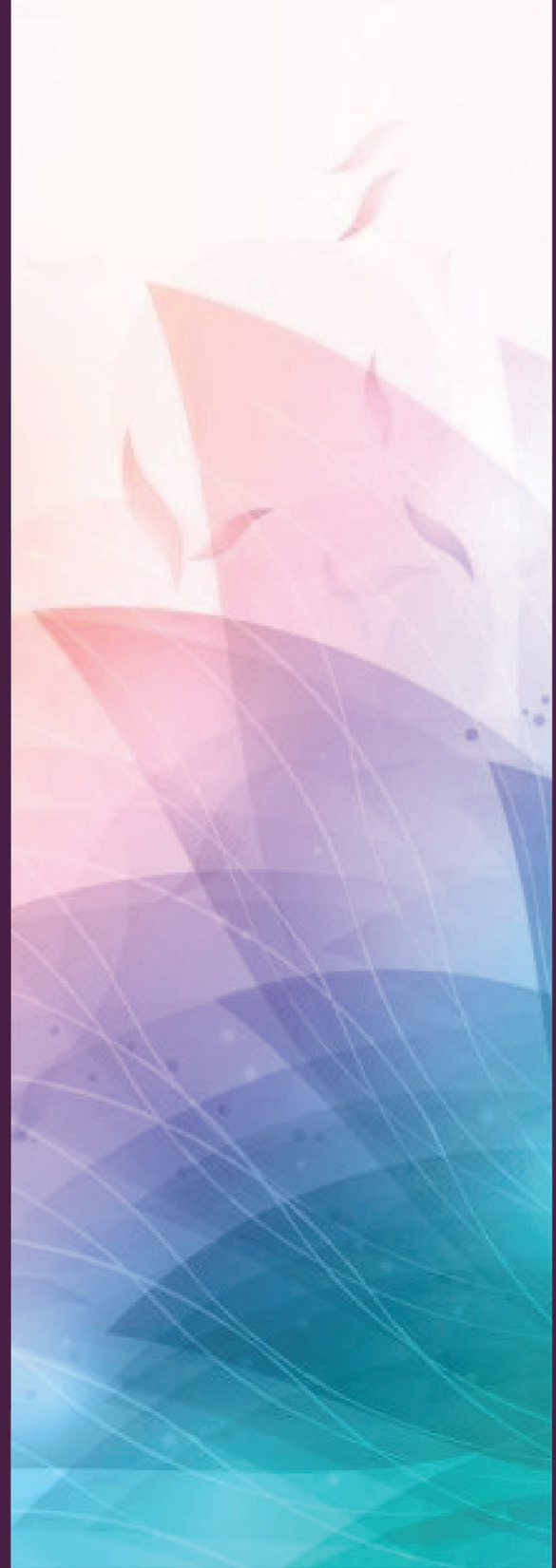
Featuring scholarly articles by Emily Berdal, Alyssa Montanez, Courtney Phillips, and Cameron Scroggs, More Than Medicine: The Power of Mind, Emotion, and Spirit to Human Health presents knowledge on the impact of stress on individuals diagnosed with illness. Honoring loved ones who are suffering or deceased because of cancer or other chronic illnesses, this book advocates for emphasizing emotional support and stress relief equal to the provision of medical or pharmaceutical interventions in the treatment of cancer and other chronic or terminal illnesses.



More Than Medicine

The Power of Mind, Emotion, and Spirit to Human Health

Alyssa Montanez

More Than Medicine:
The Power of Mind, Emotion, and Spirit
to Human Health

More Than Medicine:
The Power of Mind, Emotion, and Spirit to Human Health

Alyssa Montanez

Alyssa Montanez
Esther G. Maynor Honors College
University of North Carolina, Pembroke
2021

First Printing: 2021

The University of North Carolina, Pembroke
P.O. Box 1510
1 University Drive
Pembroke, N.C. 28372-1510

www.uncp.edu

This publication is available in alternative formats upon request. Please contact the UNCP Accessibility Resource Center, D. F. Lowry Building, Room 107, or call (910) 521-6695.

Dedication and Acknowledgments

This book is dedicated to my family for supporting me through college and helping me achieve my life goals and to professor Scott Hicks for helping me every step of this project. I don't know if I could have accomplished this work without the help of my family and Professor Hicks.

For generously contributing their honors theses for publication in this collection, I thank Emily Berdal, Courtney Phillips, and Cameron Scroggs.

I am grateful to the Esther G. Maynor Honors College for the opportunity to complete this project.

Alyssa Montanez
May 2021

How Stress Impacts Cancer Patients

Ally Montanez

Cancer is not a word taken lightly in any sense—people respect the weight that comes with it and realize that this life-taking disease is not a joking matter. Cancer patients are under a lot of stress: fighting for their lives and all that such a battle entails, from doctors' appointments to difficult prognoses to expensive bills, all while trying to go about their daily lives as normally as possible. Even for healthy individuals, healthcare on its own is very expensive. In the United States in 2017, Americans spent about $3.5 trillion, or almost $11,000 per person, on healthcare, a 3.5 percent increase from 2016 (Center for Medicare & Medicaid Services, 2020). Unfortunately, rates of cancer are rising in the United States. According to the American Cancer Society, there were an estimated 609,640 cancer deaths in the United States in 2018 (American Cancer Society, 2018). That number might not seem so bad in comparison to rates of other forms of mortality in the United States, but the sad and painful reality of cancer is that it does not care whose life it invades.

Indeed, Jaimi McIlraith—my mother—was one of those 609,640 souls lost in 2018 to cancer; she died December 14, 2018, from melanoma. In summer 2015, her doctors found melanoma, and over the span of her battle with cancer, the tumors spread from her skin to her lungs, her lymph nodes, and finally her abdomen. The tumors ranged in size from as small as a grain of sand to as large as a grapefruit. Even when they were removed, they returned within a month, and with full vengeance. At the time of her death, my mother was only 40 years old. She was a beautiful mother who would have done absolutely anything for her two daughters.

Throughout her fight against cancer, and something that I noticed, was her emphasis on keeping stress at bay, always telling my sister and me, "Stress feeds the cancer in my body." After my mother's passing, her doctors could not give a medically-based answer as to why she lived for so long, from

diagnosis in 2015 to her passing in 2018, with Stage IV melanoma. I wondered, "What helped her persevere and persist despite the odds?"

As her battle with cancer was nearing its end, I was a first-year student completing my first semester of college courses, including Composition I. Yearning for an answer to my question about her atypical perseverance, I took the opportunity of class assignments to research the impact of stress on cancer. I began at the beginning, when she was first diagnosed with melanoma, and I began to retrace what she explored and learned, using her own words as shared in real time on her social media and preserved forever as artifacts on her Facebook page, as she lived with her diagnosis. In the same way I conducted research for my own college classes, she conducted research on her own situation; as I studied and followed her trail of research and study, I concluded that she was absolutely right in maintaining that stress was directly linked with the progression of cancer.

Yet too often, too many healthcare professionals overlook the priority of psychological well-being in patients diagnosed with cancer, just as too many healthcare professionals discount the knowledge and understandings that their patients bring to their diagnoses. By implementing more treatments for cancer patients involving their mental well-being, stress can be reduced significantly, slowing the cancer's growth in the body and increasing the overall quality of life for the patients.

When I began my research, I wanted to define my terms so as to have a concrete foundation on which to argue that stress exacerbates cancer. As Vasile (2016) writes, "[C]ancer is a group of diseases in which cells have the ability to invade surrounding tissue and present a potential risk of metastasis in other distant areas of the body" (p. 74). Stress is defined medically, by Sillamy (1998), as "the condition in which there is a body threatened by imbalance under the threat of agents or conditions that endanger its homeostatic mechanisms" (as cited in Vasile, 2016, p. 75). Stress causes physical reactions in the human body, whether it be as simple

as a headache or as detrimental as weakening the immune system and allowing the body to become more susceptible to a more rapid growth rate of cancer in the body. A study conducted by scientists and psychologists at the Columbia University Medical Center in New York City proved that stress causes an accelerated rate of cancer growth and development. They conducted their study on mice and found that the hormones that were released by the stress caused this rapid development of pancreatic cancer in the mice (Printz, 2018). Cancer is, from my experience, a threat to the very core of a person due to the unknown future ahead. We did our best as a family to stay cohesive, although we did fail at times due to personal stressors overcoming us.

After her diagnosis in 2015, my mother shared publicly on social media her personal thoughts on how much her life changed in various aspects. As Nelson (2018b) emphasizes, "Cancer is hard. It is exhausting physically, emotionally, mentally and financially." Such is a reality my mother captures in Figure 1, when she had been diagnosed for just over three years. She even noted that she tries "to keep a positive outlook on everything that comes [her] way health wise" (Nelson, 2018b), meaning that my mom found the value

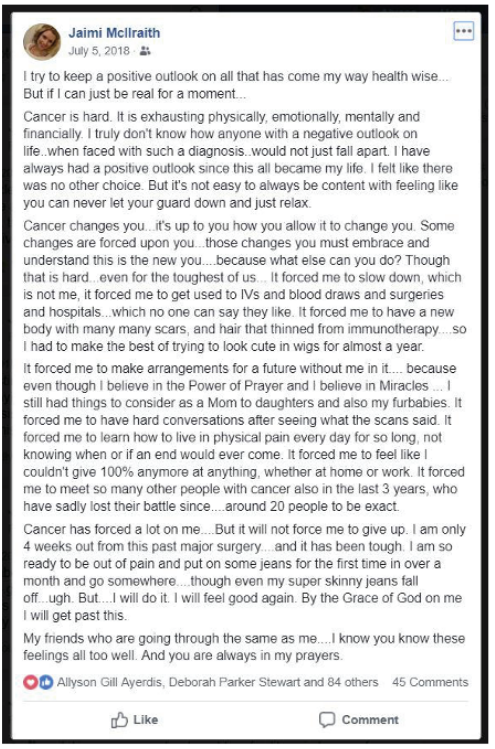


Figure 1. Status update (Nelson, 2018b)

behind having a positive mindset to be very powerful in her fight against cancer. That positive mindset can be seen as she says that if someone were already not in a positive state of mind and received such negative news as she was, she does not see how they could do anything other than completely fall to pieces in devastation (Nelson, 2018b).

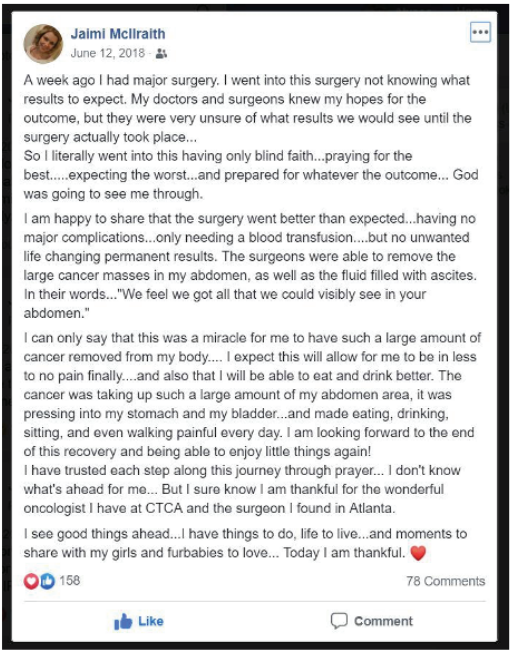


Figure 2. Status Update (Nelson, 2018a)

As cancer grows within the body, it can cause physical pain because it is wearing down the healthy cells, whether they be bone cells or the cells of an organ (Cooper, 1988, pp. 114-115). The surgery she references in Figure 2 was the operation she had in June 2018. My mother had massive tumor growth within her abdomen. Her tumors were growing to be large and aggressive, but the body does not have that much extra room to spare to allow these growths to exist peacefully. Rather, she felt them pushing up against organs which caused violent pain in her life, decreasing her desire to do anything with too much physical activity in fear of moving too much and initiating the pain to start all over again. Along with the larger tumors, she also had smaller ones scattered throughout her abdomen and even a fluid filled with tumors so tiny they were compared to "grains of sand" by the doctors in the operating room. My mother made a point of looking forward to not being in pain, another massive part of the fight against cancer.

Figure 3. Status update (Nelson, 2018c)

She truly was doing everything within her power to rid her body of tumors, but even though the surgery was a success at the time and the doctors claimed to have removed everything from her abdomen, when she went to the doctor less than three weeks post-surgery thinking she had an incisional hernia, it was actually the cancer coming back full vengeance. After receiving scan results in August 2018, my mother reached out to her Facebook friends and family for prayers as she and her doctors at Cancer Treatment Center of America all did research to find a next-best option (Figure 3). She admitted to everyone reading the post that she knew she was unable to continue working her job as a preschool teacher because of the level of pain she was undergoing, but due to my mother's resiliency and peace she had in her heart, she still remained completely hopeful and wanted to be the best mother she could be (Nelson, 2018c). I firmly believe that my mother's positive outlook on life and faith in God got her through the roughest of nights.

Integrative care is highly important for cancer patients because it gives them non-traditional options to target things in their lives other than merely the cancer itself. My mother started going to the Cancer Treatment Centers of America (CTCA) in 2018 in Atlanta, Georgia, when she made the choice that Duke Cancer Center was not giving her any more options about how she could fight cancer in a way that would

both prolong her life and allow her to keep a quality of life that she was comfortable with. Dr. Stacie Stephenson, CTCA Chair of Functional Medicine, said, "An integrative approach to cancer care treats the disease with surgery, chemotherapy and other conventional tools, while also supporting patients' strength, stamina and quality of life with evidence-informed therapies" (Cancer Treatment Centers of America, 2021b). One of these integrative care treatment options targets stress and anxiety in the life of the cancer patient. CTCA offers music therapy, guided image therapy, time with emotional support animals, and spiritual counseling and teaches their patients ways to reduce stress through various techniques to adapt into everyday life, such as including something to make you laugh every day to reduce stress-related hormones within the body (Cancer Treatment Centers of America, 2021a). My mother was offered a larger variety of treatments at CTCA that allowed her to make the choice she felt and had researched and prayed about to prolong her life and possibly improve, or at least maintain, her quality of life. Through the hard work and dedicated staff at CTCA, my mother was able to receive better quality treatments, medications, and operations that Duke Cancer Center was unable to provide for her.

Another method of treating cancer encouraged by CTCA is allowing the body quite literally to heal itself by drastically changing one's diet to consuming *only* things that are beneficial to the body that will fight cancer. My mom was an advocate for eating healthy and allowing the body to heal itself at the start of her cancer fight—instead of pumping her body full of chemicals, she altered her diet and saw results that the doctors claimed they could not explain. However, we know that it was her all natural diet and stress relief methods that kept her alive as long as she was here for. CTCA also offers spiritual care for their patients who may be wondering what happens after this life ends on the earth. My mom was heavily involved in church from an early age, but I personally noticed her being a lot more vocal about her faith and how she was seeing the hand of God working in her life and in her fight against cancer after she was diagnosed. My mom also had a lot

of faith in counseling and praying, which also goes hand in hand with techniques of stress relief, which improve the body's health. She and the pastor of our church and his wife would have several talks about what heaven was like. They would pray together over my mom for her and our family to experience peace and feel the hand of God in our home and lives during this time of unexplainable pain.

Throughout her experience with cancer, music was a huge outlet for my mom, which also went hand in hand with her faith in God because she listened to the songs by Christian artists that were reassuring of God's love and his plan for our lives. Her absolute favorite artist was Lauren Daigle, a faith-driven woman who writes music for those who are experiencing trials within their lives. Lauren Daigle's song, "You Say," was a powerful song for my mother because of the words and their meaning to her personally. The words "Taking all I have, and now I'm laying it at Your feet / You have every failure, God, You have every victory" (Daigle, 2018), were her anthem during the worst of her battle with cancer. Music was almost a way of meditation for her that could be infused with a task as simple as driving to work in the morning. By hearing these faith-filled words, she was inspired to keep up her fight with cancer, but she ultimately knew that God had the best plan in mind for her life. Her faith in God's timing is evident in her posts and the lyrics in the songs she filled her life with. "Thy Will Be Done" by Hillary Scott & The Scott Family (2016) was another song we would often hear in our home several times a day due to the message it carries. The lyric that "I may never understand / That my broken heart is a part of your plan" (Hillary Scott & The Scott Family, 2016) is one of the most impactful phrases in the entire song, due to its ultimate surrender through trust in Him despite not knowing the road ahead of her. The very title of the song proclaimed her firm trust in God, which granted her peace beyond understanding because even though she was not sure of what was coming, she knew it was meant to be and would not doubt God or His love. Another set of lyrics—"I know You see me / I know You hear me, Lord. / Your plans are for me / Goodness

You have in store" (Hillary Scott & The Scott Family, 2016)—evokes tears because of the message it brings. She prayed for her life, and she had many others who did the same, but she had the peace in knowing whatever will be will be because He has a greater plan in store for our lives. Since my mom has passed away, her story has been heard by so many people, and it has truly been a blessing to know that because of her life and advocacy for alternative treatments, she gave so many people the opportunity to see what removing stress in one's life can truly do to benefit their lives.

By witnessing my mother's fight against cancer, I learned a lot and became inspired to learn more. I also wanted to share as widely as possible what I and so many others have come to know, how stress can cause physiological changes in the bodies of individuals diagnosed with terminal cancer, and that there are so many reasons for psychologists and oncologists alike to start co-implementing psychological and medical treatment solely for the cancer patient. It has been proven to improve the overall mindset and mental wellness of the patient, and by having a healthy mindset, a patient is more equipped to take on the challenges that cancer will throw their way. By analyzing the life of my mother who beat stage 2b breast cancer, but died of stage IV melanoma, we are able to better understand how stress can play a role in the life of a cancer patient. And by delving into the research of the individuals whose chapters follow mine in this collection, we can see firsthand the power of psychological strength and support, the assault of stress, and the critical importance of supporting individuals' mental wellbeing throughout their diagnosis of cancer.

Emphasizing psychological strength and support means rethinking the contemporary practice of medicine in the United States. In "Nurse Practitioner Knowledge and Use of Complementary and Alternative Therapies for the Management of Chronic Musculoskeletal Pain: A Pilot Study," Courtney Phillips focuses on the medical side of this issue. Not only are prescription drugs easily manipulated into life-threatening addictions, Phillips notes; their preponderance

avoids a fundamental ailment of the patient: their mental and emotional wellbeing. By taking a stronger step toward greater inclusion of alternative medications and treatments, patients can expect to experience an overall increase in their mental health and decrease in stress, which in turn can have an impact on their physical health as well. From the sample in this study, Phillips makes evident that most nurse practitioners do not feel adequately informed about these alternative treatments, which means they almost never recommend them to the patients they see on a regular basis.

In "Anxious People Report Less Emotional Distancing While Imagining Negative Future Events," Cameron Scroggs explores the long-term effects of chronic stress on patients. Scroggs focuses on internally generalized thoughts as a way to safely consider the unknown future ahead and how their thinking process can become semantic when someone places too much pressure on themselves due to overthinking on the potential threat. These types of thoughts can be intrusive to the individuals' daily lives, as well as not offer any reasonable solution, which only adds to their overall suffering.

Indeed, a battle that patients with chronic illness endure is the silent battle of mental illness within their own minds. In "Investigating the Relationship Between Anxiety Sensitivity and Chronic Illness: A Replication and Extension," Emily Berdal takes a deep dive into the real issue of comorbidity of mental illnesses and chronic ailments. These comorbid diagnoses often tend to prevent the debilitating condition from fully being resolved due to the focus being placed solely and primarily on physical, not mental, health. Berdal's research points to the fact that those who are diagnosed with both a chronic illness and a mental illness will experience worse symptoms of the chronic illness than those who do not have both diagnoses. According to the data shown in prior research along with Berdal's as well as my own, mental health needs to be prioritized just as much as physical health is because it is proven to have a direct impact on our bodies.

Mental health and a positive outlook on life is vital to those who have to undergo so much in efforts to save their

lives. Not only are they undergoing the stressors of their treatments, appointments, and their prognosis; unfortunately, they also are not spared from the daily stressors that everyone is exposed to, such as how to make ends meet, who's cooking dinner, getting the kids to and from practice, and so much more that varies on an individual basis. Having a positive outlook goes a long way in the life of a cancer patient. Cancer patients undergo a bounty of stress solely dealing with their health, and they do not need to have to combat the stress of a normal life as well. By offering alternative treatments to cancer patients, many lives will be prolonged, if not saved, due to the removal of stress in their lives that allows them to focus on saving their lives from this disease.

References

American Cancer Society. *Cancer Facts & Figures, 2018*. (2018). https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2018/cancer-facts-and-figures-2018.pdf

Cancer Treatment Centers of America. (2021a). *Anxiety and stress*. https://www.cancercenter.com/integrative-care/anxiety-stress

Cancer Treatment Centers of America. (2021b). *Integrative care*. www.cancercenter.com/integrative-care

Center for Medicare & Medicaid Services. (2020, December 16). *Historical* [Data Set]. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/NationalHealthExpendData/NationalHealthAccountsHistorical

Cooper, C. L. (1988). *Stress and breast cancer*. Wiley.

Daigle, Lauren. (2018). You say [Song]. On *Look up child*. Centricity Music.

Hillary Scott & The Scott Family. (2016). Thy will. [Song]. On *Love remains*. EMI Nashville and Capitol Nashville.

Nelson, J. (2018a, June 12). "Post-Surgery June 2018" *Facebook*, June 12, 2018, https://www.facebook.com/jaimi.mcilraith/posts/1689011087800661

Nelson, J. (2018b, July 5). [Status update]. Facebook. https://www.facebook.com/jaimi.mcilraith/posts/1722602304441539

Nelson, J. (2018c, August 18). "Seeking New Treatments" *Facebook*, August 18, 2018, https://www.facebook.com/jaimi.mcilraith/posts/1790783680956734

Printz, C. (2018). Scientists probe link between stress and cancer: Studies show biological responses that appear to affect cancer growth. *Cancer, 124*(13), 2671-2672. https://doi.org/10.1002/cncr.31590

Vasile, T. (2016). Relationship between stress, cancer and immune system. *Romanian Journal of Experimental Applied Psychology, 7*(2), 73-81. https://doi.org/10.15303/rjeap.2016.v7i2.a6

Nurse Practitioner Knowledge and Use of Complementary and Alternative Therapies for the Management of Chronic Musculoskeletal Pain: A Pilot Study

Courtney Phillips

Over-prescription and misuse of opiates in the treatment of chronic musculoskeletal pain (CMP) in adults can result in patients becoming dependent on opiates for pain relief. As dependency builds, so does tolerance, requiring a higher prescribed dose in order to achieve the desired effect. According to the National Institute on Drug Abuse (NIDA) (2021), roughly 21-29% of patients prescribed opioids for chronic pain misuse them. Between 8 and 12% of those individuals develop an opioid use disorder (NIDA, 2021). The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) defines opioid use disorder as "a problematic pattern of opioid use leading to clinically significant impairment or distress" (APA, 2013). In order to be diagnosed with opioid use disorder, clinical impairment must be manifested by at least two DSM-5 criteria within a 12-month period. These criteria include using large amounts of opioids over a longer period than intended; reducing social, occupational, or recreational activities due to opioid use; continued use of opiates despite physical or psychosocial harm; and experiencing tolerance and/or withdrawal.

The treatment of chronic pain requires a multifaceted approach. Improper prescribing practices have been a contributing factor to the current opioid epidemic. Some providers are reluctant to encourage the use of complementary and alternative approaches to treat chronic pain. Complementary and alternative medicine (CAM) therapies are a group of diverse medical and health care practices that are not considered to be a part of conventional medicine (U.S. National Library of Medicine, 2018). The use of CAM offers a new integrative approach to medicine that embraces the

importance of the patient- provider relationship, focuses on the whole person, is informed by evidence, and makes use of all therapeutic approaches to achieve optimal health and well-being (Andrew Weil Center for Integrative Medicine, 2021).

Nurse practitioners (NPs) are in a position to educate their patients on the use of CAM therapies in order to minimize their use of prescription opiates. However, they must be knowledgeable of various CAM therapies in order to advocate for their use. The purpose of this feasibility study is to determine NP knowledge, treatment, and referral practices (if any) on the use of CAM to decrease the misuse of opiates in the treatment of chronic pain.

Methods

Data were gathered using a descriptive survey design to elicit the treatment and referral practices of NPs and their knowledge, beliefs, and attitudes pertaining to CAM. A survey comprising basic demographic information and open-ended questionnaires was delivered via Qualtrics online survey tool to a convenience sample of up to 20 practicing NPs. Prior to gathering participant data, approval by the University Institutional Review Board was obtained. In order to protect the privacy of subjects, no personal identifiers were collected and responses remained anonymous.

Sample

Fourteen NPs voluntarily participated in this study (n = 14), all of whom held advanced practice degrees (6 had a master of science in nursing degree, 3 had a doctorate of nursing practice degree, and 5 had a doctor of philosophy degree). The mean number of years of experience as an NP was 9.64 years. Five NPs reported working in the acute care setting (n = 5; 35.71%), eight reported working in the outpatient setting (n = 8; 57.14%), and one was not currently practicing (n = 1; 7.14%).

Results

Participant responses were categorized into three themes: (1) knowledge of CAM; (2) treatment practices for CMP; and (3) referral practices.

Knowledge of CAM

NPs were asked to rate their knowledge of CAM using a Likert scale as presented in Table 1. Although NPs are in ample positions to educate patients about various treatment options for CMP, these findings suggest that NPs are equipped with minimal to fair knowledge of CAM therapies. How their knowledge was obtained varied from course content while pursuing continuing education, to personal readings and interactions with colleagues. Each NP response provided a different definition of CAM. These definitions were centered around the concept of natural modalities, holistic approaches, alternative therapies, and practices that fall outside of traditional western medicine.

Table 1

NP Knowledge of CAM Therapies

No Knowledge	*Minimal Knowledge*	*Fair/Good Knowledge*	*Fully Knowledgeable*
0/14 (0%)	5/14 (35.71%)	8/14 (57.14%)	1/14 (7.14%)

According to Table 2, the majority of participants were in agreement that CAM plays an important role in the treatment of various health conditions. When asked to list CAM therapies, the three most common responses were acupuncture, chiropractics, essential oils and other natural products.

Table 2

The Importance of CAM in Treatment

Unessential	*Minor Importance*	*Very Important*	*Essential*
0/14 (0%)	4/14 (28.57%)	9/14 (64.29%)	1/14 (7.14%)

Treatment Practices for CMP

In light of the current opioid epidemic, we asked NPs to express their likelihood of prescribing an opioid for someone seeking treatment for CMP. Although most NPs (n = 8) were unlikely to prescribe an opioid, those who were neither likely nor unlikely (n = 2), slightly likely (n = 2), and moderately likely (n = 2) were evenly distributed. A majority of NPs (n = 10; 71.43%) claimed to have made adjustments to their current opioid prescribing practices. One participant chose to exclude this answer in their responses. Although opioid prescribing guidelines vary by state, practitioners can individualize their own prescribing practices within state regulations. NPs reported reducing their prescription of opioids by encouraging nonpharmacological interventions such as hot/cold therapy, physical and occupational therapy, and rest alongside the use of a nonsteroidal anti-inflammatory (NSAID) such as Ibuprofen as a first line of treatment. If an opioid is warranted, an NP suggested using the lowest prescription strength scheduled for shorter periods (e.g., 2 days v. 5) or as needed. For those already receiving opioids as treatment for CMP, recommending CAM in adjunct to the use of an opioid can prove beneficial and assist in potentially decreasing the dose needed to manage CMP. If opioid use disorder is suspected, it is important to facilitate treatment while maintaining a therapeutic patient-provider relationship.

Referral Practices

While some (n = 5) NPs ask about CAM therapies during every patient visit, half (50%) of NPs reported only the

occasional inquiry of CAM during yearly physicals. Although most (n = 9; 64.3%) NPs stated that they are likely to recommend the use of CAM to their patients, they also reported that their practice does not provide them with the resources in order to do so. Upon follow up when CAM therapies were incorporated into the treatment plan for those with CMP, a majority of patients (n = 9; 64.29%) reported being somewhat satisfied with treatment while some (n = 2) reported being extremely satisfied.

Discussion

Over-prescription and misuse of opioids in the treatment of chronic pain is a well-known clinical problem that can lead to dependency and opioid use disorder. The treatment of chronic pain is complex and requires a multidimensional approach due to each individual's experiences with pain being unique. Although pharmacological pain relief (opioids) may sometimes be warranted, they are often prescribed without additional patient education on complementary or alternative treatments. As suggested by Mehl-Madrona et al. (2016), the use of CAM is effective in managing pain resulting in reduced doses of opioids or some individuals choosing to stop their use altogether. While CAM therapies such as chiropractics, acupuncture, massage, and yoga are effective in adjunct with pharmacological relief, there is a lifestyle change associated with their use for pain relief. Eaves et al. (2015) illustrated that although skeptical at first, the use of CAM therapies gives patients a sense of empowerment over their care and motivation to seek additional coping strategies to manage chronic pain.

The integration of CAM therapies into conventional practice can be used to decrease the misuse of opiates in the treatment of chronic pain and improve quality of life. NPs embrace a holistic approach to care, implementing diverse cultural beliefs into the care they provide. Although pharmacologic strategies are effective, prescribing opioids for the treatment of CMP does not contribute to the goal of spiritual, mental, emotional and physical well-being. NPs in the

clinical setting have a great influence on patient care and the management of CMP. The results of this study illustrate that NPs have minimal/fair knowledge on the use of CAM in the management of CMP. A thorough pain assessment to determine the onset, location, duration, aggravating and relieving factors is the first step in understanding the patient's needs. Patients should be educated while under the care of NPs on the use of a non-steroidal anti-inflammatory (NSAID), positioning techniques, the use of yoga, massage, chiropractics, or acupuncture in adjunct to their treatment plan prior to attempting treatment with opioids.

The combination of CAM therapies and conventional medicine presents a holistic approach that considers all factors that influence health, wellness, and disease – mind, body, and spirit. Implementing an integrative approach to medicine builds a partnership between patients and practitioners and allows them to recognize the use of natural, less-invasive intervention whenever possible. If NPs seek to expand their knowledge of CAM when approaching treatment options for CMP, they are becoming models for holistic treatment approaches to patient care.

Conclusion

A limitation to this study was the small sample size. Therefore, a larger study with an adequate sample is needed to further validate study findings. These findings indicate that NPs are in an optimal position to educate patients on the use of CAM therapies in order to manage CMP and minimize the need for opioid pain relief. This research indicates a need for NPs to be adequately educated on CAM and how to access them in order for their patients to receive a holistic approach to care and minimize the amount, strength, or frequency of opioid needed to manage CMP.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books/9780890425596

Andrew Weil Center for Integrative Medicine. (2021). *What is IM/IH?* University of Arizona. https://integrativemedicine.arizona.edu/about/definition.html

Eaves, E. R., Sherman, K. J., Ritenbaugh, C., Hsu, C., Nichter, M., Turner, J. A., & Cherkin, D. C. (2015). A qualitative study of changes in expectations over time among patients with chronic low back pain seeking four CAM therapies. *BMC Complementary and Alternative Medicine, 15*(12). https://doi.org/10.1186/s12906-015-0531-9

Mehl-Madrona, L., Mainguy, B., & Plummer, J. (2016). Integration of complementary and alternative medicine therapies into primary-care pain management for opiate reduction in a rural setting. *Journal of Alternative & Complementary Medicine, 22*(8), 621-626. https://doi.org/10.1089/acm2015.0212

National Institute on Drug Abuse. (2021, March 11). *Opioid overdose crisis*. U.S. Department of Health and Human Services. https://www.drugabuse.gov/drugs-abuse/opioids/opioid-overdose-crisis

U.S. National Library of Medicine. (2018). *Complementary and alternative medicine*. https://www.nlm.nih.gov/tsd/acquisitions/cdm/subjects24.html

Anxious People Report Less Emotional Distancing While Imagining Negative Future Events

Cameron Scroggs

Do you ever think about an upcoming event, like an upcoming exam or an important interview, in a way that makes you feel like you are experiencing the event now? Do your palms sweat or does your heart race as you imagine it unfolding? If imagining future events does make you anxious or worried, you are experiencing a natural response to a uniquely human ability. Referred to as episodic future thinking (EFT) (Schacter et al., 2007), foresight (Suddendorf, 2017), or prospection (Gilbert & Wilson, 2007), the ability to imagine upcoming events can be very beneficial to humans. It can protect us from entering dangerous situations and help us react to environmental threats (Bulley et al., 2017). It can also help people plan, make decisions, and even think creatively (Madore et al., 2018).

Though the cognitive ability to imagine the future is beneficial, the feelings these mental simulations evoke may be unpleasant (Emery et al., 2019). Temporary anxious feelings are not necessarily problematic, but being chronically worried or anxious about the future can be harmful to our wellbeing. For example, worrying to the extent that it complicates day-to-day functioning is common among people who have generalized anxiety disorder (Bulley et al., 2017). How, then, might people experience the benefits of episodic future thinking while controlling the unpleasantness of the experience?

One possible method for reducing feelings of anxiety during EFT is mentally to place space between oneself and past events by adopting a "cognitively distant" perspective (Kross & Ayduk, 2011), as opposed to reliving an experience from an immersed, first-person perspective. This can be accomplished through increasing social distance (e.g., imagining yourself through the eyes of another or referring to yourself in third-person language) or temporal distance (e.g., mentally broadening the scope of time and imagining how your future

self would think about this event). The research literature on psychological distancing, however, is focused on remembering past events, rather than imagining future ones. It is therefore unknown whether distancing is an effective tool for reducing anxiety when thinking about the future.

The primary goal of this thesis, therefore, was to investigate whether psychological distance has the same emotional impact while imagining future events that it does when remembering past events. A second goal was to determine whether individual differences in anxiety might moderate the impact of psychological distancing. Before turning to my study, I will review some of what is known about the relationships between distancing, anxiety, and future thinking, using a theoretical model of threat-related internal thought (Bulley et al., 2017) as a framework.

The Costs and Benefits of Imagining the Future

The human capability to defend against future threats is thought to be a result of cognitive and physiological advancement in our evolutionary history (Bulley et al., 2017; Suddendorf, 2018). The ability broadly referred to as internally generated thinking allows humans to prospectively consider future threats and retrospectively reproduce those that have already been endured, regardless of stimuli in the present environment (Bulley et al., 2017). That is, all animals can experience fear, which is a reaction to immediate and concrete threats in the environment. Humans, however, have the ability to imagine events that have not happened but might occur and experience anxiety in response to this imagined event. While having an excess of anxiety is harmful, Bulley et al. (2017) argue that having some anxiety may be beneficial for humans. They define anxiety as an internal response based on prospective (forward-looking) and/or retrospective (backward-looking) thinking, in combination with cues of potential threat. These cues can be real or imagined.

Internally generated thought is derived from a combination of episodic and semantic thinking. Episodic thinking is described as first-person, image-based thinking.

Semantic thinking is an innate "knowing" without mental stimulation and is much more abstract and verbal than episodic thinking. The episodic and semantic content of thought is acquired by memories of past experiences but can be combined in new ways to think about the future (Schacter et al., 2007). As described by Bulley et al. (2017), "Semantic and episodic memories provide the 'raw material' from which prospective thoughts are construed" (p. 59).

Most future thinking contains some amounts of both episodic and semantic content. Researchers make a distinction, however, between EFT and other types of more general future thought. Episodic future thoughts are mental imaginations or simulations of upcoming future events (Schacter et al., 2007; Wu et al., 2015). EFT dominates most of human thought and contains specific details with concrete mental imagery. For example, if someone describes the vacation they went on last summer, episodic details would include what they did and where (e.g., they flew a yellow kite on the beach), when (e.g., the first Wednesday of the vacation), and with whom (e.g., a grandparent). Episodic future thought differs from semantic thought. In comparison, the semantic version of the episodic example used above would sound something like this: "I enjoyed going to the beach." Generally, EFT may help us plan, attain goals, and assist in prospective coping. As may be expected, EFT tends to contain more episodic information than semantic information, at least amongst young adults (Emery et al., 2019). When describing EFT that is specifically about threat, Bulley et al. (2017) suggest the term episodic threat prospection (ETP). ETP is often emotionally laden, which helps humans avoid threats, but is harmful to one's welfare in some cases because of the way ETP negatively influences mood (Bulley et al., 2017).

In contrast to EFT, other types of future thinking are dominated by semantic content. For example, worry about the future is a common feature of anxiety disorders (Bulley et al., 2017). Kaplan et al. (2018) define worry as a response that is based on uncertainty or the potential for future problems to arise. Bulley et al. (2017) clinically defines worry as non-

concrete verbal depictions of future threats, which are reliant mostly upon semantic processes. This type of thinking is also known as semantic threat prospection and is common among individuals with generalized anxiety disorder (GAD). These thoughts are usually scarce in mental imagery and episodic content. Semantic worry aids in alerting an individual of a problem but is not particularly useful for problem-solving (Bulley et al., 2017). Prior research indicates that semantic threat prospection may help individuals cope with troublesome effects of anxiety that are commonly elicited by episodic threat prospection. That is, worry may be an avoidant response to the negative feelings evoked by imagining a specific future event (e.g., Borkovec et al., 1998). Worry may therefore reduce immediate anxious feelings but impair one's ability to take active steps to avoid the very threat one is worried about.

Episodic and semantic threat prospection are thought to arise from their companion processes of episodic and semantic threat memory. A more common name for semantic threat memory is rumination. Kaplan et al. (2018) define rumination as a negatively valenced, uncontrollable repetitive thinking process, usually focused on self- and past-experiences, which occur independently of external stressors. In other words, to ruminate is to think chronically about the effects of one's past negative experiences. According to Ayduk and Kross (2010), when humans feel an emotion, there is often an urge to analyze and understand the emotion (that is, what are the feelings and why are they happening), but analyzing feelings and ruminating on them in this way can worsen gloomy thoughts instead of helping them go away (Ayduk & Kross, 2010).

Psychological Distancing

Kross et al. (2005) state that attempting to analyze negative emotions (e.g., anger or sadness) can be maladaptive in that it can lead to rumination. Engaging in rumination often leads to long term increases in negative affect. Preventing rumination should entail processing negative emotions in a more abstract manner to be managed in a distant,

contemplative fashion. Kross et al. (2005) suggested two factors that may affect one's capacity to cognitively depict negative feelings this way: self-perspective (immersed vs. distanced) and affective focus, which examines the subject matter of one's thoughts regarding one's emotional experiences. Previous emotional distancing research by Ayduk and Kross (2008) indicates that recalling negative events from a psychologically distant outlook (as opposed to the immersed perspective of "reliving" the experience) reduces negative emotions. When dealing with negative experiences, a person can decenter themselves from experiences and view experiences from a "third-person perspective" (Kross et al., 2005, p. 710). The distanced outlook helps people process emotional experiences by reflecting on them rather than negatively reacting to emotional arousal.

While initial research on psychological distancing focused on remembering events from a socially distant, third-person perspective, more recent research has looked at how temporal distancing (viewing a recent event from the point of view of a distant future self) can also reduce negative emotion. For example, one recent study examined the possibility that distancing oneself temporally may reduce negative affect in response to experiencing directly a negative event, and that it may help individuals cope. Bruehlman-Senecal and Ayduk (2015) examined whether expending cognitive resources by focusing on how impermanent negative events are (through the process of placing temporal distance between the current negative effects versus future impact) reduces anxiety.

Bruehlman-Senecal and Ayduk (2015) created an 8-item psychometric measure, the Temporal Distancing Questionnaire (TDQ), to assess the propensity to distance oneself from negative experiences by mentally broadening the scope of time. Doing so seems to make negative events feel less severe because temporal distance allows one to view the event as transitory. This construct is measured with questions like "I tell myself that this event probably won't impact my life very far into the future" (Bruehlman-Senecal & Ayduk, 2015). The authors also measured whether or not engaging in temporal

distancing promotes general welfare. Well- being was measured through various self-report scales concerning levels of optimism, satisfaction with life, and positive well-being. The findings supported the notion that temporally distancing oneself (i.e., adopting a distant-future perspective) indeed lessened the experience of current emotional distress (Bruehlman-Senecal & Ayduk, 2015).

A recent study in our lab (Emery et al., 2019) also found that distancing oneself from everyday events (as opposed to negative ones) can promote positive emotion. In the study, adults of varying ages were asked to remember or imagine everyday events (e.g., getting a haircut) in two ways. In the immersed condition, participants were guided through the event itself, as if they were experiencing it through their own eyes. In the distanced condition, participants were asked to focus on how the event integrated into their overall life. When describing events in the distanced condition, participants reported more positive affect, used more positive words, and reported less immersion in the event than when describing events in the distanced condition.

Anxiety and Episodic Future Thought

A limitation of the temporal distancing literature is that the vast majority of studies focuses on past events rather than future ones. Because anxiety is evoked by imagining future events, it is unclear whether distancing would be as helpful for worry as it is for rumination. Highly anxious people, like those with GAD, tend to engage in both prospective and retrospective thinking that is generally more negatively valenced than that of non-anxious people (Wu et al., 2015). Common features of GAD include persistent, chronic worry about what may happen in the future, unwillingness to accept unpredictability, and beliefs like "worrying allows me to prepare for the future" (Wu et al., 2015). Wu et al. (2015) add that worry is a thinking style analogous to rumination, focused on the semantic rather than episodic content of future imagined events.

Wu et al. (2015) hypothesized that it would be more difficult for highly anxious individuals to come up with detailed, negatively-valenced future events (as opposed to general, non-detailed events), think negative events were more likely to happen, and generally have a more negative outlook for the future. To test these hypotheses, researchers had participants generate extensive lists of familiar people, places, and things, select portable objects and specific locations, simulate a future event, and rate the plausibility of the event. They then returned for a second time and resimulated the events they previously constructed based on a valence tag of neutral, positive, or negative. This gave participants the chance to generate novel episodic future possibilities and then measure how likely the events were believed to be. Wu et al. (2015) found that it is easier for anxious individuals to produce negative future events than positive ones, come up with plausible reasons for the negative event's occurrence, and feel that there is high likelihood that the future will hold more negative events. Contrary to predictions, the anxious and non-anxious groups did not differ in their ratings of how detailed the negative events were when they simulated them.

Current Study

Broadly speaking, this study examined the relationship among anxiety, episodic future thinking, and temporal distancing. To my knowledge, no prior research has investigated relationships among these three constructs, largely because they arise from separate research traditions (clinical, cognitive, and social psychology, respectively). Based on the findings of Wu et al. (2015), I expected anxious individuals to engage in more negatively valenced episodic future thinking than non-anxious individuals. Based on the prior findings of Emery et al. (2019), I expected that individuals in the immersion condition would have increased feelings of negative emotion compared to people in the distanced condition. Finally, I hypothesized that the effect of anxiety on negative feelings would be bigger in the immersed condition than in the distanced condition.

Method

Participants

Participants were 73 Appalachian State University (ASU) students between the ages of 18 and 25 who were recruited through SONA, ASU's psychology recruitment system. The only inclusionary criterion was that participants had to be young adults (18-25) currently enrolled at ASU. The final sample size was 53, as there were 17 participants who did not show up for Time 1, and three participants were excluded from analysis because the event they described was fewer than 14 days (i.e., two weeks) away. The study was approved by ASU's Institutional Review Board, and participants explicitly consented to being part of this study with knowledge they could stop at any point. Student participation in this study was voluntary but was incentivized by the possibility of earning two experiential learning credits (ELCs) that count toward course credit by completing the study.

Materials

Future Event Questionnaire

Based on prior research (Ayduk & Kross, 2010; Ayduk & Kross, 2008; Bruehlman-Senecal & Ayduk, 2015), I used a 9-item, modified version of the questionnaire developed by Emery et al. (2019) to measure both mood and emotion regulation strategies used while imagining future events. Participant mood (the primary dependent variable) was measured by assessing positive and negative affect ("As I was describing the event, I felt a lot of positive emotion" or "As I was describing the event, I felt a lot of negative emotion," respectively). Immersion in the future event (the primary manipulation check) was measured with the item "As I was describing the event, I felt as if I was living the experience as it will be, through my own eyes." The response scale ranged from 1-6, where 1 = *completely disagree* and 6 = *completely agree*.

Beck Anxiety Inventory (BAI) (Beck et al., 1988)

A self-report scale by Beck et al. (1988) was used as the primary measure of anxiety in adult participants. The BAI is designed

to assess an individual's anxiety severity (Beck et al., 1988) and has been used to distinguish between anxious and non-anxious groups in prior research (Wu et al., 2015). The measure is a 21-item, 4-point Likert-type scale where 0 = *not at all* and 3 = *severely, it bothered me a lot*. Participants were asked to ponder how much they have experienced these symptoms within the past month and answer accordingly. Sample items include "numbness or tingling" and "heart pounding/racing." Internal consistency for the BAI was high (Cronbach's $\alpha = 0.92$), and test-retest reliability at one week for the BAI was adequately stable ($r = 0.75$; Beck et al., 1988).

Exploratory Measures

Two measures were included for exploratory purposes and are not reported in the analyses for the thesis.

Follow-Up Event Questionnaire. One week after the test session, participants were asked to fill out another questionnaire about the event they imagined. The measure was a 14-item, 6-point scale where 1 = *strongly disagree* and 6 = *agree*. Sample items include "As I'm thinking of the event now, I am feeling a lot of negative emotion," "I have put the event behind me completely," and "This event still bothers me".

Anxiety Sensitivity Index-3 (ASI-3) (Taylor et al., 2007). Anxiety sensitivity was assessed by the ASI-3 by Taylor et al. (2007). The self-report index consists of 18 items designed to measure general anxiety sensitivity and three domains of apprehensions: cognitive (e.g., "When my thoughts seem to speed up, I worry that I might be going crazy"), physical (e.g., "When my throat feels tight, I worry that I could choke to death"), and social (e.g., "When I begin to sweat in a social situation, I fear people will think negatively of me"). Participants were asked to rate their level of agreement of each statement on a 5-point Likert-type scale where 0 = *very little* and 4 = *very much*. The reliability and validity of the ASI-3 have been established, and there is indication that the psychometric qualities of the ASI-3 have been refined since the original ASI (Taylor et al., 2007). The total score is determined by calculating the sum of the 18 items, and scores range from 0-

72. A score of 0-17 is indicative of "almost no anxiety sensitivity"; 18- 35 indicates "low anxiety sensitivity"; 36-53 indicates "moderate anxiety sensitivity"; and 54-72 indicates an individual has a high level of anxiety sensitivity (Taylor et al., 2007).

Procedure

The experimenter began the study by briefly explaining the experiment procedure to the participant and obtained proper informed consent before continuing to the experiment. All procedures were approved by the ASU Institutional Review Board on Feb. 2, 2019. Participants completed the procedure individually in a quiet testing room with a single researcher present.

This study consisted of two parts: an in-lab, in-person portion and an online follow-up survey. Upon arrival for the in-lab portion of the study, participants were seated and told about the informed consent process, and the researcher started video recording the participant to ensure the participant was adhering to task instructions. (Videos will be analyzed and coded at a later time).

Participants were randomly assigned to one of two conditions: immersed (n = 27) or distanced (n = 26). In each condition, participants were read a prompt asking them to think of an upcoming event that they are anxious about. The prompt was adapted from a prior study by Ayduk & Kross (2010), but changed from remembering a personal conflict to imagining a worrisome event:

> No matter how well life is going, there are future events that we may be worried about. Take a few moments right now to think of an upcoming event that you may be anxious or concerned about—one that makes your heart race or palms sweat just thinking about. Although it may be difficult, most people can usually imagine at least one upcoming worrisome event that will come up in the future. Please try to imagine an experience that is at least two weeks, but no

more than two months away. Take your time as you try to do this. Once such an event comes to mind let me know when you are ready to begin describing it.

In the immersed condition, participants were asked to describe details of the surroundings, people, and actions involved in the event itself. In the distancing condition, participants were asked to describe how the surroundings, people, and actions of the event related to other events, people, and places they have previously experienced in life. These instructions had previously been used in the study by Emery et al. (2019).

After describing the event, all participants completed three questionnaires: Future Event Questionnaire, BAI, and ASI-3. One week after the event, participants were sent out a follow-up questionnaire to fill out via an online survey.

Results

All data were analyzed using an Analysis of Covariance (ANCOVA) with Condition (Immersed vs. Distanced) as the independent variable and BAI scores as the covariate.

Manipulation Check

For the question about how immersed people were in the event, there was no main effect of condition, $F(1,49) = 1.050$, $p = 0.311$, $\eta_p^2 = 0.021$, no Condition x Anxiety level interaction, $F(1,49) = 1.165$, $p = 0.286$, $\eta_p^2 = 0.023$, but there was a main effect of anxiety, $F(1,49) = 6.686$, $p = 0.013$, $\eta_p^2 = 0.120$. Immersion ratings did not differ between the Immersed ($M = 4.67$, $SD = 1.14$) and distanced conditions ($M = 4.65$, $SD = 1.02$). This suggests that the manipulation did not have its intended effect. Anxiety level, however, was moderately and positively correlated with the amount participants felt immersed while describing the event, $r(51) = 0.33$, $p = 0.016$.

Negative and Positive Feelings

For negative affect reported while describing the event, there was there was no main effect of condition, $F(1,49) = 0.571$, $p = 0.454$, $\eta_p^2 = 0.012$, no main effect of anxiety level, $F(1,49) = 1.42$, $p = 0.283$, $\eta_p^2 = 0.028$, and no Condition x Anxiety Level interaction, $F(1,49) = 0.045$, $p = .833$, $\eta_p^2 = 0.001$. Besides being not statistically significant, the effect of condition was in the opposite direction that was predicted. Participants reported more negative affect while describing the event under distancing instructions ($M = 3.58$, $SD = 1.27$) than immersion instruction ($M = 3.15$, $SD = 1.29$).

For positive affect while describing the event, there was there was no main effect of condition, $F(1,49) = 1.901$, $p = 0.174$, $\eta_p^2 = 0.037$, no main effect of anxiety level, $F(1,49) = 0.005$, $p = 0.946$, $\eta_p^2 = 0.00$, and no Condition x Anxiety Level interaction, $F(1,49) = 0.684$, $p = 0.412$, $\eta_p^2 = 0.014$. As with negative affect, the effect of condition was in the opposite direction of what was predicted: Participants reported more positive affect while describing the event under immersion instruction ($M = 3.37$, $SD = 1.18$) than distancing condition ($M = 2.88$, $SD = 1.42$).

Other Important Event Characteristics

These results found only that highly anxious people reported more immersion while imagining the events. They did not, however, differ in how they *felt* while describing the event from low-anxious participants. To investigate possible reasons for this apparent discrepancy, I investigated data from two other questions in the future events questionnaire.

First, one question asked about how much the participant had thought about the event before coming into the lab. For this variable, there was there was no main effect of condition, $F(1,49) = 0.070$, $p = 0.793$, $\eta_p^2 = 0.001$, a main effect of anxiety, $F(1,49) = 25.57$, $p < 0.001$, $\eta_p^2 = 0.343$, and no Condition x Anxiety Level interaction, $F(1,49) = 0.014$, $p = 0.908$, $\eta_p^2 = 0.00$. The amount someone considered the event before coming into the lab was strongly positively correlated with both their anxiety level, $r(51) = 0.59$, $p < 0.001$. It appears,

therefore, that high and low-anxious people differed substantially in how often they had thought about the event in the past.

In addition, participants were asked how far in the future the event was. This open-ended response was converted into a number of days for analysis. For the amount of time before the event occurs, there was there was no main effect of condition, $F(1,49) = 0.850$, $p = 0.361$, $\eta_p^2 = 0.017$, no main effect of anxiety, $F(1,49) = 0.462$, $p = 0.50$, $\eta_p^2 = 0.009$, and no Condition x Anxiety Level interaction, $F(1,49) = 0.290$, $p = 0.593$, $\eta_p^2 = 0.006$.

Discussion

In this study, I investigated whether emotional distancing decreased negative feelings about future events and whether this effect was moderated by participants' anxiety levels. Based on previous research, I expected anxious individuals to feel more negative when imagining anxiety-provoking negative events than non-anxious individuals (Wu et al., 2015). Second, I expected individuals in the immersed condition to have increased negative feelings when describing the event than participants in the distanced condition. Finally, I expected the difference between high- and low-anxious participants to be larger in the immersed than distanced condition. None of these hypotheses, however, was supported by the data.

Interestingly, I did find that participants who scored higher on the BAI immersed themselves more in describing the upcoming worrisome event. Further, I found that more anxious individuals reported thinking about the event before coming into the lab more than non-anxious individuals. However, statistical analyses indicated that participants' anxiety levels did not predict how negative they felt while describing the event, regardless of condition assignment (immersed or distancing). Moreover, the amount of negative affect induced was surprisingly low: On a 6-point scale, the average negative affect rating was just over the midpoint of 3. This suggests that my attempt to induce anxiety through episodic future thinking was

unsuccessful. It is possible that by thinking about the event beforehand allowed highly-anxious participants to rehearse details of the event and engage in emotion regulation strategies, which may explain why they did not report feeling anxious while describing the event in the lab. These findings support prior research by Wu et al. (2015) and Bulley et al. (2017) in that anxious individuals did report thinking about (and likely ruminating and/or worrying about) the event more than non-anxious individuals.

One surprising finding of the study was that the distancing instructions were ineffective at changing either participants' immersion or mood. On one hand, this finding is somewhat consistent with the findings from Wu et al. (2015) that anxiety level did not moderate the level of detail produced when imagining future events. That is, the way people think about anxiety provoking future events may be relatively impervious to either individual differences or experimental manipulations. On the other hand, these instructions have successfully changed people's sense of immersion and mood in a previous study (Emery et al., 2009). In that study, however, the events people imagined were mostly positively valenced and cued by focusing people on event content rather than event emotion. Finally, even though mood differences between conditions were not statistically significant, they were actually in the opposite direction as predicted: Participants in the distanced condition reported more negative and less positive affect while describing the event than people in the immersed condition. This did not align with the findings of Bruehlman-Senecal and Ayduk (2015) that adopting a distant-future perspective lessened the experience of current emotional distress.

There were several limitations to the current study that should be addressed in future research. First, a clear limitation of this study is the small sample size ($N = 53$). Future research should attempt to recruit a larger sample size, as the results could reflect a "power issue" (i.e., the need for a larger sample to detect effects) in detecting the differences in mood evoked by the conditions. Another potential limitation of the study is that

I did not attempt to control the extent to which participants thought about the event before coming into the lab for Time 1, which may have affected the way they processed negative emotions beforehand. This could be controlled by using a procedure like that used by Wu et al. (2015). Lastly, using a sample that is not clinically diagnosed with anxiety could be problematic in that the results are not generalizable to clinical populations. The results may have been different if the population had clinical anxiety levels, as opposed to the general population.

Conclusions

In sum, the current study finds that participants who scored higher on the BAI immersed themselves more in describing an upcoming worrisome event. The nature of this effect likely depends on how much a person thinks about (i.e., cognitively rehearses) a worrisome upcoming event before its occurrence, as well as how anxious a person is in general. In addition, instruction to either immerse or self-distance oneself from negative emotional experiences has the potential to increase feelings of anxiety. These preliminary findings suggest that anxious people may ruminate on negative emotional experiences when considering future events more than non-anxious individuals.

References

Ayduk, Ö., & Kross, E. (2008). Enhancing the pace of recovery: Self-distanced analysis of negative experiences reduces blood pressure reactivity. *Psychological Science, 19*(3), 229-231. https://doi.org/10.1111/j.1467-9280.2008.02073.x

Ayduk, Ö., & Kross, E. (2010). From a distance: Implications of spontaneous self-distancing for adaptive self-reflection. *Journal of Personality and Social Psychology, 98*(5), 809-829. https://doi.org/10.1037/a0019205

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*, 893-897. https://doi.org/10.1037/0022-006X.56.6.893

Berntsen, D., Rubin, D. C., & Salgado, S. (2015). The frequency of involuntary autobiographical memories and future thoughts in relation to daydreaming, emotional distress, and age. *Consciousness and Cognition, 36*, 352-372. https://doi:10.1016/j.concog.2015.07.007

Bulley, A., Henry, J. D., & Suddendorf, T. (2017). Thinking about threats: Memory and prospection in human threat management. *Consciousness and Cognition, 49*, 53-69. https://doi.org/10.1016/j.concog.2017.01.005

Emery, L., Hardin, K, Graves, A., & Knight, R. (2019). Mental time travel in context: Off-topic speech has affective consequences. Manuscript under review.

Kaplan, D. M., Palitsky, R., Carey, A. L., Crane, T. E., Havens, C. M., Medrano, M. R., Reznik, S.J., Sbarra, D.A., & O'Connor, M. F. (2018). Maladaptive repetitive thought as a transdiagnostic phenomenon and treatment target: An integrative review. *Journal of Clinical Psychology, 74*(7), 1126-1136. https://doi.org/https://doi.org/10.1002/jclp.22585

Kross, E., Ayduk, Ö., & Mischel, W. (2005). When asking "why" does not hurt: Distinguishing rumination from reflective processing of negative emotions. *Psychological*

Science, 16(9), 709-715. https://doi.org/10.1111/j.1467-9280.2005.01600.x

Schacter, D. L., Addis, D. R., & Buckner, R. L. (2007). Remembering the past to imagine the future: The prospective brain. *Nature Reviews Neuroscience, 8*, 657-661. https://doi.org/10.1038/nrn2213

Sugiura, T., & Sugiura, Y. (2015). Common factors of meditation, focusing, and cognitive behavioral therapy: Longitudinal relation of self-report measures to worry, depressive, and obsessive-compulsive symptoms among nonclinical students. *Mindfulness, 6*(3), 610-623. https://doi.org/10.1007/s12671-014-0296-0

Taylor, S., Zvolensky, M. J., Cox, B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., Abramowitz, J. S., Holaway, R. M., Sandin, B., Stewart, S. H., Coles, M., Eng, W., Daly, E. S., Arrindell, W. A., Bouvard, M., & Cardenas, S. J. (2007). *Anxiety Sensitivity Index-3 (ASI-3)* [Database record]. APA PsycTests. https://doi.org/10.1037/t00034-000

Wu, J. Q., Szpunar, K. K., Godovich, S. A., Schacter, D. L., & Hofmann, S. G. (2015). Episodic future thinking in generalized anxiety disorder. *Journal of Anxiety Disorders*, 36, 1-8. https://doi.org/10.1016/j.janxdis.2015.09.005

Investigating the Relationship between Anxiety Sensitivity and Chronic Illness: A Replication and Extension

Emily Berdal

Introduction

Chronic illnesses (or noncommunicable diseases [NCDs]) are those that cannot be passed from person to person, but instead slowly progress throughout the lifetime of a single individual. Worldwide, NCDs were responsible for 68% of the world's 56 million deaths in 2012, with more than 40% of the deaths being considered premature (World Health Organization [WHO], 2014). In the United States alone, more than 117 million adults, almost half of the population, have been diagnosed with at least one NCD, with one in four adults having two or more NCDs (Ward et al., 2014). Chronic illnesses account for most of the annual healthcare costs in the United States, consuming 86% of the country's annual healthcare budget, totaling over $2.3 trillion (Gerteis et al., 2014).

The overall burden of NCDs can be measured using Disability Adjusted Life Years (DALY). This measure combines years of life lost (YLL) and years lost to disability (YLD). Together DALYs are a measure of how many years of life are lost due to death, illness, or impairment (Murray et al., 2012). In 2015, almost 80,000 years were lost per 100,000 people in the United States due to NCDs. Fifteen percent of the years lost can be attributed to mental diseases, while the other 85 percent are from chronic physical illness (WHO Department of Information, Evidence and Research, 2016). Research has shown that there is a common comorbidity between mental disorder and chronic physical illness (Tsang et al., 2008). Comorbidities can exacerbate the disease condition. Verbrugge et al. (1989) found that as the numbers of comorbidities increase, disability rises exponentially.

Anxiety disorders are the most common mental illness in the United States (Facts & Statistics, 2017), and comorbidity

between chronic illness and anxiety disorders are fairly common. Katon et al. (2006) reviewed 31 studies regarding the association between chronic illnesses and anxiety/depression, finding that any person with a diagnosed chronic illness and comorbid anxiety disorder generally perceive more symptoms of the disease than those without anxiety. Chronically ill populations also appear to exhibit heightened awareness of physical symptoms. The burden of comorbid anxiety disorders and chronic illnesses is more likely to increase anxiety symptoms and worsen episodes on top of the taxing symptoms of the disease (Katon et al., 2006).

The American Heart Association (2013) reports that, in the United States, one out of every three persons is hypertensive. Hypertension causes stress to the arteries in the body, and a comorbidity with anxiety may increase that stress leading to a higher rate of mortality. In a review conducted by Pan et al. (2015), the researchers found a significant relationship between anxiety and hypertension in cross-sectional studies. In addition, there was a direct association seen in prospective studies that were included in the review. They also concluded that those with anxiety were at an increased risk for hypertension although there are other variables that come into play. In a study conducted with middle aged men, a similar result was seen. Generalized Anxiety Disorder (GAD) was found to be positively associated with hypertension (Carroll et al., 2009). Their data suggested that the comorbidity of GAD and hypertension was not synergistic, but was acting additively, resulting in an increased disease burden (Carroll et al., 2009).

In the United States alone, more than 28 million adults have been diagnosed with heart disease. In addition, it is the number one cause of death among Americans (National Center for Health Statistics [NCHS], 2021, March 1). The morbidity and mortality of cardiovascular disease makes understanding of associated factors and risks a priority. Vogelzangs et al. (2010) researched the association between the presence of an anxiety or depressive disorder and cardiovascular disease. They found that anxiety and cardiovascular disease are associated. Their

study also examined the relationship with coronary heart disease, which is the most common form of cardiovascular disease (Heart Disease, 2017). The study found that the prevalence of coronary heart disease increased over a variety of anxiety diseases. Those who had an anxiety disorder in the past year were up to three times as likely to suffer from coronary heart disease. They further examined the amount of time that persons had been diagnosed with anxiety disorders and found that there was no significant evidence relating length of diagnosis with increased cardiovascular disease (Vogelzangs et al., 2010).

High cholesterol is a strong risk factor for the development of cardiovascular disease. With the relationship of anxiety disorders and cardiovascular disease, it is important to understand if there is a relationship with risk factors as well. Over one third of the adult American population has high cholesterol with less than half of those receiving treatment (Division for Heart Disease and Stroke Prevention, 2015). Rafter (2001) completed a study with the intention of finding biochemical markers for anxiety and depression and found that high total cholesterol is related to anxiety. In another study, Peter et al. (2002) found that cholesterol levels were significantly higher in subjects with an anxiety disorder or OCD than normal control subjects. A more detailed comparison of the population with anxiety disorders showed a significant increase in LDL and a significant decrease in HDL. Of the patients with anxiety disorders, 68% had borderline or high cholesterol compared to 30% of control subjects. This data led to the assumption that elevated cholesterol levels are generally associated with anxiety disorders (Peter et al., 2002).

Arthritis is the leading cause of disability in America, affecting more than 50 million adults, with 30 million of those having osteoarthritis (Arthritis Foundation, n.d.). Research suggests that chronic pain and anxiety disorders are highly comorbid. A study investigating the link between anxiety and three chronic pain conditions found that there was a significant association that lasted through adjustments for different confounding variables (McWilliams et al., 2004). Similarly,

VanDyke et al. (2004) found that trait anxiety was significantly higher in individuals with rheumatoid arthritis than those with osteoarthritis. In addition, as seen in the research on cardiovascular disease, disease duration was not found to be statistically significant in level of anxiety (VanDyke et al., 2004). This indicates that the presence of anxiety was simply related to the presence of disease and was not impacted by the length of time the individual had been diagnosed.

Hypervigilance is one factor that could increase anxiety in those with NCDs. Those with chronic illness tend to be hypervigilant regarding symptoms and sensations (McDermid et al., 1996). Chronic illnesses often lead to a variety of sensory experiences that might alert the individual to when something is wrong within the body. While a patient might know to watch for these symptoms, they can be anxious and become hypervigilant, feeling symptoms that are provoked by the anxiety and not related to the illness. Anxiety sensitivity (AS) refers to fears of anxiety-related sensations due to beliefs that the sensations are associated with negative physical, psychological, or social outcomes (Reiss et al., 1986). Wong et al. (2014) found in chronic pain patients that pain hypervigilance mediates the relationship between AS and catastrophizing pain. For instance, a hypervigilant patient with lung disease may sense shortness of breath after a bout of movement more than a healthy patient would in the same situation. The patient with the illness may perceive this to be a sign that the condition of their lungs is deteriorating and become anxious. They may catastrophize this feeling into believing their lung collapsed or they are experiencing some other serious medical problem. In this case, hypervigilance can be maintained in the patient's AS, which itself has been marked as a risk factor for anxiety disorders (Zvolenskya et al., 2006).

As mentioned above, AS is a risk factor for the development of various anxiety disorders. AS is the fear of anxiety symptoms that comes from the belief that anxiety may result in physical harm (Reiss, 1991). Furthermore, AS has been broken down into three factors, physical concerns, social concerns, and psychological or cognitive concerns (Zinbarg et

al., 1997). Physical AS includes the belief that physical symptoms may be a sign of illness and the fear that results from that belief. Social AS is fear that others can observe the anxiety symptoms and it will result in embarrassment or ridicule. Lastly, psychological AS is fear that cognitive anxiety symptoms are proof of mental incapacitation (Stewart et al., 1997). The study done by Zinbarg et al. (1997) showed that increased physical AS was associated with greater rates of panic disorder, while higher social AS was associated with social phobia. Increased cognitive AS on the other hand, was not related to a single anxiety disorder, but differentiated diagnosis of an anxiety disorder from that of no anxiety disorder, with the exception of simple phobia (Zinbarg et al., 1997). Reiss and McNally (1985) propose that AS is an individualized personality factor relevant in the development of anxiety disorders. AS has been found to be an identifier for substance abuse (Stewart et al., 1999), PTSD (Marshall et al., 2010), panic (Maller & Reiss, 1992), and agoraphobia (Wardle, Ahmad, & Hayward, 1990). These four associations show importance in their link to chronic illness.

Often those who have been diagnosed with a chronic illness are prescribed several types of medications and in some cases might try to self-medicate. Stewart et al. (1999) investigate the links between various substances being used and abused and their link with AS. Their review suggested a relationship between AS and misuse of substances such as benzodiazepines and analgesics that are commonly prescribed to those with chronic illness. Because of a link between high AS and substance use and the possible link between AS and chronic illness, AS may be a marker predicting substance misuse and abuse among a chronically ill population.

PTSD may also be linked to chronic illness. A patient with chronic illness may experience a spell related to their disease that is later traumatizing to them. This traumatization may cause them to avoid certain situations or places that produce symptoms similar to those that occurred at the time of their spell. That scenario shows the relationship between high AS and PTSD. Furthermore, research has shown that AS can

predict future PTSD symptoms. Therefore, patients with high AS are less likely to see a decrease in their PTSD symptoms over time than their counterparts with low AS (Marshall et al., 2010). If research proves a link between AS and chronic illness, it could be seen that the chronically ill population would maintain higher rates of PTSD.

Another demonstrated association with high AS is panic disorder. AS was proven to predict the number, frequency, and intensity of future panic attacks in a study done by Maller and Reiss (1992). It is proposed that the relationship between AS and panic is a result of a misinterpretation of symptoms (Cox et al., 1999), in that a panic attack arises when an individual interprets what they are feeling as much more perilous than it actually is. This concept relates back to the topic of hypervigilance mentioned earlier. In the case of a chronically ill person, they may experience a rapid heart rate as a result of a stimulus and believe themselves to be having a heart attack leading themselves to panic. Hypervigilance led them to have increased awareness of their increased heart rate, and AS led them to become anxious about the possibility of what their symptom could mean. The increased anxiety led the patient to panic over an otherwise normal stimulus response. Because AS has been found to predict panic (Maller & Reiss, 1992), it serves a salient role in determining the risk of panic disorder in those who are chronically ill.

Similar to panic, agoraphobia has also been found to have a link with AS (Wardle et al., 1990). Agoraphobia is the fear of places and situations that may lead to a feeling of being trapped, embarrassment, or otherwise related to increased anxiety. Wardle et al. (1990) found that agoraphobia is highly linked with AS markers regarding bodily symptoms. Therefore, an individual with agoraphobia would avoid a place if it had the possibility of causing a symptom to arise. In regard to the example given above, a person with chronic illness and high AS might know that their heart rate increases around groups of people, so they will avoid a sporting event, for instance, because they feel an increased heart rate will lead to heart attack. Knowing whether AS serves as a link between

agoraphobia and chronic illness can lead to the understanding of why chronic illness causes a stark decrease in quality of life by determining if enjoyable experiences are being avoided for fear of anxiety sensations.

The studies that have been done regarding relationships between anxiety disorders and high AS have a significant role in the research of AS in chronically ill populations. If a relationship between chronic illness and AS holds true, the links described earlier can identify possible comorbidities increasing impairment and decreasing quality of life. By understanding these relationships, better treatment and care may be provided. In addition, recognition of common comorbid disease could decrease medical spending.

Very few studies have examined the relation between AS and chronic illnesses. Norman and Lang (2005) noted that AS could be a characteristic that was present before an illness was diagnosed but also that high AS may have developed as a result of the diagnosis. They utilized a sample of 389 participants gathered from Veterans Affairs and university primary care clinic waiting rooms. Their sample was fairly evenly split between men and women; about 54% of their sample was Caucasian; and 55% had been diagnosed with at least one chronic illness. In their study, they noted limitations that may have played a role in their study, upon which we plan to improve. Norman and Lang utilized the original ASI measure for its brevity. They suggested that a more comprehensive measure be used; therefore, we used the ASI-3.

In the previous study, AS was found to have a role in the functioning of patients with hypertension, heart disease, and high cholesterol. The current study expected comparable results to the previous research that showed AS is higher in patients diagnosed with one or more chronic illnesses. Because little research has been done on this topic, this study will serve to reinforce the idea that AS plays a role in the diminished functioning of chronically ill patients. The importance of replication is strengthened by the common comorbidities seen between chronic illness and anxiety disorders (Roy-Byrne et al., 2008). This study aims to determine if the linking factor is, in

fact, AS by replicating the results of Norman and Lang (2005), with the exception of functioning and neuroticism. This study evaluated functioning based on the WHO's Quality of Life measure (WHOQOL), and neuroticism was replaced by negative affect, which was measured with the Brief Symptom Inventory 18 as general distress. Based on the results of Norman and Lang (2005), we hypothesized that we would see an association between higher AS and the chronic diseases studied in our research. In addition, we further hypothesized that in the population with chronic illness physical AS would be higher and quality of life will be decreased.

Method

The data for this study were previously collected for another study (see Shanely et al. [2010] for clinical trial details). The data represent a large sample of 1,002 residents from a community in western North Carolina. Of the 1,002 participants recruited by mass advertising, 941 completed all study requirements, including cognitive testing at baseline and post treatment. Additionally, 42 participants were excluded from the calculations for high cholesterol due to insufficient data. Ninety-five percent of participants were white/Caucasian, 1.8% were African American, and the remaining 3.2% were of other racial and ethnic background. Approximately 60% of the participants sampled were women. The age range of participants was 18 to 85 with a mean of 45.96 (SD = 16.27). During recruitment, ages were stratified to ensure that various age ranges had adequate representation. Forty percent of subjects recruited were between the ages 18-40, 40% were middle aged (41-65), and the remaining 20% were 66-85 and considered older aged adults. In addition to being stratified by age, participants were also stratified by body mass index (BMI). Thirty-three percent were considered normal BMI (18.5- 24.9), 33% were considered overweight (25-29.9), and the remaining 33% were obese with BMI over 30. Almost 98% of the participants recruited had completed a high school education and 56% had earned a college degree.

Subjects completed a Brief Symptom Inventory (BSI), the ASI-3, WHOQOL, and a health questionnaire. The ASI-3 is an 18 item self-report measure that was designed to measure fear of physiological arousal-related sensations (AS). The ASI-3 improved upon the ASI by focusing on three subscales, each with six items: Physical (e.g., "It scares me when my heart beats rapidly"), Cognitive (e.g., "It scares me when I am unable to keep my mind on a task"), and Social Concerns (e.g., "It is important for me to not appear nervous"). Each question is answered on a 0-4 point Likert scale (0 = very little, and 4 = very much) (Taylor et al., 2007). The BSI included questions regarding how the individual felt in that moment. The BSI's general distress measure is also being used to predict negative affect. Research shows that the three subscales of the BSI are positively correlated with negative affect (Serafini et al., 2016). Quality of Life was measured using the WHOQOL. The WHOQOL has 115 questions and gathers information based on each individuals' perception of their place in life in the context of their values and culture relating to their goals and expectations. Lastly, the health questionnaire included demographic questions, medical history questions, a self-report on chronic disease, risk factors for chronic disease, and questions about lifestyle. Around 38% of participants reported a history including one or more chronic disease. Twenty-eight percent of participants reported having one chronic disease, 8.9% reported two, and 0.8% reported three or more. Chronic diseases to be considered in this study and the respective percentage of persons afflicted include heart disease (1.9%), hypertension (18.3%), high cholesterol (12.4%), and arthritis (15.5%). The breakdown of diseases and their respective AS and quality of life scores can be seen in Table 1.[1] These four diseases were chosen based on their inclusion in the previously done study done by Norman and Lang (2005).

---

[1] The table, "Breakdown of Chronic Illnesses with AS and Quality of Life Scores," is available online: http://libres.uncg.edu/ir/asu/f/Berdal_%20Emily%20Spring%202018%20Thesis.pdf (p. 13).

Analysis

Hierarchical logistic regression analyses were performed to determine whether the three subfactors of AS predicted unique variance in each of the chronic illnesses over and above demographic variables and negative affect. Each chronic illness served as a dependent variable in one analysis. At Step 1, age, gender, and the BSI General Distress subscale were entered into the regression model. Participants' scores on the Physical, Cognitive, and Social Concerns subscales of the ASI-3 were entered at Step 2, consistent with methodology used by Norman and Lang (2005). Age was included because there tends to be a higher prevalence of chronic illness as age increases. Also, chronic illnesses affect each gender at different rates (e.g., more women are diagnosed with arthritis than men [Arthritis Foundation, n.d.]). Watson and Pennebaker (1989) found that negative affect was significantly correlated with health complaints. Therefore, we included negative affect in the model. The selected variables were also chosen based on their inclusion in the previous study that is being replicated (Norman & Lang, 2005).

Furthermore, a separate hierarchical regression analysis was conducted to determine if AS scores predicted the number of chronic illnesses. In this analysis, the number of chronic illnesses was the dependent variable, and the entry of indicator variables was the same as described above.

Lastly, a hierarchical multiple regression analysis was conducted to determine whether AS subscale scores predicted quality of life over and above demographic variables and negative affect among individuals who met criteria for one or more chronic disease. Scores on the WHOQOL-BREF served as the independent variable, and the predictor variables were entered into the model as described above.

Results

Correlational analysis was used to examine a general relationship between chronic illness and AS, as well as demographic variables and negative affect. Preliminary results

indicated weak relationships between age and chronic illness. Other weak associations were seen between chronic illness and AS and negative affect. The correlational analysis also indicated relationships between number of diseases and AS, demographic variables, and negative affect. Quality of life was seen to have a relationship with the same variables (Table 2).[2]

The overall logistic regression analyses for hypertension, high cholesterol, arthritis, and heart disease were significant. In the final models, age was a significant predictor of each chronic illness, and gender significantly predicted all except heart disease ($p = .059$). However, the ASI-3 Physical Concerns subscale was only associated with hypertension after controlling for demographic variables and negative affect ($p < .01$), and the Cognitive Concerns subscale was only associated with high cholesterol ($p = 0.02$). The Social Concerns subscale did not predict any of the chronic illnesses, and none of the ASI-3 subscales predicted heart disease or arthritis. The results of the linear regression analyses can be seen in Table 3.[3]

Our second aim was to determine if the AS predicted the number of chronic illness endorsed. The overall regression model was significant, but, in the final model, only age and gender significantly predicted number of chronic diseases (Table 4).

A hierarchical multiple regression analysis was conducted to determine if AS subscale scores predicted quality of life among individuals with chronic illnesses ($n = 393$). The overall regression model was significant, and, in the final model, age, BSI-General Distress, and ASI-3 Cognitive

---

[2] The table, "Correlation of Variables," is available online: http://libres.uncg.edu/ir/asu/f/Berdal_%20Emily%20Spring%202018%20Thesis.pdf (p. 14).

[3] The table, "Chronic Illness and the Three Subscales of AS with Co-variates," is available online: http://libres.uncg.edu/ir/asu/f/Berdal_%20Emily%20Spring%202018%20Thesis.pdf (p. 15).

Concerns were all significant predictors of quality of life (Table 4).[4]

Discussion

The results from the current study suggest that certain chronic illnesses may be associated with the subfactors of AS. We found that physical AS was predictive of hypertension and cognitive AS was predictive of high cholesterol. However, neither of the other two illnesses that we studied had a significant relationship with any subfactor of AS. This could suggest that certain illnesses present with specific signs and symptoms that could increase AS, instead of the presence of illness in general impacting AS. Symptoms related to hypertension are commonly physical in nature and align closely with physical AS subscale questions (e.g., "When I feel pain in my chest, I worry that I am going to have a heart attack," or "When I notice my heart skipping a beat, I worry that there is something seriously wrong with me"). While hypertension is mainly asymptomatic, two possible symptoms are chest pain and irregular heartbeat, matching the ASI-3 questions. While heart disease has similar symptoms, only a small percentage (<2%) of our sample had been diagnosed, which is not representative of the total heart disease population.

While no relationship was found between physical AS and high cholesterol, we did find that cognitive AS was a predictor, which could be explained by the relationship of high cholesterol with cognitive decline, dementia, and Alzheimer's Disease. Anstey et al. (2008) conducted a systematic review of prospective studies and found that high total cholesterol could be linked to declines in cognitive abilities, such as dementia and Alzheimer's. They found this correlation to be especially true if high cholesterol was reported in middle-aged adults. High

---

[4] The table, "Anxiety Sensitivity Predicts Number of Chronic Illness and Quality of Life," is available online: http://libres.uncg.edu/ir/asu/f/Berdal_%20Emily%20Spring%202018%20Thesis.pdf (p. 16).

cholesterol's role in cognitive decline could explain why there is a significant relationship with cognitive AS.

Arthritis was found to have no relationship with any subfactor of AS. As opposed to the other three chronic illnesses analyzed in this study, no symptom of arthritis is specifically outlined by the ASI-3 questions, thus eliminating the possibility of increased AS due to specific symptoms. Norman and Lang (2005) explained that the lack of significant relationship could also be due to the symptomatic nature of the disease. Hypertension, heart disease, and high cholesterol are mainly asymptomatic, so when symptoms do arise they cause increased anxiety and AS. Arthritis patients often live with daily symptoms. Having constant exposure to symptoms may decrease the amount of anxiety and AS attributed to them over time. These are two possible explanations as to why AS cannot predict arthritis, but more research is needed to further investigate possible relationships.

The relationship between the presence of multiple chronic illnesses and AS was also investigated. Both physical and cognitive AS were related to the individual having more than one chronic illness. This relationship could be the result of a common comorbidity between hypertension and high cholesterol, where each illness raises their respective subfactor of AS as discussed earlier. These two illnesses have many of the same risk factors (i.e., sedentary lifestyle, unhealthy diet, and smoking), resulting in over half of all individuals with hypertension also being diagnosed with high cholesterol (American Heart Association [AHA], 2017). This result also suggests that AS increases as the disease burden increases. In addition, we found that in our chronically ill sample quality of life decreased as all subfactors of AS increased. This result implies that as disease burden grows so does functional impairment. A preliminary assumption can be made that the addition of AS to the normal physical burden of chronic illness increases both mental and social impairment as well. More research is needed to further investigate and better understand that relationship.

The relationships that have been identified between AS and chronic illness indicate a need for increased education on the topic. The general public is widely unaware, first, of what AS is and, second, that it has an interaction with a physical chronic illness. Bettering education can help individuals understand aspects of anxiety and the realistic risk of anxiety related sensations, while learning about their disease and its signs and symptoms. This education can help individuals to more easily manage and cope with their illnesses. Education on the topic could also facilitate better interventions. Knowing the existence of a relationship between AS and chronic illness can lead to an interdisciplinary treatment plan that lowers overall disease burden. An unhealthy lifestyle is one of the main risk factors for chronic illness as a whole. Therefore, recognizing the relationship between AS and chronic illness reinforces not only the physical but mental benefits of a healthy lifestyle.

This study was intended to be a replication of the 2005 study performed by Norman and Lang. While some of our findings corresponded, the majority differed from their results. There are many things that could have contributed to the difference. For one, we utilized different measures. Where they used the original ASI we chose the ASI-3, which is more comprehensive in measuring the three subscales of AS. We also exchanged their neuroticism measure for general distress as measured by the BSI and substituted the WHO's quality of life measure for functioning. While not likely to cause a dramatic difference in results, these substitutions may account for the discrepancies in results between the two studies. Our sample population also differed from that of the previous study, which could have led to differing results. The sample for this study had very little diversity and was mainly white. Females were also the majority in this sample, so gender differences could be a contributing factor. In addition to the differences in demographics, the samples were collected differently. The previous study pulled individuals from clinics in a larger city while this study took a community sample from a small town.

The limitations to this study somewhat align with the reasons that were given for discrepancy in results between the

two studies. A direct measure of neuroticism should be used. This study did not have access to a direct measure, so general distress as measured by the BSI took its place after research suggested it could be an adequate alternative. The sample for this study was also limited. In further research, a more stratified sample could be of benefit, as different illnesses present in other ethnic and socioeconomic groups. In addition, this study did not analyze gender differences; however, gender could play a key factor and its role should be further investigated. Another limitation to our study was small samples. For example, our heart disease sample was too small to confidently extrapolate the data to the entire population with heart disease. Larger sample sizes should be considered if further research should be done. The small R^2 values discovered in our analysis suggest that other factors not examined in this may be contributing to the predictive relationships. Any later research should further investigate additional influences. Our cross-sectional design was another limitation to this study. We were not able to determine if chronic illness preceded the AS or vice versa because of the design. If possible, further research on this topic should attempt a longitudinal design. Any other research should also further investigate symptom-specific anxiety. As discussed above, certain illnesses have physical symptoms that make them more likely to answer physical AS subscale questions. While this study shows that there is a relationship between elevated AS and decreased functioning in chronically ill populations, additional research is needed to understand the extent of these relationships and the implications they could have for those with chronic illness.

References

American Heart Association. (2013). *Statistical fact sheet, 2013 update: High blood pressure*. https://www.heart.org/idc/groups/heart-public/@wcm/@sop/@smd/documents/downloadable/ucm_319587.pdf.

American Heart Association. (2017, December 15). *Know your risk factors for high blood pressure*. http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/ UnderstandSymptomsRisks/Know-Your-Risk-Factors-for-High-Blood-Pressure_UCM_002052_Article.jsp#.WqwQOBPwbF1

Anstey, K. J., Lipnicki, D. M., & Low, L.-F. (2008). Cholesterol as a risk factor for dementia and cognitive decline: A systematic review of prospective studies with meta-analysis. *American Journal of Geriatric Psychiatry, 16*(5), 343-354. https://doi.org/10.1097/01.JGP.0000310778.20870.ae

Anxiety & Depression Association of America. (2017). *Facts & statistics*. https://adaa.org/about-adaa/press-room/facts- statistics#

Arthritis Foundation. (n.d.). *Arthritis by the numbers: Book of trusted facts and figures*. https://www.arthritis.org/getmedia/e1256607-fa87-4593-aa8a-8db4f291072a/2019-abtn-final-march-2019.pdf

Carroll, D., Phillips, A. C., Gale, C. R., & Batty, D. C. (2010). Generalized anxiety and major depressive disorders, their comorbidity and hypertension in middle-aged men. *Psychosomatic Medicine, 72*(1), 16-19. https://doi.org/10.1097/PSY.0b013e3181c4fca1

Centers for Disease Control and Prevention. (2017, June 28). *Chronic disease prevention and health promotion*. https://www.cdc.gov/chronicdisease/overview/index.htm

Centers for Disease Control and Prevention. (2020, September

8). *Heart disease facts*. https://www.cdc.gov/heartdisease/facts.htm

Cox, B. J., Borger, S. C., & Enns, M. W. (1999). Anxiety sensitivity and emotional disorders: Psychometric studies and their theoretical implications. In S. Taylor (Ed.), *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety* (pp. 115-148). Lawrence Erlbaum Associates.

Division for Heart Disease and Stroke Prevention. (2015, April 30). [Fact Sheet]. https://www.cdc.gov/dhdsp/data_statistics/fact_sheets/fs_cholesterol.htm

Gerteis, J., Izrael, D., Deitz, D., LeRoy, L., Ricciardi, R., Miller, T., & Basu, J. (2014). *Multiple chronic conditions chartbook: 2010 medical expenditure panel survey data*. Agency for Healthcare Research and Quality. https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/prevention-chronic-care/decision/mcc/mccchartbook.pdf

Katon, W., Lin, E. H. B., & Kroenke, K. (2007). The association of depression and anxiety with medical symptom burden in patients with chronic medical illness. *General Hospital Psychiatry 29*(2), 147-155. https://doi.org/10.1016/j.genhosppsych.2006.11.005

Maller, R. G., & Reiss, S. (1992). Anxiety sensitivity in 1984 and panic attacks in 1987. *Journal of Anxiety Disorders, 6*(3), 241-247. https://doi.org/10.1016/0887-6185(92)90036-7

Marshall, G. N., Miles, J. N. V., & Stewart, S. H. (2010). Anxiety sensitivity and PTSD symptom severity are reciprocally related: Evidence from a longitudinal study of physical trauma survivors. *Journal of Abnormal Psychology*, *119*(1), 143-150. https://doi.org/10.1037/a0018009

McDermid, A. J., Rollman, G. B., & McCain, G. A. (1996). Generalized hypervigilance in fibromyalgia: Evidence of perceptual amplification. *Pain*, *66*(2-3), 133-144. https://doi.org/10.1016/0304-3959(96)03059-x

McWilliams, L. A., Goodwin, R. D., & Cox, B. J. (2004). Depression and anxiety associated with three pain conditions: Results from a nationally representative sample. *Pain, 111*(1-2), 77-83. https://doi.org/10.1016/j.pain.2004.06.002

Murray, C. J. L, Vos, T., Lozano, R., Naghavi, M., Flaxman, A. D., Michaud, C., Ezzati, M., Shibuya, K., Salomon, J. A., Abdalla, S., Aboyans, V., Abraham, J., Ackerman, I., Aggarwal, R., Ahn, S. Y., Ali, M. K., Alvarado, M., Anderson, H. R., Anderson, L. M., … Memish, Z. A. (2012). Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: A systematic analysis for the Global Burden of Disease Study 2010. *Lancet, 380*(9859), 2197-2223. https://doi.org/10.1016/S0140-6736(12)61689-4

National Center for Health Statistics. (2021, March 1). *Heart disease*. https://www.cdc.gov/nchs/fastats/heart-disease.htm

Norman, S. B., & Lang, A. J. (2005). The functional impact of anxiety sensitivity in the chronically physically ill. *Depression and Anxiety, 21*(4), 154-160. https://doi.org/10.1002/da.20076

Pan, Y., Cai, W., Cheng, Q., Dong, W., An, T., & Wang, J. (2015). Association between anxiety and hypertension: A systematic review and meta-analysis of epidemiological studies. *Neuropsychiatric Disease and Treatment, 11*, 1121-1130. https://doi.org/10.2147/NDT.S77710

Peter, H., Hand, I., Hohagen, F., Koenig, A., Mindermann, O, Oeder, F., & Wittich, M. (2002). Serum cholesterol level comparison: Control subjects, anxiety disorder patients, and obsessive-compulsive disorder patients. *The Canadian Journal of Psychiatry, 47*(6), 557-561. https://doi.org/10.1177/070674370204700608

Rafter, D. (2001). Biochemical markers of anxiety and depression. *Psychiatry Research, 103*(1), 93-96. https://doi.org/10.1016/S0165-1781(01)00251-7

Reiss, S. (1991). Expectancy model of fear, anxiety, and panic.

Clinical Psychology Review, 11(2), 141-153. https://doi.org/10.1016/0272-7358(91)90092-9

Reiss, S., & McNally, R. J. (1985). Expectancy model of fear. In S. Reiss & R. R. Bootzin (Eds.), *Theoretical issues in behavior therapy* (pp. 107-121). Academic Press.

Reiss, S., Peterson, R. A., Gursky, D. M., & McNally, R. J. (1986). Anxiety sensitivity, anxiety frequency, and the prediction of fearfulness. *Behaviour Research and Therapy, 24*(1), 1-8. https://doi.org/10.1016/0005-7967(86)90143-9

Roy-Byrne, P. P., Davidson, K.W., Kessler, R. C., Asmundson, G. J. G., Goodwin, R. D., Kubzansky, L., Lydiard, R. B., Massie, M. J., Katon, W., Laden, S. K., & Stein, M. B. (2008). Anxiety disorders and comorbid medical illness. *General Hospital Psychiatry, 30*(3), 208-225. https://doi.org/10.1016/j.genhosppsych.2007.12.006

Serafini, K., Malin-Mayor, B., Nich, C., Hunkele, K., & Carroll, K. M. (2016). Psychometric properties of the Positive and Negative Affect Schedule (PANAS) in a heterogeneous sample of substance users. *The American Journal of Drug and Alcohol Abuse, 42*(2), 203-212. https://doi.org/10.3109/00952990.2015.1133632

Shanely, R. A., Knab, A. M., Nieman, D. C., Jin, F., McAnulty, S. R., & Landram, M. J. (2010). Quercetin supplementation does not alter antioxidant status in humans. *Free Radical Research, 44*(2), 224-231. https://doi.org/10.3109/10715760903407293

Stewart, S. H., Samoluk, S. B., & MacDonald, A. B. (1999). Anxiety sensitivity and substance use and abuse. In S. Taylor (Ed.), *Anxiety sensitivity: Theory, research, and treatment of the fear of anxiety* (pp. 287-319). Lawrence Erlbaum Associates.

Stewart, S. H., Taylor, S., & Baker, J. M. (1997). Gender differences in dimensions of anxiety sensitivity. *Journal of Anxiety Disorders, 11*(2), 179-200. https://doi.org/10.1016/S0887-6185(97)00005-4

Taylor, S., Zvolensky, M. J., Cox B. J., Deacon, B., Heimberg, R. G., Ledley, D. R., Abramowitz, J. S., Holaway, R. M., Sandin, B., Stewart, S. H., Coles, M., Eng, W., Daly, E. S., Arrindell, W. A., Bouvard, M., Cardenas, S. J., & Strauss, M. E. (2007). Robust dimensions of anxiety sensitivity: Development and initial validation of the Anxiety Sensitivity Index-3. *Psychological Assessment, 19*(2), 176-188. https://doi.org/10.1037/1040-3590.19.2.176

Taylor, S. (Ed.). (2010). *Anxiety sensitivity theory, research, and treatment of the fear of anxiety*. Routledge.

Tsang, A., Von Korff, M., Lee, S., Alonso, J., Karam, E., Angermeyer, M., Borges, G., Bromet, E., de Girolamo, G., de Graaf, R., Gureje, O., Lepine, J., Haro, J., Levinson, D., Oakley Browne, M., Posada-Villa, J., Seedat, S., & Watanabe, M. (2008). Common chronic pain conditions in developed and developing countries: Gender and age differences and comorbidity with depression-anxiety disorders. *The Journal of Pain, 9*(10), 883–891. https://doi.org/10.1016/j.jpain.2008.05.005

VanDyke, M. M., Parker, J. C., Smarr, K. L., Hewett, J. E., Johnson, G. E., Slaughter, J. R., Walker, & S. E. (2004). Anxiety in rheumatoid arthritis. *Arthritis Care & Research, 51*(3), 408-412. https://doi.org/10.1002/art.20474

Verbrugge, L. M., Lepkowski, J. M., & Imanaka, Y. (1989). Comorbidity and its impact on disability. *The Milbank Quarterly, 67*(3/4), 450-484. https://doi.org/10.2307/3350223

Vogelzangs, N., Seldenrijk, A., Beekman, A. T. F., van Hout, H. P. J., de Jonge, P., & Penninx, B. W. J. H. (2010). Cardiovascular disease in persons with depressive and anxiety disorders. *Journal of Affective Disorders, 125*(1-3), 241-248. https://doi.org/10.1016/j.jad.2010.02.112

Ward, B. W., Schiller, J. S., & Goodman, R.A. (2014). Multiple chronic conditions among US adults: A 2012 update. *Preventing Chronic Disease, 11*, E62. https://doi.org/10.5888/pcd11.130389

Wardle, J., Ahmad, T., & Hayward, P. (1990). Anxiety sensitivity in agoraphobia. *Journal of Anxiety Disorders, 4*(4), 325-333. https://doi.org/10.1016/0887-6185(90)90029-9

Watson, D., & Pennebaker, J. W. (1989). Health complaints, stress, and distress: Exploring the central role of negative affectivity. *Psychological Review, 96*(2), 234-254. https://doi.org/10.1037//0033-295X.96.2.234

Wong, W. S., Lam, H. M. J., Chow, Y. F., Chen, P. P., Lim, H. S., Wong, S., & Fielding, R. (2014). The effects of anxiety sensitivity, pain hypervigilance, and pain catastrophizing on quality of life outcomes of patients with chronic pain: A preliminary, cross-sectional analysis. *Quality of Life Research, 23*(8), 2333-2341. https://doi.org/10.1007/s11136-014-0683-y

World Health Organization (2014). *Global Status Report on Noncommunicable Diseases 2014*. http://apps.who.int/iris/bitstream/10665/148114/1/9789241564854_eng.pdf?ua=1

World Health Organization (2016). Disease, injury, and causes of death country, regional, and global estimates, 2000-2015 [Data set]. https://www.who.int/healthinfo/global_burden_disease/estimates_country_2000_2015/en/

Zinbarg, R. E., Barlow, D. H., Brown, T. A. (1997). Hierarchical structure and general factor saturation of the Anxiety Sensitivity Index: Evidence and implications. *Psychological Assessment, 9*(3), 277-284. https://doi.org/10.1037/1040-3590.9.3.277

Zvolensky, M. J., Schmidt, N. B., Bernstein, A., & Keough, M. E. (2006). Risk-factor research and prevention programs for anxiety disorders: A translational research framework. Behaviour Research and Therapy, 44(9), 1219-1239. https://doi.org/10.1016/j.brat.2006.06.001

Afterword

Ally Montanez

Dear Momma,

I hope you know how special you are to me and everyone you met. You are a life changer, even after you passed your story has continued to touch so many lives. Thank you for never giving up on me; I know I was not easy to raise by any means. Thank you for giving me your voice to speak out bravely even if I was speaking alone. Thank you for your never-ending love and prayers, for I know those alone are what have kept me afloat all of this time. Thank you for your courage to fight against cancer, which is what allowed for our family to have as much time together as possible.

I hope you know we miss you endlessly; we talk about you often, and we love you immensely. We laugh about the fun times and cry about the not-so-good times. You will always be missed and never forgotten, but you are especially missed when I experience milestones such as this one without you.

I love you so much, keep looking out for us, and we will always continue to keep your spirit alive through us.

Love,

Your Oldest Daughter

Dear Reader,

I'm grateful to you for reading this book, for as you have seen, this book means a lot to me personally. My hope is that you, too, see that this book is more than just my senior project. It's my way of honoring and remembering my mother, so that you might know that you're not alone, that how you feel matters to your health, and that her death is not another statistic. I want her legacy to be valued, replicated in the lives of others who can feel empowered to do their own research, advocate for themselves, and seek "alternatives" to conventional medical and pharmacological treatments; she did her research and her advocacy to continue and help others.

In America, when you say, "I've got cancer," the first question you get is, "When do you start chemo?" That was my mom's experience when she was diagnosed—but she didn't accept the status quo. Not accepting the status quo is the basis of the questions and research that Emily Berdal, Courtney Phillips, and Cameron Scroggs—three among hundreds or thousands of Honors students across the country—shared with me and you in these pages.

They are asking different questions—and asking different questions is what will lead us to different answers. These different answers are what is allowing all of us to have the opportunity to live a life that's worth living.

Sincerely,

Alyssa Montanez

Contributors

Emily Berdal is a Doctor of Physical Therapy from Knoxville, Tennessee. She received her Bachelor of Science in Exercise Science from Appalachian State University in Boone, North Carolina, in 2018. Here she wrote the thesis "Investigating the Relationship Between Anxiety Sensitivity and Chronic Illness: A Replication and Extension" to complete her honors degree. Following the completion of her undergraduate degree she went on to receive her Doctor of Physical Therapy degree from the University of Mary in Bismarck, North Dakota. She is interested in treating patients with complex cases consisting of multiple comorbidities and returning each person to a level of function where they can live their life how they desire. In her free time, she enjoys spending time with family, spending time outdoors, and reading any books the library has to offer.

Alyssa Montanez attended the University of North Carolina at Pembroke where she earned her Bachelor of Science degree in Psychology and minored in sociology in 2021. She was a member of the Esther G. Maynor Honors College all her time at the university. She plans to pursue a higher degree in the future, and after graduation, she is interested in a career that will allow her to help others in her community who feel as if they do not have a voice. Having grown up with a single mother who then went on to be diagnosed with cancer motivated her to delve deeper into the research of how the body can be impacted by stress. In her free time, she enjoys spending time with her dog and enjoying a good cup of coffee.

Courtney Phillips attended the University of North Carolina at Greensboro where she completed her Bachelor of Science in Nursing. She currently attends the University of North Carolina at Wilmington where she is pursuing her Master's in Nursing Education. Having a family member with chronic musculoskeletal pain (CMP) sparked Courtney's interest in the

subject, as she wanted to find adjunctive therapies to be used with low-dose opiates to manage chronic pain while reducing dependence and tolerance. Phillips currently works as an orthopedic nurse in Florida where she is able to apply her research on complementary and alternative approaches to the treatment of CMP. She hopes to have the opportunity to educate other future nurses on her research once becoming a nurse educator.

Cameron Scroggs earned a Bachelor of Science with honors in Psychology (Human Services) from Appalachian State University in 2019. The article that appears in this book was completed as part of honors requirements at ASU under the advisement of Dr. Lisa Emery. Scroggs will graduate with a Master of Arts in Clinical Mental Health Counseling from Lenoir-Rhyne University in 2022. She intends to provide mental health care to underserved populations to promote holistic psychological wellness.