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Development of a Text Message Stress Management Intervention and its Impact on Perceived Stress and Coping Self-efficacy among Student Nurses

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy in Community Health Promotion

by

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Abstract

Purpose: The purpose of the two studies was to develop a text message intervention and examine its effects on lowering perceived stress and increasing coping self-efficacy among nursing students. We also explored stress perceptions and investigated student satisfaction with the text message stress management program. **Methods**: For the first study, twenty three students participated in the focus groups for intervention development. Sample messages were presented to participants and feedback was requested. The messages were modified based on student feedback. The second study utilized an experimental pre/post design with a convenience sample (N=101) to examine the effects of the text message stress management intervention. An analysis of covariance (ANCOVA) was conducted to control for initial individual differences in pre perceived stress and pre self-efficacy scores. **Results**: All participants reported feelings of perceived stress and feedback resulted in a 30 message text message intervention. One message, Monday through Friday, was texted over a six week period. There was not a statistically significant difference in post perceived stress scores. However, there was a statistically significant difference in post intervention coping self-efficacy scores between the intervention and control groups, F (1,85) = 14.18, $p < .01$, $\eta 2 = .14$. The students provided favorable feedback about the intervention. **Conclusions**: Text messages are an effective means to communicate and provide support to students. This intervention shows promise in increasing student confidence and ability to cope with stress. Many factors, such as time in the semester and life events, contribute to feelings of perceived stress. Nonetheless, increasing self-efficacy in effectively coping with stress could be beneficial in buffering future stress encounters as students transition into professional practice.

Keywords: nursing student, stress, coping self-efficacy, text message, stress management

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CHAPTER 1: INTRODUCTION

Stress and daily pressures exist throughout the life span; however, young adulthood is an especially vulnerable time for high levels of stress to be experienced (Doom & Haeffel, 2013; Van Kim & Nelson, 2013). Millennials (ages 23-38) reported higher average stress levels than other adults (American Psychological Association, 2014). These younger generations are also most likely to report that their stress levels have increased in the past year (American Psychological Association, 2014). In a study of undergraduates, 45% of students reported experiencing at least two major stressors in the past 12 months and 26% reported that they were unable to manage their stress (Lust, Ehlinger, & Golden, 2010). The effects of stress have made such a negative physical and psychological impact on student well-being and academic success that there is a national effort to address it. The American College Health Association established Healthy Campus 2020 objectives in order to focus on nationwide health issues and work towards improvements across the nation's college campuses (American College Health Association, 2016). One of the Healthy Campus 2020 objectives is an effort to reduce the number of students who report a decline in academic performance as a result of stress with a 10% target improvement (American College Health Association, 2016).

College students are exposed to a large number of stressors, inclusive of academic stressors such as learning complex material, carrying intensive academic workloads, maintaining grade point averages, deciding on career paths, facing increased competition for professional programs, and having fewer job opportunities at graduation (Aselton, 2012; Kadhiravan & Kumar, 2012). College students also experience societal pressures such as exposure to new temptations, substance abuse, decreased resources and support from families, issues with roommates and romantic partners, and emerging sexual identities (Ekpenyong, Daniel, & Aribo,

2013; Kadhiravan & Kumar, 2012). Perceived time constraints and the inability to balance are also great sources of stress. College students frequently get overwhelmed with the balance of extra-curricular activities, work, and study/academic demands (Millet-Thompson, 2017; Zhang, Peters, Chen, 2017). Finally, increased financial responsibilities, food insecurity and rising cost of tuition and living expenses (Aselton, 2012; Coiro, Bettis, & Compas, 2017) are also noted stressors college students face.

Stress and Nursing Students

Students enrolled in baccalaureate nursing programs incur the typical stressors afflicting college students with the addition of stressors unique to nursing majors (Reeve, Shumaker, Yearwood, Crowell, & Riley, 2013). The nursing profession has a reputation as being a high stress profession and unfortunately the stress begins as early as nursing school. Reports of high stress are prevalent among nursing students in literature (He, Turnbull, Kirshbaum, Phillips, & Klainin-Yobas, 2018; Jameson, 2014; Zhang et al., 2018). In a focus group study examining stress perceptions, all nursing students reported feeling stressed (Henderson, 2019). Entrance into nursing programs is highly competitive and pressures intensify once students are admitted. Being around other highly driven people, the difficulty of nursing exams, and not being able to find a balance with clinical, school, and life are recounted sources of stress (Henderson, 2019). Many nursing programs have more rigorous grading scales and course failures result in program dismissals (Turner & McCarthy, 2017). The fear of failure and concern about clinical competence are also major stressors for nursing students (Wolf, Stidham, & Ross, 2015; Zyga, 2013). Clinical days are strenuous with exposure to new, challenging, and at times emotional situations (Zyga, 2013). Students are exposed to complicated situations that require high levels of critical thinking as well as death, dying, and chronic suffering during clinical rotations (Zyga,

2013). A student in Wolf, Stidham, & Ross's (2015) study expressed concern with getting through nursing program and knowing enough as a nurse. Students also struggle with time management in balancing long clinical days with multiple deadlines, didactic assignments, and high stakes testing demands (Timmins, Corroon, Byrne, & Mooney, 2011; Reeve et al., 2013; Wolf, Stidham, & Ross, 2015).

Social Support and Technology

Social support can be a protective buffer from stress (Aselton, 2012; Karaca, Yildirim, Cangur, Acikgoz, & Akkus, 2019; Chao, 2012; Van Kim & Nelson, 2013); however, social support among college students has been declining in the past several years (Chao, 2012). Weakened social ties have occurred with the advent and increasing utilization of smart phones (Twenge, 2017). This technology connects individuals; however, less time is spent in face-to-face interaction, and more time is spent interacting with friends online and through social media platforms (Twenge, 2017). According to Twenge (2017), those who spend more time than average online and less average time with friends in person are more likely to be depressed (Twenge, 2017). These mental health concerns are related to disengagement, false or shallow relationships, and cyberbullying. Even though mobile technology can be a source of stress and isolation, educators can use the heavy student reliance on cell phones to their advantage in sending health messages. A nursing program in the United Kingdom experienced success in student retention by sending students supportive and informational text messages over the course of a twelve week period (Boath et al, 2016). The students in the study also found the text messages as a favorable channel to receive information (Boath et al, 2016).

Effects of Stress

The effects of stress have negative physical and psychological impacts on well-being and academic success. Stress is a leading cause of poor academic performance and withdrawal from college classes (Coiro et al, 2017). High levels of perceived stress have been associated with impaired relationships, eating disorders, risk taking behaviors, and drug and alcohol use (Coiro et al., 2017; Kenney, Lac, Labrie, Hummer, & Pham, 2013). Stress also takes a toll on health through physical symptoms of high blood pressure, headaches, muscle tension, and fatigue as well as psychological symptoms of anxiety, irritability, sleep disturbances, and depression (Mayo Clinic, 2017). Anxiety (61%), depression (49%), and stress (45.3%) continue to be the most frequent reasons for college students seeking mental health treatment (Center for Collegiate Mental Health, 2016). Student mental health issues place significant demands on mental health clinics and other resources and result in long waiting periods for services (Hintz, Frazier & Meredith, 2015).

Buffering the Effects of Stress

How an individual copes with stress determines how well the stress is reduced or buffered (Coiro et al., 2017). It is important to establish healthy coping early in life since humans are habitual beings and could continuously engage in unhealthy coping behaviors throughout a lifetime (Kadhiravan & Kumar, 2012). It is a normal response to want to feel better when faced with stress or adversity. This emotion-focused coping response allows a person to experience temporary relief from stress by turning to food, drugs, alcohol, or tobacco (Cousins, Servaty-Seib, & Lockman, 2017; Straud, McNaughton-Cassill, & Fuhrman, 2015). While this behavior does provide short-term comfort, it is only offering temporary relief from the stressor and does not fix the problem. Turning to drugs or alcohol to numb the pains of stress could send

the student into a vicious cycle of abuse as well as create other problems. Emotion-focused coping has been associated with poor health, depression, increased academic stress, and avoidant tendencies (Cousins et al., 2017). On the other hand, problem-focused coping is a healthier, more responsible way to manage perceived stress and has been shown to promote health and build resilience in students (Kadhiravan & Kumar, 2012; Walker & Stephens, 2014). Problem-focused coping occurs when attempts are made to influence the situation to minimize the stressor or threat (Straud et al., 2015). Problem-focused coping facilitates self-efficacy through critical thinking, decision making, assertiveness, communication, and self-regulation skills (Kadhiravan & Kumar, 2012). Therefore it is imperative to bring awareness to the college student population about the benefits of healthy coping as well as the dangers of unhealthy coping.

Social support has also been identified as a positive buffer and protective factor against the effects of stress (Aselton, 2012; Cousins et al., 2017). Studies have shown that students that seek out and receive support from friends, family, and faculty members have higher reported levels of physical and psychological well-being (Cousins et al., 2017). Encouraging students to talk through stressful days, keep in touch with family members, identify a mentor, and surround themselves with positive peer support are examples of social interaction strategies found in literature (Aselton, 2012; Cousins et al., 2017; Chao, 2012; Karaca et al., 2019). Unfortunately, Twenge (2017), reports that less time is spent in face to face interaction and more time is spent interacting with friends online and through social media platforms. Those who spent more time than average online and less average time with friends in person were more likely to be depressed (Twenge, 2017).

Research Aims and Hypotheses

The research aim for Study #1 was to describe the development and testing of the text message stress management intervention by the means of a focus group protocol and literature review.

The following research questions were proposed for Study #2. This study investigates the effects of a text message stress management intervention on reducing perceived stress in nursing students. This study also seeks to examine the impact of a text message stress management program on increasing self-efficacy for effectively coping with stress.

RQ1: Did the post-survey Perceived Stress mean, adjusted for pre-survey Perceived Stress scores, differ between the intervention and control groups?

RQ2: While controlling for pre-survey Coping Self-efficacy scores, did student coping self-efficacy increase as a result of the text message stress management intervention?

RQ3: How satisfied were students with the text message stress intervention?

The null hypothesis states that the independent variable does not influence the dependent variable. On the other hand, the alternative hypothesis makes a statement about the relationship between variables that the researcher is hoping to find. The independent variable in this study is the text message intervention. The covariates are pre-survey Perceived Stress scores and pre-survey Coping Self-efficacy scores. The dependent variables are nursing student Perceived Stress and Coping Self-efficacy. The following null and alternate hypotheses are proposed:

H1o: There will be no difference in post-intervention perceived stress as measured on the Perceived Stress Scale between nursing students in the intervention and the control groups.

H1a: The post-intervention perceived stress levels of nursing students in the treatment

group, as measured on the Perceived Stress Scale, will be lower than the perceived stress levels of nursing students in the control group.

H2o: There will be no change in post-intervention coping self-efficacy, as measured on the Coping Self-efficacy scale between nursing students in the intervention and the control groups.

H2a: The post-intervention coping self-efficacy of nursing students in the treatment group, as measured on the Coping Self-Efficacy Scale, will increase following the text message stress management intervention.

Assumptions

The assumptions identified for these two studies were:

1. Participants will openly share their stress experiences.
2. Participants in the treatment group will read and interpret the text messages.
3. Participants will provide truthful, candid feedback on the sample text messages
4. Participants will provide truthful, accurate self-report responses to the questionnaires.

Limitations

The limitations identified for this study were:

1. The use of a convenience sample limited the generalizability of the findings.
2. Design contamination could occur if the intervention group shared their text messages with the control group.

Definition of Terms

The theoretical definitions for this study were: Stress- A relationship between an individual and the environment that is determined by the individual to be taxing his or her resources and endangering his or her well-being (Lazarus & Folkman, 1984).

1. Coping- The process of using behavioral and cognitive responses in order to manage burdens that are perceived to be stressful (Lazarus & Folkman, 1984).
2. Self-efficacy- An individual's confidence in his or her ability to take action and overcome their obstacles. (National Institute of Health, 2005).

Summary

In summary, the purpose of the first study was to describe the development of the text message stress management intervention development through recommendations in literature as well as focus group input from viewing sample messages. The purposes of the second study was to determine the effects of a text message stress management intervention on reducing perceived stress and increasing coping self-efficacy among nursing students. The need for the study, hypotheses, assumptions, limitations, and theoretical definition of terms have been explained.

REFERENCES

American College Health Association. (2016). *Health impediments to academic performance: Al-1.1*. In Healthy Campus 2020. Retrieved from http://www.acha.org/HealthyCampus/HealthyCampus/Student_Objectives.aspx

American Psychological Association. (2014). *2014 annual report of the American Psychological Association*. Retrieved from https://www.apa.org/about/governance/bdcmte/2014-report.pdf

Aselton, P. (2012). Sources of stress and coping in American college students who have been diagnosed with depression. *Journal of Child and Adolescent Psychiatric Nursing, 25*(3), 119-123. doi:10.1111/j.1744-6171.2012.00341.x

Boath, E., Jinks, A., Thomas, N., Thompson, R., Evans, J., O'Connell, P., & Taylor, L. (2016). Don't go with the 'FLO'-a student mobile texting service to enhance nursing student retention. *Nurse Education Today, 45*, 80-86. doi: http://dx.doi.org/10.1016/j.nedt.2016.06.019

Center for Collegiate Mental Health. (2016). *2016 annual report*. Retrieved from https://sites.psu.edu/ccmh/files/2017/01/2016-Annual-Report-FINAL_2016_01_09-1gc2hj6.pdf

Chao, R. C. (2012). Managing perceived stress among college students: The roles of social support and dysfunctional coping. *Journal of College Counseling, 15*(1), 5-21.

Coiro, M. J., Bettis, A. H., & Compas, B. E., (2017). College students coping with interpersonal stress: Examining a control-based model of coping. *Journal of American College Health, 65*(3), 177-186. doi:10.1080/07448481.2016.1266641

Cousins, C., Servaty-Seib, H. L., & Lockman, J. (2017). College student adjustment and coping: Bereaved and nonbereaved students. *Journal of Death and Dying, 74*(4), 386-409. doi: 10.1177/0030222815598911

Doom, J. R. & Haeffel, G. J. (2013). Teasing apart the effects of cognition, stress, and depression on health. *American Journal of Health Behavior, 37*(5), 610-619. doi: http://dx.doi.org/10.5993/AJHB.37.5.4

Ekpenyong, C., Daniel, N., & Aribo, E. (2013). Associations between academic stressors, reaction to stress, coping strategies and musculoskeletal disorders among college students. *Ethiopian Journal of Health Sciences, 23*(2), 98-112.

He, F. X., Turnbull, B., Kirshbaum, M. N., Phillips, B., & Klainin-Yobas, P. (2018). Assessing stress, protective factors and psychological well-being among undergraduate nursing students. *Nurse Education Today, 68*, 4-12. doi:10.1016/j.nedt.2018.05.013

Henderson, K. J. (2019). *A text message stress management intervention*. Unpublished manuscript, College of Education and Health Professionals, University of Arkansas, Fayetteville, Arkansas.

Hintz, S., Frazier, P. A., & Meredith, L. (2015). Evaluating an online stress management intervention for college students. *Journal of Counseling Psychology, 62*(2), 137-147. doi:10.1037/cou0000014

Jameson, P. R. (2014). The effects of a hardiness educational intervention on hardiness and perceived stress of junior baccalaureate nursing students. *Nurse Education Today, 34*(4), 603-607. doi:10.1016/j.nedt.2013.06.019

Kadhiravan, S. & Kumar, K. (2012) Enhancing stress coping skills among college students. *Researchers World, 3*(4), 49-5.

Karaca, A., Yildirim, S., Cangur, S., Acikgoz, F., & Akkus, D. (2019). Relationship between mental health of nursing students and coping, self-esteem and social support. *Nurse Education Today, 76*, 44-50. doi: https://doi.org/10.1016/j.nedt.2019.01.029

Kenney, S. R., Lac, A., Labrie, J. W., Hummer, J. F., & Pham, A. (2013). Mental health, sleep quality, drinking motives, and alcohol-related consequences: A path-analytic model. *Journal of Studies on Alcohol & Drugs, 74*(6), 841-851.

Lazarus, R. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY; Springer Publishing Company, Inc.

Labrague, L. J., McEnroe-Petitte, D. M., Al Amri, M., Fronda, D. C., & Obeidat, A. A. (2017). An integrative review on coping skills in nursing students: Implications for policymaking. *International Nursing Review, 65*, 279-291

Lust, K., Ehlinger, E., & Golden, D. (2010). *College student health survey report: Health and health-related behaviors Minnesota postsecondary students*. Retrieved from http://www.bhs.umn.edu/surveys/index.htm

Mayo Clinic. (2017). Stress symptoms: Effects on your body and behavior. Retrieved from https://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/stress-symptoms/art-20050987

Millet-Thompson, A. (2017). Dealing with college students' stress, anxiety, and depression. *The Journal for Quality and Participation, 39* (4), 24-27.

National Institute of Health. (2005). *Theory at a glance: A guide for health promotion practice (2nd ed.)*. Retrieved from https://archive.org/details/theoryatglancegu00glan

Reeve, K. L., Shumaker, C. J., Yearwood, E. L., Crowell, N. A., & Riley, J. B. (2013). Perceived stress and social support in undergraduate nursing students' educational experiences. *Nurse Education Today, 33*, 419-424. doi: 10.1016/j.nedt.2012.11.009.

Straud, C., McNaughton-Cassill, M., & Fuhrman, R. (2015). The role of the five factor model of personality with proactive coping and preventative coping among college students. *Personality and Individual Differences, 83*, 60-64. doi:10.1016/j.paid.2015.03.055

Timmons, F., Corroon, A. M., Byrne, G., & Mooney, B. (2011). The challenge of contemporary nurse education programs perceived stressors of nursing students: Mental health and related lifestyle issues. *Journal of Psychiatric and Mental Health Nursing, 18*(9), 758-766.

Turner, K., & McCarthy, V. L. (2017). Stress and anxiety among nursing students: A review of intervention strategies in literature between 2009 and 2015. *Nurse Education in Practice, 22*, 21-29. doi: http://0-dx.doi.org.library.uark.edu/10/1016/j.nepr.2016.11.002

Twenge, J. (2017). The number of teens who are depressed is soaring-and all signs point to smartphones. Retrieved from http://www.businessinsider.com/the-number-of-teens-who-are-depressed-is-soaring-2017-11

Van Kim, N. A., & Nelson, T. F. (2013). Vigorous physical activity, mental health, perceived stress, and socializing among college students. *American Journal of Health Promotion, 28*(1), 7-15.

Walker, R., & Stephens, R. S. (2014). Protective behavioral strategies mediate problem-focused coping and alcohol use in college students. *Addictive Behaviors, 39*(6), 1033-1037. doi:10.1016/j.addbeh.2014.02.006

Wolf, L., Stidham, A. W., & Ross, R. (2015). Predictors of stress and coping strategies of US accelerated vs. generic baccalaureate nursing students: An embedded mixed methods study. *Nurse Education Today, 35*(1), 201-205. doi: https://doi.org/10.1016/j.nedt.2014.07.005

Zhang, Y., Peters, A., & Chen, G. (2018). Perceived stress mediates the associations between sleep quality and symptoms of anxiety and depression among college nursing students. *International Journal of Nursing Education Scholarship*, 1-9. doi:10.1515/ijnes-2017-0020

Zyga, S. (2013). Stress in nursing students. *International Journal of Caring Sciences, 6*(1), 1-2.

CHAPTER 2: LITERATURE REVIEW

Theoretical Framework

How an individual copes with stress determines how well the stress is reduced or buffered (Coiro et al., 2017). Not all coping strategies are considered effective or healthy however (Chao, 2012). It is important to establish healthy coping early in life since humans are habitual beings and could continuously engage in unhealthy coping behaviors throughout a lifetime (Kadhiravan & Kumar, 2012). According to Lazarus and Folkman's Stress, Appraisal, and Coping theory (1984), coping is a constantly evolving cognitive and behavioral effort to manage situations appraised as stressful. Coping is the effort to handle demands regardless if the effort is effective or not (Lazarus & Folkman, 1984). Lazarus and Folkman (1984), theorize that coping either serves the purpose of regulating the emotional responses to the stressor (emotion-focused coping) or handling the problem by making adjustments to the factor(s) causing stress (problem-focused coping). The way an individual copes depends largely on available material resources or personal resources such as social support, social skills, and problem-solving skills (Lazarus & Folkman, 1984).

Emotion-focused coping. Emotion-focused coping is the effort to diminish the emotional reactions to stress through avoidance, denial, disengagement, positive comparisons and distractive indulgences (Lazarus & Folkman, 1984). Engaging in emotion-focused coping allows a momentary escape from overwhelming realities (Lazarus & Folkman, 1984). This coping allows for emotional relief at first, but that relief comes with a high price of increased vulnerability in future stress situations (Lazarus & Folkman, 1984). Emotion-focused coping strategies such as finding the humor or positive aspect in a circumstance aids individuals in maintaining hope and self-esteem (Lazarus and Folkman, 1984); however many emotion-focused

coping strategies are considered ineffective because they focus on the emotional aspect of the stressor and not on the problem itself (Domingues-Hirsch, Barlem, Tomaschewski-Barlem, Lunardi, & de Oliveria, 2015; Fornes-Vives, Garcia-Banda, Frias-Navarro, & Rosales-Viladrich, 2016). Unfortunately, increasing numbers of college students are turning to dysfunctional coping strategies to ease their stress (Chao, 2012). Domingues-Hirsch et al. (2014) found higher perceived stress with coping strategies that focused on pacifying emotion rather than the problem. Similarly, Coiro et al. (2017) concluded the highest stress levels were associated with disengagement coping. Both Tavolacci et al. (2013) and Van Kim and Nelson (2013) found higher levels of perceived stress among female college students. Females were also found to more likely engage in emotionally reactive coping strategies (Ekpenyong et al., 2013; Fornes-Vives et al., 2016). In addition, female participants were more prone to alcohol and tobacco use as well as eating disorders, which are indicative of unhealthy coping behaviors (Tavolacci et al, 2013). These findings are pertinent since the nursing student population is predominantly female (Zhang, Peters, & Chen, 2018). Given the evidence from literature, the first phase of the text message intervention focused on discouraging unhealthy emotion-focused coping strategies related to the concepts of disengagement and avoidance. Table 1 shows disengagement and avoidance sample messages.

Problem-focused coping. Problem-focused coping is often viewed as a more productive approach to coping since an individual attempts to change his/her interaction with the environment and/or steps are taken to mitigate future threats (Lazarus & Folkman, 1984). Problem focused efforts can either be directed at altering the environment through overcoming restraints or directed at self through learning new skills, finding new areas of motivation, and developing new standards of behavior (Lazarus & Folkman, 1984). Problem-focused coping

strategies include focusing on time management, strengthening communication skills, making preparations, and creating action plans (Lazarus & Folkman, 1984). Research has shown that students who regularly engaged in problem-focused coping strategies had less negative stress than students that regularly employed emotion-focused coping strategies (Fornes-Vives et al., 2016). Coiro et al. (2017) also found that students that took control over their stressors had lower anxiety and depressive symptoms. In addition, strengthening communication skills was proved to be a proactive coping strategy effective in reducing stress (Kadhiravan & Kumar, 2012).

Social support. Social skills are an important coping resource in facilitating cooperative problem solving and obtaining assistance and support from others (Lazarus & Folkman, 1984). Social support can be emotional, informational, and/or tangible with positive effects such reducing worry, setting a good example, providing helpful information, and sharing problems (Lazarus & Folkman, 1984). Many studies have shown the value of social support as a positive buffer from stress (Aselton, 2012; Karaca et al., 2019; Chao, 2012; Van Kim & Nelson, 2013). Social support is an essential defense against stress and low social support weakens an individuals' well-being (Chao, 2012). In Van Kim and Nelson's study (2013), low socialization resulted in a higher levels of perceived stress among participants. Also, Karaca et al. (2019) reported that nursing students with positive social support were less likely to suffer from mental health problems. It is recommended that nursing education programs focus on establishing social support among students (Karaca et al., 2019). Reeve et al. (2015) found that traditional students are more likely than nontraditional students to seek social support from fellow nursing students. Educators can help reduce student stress by providing support to students and creating a respectful environment that is conducive to learning (Reeve et al., 2015).

Self-care practices. A person that is frail or sick has less energy to devote to managing stress than a healthy individual; therefore, maintaining health is an important resource for coping with stress (Lazarus & Folkman, 1984). In addition to problem-focused coping strategies, self-care practices such as physical activity, mindfulness, and adequate sleep were found to be effective in managing stress. Both Tavolacci et al. (2013) and Van Kim and Nelson (2013) determined that students with the highest physical activity levels reported the lowest perceived stress. In addition, exercising was one of the top reported activities beneficial for reducing stress (King et al., 2012). Benefits of mindfulness and meditation have also been examined. In van der Riet, Rossiter, Kirby, Dluzewska, & Harmon's (2015) study, nursing students reported that a mindfulness/meditation program had positive benefits in stress reduction as well as self-care practices. Lastly, adequate sleep was found to be essential in managing stress. According to Zhang et al. (2018), nursing students are at risk for poor sleep patterns due to irregular clinical hours; therefore, promoting sleep is vital for well-being and managing stress. Therefore, the second phase of the text message stress management program was designed to promote problem-focused coping strategies, social support, and self-care practices. Table 2 depicts the sample messages for phase 2.

Self-efficacy. Self-efficacy is not a construct in the Stress, Appraisal, and Coping theory, but Lazarus & Folkman refer to Bandura's theory. In Bandura's Social Learning Theory, self-efficacy is defined as an individual's confidence in his or her ability to take action and overcome their obstacles. (National Institute of Health, 2005). When people believe that outcomes are contingent on their own behavior instead of luck or chance, they cope more effectively (Lazarus & Folkman, 1984). Self-efficacy is a predominant concept in literature for effectively managing stress. If a person does not have the knowledge and confidence to engage in healthy coping

behaviors, then stress could continue to go unmanaged. Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li &Yang, 2009). Increasing self-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li & Yang, 2009). Having positive self-beliefs is a valuable psychological resource for coping (Lazarus & Folkman, 1984). The last phase of the text message intervention was created to strengthen self-efficacy by providing healthy coping encouragement and affirmation. The sample messages related to self-efficacy are displayed in Table 3.

A three-phased approach was strategically chosen to scaffold effective coping practices. The first phase was designed to discourage unhealthy coping practice in order for participants to have a clean foundation in which to build healthy coping practices upon. The second phase launched problem-focused coping strategies and self-care practices. The third phase further promoted healthy coping practices by providing reinforcement and support. The cumulative effect of the text-message stress management intervention was intended to strengthen coping self-efficacy and lower perceived stress among nursing students.

Search Term Results

There is a plethora of literature on stress as related to nursing students. Searching the Cumulative Index of Nursing and Allied Health Literature (CINAHL) with key words student nurses or nursing students and stress returned 1,153 results. Literature addressing stress management interventions for nursing students was also abundant with 358 articles yielded with key words stress and nursing students or student nurses and interventions. Limiting the search to articles published in the past five years reduced the number to 108 results. However, literature

related to texting as an intervention to impact health behavior was limited. There was only one article generated with the search terms stress and nursing students or student nurses and text messages. Expanding the search to include all undergraduate students was not much more lucrative. Using search terms stress and college students or university students or undergraduates and text messages yielded three results; however, one of the articles was not applicable as it did not address text messages as a stress management intervention. The literature review highlighted a gap in literature examining the effectiveness of text message program as a motivational tool to manage stress. This study could be a literary contribution on the topic of using text-messaging as a motivational tool to change behavior such as better stress management.

Nursing Student Stress Interventions

Many nursing programs are aspiring to reduce the stress of their students by implementing stress management interventions such as mindfulness practices (Guillaumie, Boiral, & Champagne, 2017; Koren, 2017; Marthiensen, Sedgwick, & Crowder, 2019; Ratanasiripong, Park, Ratanasiripong, & Kathalae, 2015; Song & Lindquist, 2015; van der Riet et al., 2015). Even though there has been supportive evidence for mindfulness practices, this intervention is a single-faceted approach and does not provide students with a robust enough skill set to effectively cope with stress (Beanlands, et al., 2019). Attempts to reduce stress should not be limited to just a single intervention; stress interventions should be grounded in theory and have multiple facets (Beanlands et al., 2019). According to Delaney et al. (2016), the most impactful stress management programs utilize multiple interventions.

There are limited articles with multi-faceted interventions targeted at strengthening coping skills among nursing students. Turner and McCarthy (2017) appraised 26 articles on stress intervention strategies and only four of the articles utilized multiple approaches. In one

study, Beanlands et al. (2019) explored the effects of an eight week Dialectical Behavioral Therapy (DBT) intervention to promote emotional health among student nurses. DBT is an intervention that teaches students to regulate emotions, enhance problem solving skills, and develop relationship skills through didactic instruction, role play, and homework (Beanlands et al., 2019). Thirty one students participated in the study and their qualitative feedback revealed the intervention was convenient and effective in building their coping strategies as well as self-care strategies (Beanlands et al., 2019).

Delaney et al. (2016), examined the effects of the NURSE stress management program among 40 junior nursing students. The NURSE program used two 2 ½ hour simulations to deliver content that focused on caring for self, developing awareness of stress, using positive affirmations, using resources, building resilience, managing time, and learning strategies such as guided imagery and deep breathing (Delaney et al., 2016). The mixed methods study used interviews, surveys, and academic records to measure the study findings (Delaney et al., 2016). Even though there was not a statistically significant difference in perceived stress, resilience, or GPA between the control and intervention groups, the qualitative feedback indicated the intervention was acceptable among nursing students and increased the students' knowledge of stress management (Delaney et al., 2016).

Jameson (2014) used a hardiness education intervention to lower stress in nursing students. The education focused on various coping strategies to strengthen hardi-attitudes of commitment, control, and challenge (Jameson, 2014). A pre/post quasi-experimental design was used to examine the impacts of the hardiness intervention among a sample of 79 junior nursing students (Jameson, 2014). The hardiness intervention did have a statistically significant impact in lowering stress scores (Jameson, 2014).

Meng and Qi (2018) developed an emotional intelligence intervention to lower perceived stress and strengthen communication skills in nursing students. The emotional intelligence intervention consisted of 10 two hour sessions that trained students on reducing anxiety, changing perceptions, and coping with stressors (Meng & Qi, 2018). The study utilized an experimental pre/post design to measure effects of the intervention (Meng & Qi, 2018). The intervention was effective in lowering perceived stress and enhancing communication skills among the intervention group (n=40) and no changes were found among the control (n=41) (Meng & Qi, 2018).

Text Message Programs

A text message is a brief communication that is sent or received by a portable electronic device (Your Dictionary, 2016). Since most students have access to mobile electronic devices, text messages could be an effective way to communicate information as well as stimulate prompts to action. A university in the United Kingdom capitalized on the fact that students had constant access to their mobile phones by using an automated text message system, FLO, as an intervention to reduce attrition among their undergraduate nursing student population (Boath, et al., 2016). FLO is a short messaging service originally designed as patient telehealth service, but was modified to send text messages to participating nursing students that provided information, support, and reassurance in attempt to alleviate stress (Boath, et al., 2016). Message topics included reminders to visit personal tutors, information about university activities, and locations of available support services (Boath, et al., 2016). The program evaluation was favorable and the authors found the texts messages were beneficial in facilitating a supportive environment for the students (Boath, et al., 2016).

Glowacki et al. (2018) also studied impacts of a text-messaging program; however, the study population included all university students and was not limited to nursing students. The text-message program was an overall health and wellness program with messages designed to target health behaviors of alcohol risk reduction, nutrition, physical activity, sleep, healthy sexuality, stress management, and campus resources (Glowacki et al., 2018). Participants (N = 1,095) received two to four text messages a week throughout a fall semester (Glowacki et al., 2018). The post-intervention survey results indicated that messages about sleep, stress management, and hydration were most valued by students (Glowacki et al., 2018). Glowacki et al. (2018) found that 55% of participants felt the messages were relevant for them and their health and 61% reported that the messages increased their knowledge on how to stay healthy. The authors concluded that a text-messaging program was a viable strategy to enhance student health.

Other Technology Interventions for Stress Management

Since there was scant evidence related to text messages as a stress management intervention, literature with technology related interventions were explored using search terms stress management and online or mobile application and college students. An article using a mobile app and an article utilizing an online stress intervention were found to be pertinent. Crandall, Steward, and Warf (2016), studied the effectiveness of a mobile app in reducing perceived stress in college students. The mobile app, Bingocize, blended physical activity; health education in areas of time management, helpful coping skills, and self-care techniques; and the game of bingo into a stress management program (Crandall, Steward, and Warf, 2016). The authors found that Bingocize was effective in lowering Perceived Stress Scale Scores and increasing stress management knowledge in their undergraduate participants. Perceived Stress

Scale scores were reduced 17.7% and stress management knowledge as measured by the Stress Management Knowledge test increased by 26.6% (Crandall et al., 2016).

The convenience of mobile devices also facilitates web-based interventions (Hebda & Czar, 2013). Hintz, Frazier, and Meredith (2015) examined the effectiveness of an online stress management intervention in 292 undergraduate students. Their intervention was comprised of four online modules that contained education about common college student stressors, positive outcomes associated with present control, barriers to present control, and practice application activities that students completed over a seven day period (Hintz et al., 2015). The researchers found the intervention to be effective with participants having lower levels of stress and anxiety as measured on the Depression Anxiety Stress Scale and the Perceived Stress Scale (Hintz et al., 2015). Saleh, Camart, Sbeira, and Romo (2018) also explored the impact of an internet-based stress management program in their experimental study of 128 university students. The internet self-help program contained four sessions with content targeted to increase well-being, enhance coping strategies, and increase weekly physical activity (Saleh et al., 2018). The intervention had positive results with the experimental group having lowering perceived stress and higher self-esteem than participants in the control group and those effects were maintained over a three month period (Saleh et al., 2018).

Summary

This chapter has included a discussion of Richard Lazarus and Susan Folkman's Stress, Appraisal, and Coping theory specifically regarding the constructs of emotion-focused coping, problem-focused coping, self-care practices, and social support as a conceptual framework for this study. The construct of self-efficacy and its relationship with stress was also discussed. The literature on the variables under investigation of stress interventions for nursing students, text

message programs, and additional technology interventions for stress were reviewed. The next chapter will elaborate on the methodology employed for these two studies.

REFERENCES

Aselton, P. (2012). Sources of stress and coping in American college students who have been diagnosed with depression. *Journal of Child and Adolescent Psychiatric Nursing, 25*(3), 119-123. doi:10.1111/j.1744-6171.2012.00341.x

Beanlands, H., McCay, E., Fredericks, S., Newman, K., Rose, D., Santa Mina, E., … Wang, A. (2019). Decreasing stress and supporting emotional well-being among senior nursing students: A pilot test of an evidence-based intervention. *Nurse Education Today*, *76*, 222–227. https://0-doi-org.library.uark.edu/10.1016/j.nedt.2019.02.009

Boath, E., Jinks, A., Thomas, N., Thompson, R., Evans, J., O'Connell, P., & Taylor, L. (2016). Don't go with the 'FLO'-a student mobile texting service to enhance nursing student retention. *Nurse Education Today, 45*, 80-86. doi: http://dx.doi.org/10.1016/j.nedt.2016.06.019

Chao, R. C. (2012). Managing perceived stress among college students: The roles of social support and dysfunctional coping. *Journal of College Counseling, 15*(1), 5-21.

Coiro, M. J., Bettis, A. H., & Compas, B. E., (2017). College students coping with interpersonal stress: Examining a control-based model of coping. *Journal of American College Health, 65*(3), 177-186. doi:10.1080/07448481.2016.1266641

Crandall, K. J., Steward, K. & Warf, T. M. (2016). A mobile app for reducing perceived stress in college students. *American Journal of Health Studies, 31*(2), 68-73.

Delaney, C., Barrere, C., Robertson, S., Zahourek, Diaz, D., & Lachapelle, L. (2016). Pilot testing of the NURSE stress management intervention. *Journal of Holistic Nursing, 34*(4), 369-389. doi: 10.1177/0898010115622295

Domingues-Hirsch, C., Devos Barlem, E. L., Tomaschewski-Barlem, J. G., Lerch Lunardi, V., & Calçada de Oliveira, A. C. (2015). Predictors of stress and coping strategies adopted by nursing students. *Acta Paulista de Enfermagem, 28*(3), 224–229. doi: https://0-doi-org.library.uark.edu/10.1590/1982-0194201500038

Ekpenyong, C., Daniel, N., & Aribo, E. (2013). Associations between academic stressors, reaction to stress, coping strategies and musculoskeletal disorders among college students. *Ethiopian Journal of Health Sciences, 23*(2), 98-112.

Fornes-Vives, J., Garcia-Banda, G., Frias-Navarro, D., & Rosales-Viladrich, G. (2015). Coping, stress, and personality in Spanish nursing students: A longitudinal study. *Nurse Education Today, 36*, 318-323. doi: http://dx.doi.org/10.1016/j.nedt.2015.08,.0110260-6917

Guillaumie, L., Boiral, O., & Champagne, J. (2017). A mixed-methods systematic review of the effects of mindfulness on nurses. *Journal of Advanced Nursing (John Wiley & Sons, Inc.)*, *73*(5), 1017–1034. https://0-doi-org.library.uark.edu/10.1111/jan.13176

Glowacki, E., Kirtz, S., Wagner, J. H., Cance, J. D., Barrera, D., Bernhardt, J. M. (2018). HealthyhornsTXT: A text-messaging program to promote college student health and wellness. *Health Promotion Practice, 19*(6), 844-855. doi:10.1177/1524839917754089

Hebda, T. & Czar, P. (2013). *Handbook of informatics for nurses and health care professionals.* (5th ed). Upper Saddle River, New Jersey: Pearson Education, Inc.

Hintz, S., Frazier, P. A., & Meredith, L. (2015). Evaluating an online stress management intervention for college students. *Journal of Counseling Psychology, 62*(2), 137-147. doi:10.1037/cou0000014

Hirsch, C. D., Barlem, E. L. D., de Almeida, L. K., Tomaschewski-Barlem, J., Figueira, A. B., & Lunardi, V. L. (2015). Coping strategies of nursing students for dealing with university stress/Estratégias de coping de acadêmicos de enfermagem diante do estresse universitário/Estrategias de afrontamiento de los estudiantes de enfermería diante del estrés universitario. *Revista Brasileira De Enfermagem, 68*(5), 501-508. Retrieved from http://0-search.proquest.com.library.uark.edu/docview/1737492613?accountid=8361

Jameson, P. R. (2014). The effects of a hardiness educational intervention on hardiness and perceived stress of junior baccalaureate nursing students. *Nurse Education Today, 34*(4), 603-607. doi:10.1016/j.nedt.2013.06.019

Kadhiravan, S. & Kumar, K. (2012) Enhancing stress coping skills among college students. *Researchers World, 3*(4), 49-5.

Karaca, A., Yildirim, S., Cangur, S., Acikgoz, F., & Akkus, D. (2019). Relationship between mental health of nursing students and coping, self-esteem and social support. *Nurse Education Today, 76*, 44-50. doi: https://doi.org/10.1016/j.nedt.2019.01.029

King, K., Singh, M., Bernard, A., Merianos, A. L., & Vidourek, R. A. (2012). Employing the health belief model to examine stress management among college students. *American Journal of Health Studies, 27*(4), 192-203.

Koren, M. E. (2017). Mindfulness interventions for nursing students: Application of modelling and role modelling theory. *International Journal of Caring Sciences*, *10*(3), 1710–1716. Retrieved from http://0-search.ebscohost.com.library.uark.edu/login.aspx?direct=true&db=ccm&AN=127731966&site=ehost-live&scope=site

Lazarus, R. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY; Springer Publishing Company, Inc.

Li, M., & Yang, Y. (2009). Determinants of problem solving, social support seeking, and avoidance: A path analytic model. *International Journal of Stress Management, 16*(3), 155-176. doi: 10.1037/a0016844

Marthiensen, R., Sedgwick, M., & Crowder, R. (2019). Effects of a Brief Mindfulness Intervention on After-Degree Nursing Student Stress. *Journal of Nursing Education*, *58*(3), 165–168. https://0-doi-org.library.uark.edu/10.3928/01484834-20190221-07

Meng, L., & Qi, J. (2018). The effect of an emotional intelligence intervention on reducing stress and improving communication skills of nursing students. *NeuroQuantology, 16*(1) doi:http://0-dx.doi.org.library.uark.edu/10.14704/nq.2018.16.1.1175

National Institute of Health. (2005). *Theory at a glance: A guide for health promotion practice (2nd ed.)*. Retrieved from https://archive.org/details/theoryatglancegu00glan

Newport, F. (2014). *The new era of communication among Americans*. Retrieved from http://www.gallup.com/poll/179288/new-era-communication-americans.aspx

Ratanasiripong, P., Park, J. F., Ratanasiripong, N., & Kathalae, D. (2015). Stress and Anxiety Management in Nursing Students: Biofeedback and Mindfulness Meditation. *Journal of Nursing Education*, *54*(9), 520–524. https://0-doi-org.library.uark.edu/10.3928/01484834-20150814-07

Reeve, K. L., Shumaker, C. J., Yearwood, E. L., Crowell, N. A., & Riley, J. B. (2013). Perceived stress and social support in undergraduate nursing students' educational experiences. *Nurse Education Today, 33*, 419-424. doi: 10.1016/j.nedt.2012.11.009.

Saleh, D., Camart, N., Sbeira, N., & Romo, L. (2018). Can we learn to manage stress? A randomized controlled trial carried out on university students. *PLoS ONE 13*(9), 1-15. doi: https://doi.org/10.1371/journal.pone.0200997

Song, Y., & Lindquist, R. (2015). Effects of mindfulness-based stress reduction on depression, anxiety, stress and mindfulness in Korean nursing students. *Nurse Education Today*, *35*(1), 86–90. https://0-doi-org.library.uark.edu/10.1016/j.nedt.2014.06.010

Tavolacci, M. P., Ladner, J., Grigioni, S., Richard, L., Villet, H., & Dechelotte, P. (2013). Prevalence and association of perceived stress, substance use and behavioral addictions: a cross-sectional study among university students in France, 2009-2011. *BMC Public Health, 13*(724), 1-8. doi:1471-2458/13/724

Turner, K. & McCarthy, V. L. (2017). Stress and anxiety among nursing students: A review of intervention strategies in literature between 2009 and 2015. *Nurse Education in Practice, 22*, 21-29. doi: http://0-dx.doi.org.library.uark.edu/10/1016/j.nepr.2016.11.002

van der Riet, P., Rossiter, R., Kirby, D., Dluzewska, T., & Harmon, C. (2015). Piloting a stress management and mindfulness program for undergraduate nursing students; Student

feedback and lessons learned. *Nurse Education Today, 35*, 44-49. doi: 10.1016/j.nedt.2014.05.003

Van Kim, N. A., & Nelson, T. F. (2013). Vigorous physical activity, mental health, perceived stress, and socializing among college students. *American Journal of Health Promotion, 28*(1), 7-15.

Your Dictionary. (2016). Text message. Retrieved from https://www.yourdictionary.com/text-message

Zhang, Y., Peters, A., & Chen, G. (2018). Perceived stress mediates the associations between sleep quality and symptoms of anxiety and depression among college nursing students. *International Journal of Nursing Education Scholarship*, 1-9. doi:10.1515/ijnes-2017-0020

TABLES

Table 1

Phase 1 Sample Messages

Concept	Citation	Sample
Disengagement/avoidance	Hirsch, Barlem, de Almeida, Tomaschewki-Barlem, Figueira, & Lunardi, (2015) found higher perceived stress with coping strategies that focused on pacifying emotion rather than the problem. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Avoiding your problems is not effective. Whatever it is will be there tomorrow or the next day or the next.
Avoidance	College students frequently get overwhelmed with extra-curricular activities, work, and school demands; poor balancing is a major source of stress (Zhang, Peters, Chen, 2017). Millet-Thompson (2017) proposes that promoting greater school/work/life balance will reduce student anxiety and stress. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Staying super busy and stressed out does not really make you seem more important.
Disengagement/avoidance	Hirsch, Barlem, de Almeida, Tomaschewki-Barlem, Figueira, & Lunardi (2015) found higher perceived stress with coping strategies that focused on pacifying emotion rather than the problem. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Having that big piece of chocolate cake (or other vice) will not really make all your problems disappear.
Disengagement/avoidance	Hirsch, Barlem, de Almeida, Tomaschewki-Barlem, Figueira, & Lunardi (2015) found higher perceived stress with coping strategies that focused on pacifying emotion rather than the problem. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Trying to drink your problems away is not the solution. Your problems will still be there and you will have a headache.

Note. First phase of the text-message stress management program. Phase 1 was designed to discourage unhealthy coping strategies.

Table 2

Phase 2 Samples Messages

Concept	Citation	Sample
Plan of action	Students that take control over their stressor have lower anxiety and depressive symptoms (Coiro, Bettis, & Compas, 2017).	Take control of your time. Make a schedule so you can tell your time where to go.
Communication skills	Strengthening communication skills is a proactive coping strategy effective in reducing stress (Kadhiravan & Kumar, 2012).	Express yourself directly to someone today. Exercise respectful, assertive communication.
Social support	Van Kim and Nelson (2013) found that low socialization resulted in a higher odds of perceived stress. Social support is an essential defense against stress; low social support weakens an individuals' well-being (Chao, 2012).	This is a reminder to put down your phone and talk to the people around you.
Social support	Van Kim and Nelson (2013) found that low socialization resulted in a higher odds of perceived stress. Social support is an essential defense against stress; low social support weakens an individuals' well-being (Chao, 2012).	Work to build relationships with the people around you. Things don't seem as bad when your friends are there.
Sleep	Nursing students are at risk for poor sleep patterns due to irregular clinical hours; promoting sleep is vital for well-being and managing stress (Zhang, Peters, & Chen, 2018).	Make sure you get at least 7 hours of sleep tonight.
Mindfulness/meditation	Nursing students reported that the mindfulness/meditation invention had positive benefits in stress reduction as well as self-care (van der Riet, Rossiter, Kirby, Dluzewska, & Harmon, 2015).	Go for a walk and identify three things you appreciate about nature.
Mindfulness/meditation	Nursing students reported that the mindfulness/meditation invention had positive benefits in stress reduction as well as self-care (van der Riet, Rossiter, Kirby, Dluzewska, & Harmon, 2015).	Take a 10 minute time out today. Deep breathe, daydream, pray, or stretch.

Table 2

Phase 2 Samples Messages Continued

Concept	Citation	Sample
Social Support	Aselton (2012) found that divulging emotions and talking through stressful experiences was a beneficial coping strategy. King et al. (2012) found that two of the top reported techniques beneficial for reducing stress was exercising and talking to someone.	Talk to someone about your stress today. Don't just let it build up inside.

Note. Second phase of the text-message stress management program. Phase 2 was designed to encourage problem-focused coping strategies, social support, and self-care practices.

Table 3

Phase 3 Sample Messages

Concept	Citation	Sample
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	You can build meaningful relationships. Put your phone down and connect with someone today.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	Visualize positive outcomes. You can be successful on your exams and assignments this week.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	Believe in yourself. You can accomplish your goals.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	Exercise is not a chore. It's a mood booster. You can spare 30 minutes a day to exercise.

Table 3

Phase 3 Sample Messages Continued

Concept	Citation	Sample
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	You can overcome the stress you are facing.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	You are not alone. Others believe in you and support you.

Note. Third phase of the text-message stress management program. Phase 3 was designed to strengthen self-efficacy.

CHAPTER 3: METHODS

Manuscript #1

Sampling and Recruitment. A convenience sample of undergraduate nursing students was recruited in September 2018, through email and posted flyers, after receiving approval from the university's Institutional Review Board. Appendix A contains the recruitment email and Appendix B contains the recruitment flyer. The recruitment messages invited students enrolled in nursing classes to participate in a focus group, in order to understand the stress experiences of undergraduate nursing students and examine the feasibility of a text message stress management program. Three 45-minute focus groups were offered. Fruit and cookies, as well as a chance to win a $50 gift card, were advertised as incentives. A sign-up sheet was posted on the author's door with focus group dates and times. Interested participants signed up for a focus group by identifying their semester in nursing program and phone number.

Human Subjects. The proposal was submitted for approval through the university's Institutional Review Board. The proposal received exempt approval. The protocol approval is found in Appendix C. Participants were given a typed informed consent form and voluntary consent was provided. Appendix D contains the consent form.

Focus Groups. The focus groups were an essential component of the text message stress management intervention development process. In total, three focus groups were conducted to inform and cultivate the text message intervention. Feedback resulted in revision of messages as well as the development of additional messages. All focus groups were face-to-face and held in meeting rooms within the nursing building. The first focus group had 6 participants, the second focus group had 6 participants, and the third focus group had 11 participants, for a total of 23 participants. The majority of the students were 18-20 years old and female. Table 1 displays the

demographic characteristics of participants. Each focus group lasted 30-45 minutes and was recorded with student permission.

Prior to each focus group, participants were sent a text thanking them for their interest and reminding them of the time and location of the focus group for which they signed up for. These messages served as reminders as well as tested the functionality of the Remind ™application. The Remind ™ Application is a free text messaging application that allows text messages to be sent directly to phones and translates messages into more than 70 languages (Remind ™, 2017). At the beginning of each focus group, confirmation that the participants received the reminder texts and written informed consent was obtained. Participants were then given a brief survey to collect demographic data. Appendix E contains the Demographic Data form. The initial discussion was guided by a set of structured questions with the intention of exploring stress experiences and current coping strategies. The questions were constructed from stress concepts found in literature. Table 2 depicts focus group questions with rationale and support from literature. Examples of questions included, "What times in the semester do you feel most stressed? and "How do you typically cope with stress?" Participants were also asked their preferred channel of communication. Appendix F contains the focus group questions.

After the dialogue on stress experiences and coping, participants were shown the sample text messages. Lazarus and Folkman's (1984) *Stress, Appraisal, and Coping* theory constructs of emotion-focused coping, problem-focused coping, social support, and self-care practices were used as a framework in creating the sample messages. These constructs with the addition of self-efficacy were searched in literature related to stress and stress management. Given the evidence from literature, a three phase approach was chosen. The first phase of the text message intervention focused on discouraging unhealthy emotion-focused coping strategies related to the

concepts of disengagement and avoidance. Table 3 shows disengagement and avoidance sample messages. The second phase of the text message stress management program was designed to promote problem-focused coping strategies and self-care practices. Table 4 depicts the sample messages for phase 2. The last phase of the text message intervention was intended to strengthen self-efficacy by providing healthy coping encouragement and affirmation. The sample messages related to self-efficacy are displayed in Table 5. A Microsoft Power-Point slide-show with 19 sample messages was projected on a large screen for easy viewing. Participants were shown the messages one-by-one and asked for open feedback. Participants were vocal in their responses and needed little prompting. Detailed notes were taken. After all the messages were viewed, participants were asked about the overall cultural appropriateness, length, and understandability of the messages. They were asked how often they would prefer to receive the messages as well as the most optimum time of the day. Participants were also asked to provide feedback on likelihood of reading and acting on the text messages.

Analysis. Each focus group was recorded with student permission. The focus group sessions were each transcribed while listening for any emergent themes. The transcripts were then cross-referenced with notes taken during sessions for accuracy. Next, the transcripts and notes were organized and coded by communication preference, stress experiences, coping strategies, and message feedback. Themes were identified and meaningful quotes that supported the themes were isolated.

Manuscript #2

The remainder of this chapter explains the methodology used in the text message intervention study. A description of the research design, sample, procedure, intervention, and instrumentation is provided. It includes an explanation of the steps taken for protection of

human subjects through an Institutional Review Board process. Additionally, the processes of data collection, data management, and data analysis are discussed. As stated in Chapter 1, the research questions under study are: 1) Did the post-survey Perceived Stress mean, adjusted for pre-survey Perceived Stress scores, differ between the intervention and control groups? 2) While controlling for pre-survey Coping Self-efficacy scores, did student Coping Self-efficacy increase as a result of the text message stress management intervention? 3) How satisfied were students with the text message stress intervention?

Research Design. This study employed an experimental pre-test/post-test design to examine the impacts of a text message stress management intervention. The intervention group received a 6-week text-messaging program. A comparison of pre-test and post-test perceived stress and coping self-efficacy among intervention and control groups, as measured by the Perceived Stress scale and Coping Self-efficacy scale, were analyzed with an analysis of covariance (ANCOVA) statistical procedure.

Population and Sampling. The population of interest was University of Arkansas nursing students enrolled in the pre-licensure, baccalaureate program. There are approximately 500 students in the 5-semester program: sophomore second semester (So2), junior first semester (J1), junior second semester (J2), senior first semester (S1), and senior second semester (S2). The convenience sample was comprised of all pre-licensure students that agreed to participate in the study. All pre-licensure nursing students met the inclusion criteria. There was no exclusion criteria. A power analysis was calculated using Gpower 3.1 software with input parameters of an effect size of 0.3, alpha error probability of .05, power of .95, numerator degrees of freedom of 1, 2 groups, and 1 covariate. The recommended total sample size was 147.

Students were recruited through email, flyers, and class information sessions at each level in the program. Appendix G displays the recruitment email. Initially, 249 participants signed up for the text message program; however, 202 participants completed the pre-survey. A total of 146 participants completed the post-survey; 74 respondents from the intervention group and 72 respondents from the control group. There were 101 participants that completed the pre-survey and did not complete the post-survey. There were also 45 participants that completed the post-survey without completing the pre-survey. Pre-surveys and post-surveys were able to be matched with the unique code for only 101 participants, for a final response rate of 40.5%.

Human Subjects. After obtaining approval from the dissertation committee, the proposal was submitted for approval through the university's Institutional Review Board. The proposal received exempt approval. Appendix H contains the IRB approval. Participants were recruited through email and information sessions. Participants were given a typed informed consent form. Appendix I contains the informed consent form. Participants were also verbally informed that participation involved completing surveys both before and after the stress management text message intervention, and that the timing of receiving messages depended on group assignment. Participants were informed that if assigned to a control group, they would receive a text with a link to complete three short surveys and they would not receive the stress management text messages until filling out the surveys again 6 weeks later. Participants were also notified that if assigned to the intervention group, they would receive a text with a link to complete three short surveys and that the intervention would begin upon completion of the surveys. The intervention was explained as a stress management text message each day of the school week for six weeks. It was explained that following the six weeks of text messages, they would receive a link to complete the three surveys again. The participants were notified of the

possible risks and benefits of participation. Risks included any psychological distress that could occur from answering survey questions. The University of Arkansas Counseling and Psychological Services Center contact information was provided in case of any distress. The benefits included potential improvement of stress by acquiring new skills to help manage stress. In addition, participation in the study included a chance to win 1 of 5 $20 Amazon gift cards.

Procedure. The stress management intervention was delivered via text message. The Remind ™ application was used to deploy stress management text messages. The Remind ™ Application is a free text messaging application that allows text messages to be sent directly to phones as well as tracks recipient participation (Remind ™, 2017). The researcher went to a class at every level of the program to explain the purpose of the study, participant requirements, and benefits of the study. Students were asked to sign up for the study during the class information sessions. Students agreeing to participate in the study signed an informed consent and provided their phone number and level in the program. No other identifying information was collected. Each level in program had separate sign-up sheets. Initially, 249 students completed informed consents and signed up for the study. Students were divided into intervention and control groups through stratified random sampling. Participants on each sign-up sheet were numbered. The phone numbers of odd entries were entered into the Remind ™ application and named Stress Management 1. The phone numbers of even entries were entered into the Remind ™ application and named Stress Management 2. A coin was flipped to determine which group would receive the intervention. Both control and intervention groups had a balance of So2, J1, J2, S1, and S2 students to control for the varying demands and stressors within semesters. All subjects in the control group were offered the text message stress management intervention upon completion of the study.

The first text message was a survey link to complete the pretest portion of the Perceived Stress Scale, Coping Self-Efficacy Scale, and provide demographic information. Students were asked to create a unique identification code by entering their response to four questions. They were asked to remember their code and use it as identification, for the post-survey. The post-survey also asked the same four questions in creating the identification in order to foster accuracy. Once the pre-surveys closed, the intervention group began receiving the stress management text messages. Appendix J contains the 30 sample messages. The first phase of messages was designed to discourage unhealthy coping habits. The most common dysfunctional coping strategies from literature as well as ones from student focus groups were selected as the topics for the messages (Henderson, 2019). One message per day was texted, Monday through Friday, via the Remind ™ application. The first phase of messages took place over one school week. The second phase of messaging was designed to deliver healthy coping strategies such as exercise, relaxation, and time management. The messages were designed based on problem-focused coping strategies and self-care practices found in literature, as well as those identified in student focus groups (Henderson, 2019). Phase 2 messages also emphasized the importance of social support. Social support is a positive buffer from stress; however, many students do not put their electronic devices down long enough to establish a meaningful human connection (Visnjic et al., 2018). A text message reminder was sent for students to put down their phone and connect with others. One message was texted Monday through Friday for three school weeks. The third and final phase of messaging was designed to build confidence in the student's ability to engage in healthy coping strategies. The messages provided affirmation in ability to adopt healthy coping strategies as well as offered general encouragement. One message per day was texted, Monday through Friday, for two school weeks. Appendix K depicts the phases and

organizational flow of the intervention. After the completion of the text message intervention, students in both the treatment and control groups received a final text message with a link to complete the post-surveys. The post-surveys for both groups of students were the Perceived Stress Scale and the Coping Self-Efficacy Scale. Students in the intervention group also received the Post-Intervention Evaluation Survey to complete.

Data collection began after the research proposal was approved by the university's Institutional Review Board. The pre-survey was constructed by entering the Demographic Data Form, Perceived Stress Scale, and Coping Self-Efficacy Scale into Qualtrics. Qualtrics is web-based platform for designing, distributing, and evaluating online surveys (Qualtrics, 2019). The link for the pre-survey was texted to participants in both the intervention and control groups as the first text message in the study. Two separate post-surveys were created in Qualtrics. The post-survey for the control group only contained the Perceived Stress Scale and Coping Self-efficacy scale. The post-survey for the intervention group consisted of the Perceived Stress Scale, Coping Self-efficacy scale, and the Post-Intervention Evaluation survey. The link to the intervention post-survey was texted to the intervention group at the completion of the 6-week intervention. The link to the control post-survey was also texted to the control group at this time. Two reminder text messages, with cut-off dates for survey closure, were sent to each group. The surveys were closed after one week.

The pre-survey and post-survey data was extracted into SPSS files from the Qualtrics software program. A new variable, "group", was created, with 1 indicating control group and 2 indicating intervention group, for the post-surveys. The the control group post-survey and intervention group post-survey files were merged. Next, the four positive items on the Perceived Stress Scale were reversed scored on both the pre and post surveys per the Perceived Stress Scale

(PSS) scoring instructions (Cohen, 1994). The 10 PSS scale items were then totaled per scoring instructions (Chesney et al., 2006) to create the variables of pre PSS scores as well as post PSS scores. Next, the 26 Coping Self-efficacy (CSE) items were totaled to create the variable of pre CSE scores and post CSE scores. The unique identifiers for the pre-survey and post-survey were matched and a clean data set, with only the matched data, was created. Descriptive statistics for the sample, assumption testing, and inferential statistics were conducted with only the matched data set.

Instrumentation. The instrumentation for this study consisted of four surveys: the Demographic Data Form, Perceived Stress Scale, Coping Self-Efficacy Scale, and Post-Intervention Evaluation Survey.

Demographic Data Form: Demographic data was obtained by a self-report survey developed by the researcher. Information collected includes age, level in program, race, gender, marital status, and living arrangements. Appendix L contains the Demographic Data Form.

Perceived Stress Scale: The Perceived Stress Scale (PSS) is a widely used scale to measure the degree in which situations in one's life are appraised as stressful (Cohen, 1994). It is frequently used to measure perceived stress among the nursing student population (He et al., 2018; Jameson, 2014; van Vliet, Jong, & Jong, 2017; Zhang et al., 2018). The 10 question instrument asks questions about stressful feelings and thoughts during the last month. Each item asks participants to indicate how often they felt a certain way, with 0 being never to 4 being very often. Example questions are "In the past month, how often have you felt unable to control the important things in your life?" and "In the past month, how often have you found that you could not cope with all the things you had to do?" (Cohen, 1994). Items 4, 5, 7, and 8 are reverse scored then items are summed to derive at total scores (Cohen, 1994). Total scores range from 0

to 40, with higher scores denoting higher perceiving stress. Scores from 0-7 are considered very low, scores from 8-11 are low, scores of 12-15 are average, scores of 16-20 are high, and scores above 21 are considered very high (University of Wisconsin, n.d.). The internal consistency of the PSS is .84-.85 in two college student samples (Cohen, Kamarck, & Mermelstein, 1983). The PSS correlates, in a predicted way, with other measures of stress such as job responsibilities, life event scores, and maladaptive coping behaviors (Cohen et al., 1983). Appendix M contains the Perceived Stress Scale.

Coping Self-Efficacy Scale: The Coping Self-Efficacy Scale (CSE) is a 26-item instrument designed to measure one's confidence in engaging in effective coping behaviors when faced with stressors (MIDSS, 2018). Participants are asked to rate, from 0 to 10, a series of items based on the prompt, "When things aren't going well for you, how confident are you that you can…" (MIDSS, 2018). Response choices ranged from 0, indicating cannot do at all; 5 indicating moderately can do; and 10, indicating certain can do. Example items are "Keep from getting down in the dumps," "Get friends to help you with what you need," and "Find solutions to your most difficult problems" (Chesney, Neilands, Chambers, Taylor, & Folkman, 2006). The total score is calculated by adding the item ratings. The scale mean is 137.4, with SD = 45.6, and $\alpha = .95$ (MIDSS, 2018). An exploratory factor analysis resulted in three factors: 1) use problem-focused coping, 2) stop unpleasant emotions and thoughts, and 3) get support from friends and family. Internal consistency and test-retest reliability for all three factors ranged from 0.80-0.91 (Chesney et al., 2006). A concurrent validity analysis supported that the three factors assess self-efficacy for various types of coping (Chesney et al., 2006). Appendix N contains the Coping Self-Efficacy Scale.

Post-Intervention Evaluation Survey: Information regarding intervention satisfaction and number of messages acted upon was obtained by a self-report survey developed by the researcher. Example questions were "How many text messages did you take action on,?" with response options of 95-100%, 80-94%, 65-79%, 50-64%, 35-49%, 20-34%, less than 20% and "How satisfied were you with receiving text messages as a stress management program?," with response options from very satisfied to very dissatisfied on a Likert scale. Appendix O contains the Post-Intervention Evaluation Survey.

Data analysis. Data were analyzed using both descriptive and inferential statistics through the IBM Statistical Packages for Social Sciences (SPSS 25) software program. First, demographic data was analyzed to describe the study sample by use of means, standard deviations, percentages, frequencies, and range.

Next, assumption tests for ANCOVA were conducted. A histogram was generated to visually inspect the normal distribution of both post perceived stress scores and post coping self-efficacy scores. A Levene's test was conducted to verify that the error variance was equal across both the intervention group and the control group. The homogeneity of variance assumption was met for post perceived stress scores, $F(1, 99) = .058$, $p = .81$ as well as post coping self-efficacy scores, $F(1,86) = .013$, $p = .91$. Next, the homogeneity of regression slopes was tested by examining the between subjects of effects of the pre-intervention scores and group condition. The homogeneity of regression slopes was met for both post perceived stress scores, $F(1,97) = .001$, $p = .97$ and post self-efficacy scores, $F(1, 84) = 2.85$, $p = .10$.

With assumptions satisfied, a one way ANCOVA was conducted to determine if there was a statistically significant difference between control and intervention groups on perceived stress scores with post-intervention perceived stress scores as the dependent variable and pre-

intervention perceived stress scores as a covariate. A second one way ANCOVA was performed to see whether there was an overall statistically significant difference in post-intervention coping self-efficacy scores between the control and intervention groups once their means had been adjusted for pre-intervention coping self-efficacy scores. Again post-intervention scores were set as the dependent variable and pre-intervention scores as a covariate. The ANCOVA procedure is optimal for this study design because it accounts for variation around the post-test mean that comes from the variation in where participants started pre-test; therefore, differences can be inferred from the intervention and are not left over effects of pre-test differences between the control and intervention groups (Maxwell, Delaney, & Kelley, 2018).

REFERENCES

Aselton, P. (2012). Sources of stress and coping in American college students who have been diagnosed with depression. *Journal of Child and Adolescent Psychiatric Nursing, 25*(3), 119-123. doi:10.1111/j.1744-6171.2012.00341.x

Chao, R. C. (2012). Managing perceived stress among college students: The roles of social support and dysfunctional coping. *Journal of College Counseling, 15*(1), 5-21.

Chesney, M.A., Neilands, T. B., Chambers, D. B., Taylor, J. M., & Folkman, S. (2006). A validity and reliability study of the coping self-efficacy scale. *British Journal of Health Psychology, 11*(3), 421-437.

Cohen, S. (1994). Perceived stress scale. Retrieved from http://www.mindgarden.com/documents/PerceivedStressScale.pdf

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385-396. doi:10.2307/2136404

Coiro, M. J., Bettis, A. H., & Compas, B. E., (2017). College students coping with interpersonal stress: Examining a control-based model of coping. *Journal of American College Health, 65*(3), 177-186. doi:10.1080/07448481.2016.1266641

Fornes-Vives, J., Garcia-Banda, G., Frias-Navarro, D., & Rosales-Viladrich, G. (2015). Coping, stress, and personality in Spanish nursing students: A longitudinal study. *Nurse Education Today, 36*, 318-323. doi: http://dx.doi.org/10.1016/j.nedt.2015.08,.0110260-6917

He, F. X., Turnbull, B., Kirshbaum, M. N., Phillips, B., & Klainin-Yobas, P. (2018). Assessing stress, protective factors and psychological well-being among undergraduate nursing students. *Nurse Education Today, 68*, 4-12. doi:10.1016/j.nedt.2018.05.013

Henderson, K. J. (2019). *A text message stress management intervention*. Unpublished manuscript, College of Education and Health Professionals, University of Arkansas, Fayetteville, Arkansas.

Jameson, P. R. (2014). The effects of a hardiness educational intervention on hardiness and perceived stress of junior baccalaureate nursing students. *Nurse Education Today, 34*(4), 603-607. doi:10.1016/j.nedt.2013.06.019

Lazarus, R. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY; Springer Publishing Company, Inc.

Maxwell, S. E., Delaney, H. D., & Kelley, K. (2018). *Designing experiments and analyzing data.* (3rd ed). New York, New York: Routledge.

Mayo Clinic. (2017). Stress symptoms: Effects on your body and behavior. Retrieved from https://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/stress-symptoms/art-20050987

Measurement Instrument Database for the Social Sciences (MIDSS). (2018). *CAPS coping self-efficacy scale*. Retrieved from midss.org.

Newport, F. (2014). *The new era of communication among Americans*. Retrieved from http://www.gallup.com/poll/179288/new-era-communication-americans.aspx

Qualtrics. (2019). Qualtrics professional services. Retrieved from https://www.qualtrics.com/professional-services/

Reeve, K. L., Shumaker, C. J., Yearwood, E. L., Crowell, N. A., & Riley, J. B. (2013). Perceived stress and social support in undergraduate nursing students' educational experiences. *Nurse Education Today, 33*, 419-424. doi: 10.1016/j.nedt.2012.11.009.

Remind. (2017). School communication shouldn't be so hard. Retrieved from https://www.remind.com/

Tavolacci, M. P., Ladner, J., Grigioni, S., Richard, L., Villet, H., & Dechelotte, P. (2013). Prevalence and association of perceived stress, substance use and behavioral addictions: a cross-sectional study among university students in France, 2009-2011. *BMC Public Health, 13*(724), 1-8. doi:1471-2458/13/724

Timmons, F., Corroon, A. M., Byrne, G., & Mooney, B. (2011). The challenge of contemporary nurse education programs perceived stressors of nursing students: Mental health and related lifestyle issues. *Journal of Psychiatric and Mental Health Nursing, 18*(9), 758-766.

Turner, K. & McCarthy, V. L. (2017). Stress and anxiety among nursing students: A review of intervention strategies in literature between 2009 and 2015. *Nurse Education in Practice, 22*, 21-29. doi: http://0-dx.doi.org.library.uark.edu/10/1016/j.nepr.2016.11.002

University of Wisconsin (n.d.) Perceived stress scale tip sheet. Retrieved from https://uwm.edu/mcwp/wp-content/uploads/sites/337/2016/01/Perceived-Stress-Scale-Tip-Sheet.pdf

van Vliet, M., Jong, M., Jong, M. C., Mittuniversitetet, Fakulteten för humanvetenskap, Avdelningen för omvårdnad, & Avdelningen för hälsovetenskap. (2017). Long-term benefits by a mind-body medicine skills course on perceived stress and empathy among medical and nursing students. *Medical Teacher, 39*(7), 710-719. doi:10.1080/0142159X.2017.1309374

Visnjic, A., Velickovic, V., Sokolovic, D. Stankovic, M., Mijatovic, K., Stojanovic, M., Stojanovic, M., Milosevic, Z., & Radulovic, O. (2018). Relationship between the manner

of mobile phone use and depression, anxiety, and stress in university students. *Environmental Research and Public Health, 15*, 1-11.

Wolf, L., Stidham, A. W., & Ross, R. (2015). Predictors of stress and coping strategies of US accelerated vs. generic baccalaureate nursing students: An embedded mixed methods study. *Nurse Education Today, 35*(1), 201-205. doi: https://doi.org/10.1016/j.nedt.2014.07.005

Zhang, Y., Peters, A., & Chen, G. (2018). Perceived stress mediates the associations between sleep quality and symptoms of anxiety and depression among college nursing students. *International Journal of Nursing Education Scholarship*, 1-9. doi:10.1515/ijnes-2017-0020

Zyga, S. (2013). Stress in nursing students. *International Journal of Caring Sciences, 6*(1), 1-2.

TABLES

Table 1

Participant characteristics

Item	*n*	%
Gender		
Female	22	95.7
Male	1	4.3
Age		
18-20	14	60.9
21-23	7	30.4
24-26	1	4.3
27-30	1	4.3
Semester in Program		
So2	3	13
J1	12	52.2
J2	1	4.3
S1	4	17.4
S2	3	13
Race		
Caucasian/Native American	1	4.3
Caucasian/Asian	1	4.3
Caucasian	20	87

Note. So2 = first semester in program, J1 = second semester in program, J2 = third semester in program, S1 = fourth semester in program, S2 = fifth semester in program.

Table 2

Rationale and Support for Focus Group Questions

Focus Group Question(s)	**Rationale**	**Literature Findings**
What is your preferred channel of communication?	To determine if text message delivery would be a feasible avenue in delivery a stress management intervention.	A Gallup poll examining preferred communication delivery revealed that text messaging is the predominant form of communication for Americans aged 18-29 (Newport, 2014)
How do you know you are experiencing stress? What does stress feel like to you?	To determine if participant physical and psychological symptoms are consistent with those found in literature.	Stress also takes a toll on health through physical symptoms of high blood pressure, headaches, muscle tension, and fatigue as well as psychological symptoms of anxiety, irritability, sleep disturbances, and depression (Mayo Clinic, 2017).
What are your greatest sources of stress? What times in the semester do you feel the most stressed?	To determine if participant sources of stress are consistent with other nursing student stressors in literature.	Many nursing programs have more rigorous grading scales and course failures result in program dismissals (Turner & McCarthy, 2017). The fear of failure and concern about clinical competence are also major stressors for nursing students (Wolf, Stidham, & Ross, 2015; Zyga, 2013). Students also struggle with time management in balancing long clinical days with multiple deadlines, didactic assignments, and high stakes testing demands (Timmins, Corroon, Byrne, & Mooney, 2011; Reeve, et al., 2013; Wolf, Stidham, & Ross, 2015).
How do you typically cope with stress?	To determine if participants were utilizing emotion-focused coping strategies or problem-focused coping strategies.	The highest stress levels were associated with disengagement coping (Coiro, 2017). Female participants were more prone to alcohol and tobacco use as well as eating disorders, which are indicative of unhealthy coping behaviors (Tavolacci, et al, 2013). Students who regularly engaged in problem-focused coping strategies had less negative stress than students that regularly employed emotion-focused coping strategies (Fornes-Vives et al., 2016).
How do you feel about your social support?	To determine if participants had a social support network and how they perceived social support.	Social support can be a protective buffer from stress (Aselton, 2012). Social support among college students has been declining in the past several years (Chao, 2012).

Table 3

Phase 1 Sample Messages

Concept	Citation	Sample
Disengagement/avoidance	Hirsch, Barlem, Tomaschewki-Barlem, Lunardi, & de Oliveira (2014) found higher perceived stress with coping strategies that focused on pacifying emotion rather than the problem. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Avoiding your problems is not effective. Whatever it is will be there tomorrow or the next day or the next.
Avoidance	College students frequently get overwhelmed with extra-curricular activities, work, and school demands; poor balancing is a major source of stress (Zhang, Peters, Chen, 2017). Millet-Thompson (2017) proposes that promoting greater school/work/life balance will reduce student anxiety and stress. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Staying super busy and stressed out does not really make you seem more important.
Disengagement/avoidance	Hirsch, Barlem, Tomaschewki-Barlem, Lunardi, & de Oliveira (2014) found higher perceived stress with coping strategies that focused on pacifying emotion rather than the problem. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Having that big piece of chocolate cake (or other vice) will not really make all your problems disappear.
Disengagement/avoidance	Hirsch, Barlem, Tomaschewki-Barlem, Lunardi, & de Oliveira (2014) found higher perceived stress with coping strategies that focused on pacifying emotion rather than the problem. Coiro, Bettis, & Compas (2017) found the highest stress levels were associated with avoidance coping	Trying to drink your problems away is not the solution. Your problems will still be there and you will have a headache.

Note. First phase of the text-message stress management program. Phase 1 was designed to discourage unhealthy coping strategies.

Table 4

Phase 2 Samples Messages

Concept	Citation	Sample
Plan of action	Students that take control over their stressor have lower anxiety and depressive symptoms (Coiro, Bettis, & Compas, 2017).	Take control of your time. Make a schedule so you can tell your time where to go.
Communication skills	Strengthening communication skills is a proactive coping strategy effective in reducing stress (Kadhiravan & Kumar, 2012).	Express yourself directly to someone today. Exercise respectful, assertive communication.
Social support	Van Kim and Nelson (2013) found that low socialization resulted in a higher odds of perceived stress. Social support is an essential defense against stress; low social support weakens an individuals' well-being (Chao, 2012).	This is a reminder to put down your phone and talk to the people around you.
Social support	Van Kim and Nelson (2013) found that low socialization resulted in a higher odds of perceived stress. Social support is an essential defense against stress; low social support weakens an individuals' well-being (Chao, 2012).	Work to build relationships with the people around you. Things don't seem as bad when your friends are there.
Sleep	Nursing students are at risk for poor sleep patterns due to irregular clinical hours; promoting sleep is vital for well-being and managing stress (Zhang, Peters, & Chen, 2018).	Make sure you get at least 7 hours of sleep tonight.
Mindfulness/meditation	Nursing students reported that the mindfulness/meditation invention had positive benefits in stress reduction as well as self-care (van der Riet, Rossiter, Kirby, Dluzewska, & Harmon, 2015).	Go for a walk and identify three things you appreciate about nature.
Mindfulness/meditation	Nursing students reported that the mindfulness/meditation invention had positive benefits in stress reduction as well as self-care (van der Riet, Rossiter, Kirby, Dluzewska, & Harmon, 2015).	Take a 10 minute time out today. Deep breathe, daydream, pray, or stretch.

Table 2

Phase 2 Samples Messages Continued

Concept	Citation	Sample
Social Support	Aselton (2012) found that divulging emotions and talking through stressful experiences was a beneficial coping strategy. King et al. (2012) found that two of the top reported techniques beneficial for reducing stress was exercising and talking to someone.	Talk to someone about your stress today. Don't just let it build up inside.

Note. Second phase of the text-message stress management program. Phase 2 was designed to encourage problem-focused coping strategies, social support, and self-care practices.

Table 5

Phase 3 Sample Messages

Concept	Citation	Sample
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	You can build meaningful relationships. Put your phone down and connect with someone today.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	Visualize positive outcomes. You can be successful on your exams and assignments this week.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	Believe in yourself. You can accomplish your goals.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	Exercise is not a chore. It's a mood booster. You can spare 30 minutes a day to exercise.

Table 5

Phase 3 Sample Messages Continued

Concept	Citation	Sample
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	You can overcome the stress you are facing.
Self-efficacy/encouragement	Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li and Yang, 2009). Increasing elf-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li and Yang, 2009).	You are not alone. Others believe in you and support you.

Note. Third phase of the text-message stress management program. Phase 3 was designed to strengthen self-efficacy.

APPENDIX A

Study 1 Recruitment E-mail

Hello Nursing Students,

Welcome back!

Nursing School can be stressful. Let's help each other by learning more about how to effectively handle experienced stress. Please consider participating in one 45 minute focus group. The purpose of this study is to understand the stress experiences and perceptions of undergraduate students as well as examine the feasibility of a text message stress management program. Pre-nursing through S2 students are invited to participate. Feel free to bring your lunch to one of the sessions. Fruit and cookies will be provided. Participants will be entered into a drawing to receive a $50 gift card. The sign-up sheet will be on the door of room 236 or you can contact Jaye Henderson at kristenh@uark.edu.

- Sept 17th 12:00-12:45 room 117
- Sept 18th 12:00-12:45 room 276
- Sept 25th 12:00-12:45 room 276

Warm regards,

Mrs. Henderson

APPENDIX B

Study 1 Recruitment Flyer

Nursing School can be stressful. Let's help each other by learning more about how to effectively handle experienced stress. Please consider participating in one 45 minute focus group. Pre-nursing through S2 students are invited to participate. Participants will be entered into a drawing for a $50 gift card. Please contact Jaye Henderson at kristenh@uark.edu

Stress Management Focus Groups

- Sept 17th 12:00-12:45
- Sept 18th 12:00-12:45
- Sept 25th 12:00-12:45

APPENDIX C
Study 1 IRB

RG
Protocol #: 1805122510
Investigator: Kristin Jaye Henderson

Expiration Date:
Last Approval Date:

RazorGrant

Protocol Summary

Protocol Number:	1805122510
Sequence Number:	2
Status:	Exempt
Expiration Date:	
Last Approval Date:	
Investigator:	Kristin Jaye Henderson

Protocol Details

Type:	Exempt
Description:	
Application Date:	08/17/2018
Reference Num 1:	
Reference Num 2:	
FDA Application No:	
Title:	Pilot Study to Examine Feasibility of Text Message Stress Management Program

APPENDIX D
Study 1 Informed Consent

Examining the Feasibility of a Text Message Stress Management Program
Consent to Participate in a Research Study
Principal Researcher: Jaye Henderson
Faculty Advisor: Dr. Bart Hammig

INVITATION TO PARTICIPATE

You are invited to participate in a research study about the stress experiences and perceptions of undergraduate students. You are being asked to participate in this study because you are currently an undergraduate student enrolled in a program of study.

WHAT YOU SHOULD KNOW ABOUT THE RESEARCH STUDY

Who is the Principal Researcher?
Jaye Henderson
Phone: 479-575-4885
Email: kristenh@uark.edu

Who is the Faculty Advisor?
Dr. Bart Hammig
Phone: 479-575-4360
Email: bhammig@uark.edu

What is the purpose of this research study?
The purpose of this study is to understand the stress experiences and perceptions of undergraduate students as well as examine the feasibility of a text message stress management program.

Who will participate in this study?
20-40 undergraduate students enrolled in NURS classes in the fall 2018 semester will participate in the study. All participants will be over the age of 18.

What am I being asked to do?
Your participation will require the following:
You will be asked to provide demographic information and participate in one focus group. The focus groups will take place in a classroom in the Epley building. The sessions will be audio-recorded and transcribed verbatim by the researcher who will also follow all procedures to protect your confidentiality and privacy.

What are the possible risks or discomforts?
It is unlikely that you will be exposed to more than minimal risks; however, if you do feel any distress as a result of talking about your stress or undergraduate school experiences, you may contact the University of Arkansas Counseling and Psychological Services Center at 479-575-5276.

What are the possible benefits of this study?
Benefit(s) to participation in this study includes a chance to win a $50 gift card. Additional benefits could also be a greater sense of self-awareness as well as empowerment participants may feel in that their contribution to the research could inform future higher education practices and programs.

How long will the study last?
The focus group will last approximately 45 minutes.

Will I receive compensation for my time and inconvenience if I choose to participate in this study?
Participants will be entered into a drawing to receive a $50 gift card.

Will I have to pay for anything?
No, there will be no cost associated with your participation.

What are the options if I do not want to be in the study?
If you do not want to be in this study, you may refuse to participate. Also, you may refuse to participate at any time during the study.

How will my confidentiality be protected?
All information will be kept confidential to the extent allowed by applicable State and Federal law.
Each participant will be assigned a code and all data gathered will be assigned the corresponding code. No personal identifying information will be reported in research papers or presentations that result from this study. All audio-files and interview transcripts will be stored in a locked file cabinet in Epley 236.

Will I know the results of the study?
At the conclusion of the study you will have the right to request feedback about the results. You may contact the Principal Researcher, Jaye Henderson, kristenh@uark.edu, 479-575-4885.

What do I do if I have questions about the research study?
You have the right to contact the Principal Researcher or Faculty Advisor as listed below for any concerns that you may have.

Dr. Bart Hammig
Phone: 479-575-4360
Email: bhammig@uark.edu

Jaye Henderson
Phone: 479-575-4885
Email: kristenh@uark.edu

You may also contact the University of Arkansas Research Compliance office listed below if you have questions about your rights as a participant, or to discuss any concerns about, or problems with the research.

Ro Windwalker, CIP
Institutional Review Board Coordinator
Research Compliance
University of Arkansas
109 MLKG Building
Fayetteville, AR 72701-1201
479-575-2208
irb@uark.edu

I have read the above statement and have been able to ask questions and express concerns, which have been satisfactorily responded to by the investigator. I understand the purpose of the study as well as the potential benefits and risks that are involved. I understand that participation is voluntary. I understand that significant new findings developed during this research will be shared with the participant. I understand that no rights have been waived by signing the consent form. I have been given a copy of the consent form.

_____Date_____
_____

APPENDIX E

Study 1 Demographic Data Form

Please circle all that apply. Please elaborate as much as possible for the "other" options.

Gender identity

Woman

Man

Other

Age group

18-20

21-23

24-26

27-30

31-37

38-50

51-99

Level in program

Pre-nursing

J1

J2

S1

S2

Residence status

Lives significant other

Lives with family

Lives with roommate(s)

Lives alone

Other

Marital status

Married

Single

Other

Ethnicity

Asian

Caucasian

Black/African

Hispanic/Latino

Native American

Pacific Islander

Other

Sources of stress. Select all that apply.

Extracurricular activities

Family issues

Relationships/dating

School grades

Clinical rotation demands

Friends

Homework

Physical Health

Appearance

Mental Health

Other

APPENDIX F

Focus Group Questions

What is your preferred channel of communication?

What times in the semester do you feel most stressed?

How do you know you are experiencing stress?

What are your greatest sources of stress?

What does stress feel like to you?

How do you typically cope with stress?

How do you do about your social support?

How do you feel stress impacts your health?

Specifically related to sample messages:

Are the messages culturally appropriate?

Are the messages understandable?

How do you feel about the length of the messages?

Would you read stress management text messages?

What is the likelihood of acting on messages?

What is the most optimum time of day to receive the text messages?

How often would you prefer to receive the text messages?

APPENDIX G

Study 2 Recruitment E-Mail

Hello Nursing Students,

We have all experienced the stress of nursing school. Let's work on managing that stress. Please consider participating in a stress management text message program. The purpose of this study is to examine the impact of targeted text messages in reducing stress and increasing coping ability. All students enrolled in NURS classes are invited to participate. Participants will be entered into a drawing to win one of five $20 Amazon gift cards. Please contact Jaye Henderson at kristenh@uark.edu with any questions.

What is the purpose of this research study?

The purpose of this study is to examine the effects of a text message stress management intervention on stress and coping ability in nursing students.

Who will participate in this study?

All undergraduate students enrolled in NURS classes in the spring 2019 semester are invited to participate in the study. All participants will be over the age of 18. This study will have two groups. Participants will be randomly assigned into either the treatment group or control group.

What happens if I am assigned to the control group?

If you are assigned to the control group, you receive a text with a link to complete three short surveys. You will not receive the stress management text messages until you fill out the surveys again in 6 weeks.

What happens if I am assigned to the treatment group?

If you are assigned to the treatment group, you will receive a text with a link to complete three short surveys. You will then begin the intervention portion of the study and receive one stress management text message each day of the school week for six weeks. Following the six weeks of text messages, you will receive a link to complete the three surveys again.

What are the possible benefits of this study?

The potential benefits to participating in this study include potential improvement of stress by acquiring new skills to help manage stress. In addition, participation in this study includes a chance to win a $20 Amazon gift card. There will be five $20 gift cards available.

How long will the study last?

The study will last approximately seven weeks. It will take approximately one minute to read each text message. It will take approximately 15-20 minutes to complete the pre surveys and approximately 15-20 to complete the post surveys.

If I decide to participate, what do I have to do?

You will need to provide your phone number and semester in program in order to received text messages. You will also need to sign an informed consent form.

APPENDIX H
Study 2 IRB

UNIVERSITY OF ARKANSAS

To:	Kristin Jaye Henderson
From:	Douglas James Adams, Chair IRB Committee
Date:	02/20/2019
Action:	**Exemption Granted**
Action Date:	02/20/2019
Protocol #:	1901172406
Study Title:	Examining Effects of a Text Message Stress Management Intervention

The above-referenced protocol has been determined to be exempt.

If you wish to make any modifications in the approved protocol that may affect the level of risk to your participants, you must seek approval prior to implementing those changes. All modifications must provide sufficient detail to assess the impact of the change.

If you have any questions or need any assistance from the IRB, please contact the IRB Coordinator at 109 MLKG Building, 5-2208, or irb@uark.edu.

cc: Bart Hammig

APPENDIX I
Study 2 Informed Consent

Examining a Text Message Stress Management Program
Consent to Participate in a Research Study
Principal Researcher: Jaye Henderson
Faculty Advisor: Dr. Bart Hammig

INVITATION TO PARTICIPATE

You are invited to participate in a research study to examine the effects of a text message stress management program on stress and coping. You are being asked to participate in this study because you are currently an undergraduate student enrolled in a program of study.

WHAT YOU SHOULD KNOW ABOUT THE RESEARCH STUDY

Who is the Principal Researcher?
Jaye Henderson
Phone: 479-575-4885
Email: kristenh@uark.edu

Who is the Faculty Advisor?
Dr. Bart Hammig
Phone: 479-575-4360
Email: bhammig@uark.edu

What is the purpose of this research study?
The purpose of this study is to examine the effects of a text message stress management intervention on stress and coping ability in nursing students.

Who will participate in this study?
All undergraduate students enrolled in NURS classes in the spring 2019 semester are invited to participate in the study. All participants will be over the age of 18. This study will have two groups. Participants will be randomly assigned into either the treatment group or control group.

What happens if I am assigned to the control group?
If you are assigned to the control group, you receive a text with a link to complete three short surveys. You will not receive the stress management text messages until you fill out the surveys again in 6 weeks.

What happens if I am assigned to the treatment group?
If you are assigned to the treatment group, you will receive a text with a link to complete three short surveys. You will then begin the intervention portion of the study and receive one stress management text message each day of the school week for six weeks. Following the six weeks of text messages, you will receive a link to complete the three surveys again.

What are the possible risks or discomforts?

There are minimal anticipated risks to participating in this study. If you do feel any distress as a result of answering any survey questions uncomfortable to you, you may contact the University of Arkansas Counseling and Psychological Services Center at 479-575-5276.

What are the possible benefits of this study?
The potential benefits to participating in this study include potential improvement of stress by acquiring new skills to help manage stress. In addition, participation in this study includes a chance to win a $20 Amazon gift card. There will be five $20 gift cards available.

How long will the study last?
The study will last approximately seven weeks. It will take approximately one minute to read each text message. It will take approximately 15-20 minutes to complete the pre surveys and approximately 15-20 to complete the post surveys.

Will I receive compensation for my time and inconvenience if I choose to participate in this study?
Participants will be entered into a drawing to receive a $20 Amazon gift card.

Will I have to pay for anything?
No, there will be no cost associated with your participation.

What are the options if I do not want to be in the study?
Participation is voluntary. If you do not want to be in this study, you may decline to participate. Also, you may drop out at any time during the study.

How will my confidentiality be protected?
All information will be kept confidential to the extent allowed by applicable State and Federal law. Phone numbers will be collected and entered into the Remind application. No names or other identifying information will be collected. Each participant will create a unique code and all data gathered will be assigned the corresponding code. No personal identifying information will be reported in research papers or presentations that result from this study. All data will be stored on a password protected computer in a locked office in in Epley 236.

Will I know the results of the study?
At the conclusion of the study you will have the right to request feedback about the results. You may contact the Principal Researcher, Jaye Henderson, kristenh@uark.edu, 479-575-4885.

What do I do if I have questions about the research study?
You have the right to contact the Principal Researcher or Faculty Advisor as listed below for any concerns that you may have.

Dr. Bart Hammig
Phone: 479-575-4360
Email: bhammig@uark.edu

Jaye Henderson
Phone: 479-575-4885
Email: kristenh@uark.edu

You may also contact the University of Arkansas Research Compliance office listed below if you have questions about your rights as a participant, or to discuss any concerns about, or problems with the research.

Ro Windwalker, CIP
Institutional Review Board Coordinator
Research Compliance
University of Arkansas
109 MLKG Building
Fayetteville, AR 72701-1201
479-575-2208
irb@uark.edu

I have read the above statement and have been able to ask questions and express concerns, which have been satisfactorily responded to by the investigator. I understand the purpose of the study as well as the potential benefits and risks that are involved. I understand that participation is voluntary. I understand that significant new findings developed during this research will be shared with the participant. I understand that no rights have been waived by signing the consent form. I have been given a copy of the consent form.

_____Date_____
_____

APPENDIX J

Sample Text Messages

Phase 1

- Avoidance and procrastination are not effective. Address it today and you won't have as much to do tomorrow.
- Choose quality over quantity. You are not your best self when you take on too much.
- Make healthy choices for yourself. Having that big piece of chocolate cake or alcohol or more caffeine will not really make all your problems disappear.
- Do not try to manage your stress with a Netflix binge this week.
- Staying up cramming for exams is not a healthy choice. Make a study schedule so you are not as overwhelmed the night before exams.

Phase 2

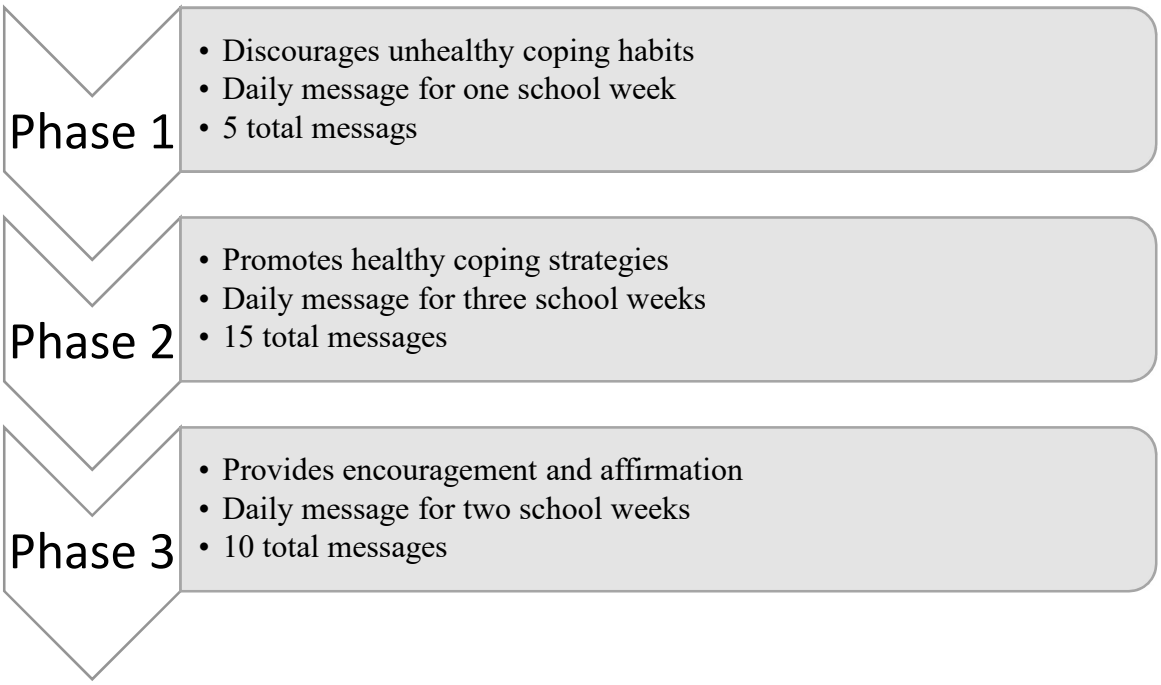
- Do a physical activity you enjoy today. Try to get at least 30 minutes of aerobic exercise.
- Take control of your time. Make a schedule so you can tell your time where to go.
- Express yourself directly to someone today. Exercise respectful, assertive communication.
- This is a reminder to put down your phone and talk to the people around you.
- Work to build relationships with the people around you. Things don't seem as bad when your friends are there.
- Prioritize your day to make sure you get at least 7 hours of sleep tonight.
- Go for a walk and identify three things you appreciate about nature.
- Take a 10 minute time out today. Deep breathe, daydream, pray, or stretch.
- Talk to someone about your stress today. Don't just let it build up inside.
- Find a mentor this week. A mentor can help you talk through things and support personal as well as professional growth.
- Visualize your happy place. Spend three minutes taking deep breaths and thinking about that place that makes you feel happy and relaxed.
- Laugh today. Talk to one of your funny friends or watch a cat video-whatever works.
- Reflect on all the positive things in your life today.
- Take steps today to make positive changes in your life.
- Be proactive and stick to your study plans.

Phase 3

- You can build meaningful relationships. Put your phone down and connect with someone today.
- You can overcome the stress you are facing.
- You are not alone. Others believe in you and support you.
- Your grade does not define you. The important thing is that you are learning and doing your best.
- You do not have to be the best, just do your best.
- You can budget time for positive self-care practices in your day.
- Work to find meaning in all stressful situations. Some stressors bring opportunity.
- You have such a bright future. Visualize success this semester. Visualize success in the nursing program. Visualize success in your career.
- Try not to compare yourself to anyone today. You have your own unique talents and gifts.
- Celebrate all successes. Look how far you have come!

APPENDIX K

Organizational Chart of Intervention



APPENDIX L

Study 2 Demographic Data Form

First you will generate your unique identification code by entering the responses to the next 4 questions in the text box below. Please be careful in constructing your code accurately. Letters should be capitalized. Please do not put in any spaces.

What is the first letter of your mother's first name?

What is the number of older brothers (living and deceased)? Use a leading zero if less than 10 and 00 is no older brothers. For example, if you have two older brothers, type 02.

What is the number representing the month you were born with leading zero for months 01-09?

What is the first letter of your middle name (if no middle name, use X)?

You have constructed you unique code. It should start with a letter, have 4 numerical digits and end with a letter and no spaces. For example: E0009J

Please select all that apply. Please elaborate as much as possible for the "other" options.

Gender identity Woman Man Other

Age group 18-20 21-23 24-26 27-30 31-37 38-50 51-99

Level in program So2 J1 J2 S1 S2

Residence status Lives significant other Lives with family Lives with roommate(s) Lives alone Other

Marital status Married Single Other

Ethnicity Asian Caucasian Black/African Hispanic/Latino Native American Pacific Islander Other

APPENDIX M

Perceived Stress Scale

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

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = 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 N

Coping Self-Efficacy Scale

Coping Self-Efficacy Scale v. 01-18-07

When things aren't going well for you, or when you're having problems, how confident or certain are you that you can do the following:

Cannot do at all =0 **Moderately certain can do =5** **Certain can do =10**

For each of the following items, write a number from 0 - 10, using the scale above.
When things aren't going well for you, how confident are you that you can:

1. Keep from getting down in the dumps.
2. Talk positively to yourself.
3. Sort out what can be changed, and what can not be changed.
4. Get emotional support from friends and family.
5. Find solutions to your most difficult problems.
6. Break an upsetting problem down into smaller parts.
7. Leave options open when things get stressful.
8. Make a plan of action and follow it when confronted with a problem.
9. Develop new hobbies or recreations.
10. Take your mind off unpleasant thoughts. Stop unpleasant thoughts
11. Look for something good in a negative situation.
12. Keep from feeling sad.
13. See things from the other person's point of view during a heated argument.
14. Try other solutions to your problems if your first solutions don't work.
15. Stop yourself from being upset by unpleasant thoughts.
16. Make new friends.
17. Get friends to help you with the things you need.
18. Do something positive for yourself when you are feeling discouraged.
19. Make unpleasant thoughts go away.
20. Think about one part of the problem at a time.
21. Visualize a pleasant activity or place.
22. Keep yourself from feeling lonely.
23. Pray or meditate.
24. Get emotional support from community organizations or resources.
25. Stand your ground and fight for what you want.
26. Resist the impulse to act hastily when under pressure.

Chesney MA, Neilands TB, Chambers DB, Taylor JM, Folkman S. A validity and reliability study of the coping self-efficacy scale. Br J Health Psychol 2006 Sep; 11(3): 421-37.
http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=1602207.

We appreciate copies of manuscripts or conference presentations generated from the use of this scale to help us stay current with its use and to assess its validity and reliability in other populations.

Please address correspondence to Dr. Margaret A. Chesney, chesneym@gmail.com

© Do not copy without Permission - Margaret A. Chesney

APPENDIX O

Post-Intervention Evaluation Survey

Please select the most applicable response. Please elaborate as much as possible for the "other" options.

1. How many text messages did you take action on?

95%-100% 80-94% 65-79% 50-64% 35-49% 20-34% less than 20% other

2. How satisfied were you with receiving text messages as a stress management program?

Very satisfied satisfied indifferent dissatisfied very dissatisfied

3. How many of the stress management text messages did you read?

95%-100% 80-94% 65-79% 50-64% 35-49% 20-34% less than 20% other

4. What would make the text message stress management program better?

CHAPTER 4: MANUSCRIPT #1

A Text Message Stress Management Intervention: Using Literature and Focus Groups to Inform the Intervention Development.

Abstract

Students enrolled in baccalaureate nursing programs have all the typical stressors college students face with the addition of stressors unique to nursing majors. It is important to establish healthy coping habits early, as unhealthy coping habits of students could continue into their careers as nursing professionals. College students have a heavy reliance on mobile technology; therefore, text messages could be a viable way to communicate stress related health messages. A text message stress management intervention was designed through focus group input and recommendations in literature. Three focus groups were held to explore nursing student's stress perceptions, as well as solicit feedback about 19 stress management sample messages. Sample messages were edited as well as 11 new messages created based on student feedback. The student input resulted in a 6 week stress management text message intervention consisting of 30 text messages. Future research is needed to determine if this text-message stress management could be effective in lowering perceived stress and strengthening coping self-efficacy.

Keywords: nursing student, stress management, text message, stress

Stress and daily pressures exist throughout the life span; however, young adulthood is an especially vulnerable time for high levels of stress to be experienced (Doom & Haeffel, 2013; Van Kim & Nelson, 2013). Millennials (ages 23-38) have reported higher average stress levels than other adults (American Psychological Association, 2014). These younger generations are also most likely to report that their stress levels have increased in the past year (American Psychological Association, 2014). In a study of undergraduates, 45% of students reported experiencing at least two major stressors in the past 12 months and 26% reported that they were unable to manage their stress (Lust, et al., 2010). College students are exposed to a large number of stressors, inclusive of academic stressors such as learning complex material, carrying intensive academic workloads, maintaining grade point averages, deciding on career paths, facing increased competition for professional programs, and having fewer job opportunities at graduation (Aselton, 2012; Kadhiravan & Kumar, 2012). College students also experience societal pressures such as exposure to new temptations, substance abuse, decreased resources and support from families, issues with roommates and romantic partners, perceived time constraints, and emerging sexual identities (Ekpenyong et al., 2013; Kadhiravan & Kumar, 2012). Finally, increased financial responsibilities, food insecurity and rising cost of tuition (Aselton, 2012; Coiro, et al., 2017) round out the list of top stressors college students face.

Students enrolled in baccalaureate nursing programs incur the typical stressors afflicting college students with the addition of stressors unique to nursing majors (Reeve, et al., 2013). Entrance into nursing programs is highly competitive and pressures intensify once students are admitted. Students are financially burdened with required purchases of medical equipment, textbooks, applications, immunizations, and uniforms. Many nursing programs have more rigorous grading scales and course failures result in program dismissals (Turner & McCarthy,

2017). The fear of failure is a major psychological stressor for nursing students (Zyga, 2013). Students also have to balance long clinical days with didactic assignments, as well as have the pressure of progression and dismissal based on testing performance (Timmins et al., 2011; Reeve, et al., 2013). Clinical shifts are physically, mentally, and emotionally taxing. Students are exposed to complicated situations that require high levels of critical thinking as well as death, dying, and chronic suffering, during clinical rotations (Zyga, 2013).

Social support can be a protective buffer from stress (Aselton, 2012; Karaca et al., 2019; Chao, 2012; Van Kim & Nelson, 2013); however, social support among college students has been declining in the past several years (Chao, 2012). Weakened social ties have occurred with the increasing utilization of smart phones. This technology connects individuals; however, less time is spent in face-to-face interaction and more time is spent interacting with friends online and through social media platforms (Twenge, 2017). According to Twenge (2017), those who spend more time than average online and less average time with friends in person are more likely to be depressed. These mental health concerns are related to disengagement, false or shallow relationships, and cyberbullying. Even though mobile technology can be a source of stress and isolation, educators can use the heavy student reliance on cell phones to their advantage in sending health messages. A nursing program in the United Kingdom experienced success in student retention by sending students supportive and informational text messages over the course of twelve weeks (Boath et al., 2016). The text messages were found to be helpful for students with 96% of participants reporting that the content of the messages was good or excellent (Boath et al., 2016). The purpose of this study was to inform the development of a text message stress management intervention, focus group data collection and recommendations in literature.

Theoretical Framework

How an individual copes with stress determines how well the stress is reduced or buffered (Coiro et al., 2017). However, not all coping strategies are considered effective or healthy (Chao, 2012). It is important to establish healthy coping early in life since humans are habitual beings and could continuously engage in unhealthy coping behaviors throughout a lifetime (Kadhiravan & Kumar, 2012). According to Lazarus and Folkman's Stress, Appraisal, and Coping theory, coping is a constantly evolving cognitive and behavioral effort to manage situations appraised as stressful (Lazarus & Folkman, 1984.) Lazarus and Folkman, theorize that coping either serves the purpose of regulating the emotional responses to the stressor (emotion-focused coping) or handling the problem by making adjustments to the factor(s) causing stress (problem-focused coping). The way an individual copes depends largely on available material resources or personal resources such as social support, social skills, and problem-solving skills (Lazarus & Folkman, 1984).

Emotion-focused coping. Emotion-focused coping is the effort to diminish the emotional reactions to stress through avoidance, denial, disengagement, positive comparisons, and distractive indulgences. Emotion-focused coping strategies such as finding the humor or positive aspect in a circumstance aids individuals in maintaining hope and self-esteem (Lazarus and Folkman, 1984); however many emotion-focused coping strategies are considered ineffective because they focus on the emotional aspect of the stressor and not on the problem itself (Domingues-Hirsch et al., 2015; Fornes-Vives et al., 2016). Unfortunately, increasing numbers of college students are turning to dysfunctional coping strategies to ease their stress (Chao, 2012). Domingues-Hirsch et al. (2014) found higher perceived stress with coping strategies that focused on pacifying emotion rather than focusing on the problem. Similarly,

Coiro et al. (2017) concluded the highest stress levels were associated with disengagement coping. Both Tavolacci et al. (2013) and Van Kim and Nelson (2013) found higher levels of perceived stress among female college students. Females were also found to more likely engage in emotionally reactive coping strategies (Ekpenyong et al., 2013; Fornes-Vives et al., 2016). In addition, female participants were more prone to alcohol and tobacco use as well as eating disorders, which are indicative of unhealthy coping behaviors (Tavolacci et al, 2013). These findings are pertinent as the nursing student population is predominantly female (Zhang, et al., 2018). Given the evidence from literature, the first phase of the text message intervention focuses on discouraging unhealthy emotion-focused coping strategies related to the concepts of disengagement and avoidance.

Problem-focused coping. Problem-focused coping is often viewed as a more productive approach to coping, because an individual attempts to change his/her interaction with the environment and/or steps are taken to mitigate future threats (Lazarus & Folkman, 1984). Problem-focused coping strategies include focusing on time management, strengthening communication skills, and creating action plans (Lazarus & Folkman, 1984). Research has shown that students who regularly engaged in problem-focused coping strategies had less negative stress than students that regularly employed emotion-focused coping strategies (Fornes-Vives et al., 2016). Coiro et al. (2017) also found that students that took control over their stressors had lower anxiety and depressive symptoms. In addition, strengthening communication skills was proved to be a proactive coping strategy effective in reducing stress (Kadhiravan & Kumar, 2012).

Social support. Many studies have shown the value of social support as a positive buffer from stress (Aselton, 2012; Karaca et al., 2019; Chao, 2012; Van Kim & Nelson, 2013). Social

support is an essential defense against stress, and low social support weakens an individual's well-being (Chao, 2012). In Van Kim and Nelson's study (2013), low socialization resulted in higher levels of perceived stress among participants. Also, Karaca et al. (2019) reported that nursing students with positive social support were less likely to suffer from mental health problems. They recommended that nursing education programs focus on establishing social support among students.

Self-care practices. In addition to problem-focused coping strategies, self-care practices such as physical activity, mindfulness, and adequate sleep, were also found to be effective in managing stress. Both Tavolacci et al. (2013) and Van Kim and Nelson (2013) determined that students with the highest physical activity levels reported the lowest perceived stress. In addition, exercising was one of the most reported techniques beneficial for reducing stress (King et al., 2012). Benefits of mindfulness and meditation have also been examined. In Van der Riet, et al., (2015) study, nursing students reported that a mindfulness/meditation program had positive benefits in stress reduction as well as self-care practices. Lastly, adequate sleep was found to be essential in managing stress. According to Zhang et al. (2018), nursing students are at risk for poor sleep patterns due to irregular clinical hours; thus, promoting sleep is vital for well-being and managing stress. Therefore, the second phase of the text message stress management program is designed to promote problem-focused coping strategies, social support, and self-care practices.

Self-efficacy. Self-efficacy is not a construct in the Stress, Appraisal, and Coping theory, but it is a predominant concept in literature for effectively managing stress. If a person does not have the knowledge and confidence to engage in healthy coping behaviors, stress could continue to go unmanaged. In Bandura's Social Cognitive Theory, self-efficacy is defined as an

individual's confidence in his or her ability to take action and overcome obstacles. (National Institute of Health, 2005). Fostering self-efficacy can motivate individuals to engage in healthy coping as well as increase competence in coping (Kadhiravan & Kumar, 2012). Self-efficacy has been found to buffer the effects of stress reactions as well as have a negative correlation with stress (Li &Yang, 2009). Increasing self-efficacy and motivation could assist stressed individuals in engaging in healthy problem-focused coping responses (Li & Yang, 2009). The last phase of the text message intervention was designed to strengthen self-efficacy by providing healthy coping encouragement and affirmation.

A three-phased approach was strategically chosen to scaffold effective coping practices. The first phase was designed to discourage unhealthy coping practice in order for participants to have a clean foundation in which to build healthy coping practices upon. The second phase launched problem-focused coping strategies and self-care practices. The third phase further promoted healthy coping practices by providing reinforcement and support. The cumulative effect of the text-message stress management intervention was intended to strengthen coping self-efficacy and lower perceived stress among nursing students.

Methods

Sampling and Recruitment. A convenience sample of undergraduate nursing students was recruited, in September 2018, through email and posted flyers after receiving approval from the university's Institutional Review Board. The recruitment messages invited students enrolled in nursing classes to participate in a focus group in order to understand the stress experiences of undergraduate nursing students and examine the feasibility of a text message stress management program. Three 45-minute focus groups were offered. Fruit and cookies, as well as a chance to win a $50 gift card, were advertised as incentives. A sign-up sheet was posted on the author's

door with focus group dates and times. Interested participants signed up for a focus group by identifying their semester in nursing program and phone number.

Focus Groups. In total, three focus groups were conducted to cultivate the text messages and inform the development of the intervention. All focus groups were face-to-face and held in meeting rooms within the nursing building. The first focus group had 6 participants, the second focus group had 6 participants, and the third focus group had 11 participants, n=23. The majority of the students were 18-20 years old and female. Each focus group lasted 30-45 minutes.

Prior to each focus group, participants were sent a text thanking them for their interest and information about participating in the focus group. These messages served as reminders as well as tested the functionality of the Remind ™ application. The Remind ™ application is a free text messaging application that allows text messages to be sent directly to phones and translates messages into more than 70 languages (Remind ™, 2017). At the beginning of each focus group, confirmation that the participants received the reminder texts and written informed consent was obtained. Participants were given a brief survey to collect demographic data. The initial discussion was guided by a set of structured questions, with the intention of exploring stress experiences and current coping strategies. The questions were constructed from stress concepts found in literature. Table 1 depicts focus group questions with rationale and support from literature. Examples of questions included, "What times in the semester do you feel most stressed? and "How do you typically cope with stress?" Participants were also asked their preferred channel of communication. After the dialogue on stress experiences and coping, participants were shown the sample text messages. A slide-show with 19 sample messages was projected on a large screen for easy viewing. Participants were shown the messages one-by-one

and asked for open feedback. Participants were vocal in their response and needed little probing. Detailed notes were taken. After all the messages were viewed, participants were asked about the overall cultural appropriateness, length, and understandability of the messages. They were asked how often they would prefer to receive the messages as well as the optimum time of the day. Participants were also asked to provide feedback on likelihood of reading and acting on the text messages.

Each focus group was recorded with student permission. The focus group sessions were each transcribed while listening for any emergent themes. The transcripts were then cross-referenced with notes taken during sessions for accuracy. Next, the transcripts and notes were organized and coded by communication preference, stress experiences, coping strategies, and message feedback. Themes were identified and meaningful quotes that supported the themes were isolated.

Results

Preferred Channel of Communication. The preferred channel of communication among all 23 focus group participants was text message. One participant said, "I am more likely to read texts than email." Another participant said, "If I get a text, I read it immediately." The participants were also clear on their preference of text messages versus messages through other channels such as GroupMe messages. Several participants expressed that GroupMe messages were overused and they were already a part of numerous GroupMe chats.

Stress Experiences. All participants verbalized that they were currently experiencing stress. Physical stress responses such as chest tightness, twitching eyes, nervous vomiting, increased heart rate, and insomnia were reported. The beginning and end of the semesters were the times of the semester the participants recounted the most stress. One focus group also

reported mid-semester as being a busy time. One participant said, "I never had stress like this before nursing school." The most commonly discussed sources of stress were not being able to find a balance with school demands and social life, disorganized courses, worrying about sleeping in and missing clinical, information overload in courses, extracurricular priorities such as sorority involvement and jobs, nursing exams, pressure for maintaining grade point average, and being around so many other highly driven people. Two of the three focus groups had rich discussions about other highly driven people being a source of stress. In one focus group a participant said, "Being around 'try-hards' is unhealthy. I will feel OK but then when I come into the nursing building I feel stressed especially listening to people before tests." Another participant said, "When other people are stressed, it stresses me out." A third participant added, "It feels like we 'co-ruminate' on each other's stress." In another focus group a participant said "Comparison is a major stressor. It is stressful because I am around so many other highly driven people." A second participant added, "Sometimes the comparison is stressful because of the feeling you are behind."

Current Coping Strategies. The coping strategies varied among focus group participants. Participants in all three focus groups discussed stress eating, talking to someone, online shopping, and binge watching streaming video services to cope with stress. Other reported coping strategies included using essential oils, physical activity, reading, finding fun places to study, consuming caffeine, and self-care practices. The participants in all three focus groups discussed the importance of social support for encouragement. A participant reported the value of talking with friends in cohort as well as friends that attend other nursing schools. She said it helps with perspective because "we all do same things for same reason." Another

participant discussed the value of social support with classmates by saying, "Having someone that gets it is nice. Just having someone to empathize."

Sample Message Feedback. The participants indicated that they liked some messages as written, but suggested significant revisions for other messages in phase one of the study. For example, participants felt the message "Staying super busy and stressed out does not really make you seem more important" was too harsh. Participants suggested softening the message or adding a smiley face at the end. One participant said, "I only like encouraging things so that message throws me off." Another participant suggested, "Make the messages as approachable as possible." Table 2 displays phase one sample messages with revisions and additions.

All participants liked the action-oriented messages in the second phase of the study. Adding a humor message and a message about visualizing success were suggested. A participant said, "Visualizing success is effective in sports. It should also be used in nursing school." The participants reported they liked that a time frame was set in some of the phase two messages and that the messages were, "good and tangible." Revisions and additions for phase two are depicted in Table 2. The participants also approved of the encouraging messages in phase three. The consensus across all three focus groups was that more encouraging messages should be added. One participant said, "The encouraging ones are the ones I would look forward to." Table 3 displays phase one sample messages with revisions and additions.

The consensus among all three focus groups was that the messages were culturally appropriate and understandable. Participants also agreed that the length of the messages were neither too long nor too short. Two of the three focus group participants said they would like to receive the messages on a daily basis. The other focus group participants said they would prefer messages 2-3 days a week. The majority of participants agreed the optimum time of day to

receive messages was mid-morning, especially for action-oriented messages. Participants agreed that they would read the messages, but feedback on the likelihood of acting on the messages was uncertain. The participants indicated that acting on the messages would depend on the person and that each person would filter out what was applicable to him/her. One participant said, "They might not do it, but it starts the thought so that's important."

Focus group feedback signified that text messages may be a viable option for the delivery of a stress management program. A text message stress management intervention was created using evidence from literature and student nurse focus group feedback. The text message stress management intervention consists of three phases with 30 messages. The first phase contains five messages with the focus on discouraging maladaptive avoidance and disengagement strategies. The second phase consists of fifteen messages with the intent to encourage problem-focused coping, social support, and self-care practices. The third phase contains ten messages designed to provide encouragement and build self-efficacy. Table 4 depicts the sample messages with revisions and additions noted.

Conclusion

Nursing students are under immense stress and nursing educators have a professional and an ethical duty to address that stress. Stress intensifies and perpetuates among cohorts due to the competitive and driven nature of nursing students. Therefore, it is imperative to create a stress management culture. Healthy stress management and self-care practices need to be promoted and students need to feel encouraged and championed. The literature has emphasized the importance of social support. The focus groups in the study indicated that positive, encouraging social support is the most beneficial. Encouraging messages were emphasized in the creation of the intervention because focus group participants expressed such a need and desire for

encouragement. Messages were also designed to be distributed on a daily basis in response to participant requests. Future research is needed to determine if this text-message stress management could be effective in lowering perceived stress and strengthening coping self-efficacy.

REFERENCES

American Psychological Association. (2014). *2014 annual report of the American Psychological Association*. Retrieved from https://www.apa.org/about/governance/bdcmte/2014-report.pdf

Aselton, P. (2012). Sources of stress and coping in American college students who have been diagnosed with depression. *Journal of Child and Adolescent Psychiatric Nursing, 25*(3), 119-123. doi:10.1111/j.1744-6171.2012.00341.x

Boath, E., Jinks, A., Thomas, N., Thompson, R., Evans, J., O'Connell, P., & Taylor, L. (2016). Don't go with the 'FLO'-a student mobile texting service to enhance nursing student retention. *Nurse Education Today, 45*, 80-86. doi: http://dx.doi.org/10.1016/j.nedt.2016.06.019

Chao, R. C. (2012). Managing perceived stress among college students: The roles of social support and dysfunctional coping. *Journal of College Counseling, 15*(1), 5-21.

Coiro, M. J., Bettis, A. H., & Compas, B. E., (2017). College students coping with interpersonal stress: Examining a control-based model of coping. *Journal of American College Health, 65*(3), 177-186. doi:10.1080/07448481.2016.1266641

Doom, J. R. & Haeffel, G. J. (2013). Teasing apart the effects of cognition, stress, and depression on health. *American Journal of Health Behavior, 37*(5), 610-619. doi: http://dx.doi.org/10.5993/AJHB.37.5.4

Domingues Hirsch, C., Devos Barlem, E. L., Tomaschewski-Barlem, J. G., Lerch Lunardi, V., & Calçada de Oliveira, A. C. (2015). Predictors of stress and coping strategies adopted by nursing students. *Acta Paulista de Enfermagem, 28*(3), 224–229. doi: https://0-doi-org.library.uark.edu/10.1590/1982-0194201500038

Ekpenyong, C., Daniel, N., & Aribo, E. (2013). Associations between academic stressors, reaction to stress, coping strategies and musculoskeletal disorders among college students. *Ethiopian Journal of Health Sciences, 23*(2), 98-112.

Fornes-Vives, J., Garcia-Banda, G., Frias-Navarro, D., & Rosales-Viladrich, G. (2015). Coping, stress, and personality in Spanish nursing students: A longitudinal study. *Nurse Education Today, 36*, 318-323. doi: http://dx.doi.org/10.1016/j.nedt.2015.08,.0110260-6917

Kadhiravan, S. & Kumar, K. (2012) Enhancing stress coping skills among college students. *Researchers World, 3*(4), 49-5.

Karaca, A., Yildirim, S., Cangur, S., Acikgoz, F., Akkus, D. (2019). Relationship between mental health of nursing students and coping, self-esteem and social support. *Nurse Education Today, 76*, 44-50. doi: https://doi.org/10.1016/j.nedt.2019.01.029

King, K., Singh, M., Bernard, A., Merianos, A. L., & Vidourek, R. A. (2012). Employing the health belief model to examine stress management among college students. *American Journal of Health Studies, 27*(4), 192-203.

Lazarus, R. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY; Springer Publishing Company, Inc.

Li, M. & Yang, Y. (2009). Determinants of problem solving, social support seeking, and avoidance: A path analytic model. *International Journal of Stress Management, 16*(3), 155-176. doi: 10.1037/a0016844

Lust, K., Ehlinger, E., & Golden, D. (2010). *College student health survey report: Health and health-related behaviors Minnesota postsecondary students*. Retrieved from http://www.bhs.umn.edu/surveys/index.htm

Mayo Clinic. (2017). Stress symptoms: Effects on your body and behavior. Retrieved from https://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/stress-symptoms/art-20050987

National Institute of Health. (2005). *Theory at a glance: A guide for health promotion practice (2nd ed.)*. Retrieved from https://archive.org/details/theoryatglancegu00glan

Newport, F. (2014). *The new era of communication among Americans*. Retrieved from http://www.gallup.com/poll/179288/new-era-communication-americans.aspx

Reeve, K. L., Shumaker, C. J., Yearwood, E. L., Crowell, N. A., & Riley, J. B. (2013). Perceived stress and social support in undergraduate nursing students' educational experiences. *Nurse Education Today, 33*, 419-424. doi: 10.1016/j.nedt.2012.11.009.

Remind ™. (2017). School communication shouldn't be so hard. Retrieved from https://www.remind.com/

Tavolacci, M. P., Ladner, J., Grigioni, S., Richard, L., Villet, H., & Dechelotte, P. (2013). Prevalence and association of perceived stress, substance use and behavioral addictions: a cross-sectional study among university students in France, 2009-2011. *BMC Public Health, 13*(724), 1-8. doi:1471-2458/13/724

Timmons, F., Corroon, A.M., Byrne, G., & Mooney, B. (2011). The challenge of contemporary nurse education programs perceived stressors of nursing students: Mental health and related lifestyle issues. *Journal of Psychiatric and Mental Health Nursing, 18*(9), 758-766.

Turner, K. & McCarthy, V. L. (2017). Stress and anxiety among nursing students: A review of intervention strategies in literature between 2009 and 2015. *Nurse Education in Practice, 22*, 21-29. doi: http://0-dx.doi.org.library.uark.edu/10/1016/j.nepr.2016.11.002

Twenge, J. (2017). The number of teens who are depressed is soaring-and all signs point to smartphones. Retrieved from http://www.businessinsider.com/the-number-of-teens-who-are-depressed-is-soaring-2017-11

Van der Riet, P., Rossiter, R., Kirby, D., Dluzewska, T. & Harmon, C. (2015). Piloting a stress management and mindfulness program for undergraduate nursing students; Student feedback and lessons learned. *Nurse Education Today, 35*, 44-49. doi: 10.1016/j.nedt.2014.05.003

VanKim, N. A., & Nelson, T. F. (2013). Vigorous physical activity, mental health, perceived stress, and socializing among college students. *American Journal of Health Promotion, 28*(1), 7-15.

Wolf, L., Stidham, A. W., & Ross, R. (2015). Predictors of stress and coping strategies of US accelerated vs. generic baccalaureate nursing students: An embedded mixed methods study. *Nurse Education Today, 35*(1), 201-205. doi: https://doi.org/10.1016/j.nedt.2014.07.005

Zhang, Y., Peters, A., & Chen, G. (2018). Perceived stress mediates the associations between sleep quality and symptoms of anxiety and depression among college nursing students. *International Journal of Nursing Education Scholarship*, 1-9. doi:10.1515/ijnes-2017-0020

Zyga, S. (2013). Stress in nursing students. *International Journal of Caring Sciences, 6*(1), 1-2.

TABLES

Table 1

Rationale and Support for Focus Group Questions

Focus Group Question(s)	**Rationale**	**Literature Findings**
What is your preferred channel of communication?	To determine if text message delivery would be a feasible avenue in delivery a stress management intervention.	A Gallup poll examining preferred communication delivery revealed that text messaging is the predominant form of communication for Americans aged 18-29 (Newport, 2014)
How do you know you are experiencing stress? What does stress feel like to you?	To determine if participant physical and psychological symptoms are consistent with those found in literature.	Stress also takes a toll on health through physical symptoms of high blood pressure, headaches, muscle tension, and fatigue as well as psychological symptoms of anxiety, irritability, sleep disturbances, and depression (Mayo Clinic, 2017).
What are your greatest sources of stress? What times in the semester do you feel the most stressed?	To determine if participant sources of stress are consistent with other nursing student stressors in literature.	Many nursing programs have more rigorous grading scales and course failures result in program dismissals (Turner & McCarthy, 2017). The fear of failure and concern about clinical competence are also major stressors for nursing students (Wolf, Stidham, & Ross, 2015; Zyga, 2013). Students also struggle with time management in balancing long clinical days with multiple deadlines, didactic assignments, and high stakes testing demands (Timmins, Corroon, Byrne, & Mooney, 2011; Reeve, et al., 2013; Wolf, Stidham, & Ross, 2015).
How do you typically cope with stress?	To determine if participants were utilizing emotion-focused coping strategies or problem-focused coping strategies.	The highest stress levels were associated with disengagement coping (Coiro, 2017). Female participants were more prone to alcohol and tobacco use as well as eating disorders, which are indicative of unhealthy coping behaviors (Tavolacci, et al, 2013). Students who regularly engaged in problem-focused coping strategies had less negative stress than students that regularly employed emotion-focused coping strategies (Fornes-Vives et al., 2016).
How do you feel about your social support?	To determine if participants had a social support network and how they perceived social support.	Social support can be a protective buffer from stress (Aselton, 2012). Social support among college students has been declining in the past several years (Chao, 2012).

Table 2

Phase 1 Sample Messages with Revisions and Additions

Sample	Revision
Avoiding your problems is not effective. Whatever it is will be there tomorrow or the next day or the next.	Avoidance and procrastination are not effective. Address it today and you won't have as much to do tomorrow.
Staying super busy and stressed out does not really make you seem more important.	Choose quality over quantity. You are not your best self when you take on too much.
Having that big piece of chocolate cake (or other vice) will not really make all your problems disappear.	Make healthy choices for yourself. Having that big piece of chocolate cake or alcohol or more caffeine will not really make all your problems disappear.
Trying to drink your problems away is not the solution. Your problems will still be there and you will have a headache.	Do not try to manage your stress with a Netflix binge this week.
Added due to focus group feedback.	Staying up cramming for exams is not a healthy choice.

Note. Demonstration of changes based on feedback to the first phase of the text-message stress management program.

Table 3

Phase 2 Sample Messages with Revisions and Additions

Sample	Revision
Do a physical activity you enjoy today. Try to get at least 30 minutes of aerobic exercise.	No change.
Take control of your time. Make a schedule so you can tell your time where to go.	No change.
Express yourself directly to someone today. Exercise respectful, assertive communication.	No change.
This is a reminder to put down your phone and talk to the people around you.	No change.
Work to build relationships with the people around you. Things don't seem as bad when your friends are there.	No change.
Make sure you get at least 7 hours of sleep tonight.	Prioritize your day to make sure you get at least 7 hours of sleep tonight.
Go for a walk and identify three things you appreciate about nature.	No change.
Take a 10 minute time out today. Deep breathe, daydream, pray, or stretch.	No change.
Added due to focus group feedback.	Find a mentor this week. A mentor can help you talk through things and support personal as well as professional growth.
Added due to focus group feedback.	Visualize your happy place. Spend three minutes taking deep breaths and thinking about that place that makes you feel happy and relaxed.
Added due to focus group feedback.	Laugh today. Talk to one of your funny friends or watch a cat video-whatever works.
Added due to focus group feedback.	Reflect on all the positive things in your life today.
Added due to focus group feedback.	Take steps today to make positive changes in your life.
Added due to focus group feedback.	Be proactive and stick to your study plans.
Talk to someone about your stress today. Don't just let it build up inside.	No change.

Note. Demonstration of changes based on feedback to the second phase of the text-message stress management program.

Table 4

Phase 3 Sample Messages with Revisions and Additions

Sample	Revision
You can build meaningful relationships. Put your phone down and connect with someone today.	No change.
Visualize positive outcomes. You can be successful on your exams and assignments this week.	You have such a bright future. Visualize success this semester. Visualize success in the nursing program.
Believe in yourself. You can accomplish your goals.	Your grade does not define you. The important thing is that you are learning and doing your best.
Exercise is not a chore. It's a mood booster. You can spare 30 minutes a day to exercise.	You can budget time for positive self-care practices in your day.
You can overcome the stress you are facing.	No change.
You are not alone. Others believe in you and support you.	No change.
Added due to focus group feedback.	You do not have to be the best, just do your best.
Added due to focus group feedback.	Work to find meaning in all stressful situations. Some stressors bring opportunity.
Added due to focus group feedback.	Try not to compare yourself to anyone today. You have your own unique talents and gifts.
Added due to focus group feedback.	Celebrate all successes. Look how far you have become!

Note. Demonstration of changes based on feedback to the third phase of the text-message stress management program.

CHAPTER 5: MANUSCRIPT #2

Examining Effects of a Text Message Stress Management Intervention

Abstract

Nursing students are exposed to high levels of stress early on in their degree programs. Since nursing is an intellectually, physically, and emotionally demanding profession, it is imperative for nursing students to establish healthy coping strategies that will aid them throughout their careers. The present study examines the effects of a six week text message stress management intervention on lowering perceived stress and increasing coping self-efficacy. An analysis of covariance (ANCOVA) was conducted to control for initial individual differences in pretest scores on perceived stress and self-efficacy scores. There was not a statistically significant difference in post perceived stress scores. However, there was a statistically significant difference in post intervention coping self-efficacy scores between the intervention and control groups, $F(1,85) = 14.18$, $p < .01$, $\eta 2 = .14$. This intervention shows promise in increasing student confidence and ability to cope with stress. Many factors, such as time in the semester and life events, contribute to feelings of perceived stress. Nonetheless, increasing self-efficacy in effectively coping with stress could be beneficial in buffering future stress encounters.

Keywords: nursing student, stress, coping self-efficacy, text message, stress intervention

Students enrolled in baccalaureate nursing programs are exposed to even more stressors than the typical college student (Reeve, Shumaker, Yearwood, Crowell, & Riley, 2013). In a focus group study examining stress perceptions, all nursing student participants reported feeling stressed (Henderson, 2019). Recounted sources of stress included being around other highly driven people, the difficulty of nursing exams, and not being able to find a balance with clinical, school, and life (Henderson, 2019). The fear of failure and concern about clinical competence are also major stressors for nursing students (Wolf, Stidham, & Ross, 2015; Zyga, 2013). Clinical days are strenuous, with exposure to new, challenging, and at times emotional situations (Zyga, 2013). A student in Wolf, Stidham, & Ross's (2015) study expressed concern with getting through nursing program and knowing enough as a nurse. Students also struggle with time management in balancing long clinical days with multiple deadlines, assignments, and exams (Timmins et al., 2011; Reeve et al., 2013; Wolf, Stidham, & Ross, 2015).

The effects of stress can have negative physical and psychological impacts on well-being and academic success. Stress is a leading cause of poor academic performance and withdrawal from college classes (Coiro et al., 2017). High levels of perceived stress have been associated with impaired relationships, eating disorders, risk taking behaviors, and drug and alcohol use (Coiro et al., 2017; Kenney, et al., 2013). Stress may also impact health through physical manifestations such as high blood pressure, headaches, muscle tension, and fatigue as well as psychological manifestations such as anxiety, irritability, sleep disturbances, and depression (Mayo Clinic, 2017). Anxiety (61%), depression (49%), and stress (45.3%) continue to be the most frequent reasons for college students seeking mental health treatment (Center for Collegiate Mental Health, 2016). Student mental health issues place significant demands on mental health

clinics and other resources and result in long waiting periods for services (Hintz, Frazier & Meredith, 2015).

An individual attempts to manage stress through various coping mechanisms (Coiro et al., 2017). The coping strategies adopted early in life are often used throughout a person's lifetime; therefore it is important to establish healthy coping in youth (Kadhiravan & Kumar, 2012). It is a normal response to want to feel better when faced with stress or adversity. Lazarus and Folkman (1984), theorize that coping either serves the purpose of regulating the emotional responses to the stressor (emotion-focused coping) or handling the problem by making adjustments to the factor(s) causing stress (problem-focused coping). The emotion-focused coping response allows a person to experience temporary relief from stress by turning to food, drugs, alcohol, tobacco, or other maladaptive coping behaviors (Cousins et al., 2017; Straud, et al., 2015). While this behavior may provide short-term comfort, it does not remedy the problem. As such, emotion-focused coping responses have been associated with poor health, depression, increased academic stress, and avoidant tendencies (Cousins et al. 2017). Problem-focused coping is a healthier, more responsible way to manage perceived stress and has been shown to promote health and build resilience in students (Kadhiravan & Kumar, 2012; Walker & Stephens, 2014). Problem-focused coping occurs when attempts are made to influence the situation in order to minimize the stressor (Straud et al., 2015). Problem-focused coping facilitates self-efficacy through critical thinking, decision making, assertiveness, communication, and self-regulation skills (Kadhiravan & Kumar, 2012). Therefore it is imperative to bring awareness to the college student population about the benefits of healthy coping as well as the potentially harmful effects of unhealthy coping.

Social support has also been identified as a positive buffer and protective factor against the effects of stress (Aselton, 2012; Cousins et al., 2017). Studies have shown that students that seek out and receive support from friends, family, and faculty members have higher reported levels of physical and psychological well-being (Cousins et al., 2017). Encouraging students to talk through stressful days, keep in touch with family members, identify a mentor, and surround themselves with positive peer support are examples of social interaction strategies found in literature. Unfortunately, Twenge (2017), reports that less time is spent in face to face interaction and more time is spent interacting with friends online and through social media platforms. Those who spent more time than average online and less average time with friends in person were more likely to be depressed (Twenge, 2017).

The purpose of this study was to examine the effects of a text message stress management intervention on reducing perceived stress in nursing students. This study also sought to examine the impact of a text message stress management program on increasing self-efficacy for effectively coping with stress.

Methodology

This study employed an experimental pre-test/post-test design to examine the impact of a text message stress management intervention. The intervention group received a 6-week text-messaging program, while the comparison group did not receive any messages. A comparison of pre-test and post-test perceived stress and coping self-efficacy among intervention and control groups, as measured by the Perceived Stress scale and Coping Self-efficacy scale, were analyzed with an analysis of covariance (ANCOVA) statistical procedure.

Population. The population of interest was nursing students enrolled in the pre-licensure, baccalaureate program at a large Southeastern university. There are approximately

500 students in the five semester program: sophomore second semester (So2), junior first semester (J1), junior second semester (J2), senior first semester (S1), and senior second semester (S2). The convenience sample was comprised of all pre-licensure students that agreed to participate in the study. All pre-licensure nursing students met the inclusion criteria. There was no exclusion criteria. Students were recruited through email, flyers, and class information sessions at each level in the program. The proposal received exempt approval through the university's Institutional Review Board.

Sampling. The stress management intervention was delivered via text message. The Remind ™ application was used to deploy stress management text messages. The Remind ™ Application is a free text messaging application that allows text messages to be sent directly to phones as well as tracks recipient participation (Remind ™, 2017). Students agreeing to participate in the study signed an informed consent and provided their phone number and level in the program. No other identifying information was collected. Each level in program had separate sign-up sheets. Initially, 249 students completed informed consents and signed up for the study. Students were divided into intervention and control groups through stratified random sampling. Participants on each sign-up sheet were numbered. The phone numbers of odd entries were entered into the Remind ™ application and named Stress Management 1. Next, the phone numbers of even entries were entered into the Remind ™ application and named Stress Management 2 and then groups were randomly assigned into control or intervention groups. Both control and intervention groups had a balance of So2, J1, J2, S1, and S2 students to control for the varying demands and stressors within semesters. All subjects in the control group were offered the text message stress management intervention upon completion of the study.

Intervention. The first text message was a survey link to complete Perceived Stress Scale, Coping Self-Efficacy Scale, and provide demographic information. Students were asked to create a unique identification code by entering their response to four questions. They were asked to remember their code and use it as identification for the post-survey. The post-survey also asked the same four questions in creating the identification in order to foster accuracy. Once the pre-surveys closed, the intervention group began receiving the stress management text messages.

The first phase of messages were designed to discourage unhealthy coping habits. The most common dysfunctional coping strategies from literature, as well as ones identified from student focus groups were selected as the topics for the messages (Henderson, 2019). "Avoidance and procrastination are not effective. Address it today and you won't have as much to do tomorrow" was an example of a message from the first phase. One message per day was texted Monday through Friday via the Remind ™ application. The first phase of messages took place over one school week.

The second phase of messaging was designed to promote healthy coping strategies such as exercise, relaxation, and time management. The messages were designed based on problem-focused coping strategies and self-care practices found in literature, as well as those identified in student focus groups (Henderson, 2019). Phase 2 messages also emphasized the importance of social support. Social support is a positive buffer from stress; however, many students do not put their electronic devices down long enough to establish a meaningful human connection (Visnjic et al., 2018). Examples of phase 2 messages were "Go for a walk and identify three things you appreciate about nature" and "This is a reminder to put down your phone and talk to the people around you." One message per day was texted Monday through Friday for three school weeks.

The third, and final, phase of messaging was designed to build self-efficacy in the student's ability to engage in healthy coping strategies. The messages provided affirmation in ability to adopt healthy coping strategies as well as offered general encouragement. "You are not alone. Others believe in you and support you" was an example message from the third phase. One message per day was texted, Monday through Friday, for two school weeks. After the completion of the text message intervention, students in both the treatment and control groups received a final text message with a link to complete the post-surveys. The post-surveys for both groups of students were the Perceived Stress Scale and the Coping Self-Efficacy Scale. Students in the intervention group also received the Post-Intervention Evaluation Survey to complete.

Instrumentation. The instrumentation for this study consisted of four surveys: the Demographic Data Form, Perceived Stress Scale, Coping Self-Efficacy Scale, and Post-Intervention Evaluation Survey.

Demographic Data Form: Demographic data was obtained by a self-report survey developed by the researcher. Information collected includes age, level in program, race, gender, marital status, and living arrangements.

Perceived Stress Scale: The Perceived Stress Scale (PSS) is a widely used scale to measure the degree in which situations in one's life are appraised as stressful (Cohen, 1994). The 10 question instrument asks questions about stressful feelings and thoughts during the last month. Each item asks participants to indicate how often they felt a certain way, with 0 being never to 4 being very often. Example questions are "In the past month, how often have you felt unable to control the important things in your life?" and "In the past month, how often have you found that you could not cope with all the things you had to do?" (Cohen, 1994). Items 4, 5, 7, and 8 are reverse scored then items are summed to derive at total scores (Cohen, 1994). Total

scores range from 0 to 40, with higher scores denoting higher perceiving stress. Scores from 0-7 are considered very low, scores from 8-11 are low, scores of 12-15 are average, scores of 16-20 are high, and scores above 21 are considered very high (University of Wisconsin, n.d.). The internal consistency of the PSS is .84-.85 in two college student samples (Cohen, Kamarck, & Mermelstein, 1983). The PSS correlates in a predicted way with other measures of stress such as job responsibilities, life event scores, and maladaptive coping behaviors (Cohen, et al., 1983).

Coping Self-Efficacy Scale: The Coping Self-Efficacy Scale (CSE) is a 26-item instrument designed to measure one's confidence in engaging in effective coping behaviors when faced with challenges (MIDSS, 2018). Participants are asked to rate from 0 to 10, a series of items based on the prompt, "When things aren't going well for you, how confident are you that you can…" (MIDSS, 2018). Zero indicates cannot do at all, 5 indicates moderately can do, and 10 indicates certain can do. The total score is calculated by adding the item ratings. An exploratory factor analysis resulted in three factors: 1) use problem-focused coping, 2) stop unpleasant emotions and thoughts, and 3) get support from friends and family. Internal consistency and test-retest reliability for all three factors ranged from 0.80-0.91 (Chesney et. al, 2006). A concurrent validity analyses supported that the three factors assess self-efficacy for various types of coping (Chesney et. al, 2006).

Post-Intervention Evaluation Survey: Information regarding intervention satisfaction and number of messages acted upon was obtained by a self-report survey developed by the researcher. Example questions were "How many text messages did you take action on?" with response options of 95-100%, 80-94%, 65-79%, 50-64%, 35-49%, 20-34%, less than 20% and "How satisfied were you with receiving text messages as a stress management program?" with response options from very satisfied to very dissatisfied on a Likert scale.

Results

Out of the 249 that initially signed up for the text message program, 202 participants completed the pre-surveys for a pre-survey response rate of 81%. A total of 146 participants completed the post-survey; 74 respondents from the intervention group and 72 respondents from the control group, for a post-survey response rate of 58.6%. There were 101 participants that completed the pre-survey and did not complete the post-survey. There were also 45 participants that completed the post-survey without completing the pre-survey. Pre and post surveys were able to be matched with the unique code for only 101 participants for a final response rate of 40.5%. In addition, not all of those participants completed the Coping Self-efficacy scale. All data were analyzed the IBM Statistical Package for Social Sciences (SPSS) software package.

Demographic characteristics. Of the total sample with matched scores (N=101), 96% were female and 4% were male. Ages ranged from 19-34 with a mean of 21 years (M=20.7, SD= 1.6). All five semesters of the nursing program were represented in the sample. The majority of students (93.1%) were Caucasian. Most students lived with roommates (85.1%) or family (7%) with only 5% reporting that they lived alone. The majority of the students (97%) were unmarried. Table 1 displays the demographic characteristics of the sample population.

ANCOVA Analysis. First, a histogram was generated to visually inspect the normal distribution of both post perceived stress scores and post coping self-efficacy scores. Then a Levene's test was conducted to verify that the error variance was equal across both the intervention group and the control group. The homogeneity of variance assumption was met for post perceived stress scores, $F(1, 99) = .058$, $p = .81$ as well as post coping self-efficacy scores, $F(1,86) = .013$, $p = .91$. Next, the homogeneity of regression slopes was tested by examining the between subjects of effects of the pre-intervention scores and group condition. The homogeneity

of regression slopes was met for both post perceived stress scores, $F(1,97) = .001$, $p = .97$ and post coping self-efficacy scores, $F(1, 84) = 2.85$, $p = .10$.

With assumptions satisfied, a one way ANCOVA was conducted to determine if there was a statistically significant difference between control and intervention groups on perceived stress scores with post-intervention perceived stress scores as the dependent variable and pre-intervention perceived stress scores as a covariate. A second one way ANCOVA was performed to see whether there was an overall statistically significant difference in post-intervention coping self-efficacy scores between the control and intervention groups once their means had been adjusted for pre-intervention coping self-efficacy scores. Again post-intervention scores were set as the dependent variable and pre-intervention scores as a covariate. The ANCOVA procedure is optimal for this study design because it accounts for variation around the post-test mean that comes from the variation in where participants started pre-test; therefore, differences can be inferred from the intervention and are not left over effects of pre-test differences between the control and intervention groups (Maxwell, Delaney, & Kelley, 2018).

The mean perceived stress scores for the intervention group decreased slightly from pre-intervention M = 22.29 to post-intervention M = 21.20. However, the ANCOVA indicated this difference was not statistically significant after adjusting for the pre-intervention perceived stress scores, $F(1, 98) = .21$, $p = .65$, partial $\eta 2 = .002$. The ANCOVA results for coping self-efficacy are displayed in Table 2. On the other hand, the mean coping self-efficacy scores for the intervention group increased from pre-intervention M = 152.94 to post-intervention M = 176.96. The second one way ANCOVA indicated that after controlling for pre-intervention coping self-efficacy scores, the text message intervention had a statistically significant effect on increasing coping self-efficacy post-intervention, $F(1, 85) = 14.18$, $p < .01$. The intervention effect explains

14% of the variance in post-intervention coping self-efficacy scores; thus indicating a large effect size (Richardson, 2011). The ANCOVA results for coping self-efficacy are displayed in Table 3.

Post-Intervention Evaluation. Only participants in the intervention group received the post-intervention evaluation survey.73 participants completed the survey, for a response rate of 58%. The majority of participants (78.3%) reported satisfaction with text message stress management program and only 1 reported dissatisfaction. A large percentage of the text messages were read by the participants; 95.7% of participants read at least 65% of the stress management text messages. Table 4 depicts the quantity of messages read. Participants perceived the encouraging messages, affirming messages, and messages regarding humor to be the three most effective messages in the stress management text message intervention. Messages regarding finding a mentor and visualizing a happy place were perceived to be the least effective messages. Table 5 displays the results of the participant perceptions of message effectiveness. Prioritizing sleep was the message that most participants took action on, whereas finding a mentor was the action that the least number of participants took action on. Table 6 displays results of message in which participants took action. Qualitative feedback indicated that the participants had generally positive perceptions of the stress management intervention and the text message format. There were many positive comments and participants expressed the desire for the intervention to continue. Many participants reported that they enjoyed the affirming and encouraging messages the most and some participants said they only like the affirming messages and didn't like the messages that told them what to do. Participants reported that personalizing the messages and attaching images with the messages would be beneficial.

Discussion

The study did not confirm that the text message stress intervention was effective in lowering perceived stress. The fact that the study was under powered was a contributing factor. Even though post-intervention scores were slightly lower, there was not a statistically significant difference to indicate that the difference was a result of the text message intervention and not chance alone. The findings regarding perceived stress scores in this study were inconsistent with findings from the Crandall et al. (2016) and Hintz et al. (2015) studies. Perceived stress levels of nursing students fluctuate during the course of semesters due to variability of scheduled exams, assignment due dates, and clinical rotations. With the continual nature of stressors nursing students as well as practicing nurses face, it is difficult to drastically decrease perceived stress levels. Also, stress levels could lag behind coping responses. Perhaps it might take longer for stress to subside once an individual improves his coping self-efficacy. Investigating this hypothesis with a longer intervention period is an area of recommended research.

The post-intervention coping self-efficacy scores of nursing students in the treatment group did increase following the text message stress management intervention. Kadhiravan and Kumar (2012) found similar results in their coping intervention study. They did not find a difference in perceived stress scores but did find a significant difference in measures of proactive coping, reflective coping, preventative coping, and general self-efficacy (Kadhiravan & Kumar, 2012). The post-intervention coping self-efficacy mean for the intervention group was 176.96, which is much higher than the average scale score of 137.4. The text message stress management program could have improved student coping self-efficacy. Thus, strengthening the ability and confidence to cope with stressful situations could benefit students throughout their nursing careers. Further research will need to be conducted to substantiate these findings.

Students were mostly satisfied with the text message stress management intervention and read a majority of their text messages. This favorable program evaluation is consistent with findings of the Boath et al. (2016) study indicating that text messages are a worthwhile means to support and communicate with students. Communicating with students via text message instead of email could result in timelier student responsiveness as well as contribute to student satisfaction.

Limitations and Suggestions

Though the experimental design of this study strengthens the internal validity, there are limitations that should be addressed with future research. A convenience sample of participants from only one nursing program limits the generalizability of findings. The majority of the participants were Caucasian females. Although the sample was representative of the nursing school population under study, diversity is lacking. This study could be strengthened by recruiting participants from several nursing programs in different geographic locations. A second limitation is the possibility of a positive response bias due the participant/teacher relationship. This bias could also be addressed by including students from other programs that do not have a relationship with the researcher. A third limitation is the attrition of participants due to matching pre and post surveys. Even though the unique identifier code was constructed from the same four questions for both the pre-survey and post-surveys, some participants did not follow directions or made up their own code that could not be matched. There were 101 pre-survey participant codes that could not be matched with post-survey participant codes. In addition, there were 45 post-survey participant codes that could not be matched with pre-survey participant codes. In the future, using a better system to code participants or adding the importance of answering the questions consistently for both the pre and post surveys could be

included in the study informational sessions. A fourth limitation is the cross-sectional nature of this study. There is a need for a longitudinal design to determine the long-term effectiveness of the intervention. A final limitation is the risk of information bias since all of the study instruments were self-reported instruments. More objective measures could be beneficial in future studies.

Conclusions

Students in both the control and intervention groups had mean stress scores greater than 20 indicating high stress (Cohen, 1994). High stress scores are consistent among nursing students in other studies; (He et al., 2018; Jameson, 2014; Zhang et al., 2018); therefore further research is needed to identify interventions most effective in aiding stress reduction among nursing students. Many factors, such as time in the semester and life events, contribute to feelings of perceived stress. Nurse educators are unable to control these factors; however, they can control other stressors such as course organization, clear communication and direction, and intimidating learning environments. A text message stress management intervention in conjunction with an organized, communicative, and supportive learning environment could positively benefit nursing students and warrants further research. Nonetheless, the text message stress management program was effective in increasing coping self-efficacy. Effectively coping with stress is beneficial in buffering future stress encounters as students transition into professional nursing practice.

REFERENCES

Aselton, P. (2012). Sources of stress and coping in American college students who have been diagnosed with depression. *Journal of Child and Adolescent Psychiatric Nursing, 25*(3), 119-123. doi:10.1111/j.1744-6171.2012.00341.x

Boath, E., Jinks, A., Thomas, N., Thompson, R., Evans, J., O'Connell, P., & Taylor, L. (2016). Don't go with the 'FLO'-a student mobile texting service to enhance nursing student retention. *Nurse Education Today, 45*, 80-86. doi: http://dx.doi.org/10.1016/j.nedt.2016.06.019

Center for Collegiate Mental Health. (2016). *2016 annual report*. Retrieved from https://sites.psu.edu/ccmh/files/2017/01/2016-Annual-Report-FINAL_2016_01_09-1gc2hj6.pdf

Chesney, M. A., Neilands, T. B., Chambers, D. B., Taylor, J. M., & Folkman, S. (2006). A validity and reliability study of the coping self-efficacy scale. *British Journal of Health Psychology, 11*(3), 421-437.

Cohen, S. (1994). Perceived stress scale. Retrieved from http://www.mindgarden.com/documents/PerceivedStressScale.pdf

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior, 24*, 385-396. doi:10.2307/2136404

Coiro, M. J., Bettis, A. H., & Compas, B. E., (2017). College students coping with interpersonal stress: Examining a control-based model of coping. *Journal of American College Health, 65*(3), 177-186. doi:10.1080/07448481.2016.1266641

Cousins, C., Servaty-Seib, H. L., & Lockman, J. (2017). College student adjustment and coping: Bereaved and nonbereaved students. *Journal of Death and Dying, 74*(4), 386-409. doi: 10.1177/0030222815598911

Crandall, K. J., Steward, K. & Warf, T. M. (2016). A mobile app for reducing perceived stress in college students. *American Journal of Health Studies, 31*(2), 68-73.

Glowacki, E., Kirtz, S., Wagner, J. H., Cance, J. D., Barrera, D., Bernhardt, J. M. (2018). HealthyhornsTXT: A text-messaging program to promote college student health and wellness. *Health Promotion Practice, 19*(6), 844-855. doi:10.1177/1524839917754089

He, F. X., Turnbull, B., Kirshbaum, M. N., Phillips, B., & Klainin-Yobas, P. (2018). Assessing stress, protective factors and psychological well-being among undergraduate nursing students. *Nurse Education Today, 68*, 4-12. doi:10.1016/j.nedt.2018.05.013

Hebda, T. & Czar, P. (2013). *Handbook of informatics for nurses and health care professionals.* (5th ed). Upper Saddle River, New Jersey: Pearson Education, Inc.

Henderson, K. J. (2019). *A text message stress management intervention*. Unpublished manuscript, College of Education and Health Professionals, University of Arkansas, Fayetteville, Arkansas.

Hintz, S., Frazier, P. A., & Meredith, L. (2015). Evaluating an online stress management intervention for college students. *Journal of Counseling Psychology, 62*(2), 137-147. doi:10.1037/cou0000014

Jameson, P. R. (2014). The effects of a hardiness educational intervention on hardiness and perceived stress of junior baccalaureate nursing students. *Nurse Education Today, 34*(4), 603-607. doi:10.1016/j.nedt.2013.06.019

Kadhiravan, S. & Kumar, K. (2012) Enhancing stress coping skills among college students. *Researchers World, 3*(4), 49-5.

Kenney, S. R., Lac, A., Labrie, J. W., Hummer, J. F., & Pham, A. (2013). Mental health, sleep quality, drinking motives, and alcohol-related consequences: A path-analytic model. *Journal of Studies on Alcohol & Drugs, 74*(6), 841-851.

Lazarus, R. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY; Springer Publishing Company, Inc.

Mayo Clinic. (2017). Stress symptoms: Effects on your body and behavior. Retrieved from https://www.mayoclinic.org/healthy-lifestyle/stress-management/in-depth/stress-symptoms/art-20050987

Maxwell, S. E., Delaney, H. D., & Kelley, K. (2018). *Designing experiments and analyzing data.* (3rd ed). New York, New York: Routledge.

Measurement Instrument Database for the Social Sciences (MIDSS). (2018). *CAPS coping self-efficacy scale*. Retrieved from midss.org.

Millet-Thompson, A. (2017). Dealing with college students' stress, anxiety, and depression. *The Journal for Quality and Participation, 39* (4), 24-27.

National Institute of Health. (2005). *Theory at a glance: A guide for health promotion practice* (2nd ed.). Retrieved from https://archive.org/details/theoryatglancegu00glan

Newport, Frank. (2014). *The new era of communication among Americans*. Retrieved from http://www.gallup.com/poll/179288/new-era-communication-americans.aspx

Oguz-Duran, N., & Yüksel, A. (2010). The effects of coping humour and gender on college adjustment in Turkish freshmen. *Education, 130*(3), 470–478. Retrieved from http://0-search.ebscohost.com.library.uark.edu/login.aspx?direct=true&db=a9h&AN=48753409&site=ehost-live&scope=site

Remind. (2017). *School communication shouldn't be so hard*. Retrieved from https://www.remind.com/

Reeve, K. L., Shumaker, C. J., Yearwood, E. L., Crowell, N. A., & Riley, J. B. (2013). Perceived stress and social support in undergraduate nursing students' educational experiences. *Nurse Education Today, 33*, 419-424. doi: 10.1016/j.nedt.2012.11.009.

Richardson, J. (2011). Eta squared and partial eta squared as measures of effect size in educational research. *Educational Research Review*, 6(2), 135-147. doi:10.1016/j.edurev.2010.12.001

Straud, C., McNaughton-Cassill, M., & Fuhrman, R. (2015). The role of the five factor model of personality with proactive coping and preventative coping among college students. *Personality and Individual Differences, 83*, 60-64. doi:10.1016/j.paid.2015.03.055

Timmons, F., Corroon, A. M., Byrne, G., & Mooney, B. (2011). The challenge of contemporary nurse education programs perceived stressors of nursing students: Mental health and related lifestyle issues. *Journal of Psychiatric and Mental Health Nursing, 18*(9), 758-766.

Twenge, J. (2017). The number of teens who are depressed is soaring-and all signs point to smartphones. Retrieved from http://www.businessinsider.com/the-number-of-teens-who-are-depressed-is-soaring-2017-11

University of Wisconsin (n.d.) Perceived stress scale tip sheet. Retrieved from https://uwm.edu/mcwp/wp-content/uploads/sites/337/2016/01/Perceived-Stress-Scale-Tip-Sheet.pdf

Visnjic, A., Velickovic, V., Sokolovic, D. Stankovic, M., Mijatovic, K., Stojanovic, M., Stojanovic, M., Milosevic, Z., & Radulovic, O. (2018). Relationship between the manner of mobile phone use and depression, anxiety, and stress in university students. *Environmental Research and Public Health, 15*, 1-11.

Walker, R., & Stephens, R. S. (2014). Protective behavioral strategies mediate problem-focused coping and alcohol use in college students. *Addictive Behaviors, 39*(6), 1033-1037. doi:10.1016/j.addbeh.2014.02.006

Wolf, L., Stidham, A. W., & Ross, R. (2015). Predictors of stress and coping strategies of US accelerated vs. generic baccalaureate nursing students: An embedded mixed methods study. *Nurse Education Today, 35*(1), 201-205. doi: https://doi.org/10.1016/j.nedt.2014.07.005

Your Dictionary. (2016). Text message. Retrieved from https://www.yourdictionary.com/text-message

Zhang, Y., Peters, A., & Chen, G. (2017). Perceived stress mediates the associations between sleep quality and symptoms of anxiety and depression among college nursing students. *International Journal of Nursing Education and Scholarship, 15*(1), 1-10. doi: http//0-dx.doi.org.library.uark.edu/10.1515/ijnes-2017-0020

Zyga, S. (2013). Stress in nursing students. *International Journal of Caring Sciences, 6*(1), 1-2.

TABLES

Table 1

Demographic Characteristics of Participants

Item	*n*	%
Gender		
Male	4	4
Female	97	96
Semester in Program		
Sophomore 2nd Semester	23	22.8
Junior 1st Semester	15	14.9
Junior 2nd Semester	30	29.7
Senior 1st Semester	18	17.8
Senior 2nd Semester	15	14.9
Race		
Caucasian	94	93.1
Black/African	1	1
Pacific Islander	3	3
Other	3	3
Ethnicity		
Hispanic	5	5
Not Hispanic	96	95
Age		
19	10	9.9
20	38	37.6
21	38	37.6

Table 1

Demographic Characteristics of Participants Continued

Item	*n*	%
Age		
22	13	12.9
23	1	1
34	1	1

Note. These characteristics describe participants that completed both the pre-intervention survey and post-intervention survey as well as could be matched with unique code.

Table 2

ANCOVA Results and Descriptive Statistics for Perceived Stress by Pre/Post and Condition Type

Outcome Measure and Condition	Pre-Survey		Post-Survey			Condition Effect		
	M	*SD*	*M*	*SD*	Adjusted *M*	*F*	*p*	Partial η^2
Perceived Stress						.21	.65	.002
Intervention (n=55)	22.89	4.32	21.20	5.18	21.05			
Control (n=46)	22.22	3.74	21.30	4.76	22.84			

Table 3

ANCOVA Results and Descriptive Statistics for Coping Self-Efficacy by Pre/Post and Condition Type

Outcome Measure and Condition	Pre-Survey		Post-Survey			Condition Effect		
	M	*SD*	*M*	*SD*	Adjusted *M*	*F*	*p*	Partial η^2
Coping Self-Efficacy						14.18	<.01	.14
Intervention (n=49)	152.94	38.26	176.96	37.90	178.91			
Control (n=39)	158.23	33.42	160.59	41.31	158.14			

Table 4

The Quantity of Text Messages in which Participants Reported Reading

Item	*n*	%
95%-100%	49	66.2
80%-94%	10	13.5
65%-79%	7	9.5
50%-64%	1	1.4
20%-34%	1	1.4
Less than 20%	1	1.4

Note. Responses from 5 participants missing, N=69.

Table 5

Text Messages in which the Participants Reported Effectiveness

Item	*n*	%
Encouraging messages	42	56.8
Affirming messages	35	47.3
Laughing	34	45.9
Exercising	33	44.6
Prioritizing sleep	31	41.9
Making a schedule	30	40.5
Talking to someone	26	35.1
Putting phone down to socialize	25	33.8
Being proactive	23	31.1
Appreciating nature	23	31.1
Taking a 10 minute time out	21	28.4
Reflecting	17	23
Practicing assertiveness	13	17.6
Building relationships	13	17.6
Visualizing happy place	11	14.9
Finding a mentor	2	2.7

Note. Only the intervention group received the program evaluation survey. N =73. Items are sorted from most frequently found effective to least frequently found effective.

Table 6

Text Messages in which the Participants Reported Taking Action

Item	*n*	%
Prioritizing sleep	48	64.9
Laughing	47	63.5
Putting phone down to socialize	45	60.8
Making a schedule	43	58.1
Exercising	42	56.8
Talking to someone	41	55.4
Appreciating nature	37	50
Being proactive	36	48.6
Taking a 10 minute time out	33	44.6
Reflecting	32	43.2
Visualizing happy place	24	32.4
Building relationships	23	31.1
Practicing assertiveness	13	17.6
Finding a mentor	3	4.1

Note. Only the intervention group received the program evaluation survey. *N*= 73. Items are sorted from most frequently took action to least frequently took action.

CHAPTER 6: CONCLUSIONS

In this chapter, a summary of the studies, discussion of the findings, limitations, and recommendations for future research are presented. The chapter closes with conclusions and final reflections.

Introduction

These studies were conducted to determine the feasibility of a text message stress management intervention as well as examine its effects on perceived stress and coping self-efficacy. Nursing students are under immense stress and nursing educators have a professional and an ethical duty to address that stress. Stress intensifies and perpetuates among cohorts due to the competitive and driven nature of nursing students. Therefore, it is imperative to create a stress management culture.

In Study 1, a mixed methods approach was used to explore stress perceptions and develop a stress management intervention. A text message stress management intervention was created using Lazarus and Folkman's *Stress, Appraisal, and Coping* as a theoretical framework in conjunction with findings from literature. The messages were presented to a convenience sample of 23 student nurses and feedback was solicited. Messages were modified based on participant feedback. The messages were displayed on an overhead screen and structured interview questions were used to elicit feedback. The final product was a stress management intervention consisting of 30 messages in three phases. The first phase contains five messages with the focus on discouraging maladaptive avoidance and disengagement strategies. The second phase consists of fifteen messages with the intent to encourage problem-focused coping, social support, and self-care practices. The third phase contains ten messages designed to provide encouragement and build self-efficacy.

In study 2, an experimental pre/post design was used to examine if the text message stress management program was effective in reducing stress and increasing coping self-efficacy among nursing students. A convenience sample representing all five levels of the program was recruited to participate in the study. Participants were randomly assigned to a control or intervention group. Data was collected pre-intervention through Demographic Data Form, Perceived Stress Scale, and Coping Self-efficacy scale questionnaires. The intervention group then began receiving the six week text message intervention. The Perceived Stress Scale and Coping Self-efficacy scale were only used post-intervention for data collection. The intervention group also completed the Post-evaluation survey. The null hypotheses were tested using one way ANCOVA with a level of significance set at $p = .05$.

Discussion

In Study 1, we determined that text messages are a viable option for the delivery of a stress management program. Text messages are an effective way to reach a large number of students and were the preferred channel of communication among the study participants. Even though literature has emphasized the importance of social support, the focus groups revealed that positive, encouraging social support is the most beneficial. Four additional encouraging messages were created since focus group participants expressed such a need and desire for encouragement. Additional messages were also added to phase one and phase two given that most participants requested daily messages. The focus group participants also gave feedback about the preferred time of day for messages to be sent.

In Study 2, we determined that the text message stress management intervention was effective in increasing coping self-efficacy but was not effective in lowering perceived stress. The findings regarding perceived stress scores in this study were inconsistent with findings from

the Crandall et al. (2016) and Hintz et al. (2015) studies. However, Kadhiravan and Kumar's (2012) had similar results in their coping intervention study. They did not find a difference in perceived stress scores but did find a significant difference in measures of proactive coping, reflective coping, preventative coping, and general self-efficacy (Kadhiravan & Kumar, 2012). We did not detect a statistically significant difference in perceived stress scores partly because the study was not adequately powered. In addition, perceived stress levels of nursing students fluctuate during the course of semesters due to variability of scheduled exams, assignment due dates, and clinical rotations. With the continual nature of stressors experienced by nursing students as well as practicing nurses, it is difficult to drastically decrease perceived stress levels. However, strengthening the ability and confidence to cope with stressful situations will benefit students throughout their nursing careers. This will be especially important in the first year in the transition from student to nurse since there is a high attrition rate within the first year of practice (Turner & McCarthy, 2017).

Students were mostly satisfied with the text message stress management intervention and read a majority of their text messages. Table 5 depicts the quantity of messages participants reported reading. This favorable program evaluation is consistent with findings of the Boath et al. (2016) study indicating that text messages are a worthwhile means to support and communicate with students. Communicating with students via text message instead of email could result in timelier student responsiveness as well as contribute to student satisfaction.

Limitations and Suggestions

Though the experimental design of study 2 strengthens the internal validity, there are limitations that should be addressed with future research. A convenience sample of participants from only one nursing program limits the generalizability of findings. The majority of the

participants were Caucasian females. Although the sample was representative of the nursing school population under study, diversity is lacking. This study could be strengthened by recruiting participants from several nursing programs in different geographic locations. A second limitation is the possibility of a positive response bias due the participant/teacher relationship. This bias could also be addressed by including students from other programs that do not have a relationship with the researcher. A third limitation is the attrition of participants due to matching pre and post surveys. Even though the unique identifier code was constructed from the same four questions for both the pre-survey and post-surveys, some participants did not follow directions or made up their own code that could not be matched. There were 101 pre-survey participant codes that could not be matched with post-survey participant codes. In addition, there were 45 post-survey participant codes that could not be matched with pre-survey participant codes. In the future, using a better system to code participants or adding the importance of answering the questions consistently for both the pre and post surveys could be included in the study informational sessions. A fourth limitation is the cross-sectional nature of this study. There is a need for a longitudinal design to determine the long-term effectiveness of the intervention. A final limitation is the risk of information bias since all of the study instruments were self-reported instruments. More objective measures could be beneficial in future studies.

Recommendations for Future Research

Students in both the control and intervention groups had mean stress scores greater than 20 indicating high stress (Cohen, 1994). High stress scores are consistent among nursing students in other studies; (He, Turnbull, Kirshbaum, Phillips, & Klainin-Yobas, 2018; Jameson, 2014; Zhang et al., 2018); therefore further research is needed to identify interventions most

effective in aiding stress reduction and effective coping among nursing students. Many factors, such as time in the semester and life events, contribute to feelings of perceived stress. Nurse educators are unable to control these factors; however, they can control other stressors such as course organization, clear communication and direction, and intimidating learning environments. In the Karaca et al. (2019) study, it was concluded that nursing schools should establish programs that build student self-esteem and provide faculty support. A text message stress management intervention in conjunction with an organized, communicative, and supportive learning environment could positively benefit nursing students. Labrague, McEnroe-Petitte, Al Amri, Fronda, & Obeidat (2018) recommend that structured orientation programs in addition to the provision of student support will strengthen student positive-coping skills.

Conclusions

Three major conclusions can be made from these two studies. The first is that text messages are a favored method of communication among nursing students. Students were mostly satisfied with the text message stress management intervention and read a majority of their text message. Using an educational communication app such as Remind ™ is an easy and effective way to communicate with a large number of students. The second conclusion is that the stress management text message was not impactful in lowering perceived stress scores. It is worth noting that the study was under-powered and stress levels fluctuate depending on the time of the semester and the amount of course and clinical workload experienced by the students. The post-intervention surveys were completed at the end of the semester which is a time of high stress according to the focus group participants. The third conclusion is that the text message intervention was effective in increasing coping self-efficacy scores. Effectively coping with

stress is beneficial in buffering future stress encounters as students transition into professional nursing practice.

Summary

In summary, continuing to research stress management and effective coping strategies for nursing students is an important endeavor. Educators need to be intentional in creating civil, supportive learning environments and equipping students with needed skills to cope with stressors they will experience as practicing nurses. If this does not happen, new nurses will continue to leave the profession and the nursing shortage could continue to worsen. This study will contribute to the body of knowledge for this subject matter and support evidence that adopting a text message stress management program is a worthwhile endeavor for any nursing program.

REFERENCES

Boath, E., Jinks, A., Thomas, N., Thompson, R., Evans, J., O'Connell, P., & Taylor, L. (2016). Don't go with the 'FLO'-a student mobile texting service to enhance nursing student retention. *Nurse Education Today, 45*, 80-86. doi: http://dx.doi.org/10.1016/j.nedt.2016.06.019

Cohen, S. (1994). Perceived stress scale. Retrieved from http://www.mindgarden.com/documents/PerceivedStressScale.pdf

Crandall, K. J., Steward, K. & Warf, T. M. (2016). A mobile app for reducing perceived stress in college students. *American Journal of Health Studies, 31*(2), 68-73.

He, F. X., Turnbull, B., Kirshbaum, M. N., Phillips, B., & Klainin-Yobas, P. (2018). Assessing stress, protective factors and psychological well-being among undergraduate nursing students. *Nurse Education Today, 68*, 4-12. doi:10.1016/j.nedt.2018.05.013

Hintz, S., Frazier, P. A., & Meredith, L. (2015). Evaluating an online stress management intervention for college students. *Journal of Counseling Psychology, 62*(2), 137-147. doi:10.1037/cou0000014

Jameson, P. R. (2014). The effects of a hardiness educational intervention on hardiness and perceived stress of junior baccalaureate nursing students. *Nurse Education Today, 34*(4), 603-607. doi:10.1016/j.nedt.2013.06.019

Kadhiravan, S. & Kumar, K. (2012) Enhancing stress coping skills among college students. *Researchers World, 3*(4), 49-5.

Karaca, A., Yildirim, S., Cangur, S., Acikgoz, F., & Akkus, D. (2019). Relationship between mental health of nursing students and coping, self-esteem and social support. *Nurse Education Today, 76*, 44-50. doi: https://doi.org/10.1016/j.nedt.2019.01.029

Labrague, L. J., McEnroe-Petitte, D. M., Al Amri, M., Fronda, D. C., & Obeidat, A. A. (2017). An integrative review on coping skills in nursing students: Implications for policymaking. *International Nursing Review, 65*, 279-291.

Turner, K. & McCarthy, V. L. (2017). Stress and anxiety among nursing students: A review of intervention strategies in literature between 2009 and 2015. *Nurse Education in Practice, 22*, 21-29. doi: http://0-dx.doi.org.library.uark.edu/10/1016/j.nepr.2016.11.002

Zhang, Y., Peters, A., & Chen, G. (2018). Perceived stress mediates the associations between sleep quality and symptoms of anxiety and depression among college nursing students. *International Journal of Nursing Education Scholarship*, 1-9. doi:10.1515/ijnes-2017-0020

APPENDIX A

Permission to Use CSE

Dear Jaye,

You are welcome to use the Coping Self Efficacy scale to assess changes in coping in your dissertation. I have attached some materials to help you and am glad to assist you as you proceed with you dissertation.

First, I recommend that you use the full scale and I have attached a copy. The full 26-item scale will give you the most reliable measure and the one that other investigators are using. By using the full scale you also have the total scores and have the option of using the full scale or the subscales, which are described in the attached paper on the reliability and validity of the scale. Using the full scale is important because we built the subscales on our studies with HIV patients and your population will be different. The CSE as a full scale is being used with many different populations, young and old, with a full range of stressful conditions, including psychological and physical. I'm attaching general scoring instructions and if you have any problems, just let me know.

You can also use the information in the article to score the subscales. I can provide additional information, if you have questions. I work closely with Tor Neilands and he or I can answer any questions you may have.

I've also attached a copy of the first paper that my colleagues and I wrote which showed how coping self-efficacy was helpful in evaluating a coping intervention and mediated the effect of the intervention on outcomes (*Psychosomatic Medicine* paper). As I mentioned in my earlier email, I encourage you to look at the description of "coping effectiveness training." Years ago, I had been doing stress management interventions for years and they had "some" effects but they weren't that convincing. I then met with Susan Folkman, a person I long admired but not met. This was so "eye opening for me!" Her work with Dr. Arnold Lazarus, was all on the "theory of coping." Usually when doing dissertations, you may need some "theory." This theory is so often cited but more important, it suggests HOW to make coping interventions "stick." Drs. Lazarus and Folkman were not clinicians and they didn't do interventions. BUT their theory is really helpful. You may be thinking of doing a "cluster" of stress management interventions, like "mindfulness," "breathing," etc. If you read the paper I attached and I'll include another earlier one I wrote with Susan you'll see a "strategy" that you can use in teaching your intervention approaches (see the last attached document, paper dated 1994, page 12). Specifically, some stressors that nursing student have are actual problems that they may be able to solve. For those stressors, it is best to SOLVE THE PROBLEM. For example a roommate that plays loud music so the student can't study – they should try to find another place to study, move, etc. – Not just breathe and do mindfulness. Conversely, we used this

approach with HIV, which at the time was a stressor that was entirely unchangeable. So for that, the key intervention is a stress management approach focused ON the person's emotions.

The "bottom line" is that you can sort your approaches into those focused on problems – Problem focused coping and sort your other approaches focused on dealing with anxiety/depression and other emotions – Emotion-focused coping. Mindfulness, which is so popular now, is "emotion-focused coping." The students can be feeling "stressed out" but then the question is to sort the stressors roughly into the two approaches.

Anyway, you can cite this theory in your dissertation. AND nursing students will "get it" – they have TWO tool boxes --- one for things they can change and one that they cannot change. They can't change the graduate program, they can't change the professors, etc. BUT they can change other things. This is just a suggestion for your consideration. It may not relate at all with what you are doing or may be too late in your planning. You are still entirely free to simply use the scale but again, use the full scale.

In agreeing to use the scale for research purposes, I also ask that you keep me informed of what you find. I have created a log of all the scientists, such as yourself who are using the scale and will let everyone on the log know when there are developments as well as the results found by others who are using the scale. For the log, could you send me your best mailing address, or any other identifying information. _____

Again please stay in touch and let me know what you find – I'm more than happy to discuss how the concept of "self-efficacy" may relate to your outcomes.

I look forward to hearing from you as the work progresses,

Margaret

P.S. I remember when I was in graduate school, I needed some information from a physician in England to help me on a study. While prior to the internet, I wrote her and sent my request, typed on the portable typewriter that we each had in those days and mailed my letter "air mail." A couple of weeks or so later, a letter came back from England, with all the answers. My only request for you will be that when you receive a request from a student, you was pass this tradition on.

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