportunities to help and support others.	0	1	2	3
17. I have a close friend(s) whom I feel comfortable sharing deeply about myself.	0	1	2	3
18. I seldom get invited to do things with others.	0	1	2	3
19. I feel well supported by my friends and/or family.	0	1	2	3
20. I wish I had more people in my life that enjoy the same interests and activities as I do.	0	1	2	3
21. There is no one that shares my beliefs and attitudes.	0	1	2	3

Appendix D: Permission to use Connor-Davidson Resilience Scale

Dear Teresa:

Thank you for your interest in the Connor-Davidson Resilience Scale (CD-RISC). We are pleased to grant permission for use of the CD-RISC in the project you have described under the following terms of agreement:

1. You agree not to use the CD-RISC for any commercial purpose, or in research or other work performed for a third party, or provide the scale to a third party. If other off-site collaborators are involved with your project, their use of the scale is restricted to the project, and the signatory of this agreement is responsible for ensuring that all collaborators adhere to the terms of this agreement.
2. You may use the CD-RISC in written format or through administration over the telephone or in a secure electronic format in which the scale is protected from unauthorized distribution or the possibility of modification.
3. The scale's content may not be modified, although in some circumstances the formatting may be adapted, with permission of either Dr. Connor or Dr. Davidson. If you wish to create a non-English language translation or culturally modified version of the CD-RISC, please let us know and we will provide details of the standard procedures.
4. Three forms of the scale exist: the original 25 item version and two shorter versions of 10 and 2 items respectively. When reproducing the CD-RISC 25, CD-RISC 10 or CD-RISC 2, whether in English or other language, please include the full copyright statement and use restrictions as it appears on the scale.
5. A fee of \$ 50 US is payable to Jonathan Davidson at 3068 Baywood Drive, Seabrook Island, SC 29455, USA, by either cheque, bank draft, international money order or Western Union.
6. Complete and return this form via email to david011@mc.duke.edu, along with the attached User's Profile form describing the nature of the project in which you plan to use the CD-RISC.
7. In any publication or report resulting from use of the CD-RISC, you do not publish or partially reproduce the CD-RISC without first securing permission from the authors.

If you agree to the terms of this agreement, please email a signed copy to the above email address, along with the completed User's Profile form. Upon receipt of the signed agreement and of payment, we will email a copy of the scale.

For questions regarding use of the CD-RISC, please contact Jonathan Davidson at david011@mc.duke.edu. We wish you well in pursuing your goals.

Sincerely yours,

Jonathan R. T. Davidson, M.D.
Kathryn M. Connor, M.D.

Agreed to by:

Teresa M. Stephens _____ June 25, 2011 _____
Signature (printed) Date

MSN, RN – PhD Student _____

University of Tennessee, College of Nursing _____

Appendix E: Content of the Connor-Davidson Resilience Scale

Item no.	Description
1	Able to adapt to change
2	Close and secure relationships
3	Sometimes fate or God can help
4	Can deal with whatever comes
5	Past success gives confidence for new challenge
6	See the humorous side of things
7	Coping with stress strengthens
8	Tend to bounce back after illness or hardship
9	Things happen for a reason
10	Best effort no matter what
11	You can achieve your goals
12	When things look hopeless, I don't give up
13	Know where to turn for help
14	Under pressure, focus and think clearly
15	Prefer to take the lead in problem solving
16	Not easily discouraged by failure
17	Think of self as strong person
18	Make unpopular or difficult decisions
19	Can handle unpleasant feelings
20	Have to act on a hunch
21	Strong sense of purpose
22	In control of your life
23	I like challenges
24	You work to attain your goals
25	Pride in your achievements

Connor, K., & Davidson, J.R.T. (2003). Development of a new resilience scale: The Connor-Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 18, 76-82.

Appendix F: Follow-Up Email Survey

1. Were the Twitter messages helpful to you?
 - a. If “yes” how were they helpful?
 - b. If “no”, why not?
2. What did you like most about participating in the study?
3. What did you like least about participating in the study?

Appendix G: Consent Form

INFORMED CONSENT STATEMENT

Dear Nursing Student:

You are invited to participate in a research study exploring resilience (ability to adapt and cope).

Purpose of the Research Study

The purpose of this research study is to examine the effectiveness of an educational intervention delivered via Twitter to increase resilience in adolescent nursing students (ages 19-23).

Participation in the study will last approximately 14-16 weeks (6 weeks of Twitter intervention).

What you will be asked to do:

Following a brief explanation of the study, I will ask for your written consent to participate and you will sign this form if you agree. Then I will ask you to complete a demographics form and three brief surveys: resilience, perceived stress, and social support. It is important that you answer the questions as honestly and completely as possible. Once you are done, I will collect your completed surveys and signed consent form. None of your answers will affect your grades or your standing as a student. None of your faculty will know your scores or how you responded to any of the questions.

Time required: Approximately 45 minutes -1 hour

After this first session together, you will be randomly assigned to one of two groups: (a) experimental, or (b) control. Approximately one week after this session, you will be contacted by email to give you instructions on how to follow me on Twitter. Please follow these instructions as soon as possible after receiving the email.

Time required: approximately 10 minutes.

Each week, I will send you 4 tweets. Some will be information; others will be questions. After I send the tweet, you may choose to respond or not. ***Please do not send sensitive information via tweets that you do not want everyone in the group to see.*** Time spent each week will depend on the number of tweets generated. The time spent to read and respond to one tweet will be less than one minute.

Time required for weekly Twitter activity: approximately 6-15 minutes.

At the end of the six weeks, you will meet with me to complete the 3 surveys again. You will also complete these again one month later. These sessions will be held in a location on your school campus at a time before/during/after a regularly scheduled class meeting.

Time required: approximately 30 minutes for each session (60 minutes total).

One to two weeks after our last meeting, you will receive a brief email survey. You will be asked to respond to a few simple questions about your experience with this study. Please complete this survey within 24 hours of receipt. Your honest responses are very important. **Time required:** less than 5 minutes.

_____ Participant's initials (place on the bottom front page of consent forms)

RISKS

There are minimal risks for participating in this study. You do not have to answer any survey questions that make you feel uncomfortable. You do not have to respond to any tweets you receive during the study. You may realize the need to change some of your behaviors or aspects of your life as a result of participating in this study. Every effort will be taken to assure confidentiality, but loss of confidentiality may occur due to unforeseen events.

BENEFITS/INCENTIVES

You may benefit from this study by experiencing increased resilience, increased sense of support, and/or decreased perceived stress, but no benefit can be guaranteed.

All participating students will receive a \$10 Wal-Mart giftcard. You will receive the gift card at the final data collection time. You will be able to note your participation in an interventional research study in your school portfolio, resume/CV, and job applications.

CONFIDENTIALITY

All information that you provide will be kept confidential and stored securely. Your identity will be coded and the researcher and research team will be the only persons with access to your identity. All forms linking your name to the identity code will be kept separate from the data. Only the researcher, members of the research committee, members of the UT IRB and its staff, and authorized research personnel, may inspect the records from this research project. The results of this study may be published in a journal article, presented at a conference, or displayed in a poster. However, the data obtained from you will be combined with data from others in the publication. There will be no way to identify you personally in any way in published results of this research.

EMERGENCY MEDICAL TREATMENT

The University of Tennessee does not "automatically" reimburse subjects for medical claims or other compensation. If physical injury is suffered in the course of research, or for more information, please notify the investigator in charge (list PI name and phone number).

_____ Participant's initials

CONTACT INFORMATION

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, **Teresa M. Stephens**, at tsteph13@utk.edu and 423-276-4310 (cell). If you have questions about your rights as a participant, contact the UTK Office of Research [Compliance Officer](#) at (865) 974-3466.

Brenda Lawson

Compliance Officer and IRB Administrator
UT Knoxville Office of Research
1534 White Ave.
Knoxville, TN 37996-1529
Phone: (865) 974-7697
Fax: (865) 974-7400
Email: blawson@utk.edu

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime by contacting **Teresa Stephens** via email (tsteph13@utk.edu) without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data will be destroyed.

CONSENT

I have read the above information. I have received a study information sheet with the researcher's contact information. I agree to participate in this study.

Participant's signature _____ Date _____

Investigator's signature _____ Date _____

FUTURE RESEARCH STUDIES

Do you give permission for the researcher to contact you again for future research activities? Your signature does not obligate you to participate in any future research activities, only that you are willing to be contacted.

☐ **Yes, I give my permission for the researcher to contact me again for future research activities.**

☐ **No, I do not want to be contacted for future research activities.**

Signature: _____

Date: _____

Study Information

Purpose of the Research Study

The purpose of this research study is to examine the effectiveness of an educational intervention delivered via Twitter to increase resilience in adolescent nursing students.

What you will be asked to do:

Following a brief explanation of the study, I will ask for your written consent to participate and you will sign a form if you agree. Then I will ask you to complete a demographics form and 3 brief surveys: resilience, social support, and perceived stress. It is important that you answer the questions as honestly and completely as possible. Once you are done, I will collect your completed surveys and signed consent form. None of your answers will affect your grades or your standing as a student. None of your faculty will know your scores or how you responded to any of the questions.

After you complete the last survey, you will be randomly assigned to one of two groups: (a) experimental, or (b) control.

After being assigned to your group, you will be contacted by email to give you instructions on how to follow me on Twitter. Please follow these instructions as soon as possible after receiving the email.

Each week, I will send you 4 tweets. Some will be information; others will be questions. After I send the tweet, you may choose to respond or not. ***Please do not send sensitive information via tweets that you do not want everyone in the group to see.*** Time spent each week will depend on the number of tweets generated. The time spent to read and respond to one tweet will be less than one minute.

At the end of the six weeks, you will meet with me to complete the 3 surveys again. You will also complete these again one month later. These sessions will be held in a location on your school campus at a time before/during/after a regularly scheduled class meeting.

One to two weeks after our last meeting, you will receive a brief email survey. You will be asked to respond to a few simple questions about your experience with this study. Please complete this survey within 24 hours of receipt. Your honest responses are very important.

RISKS

There are minimal risks for participating in this study. You do not have to answer any survey questions that make you feel uncomfortable. You do not have to respond to any tweets you receive during the study. You may realize the need to change some of your behaviors or aspects of your life as a result of participating in this study. Every effort will be taken to assure confidentiality, but loss of confidentiality may occur due to unforeseen events.

BENEFITS/INCENTIVES

You may benefit from this study by experiencing increased resilience, increased sense of support, and/or decreased perceived stress, but no benefit can be guaranteed.

All participating students will receive a \$10 Wal-Mart giftcard. You will receive the gift card at the final data collection time. You will be able to note your participation in an interventional research study in your school portfolio, resume/CV, and job applications.

CONFIDENTIALITY

All information that you provide will be kept confidential and stored securely. Your identity will be coded and the researcher and research team will be the only persons with access to your identity. Only the researcher, members of the research committee, members of the UT IRB and its staff, and authorized

research personnel, may inspect the records from this research project. The results of this study may be published in a journal article, presented at a conference, or displayed in a poster presentation. However, the data obtained from you will be combined with data from others in the publication. There will be no way to identify you personally in any way in published results of this research.

EMERGENCY MEDICAL TREATMENT

The University of Tennessee does not "automatically" reimburse subjects for medical claims or other compensation. If physical injury is suffered in the course of research, or for more information, please notify the investigator in charge (list PI name and phone number).

CONTACT INFORMATION

If you have questions at any time about the study or the procedures, (or you experience adverse effects as a result of participating in this study,) you may contact the researcher, **Teresa M. Stephens**, at tsteph13@utk.edu and 423-276-4310 (cell). If you have questions about your rights as a participant, contact the Office of Research [Compliance Officer](#) at (865) 974-3466.

Brenda Lawson

Compliance Officer and IRB Administrator
UT Knoxville Office of Research
1534 White Ave.
Knoxville, TN 37996-1529
Phone: (865) 974-7697
Fax: (865) 974-7400
Email: blawson@utk.edu

PARTICIPATION

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at anytime by contacting **Teresa Stephens** via email (tsteph13@utk.edu) without penalty and without loss of benefits to which you are otherwise entitled. If you withdraw from the study before data collection is completed your data destroyed.

Appendix I: University Resources

UT Counseling Center Services

The Counseling Center is the university's primary facility for personal counseling, psycho-therapy, and psychological outreach and consultation services. Our mission is to promote the psychological, educational, and social well-being of the student of the University of Tennessee and to help prepare them to be productive members of society. Our staff members provide a variety of services for students, faculty, and staff, including:

- Walk-in intake
- Crisis intervention
- Individual, couples and group counseling and psychotherapy
- Psychoeducational workshops and consultation

The Counseling Center is located on Volunteer Blvd. across from Greve and Dunford Halls, near the Haslam Business Building.

To seek initial services, you can be seen during our walk-in hours (Monday-Friday » 10am-3:30pm). You do not need to make an appointment. The walk-in screening is a brief (usually 10-15 minutes) meeting that gives you an opportunity to discuss your present concerns with a counselor. If you cannot come in during the walk-in times, [contact the Center](#) and ask the receptionist to assist you in making an appointment.

Counseling Center
900 Volunteer Blvd.
Knoxville, TN 37996-4250
Phone: (865) 974-2196

Email: counselingcenter@utk.edu

For a complete listing of available services, please go to the following website:

<http://counselingcenter.utk.edu/>

Center Hours: 8:00 am to 5:00 pm, Monday thru Friday

Daytime Emergencies: Either call (974-2196) or come to the center from 8:00 am. to 5:00 pm.

After 5 p.m.: Go to the emergency room of the UT Medical Center or the nearest local hospital

Transportation: Students who are on campus and need transportation, call Campus Police at 974-3114.

Mobile Crisis is Available 24/7 at 865-539-2409.

1-800-SUICIDE or 1-800-784-2433

National Suicide Prevention Lifeline: (1-800-273-TALK) (www.suicidepreventionlifeline.org)



Emergencies

Call 911 if you think that the student is an immediate danger to self or others.

Distressed Students

The goal of the [Distressed Student Protocol](#) is to foster student success and well-being. This protocol was developed as a guide for faculty, staff, and students in helping distressed or distressing students. Please call 865-974-HELP or visit the website for more information.

<http://volaware.utk.edu/distressed.shtml>

ETSU Counseling Center Services

The counseling center is a service available to all current ETSU students. There is no charge for counseling services and only a nominal fee for psychiatry services. Please see website for complete details of all services offered: <http://www.etsu.edu/students/counseling/default.aspx>

We are located on the third floor of the D.P. Culp Center.

Walk-in hours for new intakes:

Monday – Thursday, 10:00a.m. – 11:30 a.m. & 2:30p.m. – 3:30 p.m.

Telephone: (423) 439-4841

Electronic mail: browsd02@etsu.edu

Emergencies: The Counseling Center provides crisis-intervention services to ETSU students experiencing mental health emergencies (e.g. psychological trauma, thoughts of harming self or others).

During normal office hours (8:00am - 4:30pm) call the Counseling Center: 439-4841

After normal hours and during weekends, you should either:

- a. contact Public Safety at 439-4480 (on campus)
- b. call 9-1-1 (off campus)
- c. go directly to your local emergency room

If you contact Public Safety, they can notify our on-call counselor who can then respond to your emergency situation.

If you have been sexually assaulted, contact your local emergency room and/or police department.

For more information about sexual assault emergencies go to

http://www.etsu.edu/students/counseling/health/sexual_assault.aspx

Do NOT contact us via e-mail for emergency situations. We cannot guarantee when we may receive or be able to respond to e-mail messages, nor can we ensure their confidentiality.

Emergency Contacts:

General Emergency Assistance	911
ETSU Public Safety	423-439-4480
Johnson City Police Department	423-434-6160
Johnson City Medical Center	423-431-6111
Woodridge Hospital	423-928-7111
Safe Passage (Domestic Violence Shelter)	423-926-7233
Contact Ministries (Local Crisis Hotline)	423-926-0144
National Hopeline Network (Suicide Hotline)	1-800-784-2433

Other University Resources:

Student Health Services 423-439-4225

Disability Services 423-439-8346

Peer Career Center 423-439-8651

Career Placement and Internship Services 423-439-4441

Community Resources:

Watauga Mental Health Clinic 423-232-2600

ETSU Community Counseling Center 423-439-7679

University Physicians (Psychiatric Clinic) 423-439-8000

Alcoholics Anonymous 423-928-0871

Frontier Health Mobile Crisis Line (24-hrs day) 423-928-9062

Franklin Woods Community Hospital 423-302-1000

Appendix J: Email Twitter Instructions

Hello Study Participants!

Thanks again for volunteering to participate in my dissertation research study. You have been randomly assigned to one of two groups (a) Research Group 0, or (b) Research Group 1. You will soon receive an email from one of these inviting you to "Join me" on Twitter. After you receive this email, please follow the instructions listed below as soon as possible. You will begin receiving tweets from me on Monday, December 12th and will receive 4 tweets/wk for the next 6 weeks.

Steps to follow after receiving email from Research Group/Twitter account:

1. Go to email invitation from ResearchGroup0 or ResearchGroup1. (Note: if you listed more than one email address you will receive more than 1 invitation. You only need to acknowledge one of these.)
2. Click "Join me on Twitter".
3. You may be prompted to log into your Twitter account (if not already logged in).
4. You will be taken to the appropriate ResearchGroup homepage.
5. Click "send follow request". (These are protected/private groups, so you must be approved by me to belong to the group.)
6. Once I have approved you (within 1-2 days), go to your Twitter profile page.
7. Find the appropriate ResearchGroup under "Following".
8. Click the name of the group (ResearchGroup0 or ResearchGroup1).
9. Activate the mobile phone icon to receive tweets via text messaging on your phone. (Note: This is a free service from Twitter, but standard text messaging rates apply.) The mobile phone icon will turn green when activated.
10. If your phone is not already linked to Twitter, text START to 40404.

You may choose to respond to tweets and engage in conversation with others in your group. I will not participate beyond sending the initial tweet. Please do not send messages that you do not want the entire group to see. The groups are protected and those outside the group will not be able to receive retweets.

*Please contact me at tsteph13@utk.edu if you have any questions!
See you on Twitter in a few days!*

Appendix K: Twitter Script

Experimental Group

Attention Placebo Control

Week One – Social Support

Monday: Call or visit someone each day this week who gives you support. Tell us about it.

Wednesday: Who helps you the most with the stress of being a nursing student? How do they help you?

Friday: Who loves you “no matter what”? Do you rely on them when feeling stressed?

Saturday: Who helps you stay on track or do what is best for you to remain positive and healthy?

Week Two – Positive Emotions

Tuesday: Make your thoughts and words this week be positive. Encourage others to do the same.

Wednesday: What have you learned from past mistakes or failures?

Friday: Who is the most positive influence in your life? What can you learn from him/her?

Saturday: What are you thankful for?

Week Three - Humor

Monday: Laugh out loud at least once a day. Try smiling at everyone you meet.

Wednesday: Laughter is a great stress-buster! Who/what makes you laugh?

Friday: Don't forget to laugh at yourself. Humor can be found in almost every situation.

Sunday: Spend some time with someone who enjoys life and knows how to laugh. Learn from them.

Week One

Monday: Check out the CDC website: www.cdc.gov

Wednesday: How many bones are in the human body?

Friday: What is the bell of the stethoscope used for?

Sunday: What is a nevus?

Week Two

Tuesday: Bruxism is teeth grinding during sleep.

Wednesday: What is a bruit?

Friday: How do you determine the mean arterial pressure?

Saturday: Where is the spleen?

Week Three

Monday: A medication's half-life is the time it takes for 1/2 of the drug to be eliminated from the body

Wednesday: What does a Holter monitor do?

Friday: Emboli come in many forms: blood clot, fat, air, or amniotic fluid

Sunday: R. bronchus is longer and straighter than the L. increasing the risk of right lobe aspiration pneumonia

Week Four – Knowledge of Health Behaviors

Tuesday: Do something everyday this week to improve your health (diet, exercise, sleep). Tell us about it.

Thursday: Sleep, healthy diet, and exercise are great stress-busters! Try using them in your own life.

Friday: What did you do this week to be healthier? How did it make you feel?

Saturday: How do you plan to improve or maintain good health? Who supports you in these efforts?

Week Five – Self-Knowledge

Monday: Believing in your ability to make decisions and take actions helps you succeed in the challenge you are facing.

Wednesday: What is your greatest strength? How does this help you?

Friday: Look at mistakes as learning opportunities. Make a plan for the next time you face a similar situation.

Sunday: Who/What are your top 3 priorities? Does the way you spend your time reflect your priorities?

Week Six – Effective Coping

Tuesday: Physical coping methods include getting enough sleep, being physically active everyday, and eating healthy. Try them!

Wednesday: What creates stress in your life? What helps you cope with stress?

Friday: Emotional coping methods include talking to someone you trust, writing in a journal, or receiving counseling. Try them!

Saturday: What can you do to improve your coping skills? Did you try anything new this week?

Week Four

Tuesday: Antidiuretic hormone is stored in the posterior pituitary gland.

Thursday: Plain D5W is rapidly metabolized in children, leaving free water which can result in cerebral edema.

Friday: What is a low residue diet?

Saturday: What are S/S of an allergic reaction?

Week Five

Monday: Weight gain is an early symptom of congestive heart failure due to accumulation of fluid.

Wednesday: If amniocentesis fluid contains Barr bodies, what is the sex?

Friday: The therapeutic serum level for Dilantin is 10 - 20 mcg/mL

Sunday: Who was known as the “angel of the battlefield?”

Week Six

Tuesday: Morphine sulfate can suppress respiration and respiratory reflexes, such as cough.

Wednesday: What is Glucagon?

Friday: The parathyroid glands regulate the calcium level in the blood.

Saturday: What are Fluorescein drops used for?

Appendix L: Email Survey Results

	Experimental (n = 8)	Control (n = 15)
Question 1: <i>Were the Twitter messages helpful to you?</i>	“Yes” = 7 (87.5%) “No” = 1 (12.5%)	“Yes” = 12 (80%) “No” = 3 (20%)
1A: <i>If “yes”, how were they helpful?</i>	• “They were a good reminder of how to handle my stress.” • “They made me take a few minutes to really reflect on who/what makes me happy and helps to relieve my stress. This definitely made me more appreciative of the people in my life.” • “It allowed me to think more positively even when I was stressed.” • “Provided messages that made me conscientiously think about my actions and feelings.” • “They were inspiring, and I felt encouragement during this stressful time in school.” • “It made me think more about my life and the stress in it and reminded me to relax, take time for myself, and do things that make me happy!”	• “They helped me to think back to what I had learned.” • “They were all about things we had discussed in class so it was a helpful refresher/reminder of what they were when I forgot what exactly the definition/concept was about.” • “They caused me to think about things that most people believe to be common sense but are often forgotten.” • “They were helpful because they gave me information I didn’t know and were interesting or information I should know and I researched the answer.” • “They were quick bits of information and made me think.” • “They provided information about health topics.” • “Got me thinking about things.” • “They made me think and reminded me of things I had been learning about.” • “I learned several small things that I did not know.”
1B: <i>If “no”, why not?</i>	No responses	• “They were kind of random. I think statements would have been better than questions.” • “I don’t use Twitter so I never really checked it or understood

		what the purpose was.”
Question 2: <i>What did you like most about participating in the study?</i>	• “Responding to the tweets and seeing how others responded to the same questions.” • “I love tweeting! So obviously I loved the twitter part of this study ☺.” • “The positive thoughts it brought to the surface.” • “Receiving daily messages.” • “I liked receiving the tweets the best. It also allowed me to look at my attitudes and support system when under stress.” • “Constant reminders to be happy and thankful!” • “It gave me insight about myself and how I cope with stress.”	• “Using Twitter” • “Laid back process and resourceful information obtained” • “It helped to jog my memory about things that I had learned.” • “It was a simple study that didn’t take up much time and only required reading tweets. Also, the study consisted of something I did everyday (reading tweets) so it wasn’t like I had to remember to do something everyday for the study.” • “The tweets about different subjects which I hadn’t thought about in a while.” • “Reminded me of nursing over the break.” • “Gift card” • “The info posted that made me think ‘WOW’!” • “It was not time consuming.” • “That it was done over Twitter because I have never participated in a study done this way before.” • “The posts” • “Seeing tweets about things I was learning.” • “I loved that it was on Twitter.” • “It was easy” • “It was easy to do and follow”
Question 3: <i>What did you like least about participating in the study?</i>	• “There wasn’t really anything I didn’t like.” • “Nothing. I thoroughly enjoyed it!” • “I did not want everyone to see my responses so I did not publish them, only thought them.” • “Nothing” • “There was not anything I did not like.” • “Nothing!” • “Filling out the paperwork.”	• “There was not any dislikes about the study..)” • “Nothing” • “The usage of twitter as means of communication. I could not get into the habit to check my account on a regular basis as I am not in the habit of doing so.” • “Having to meet up to do the 3 surveys.” • “N/A” • “Nothing” • “Some of the things tweeted I hadn’t learned about yet.”

		• “Nothing” • “I just forgot to look at Twitter a lot because I’ve never used it before.....Facebook would have been more convenient.” • “No one responded so sometimes I didn’t see the point.” • “I didn’t really know what it was about.” • “Nothing” • “Having to meet multiple times to fill out paperwork.” • “I liked everything” • “Filling out lots of repetitive surveys” • “Needs more interaction”
--	--	--

Appendix M: MLM Syntax

COMMENT Use the "long file" data set for these analyses.

COMMENT This recodes the time variable.

RECODE Time (3=2) (2=1) (1=0).

COMMENT This creates the scatterplots for individual cases by group.

COMMENT Do the intercepts (status at pretest) vary among individuals and, if so, why (demographics)?

Do individuals change over time and, if so, by how much, in what direction, and are there differences among individuals?

If there is change over time is it linear, or curvilinear?

Are the intercepts or slopes different for the control and experimental groups?.

SORT CASES BY Group.

SPLIT FILE LAYERED BY Group.

GRAPH

/SCATTERPLOT(BIVAR)=Time WITH PSS BY id.

GRAPH

/SCATTERPLOT(BIVAR)=Time WITH CDRS BY id.

GRAPH

/SCATTERPLOT(BIVAR)=Time WITH SSS BY id.

SPLIT FILE OFF.

COMMENT SPSS provides two-tailed probability values by default. These probability values should be divided in half when testing variance estimates for significance (However, a two-tailed test is appropriate for a significance test of the intercept-slope covariance).

COMMENT PSS Hox M1, p. 88: null model.

COMMENT Unconditional means model (Singer & Willett, p. 92).

COMMENT Describes the change in each student's DV over time as a flat line (slope=0) for each students mean DV value.

COMMENT Use this model to calculate the ICC and design effect and from this determine whether MLM is necessary.

COMMENT The intercept is the mean value of the DV across all students and times.

COMMENT The residual variance is the repeated measures (level 1) variance.

COMMENT The intercept variance is the subject level (level 2) variance.

COMMENT The repeated measures and subject level variance are used to calculate the ICC (Hox, p. 86) and this can be used to determine the proportion of variance

due to level 1 and 2.

COMMENT Model assumes that the rate of change is the same for all students (Hox, p. 89).

MIXED PSS WITH Time

```
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.0000000000001) HCONVERGE(0,
  ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED=| SSTYPE(3)
/METHOD=ML
/PRINT=G SOLUTION TESTCOV
/RANDOM=INTERCEPT | SUBJECT(ID) COVTYPE(VC).
```

COMMENT Quadratic PSS.

MIXED PSS WITH Time QuadTime Group

```
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.0000000000001) HCONVERGE(0,
  ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED=Time QuadTime Group Time*Group QuadTime*Group | SSTYPE(3)
/METHOD=ML
/PRINT=G R SOLUTION TESTCOV
/REPEATED=Time QuadTime | SUBJECT(ID) COVTYPE(UN).
```

COMMENT Linear PSS.

MIXED PSS WITH Time Group

```
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.0000000000001) HCONVERGE(0,
  ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED=Time Group Time*Group | SSTYPE(3)
/METHOD=ML
/PRINT=G R SOLUTION TESTCOV
/REPEATED=Time | SUBJECT(ID) COVTYPE(UN)
```

COMMENT SSS Hox M1, p. 88: null model.

COMMENT Unconditional means model (Singer & Willett, p. 92).

COMMENT Describes the change in each student's DV over time as a flat line (slope=0)
for each students mean DV value.

COMMENT Use this model to calculate the ICC and design effect and from this
determine whether MLM is necessary.

COMMENT The intercept is the mean value of the DV across all students and times.

COMMENT The residual variance is the repeated measures (level 1) variance.

COMMENT The intercept variance is the subject level (level 2) variance.
COMMENT The repeated measures and subject level variance are used to calculate the
ICC (Hox, p. 86) and this can be used to determine the proportion of variance
due to level 1 and 2.

COMMENT Model assumes that the rate of change is the same for all students (Hox, p.
89).

MIXED SSS WITH Time

```
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
  ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED=| SSTYPE(3)
/METHOD=ML
/PRINT=G SOLUTION TESTCOV
/RANDOM=INTERCEPT | SUBJECT(ID) COVTYPE(VC).
```

COMMENT Quadratic SSS.

MIXED SSS WITH Time QuadTime Group

```
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
  ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED=Time Group QuadTime Time*Group QuadTime*Group | SSTYPE(3)
/METHOD=ML
/PRINT=G R SOLUTION TESTCOV
/REPEATED=Time QuadTime| SUBJECT(ID) COVTYPE(UN).
```

COMMENT Linear SSS.

MIXED SSS WITH Time Group

```
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
  ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
/FIXED=Time Group Time*Group | SSTYPE(3)
/METHOD=ML
/PRINT=G R SOLUTION TESTCOV
/REPEATED=Time | SUBJECT(ID) COVTYPE(UN).
```

COMMENT Linear SSS.

MIXED SSS WITH Time Group

```
/CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
```

```

    ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
    /FIXED=Time | SSTYPE(3)
    /METHOD=ML
    /PRINT=G R SOLUTION TESTCOV
    /REPEATED=Time | SUBJECT(ID) COVTYPE(UN).

COMMENT CDRS Hox M1, p. 88: null model.
COMMENT Unconditional means model (Singer & Willett, p. 92).
COMMENT Describes the change in each student's DV over time as a flat line (slope=0)
    for each students mean DV value.
COMMENT Use this model to calculate the ICC and design effect and from this
determine whether MLM is necessary.
COMMENT The intercept is the mean value of the DV across all students and times.
COMMENT The residual variance is the repeated measures (level 1) variance.
COMMENT The intercept variance is the subject level (level 2) variance.
COMMENT The repeated measures and subject level variance are used to calculate the
    ICC (Hox, p. 86) and this can be used to determine the proportion of variance
    due to level 1 and 2.
COMMENT Model assumes that the rate of change is the same for all students (Hox, p.
89).
MIXED CDRS WITH Time
    /CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
    ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
    /FIXED=| SSTYPE(3)
    /METHOD=ML
    /PRINT=G SOLUTION TESTCOV
    /RANDOM=INTERCEPT | SUBJECT(ID) COVTYPE(VC).

COMMENT Quadratic CDRS.
MIXED CDRS WITH Time QuadTime Group
    /CRITERIA=CIN(95) MXITER(100) MXSTEP(10) SCORING(1)
SINGULAR(0.000000000001) HCONVERGE(0,
    ABSOLUTE) LCONVERGE(0, ABSOLUTE) PCONVERGE(0.000001,
ABSOLUTE)
    /FIXED=Time Group QuadTime Time*Group QuadTime*Group | SSTYPE(3)
    /METHOD=ML
    /PRINT=G R SOLUTION TESTCOV
    /REPEATED=Time QuadTime| SUBJECT(ID) COVTYPE(UN).

```

VITA

Teresa “Tese” Lynn Maggard Stephens was born on December 29, 1963 in Radford, Va. The oldest child of Bill and Linda Maggard, she was raised in the Indian Springs community of northeast Tennessee. She graduated from Sullivan Central High School in 1982 and received a Bachelor of Science in Nursing degree from East Tennessee State University in May 1987 and soon moved to Spartanburg, SC where she completed a Maternal-Child Internship program while working as a registered nurse in labor and delivery. After completion of the internship, she returned to northeast Tennessee where she worked as a registered nurse in the Emergency/Trauma department of Holston Valley Hospital and Medical Center. Over the next few years she taught various nursing and health-related courses in the hospital and community settings while working in various aspects as a registered nurse and also spent some time living in Singapore. In December 2009, she realized a goal of obtaining her Master of Science in Nursing degree from King College and soon began the pursuit of a Doctor of Philosophy in Nursing degree at the University of Tennessee. She has currently completed all course requirements and successfully passed her comprehensive exams. This dissertation completes her requirements for the Doctor of Philosophy degree with expected date of graduation as May 2012.

Tese is married to G. Scott Stephens and has one son, Hunter Scott Stephens, who is a student at Tennessee Tech University. She currently resides in Blountville, TN with her family and four dogs.