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The Effect of Cognitive Behavioral Therapy and Chiropractic Care on Stress Reduction

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Walden University
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Abstract

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Dissertation Submitted in Partial Fulfillment

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Abstract

Decreasing the impact of stressors on the body remains an important area of study for the affected population. While there is evidence showing that cognitive behavior therapy (CBT), a psychotherapy approach, results in decreased stress, little was found about the effects of chiropractic treatment (CC) on stress. The purpose of this quantitative archival study was to determine whether the combination therapy of CC and CBT was more effective in decreasing stress than CBT independently. Cognitive neuropsychology served as the theoretical lens. Client data from a mental health and chiropractic care center on the West coast ($N = 112$) were divided into 2 treatment groups, CBT and CC and CBT alone. Pre and posttreatment data were collected on stress, anxiety, and nerve conduction. ANOVA test results indicated that there were no statistically significant differences in the mean change scores between the 2 groups in terms of individual participants' stress, anxiety, and nerve interference. Although there was no significant interaction effect, results showed that both the combination therapy and CBT alone led to a decrease in stress and anxiety and an increase in the nerve conduction of participant's posttreatment. While this archival study did not yield evidence of the benefits of CC for stress-related disorders, its results suggest that future researchers should pursue more direct efforts to evaluate the effects of combination therapies. Considering the high number of people who experience stress-related challenges, the incorporation of CC along with a psychological treatment might engender positive social change for individuals and healthcare practitioners through the potential reduction of stress.

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Dedication

To my daddy, Clarence Filmore Johnson, my mentor and heavenly angel, you have encouraged me to be faithful to God and to continue pursuing higher education. I never knew how I would find my way, passion, or purpose for living after you passed. Through this journey, I know you and my heavenly Father have been watching over me every step of the way, and I thank you. To my mother, Helen Faye Jackson Johnson, my strength and my Delta Sigma Theta Soror, you have sacrificed and taught me to be disciplined and navigate for what I want regardless of any obstacles. I thank you for continuing to believe in me even when I wanted to give up. To my husband, Quinton N. Williams, Sr., you are my best friend and soul mate. Through this process, we have endured many challenges; yet, we became one, and together we will prevail. To my legacies --my children, Quinton Nmandi "Filmore," Ethan Xavier "Sandy," and Quincee Reece "CeeCe" -- you three have shown me true unconditional love. Thank you for your encouragement, "Mommy, let us do our homework together so we will be smart." I pray that I am a great role model to you, and I will assist you with striving toward your educational goals. To my sister, Tanya, even though you were unsure of my process, you have always encouraged me to find a way. Thank you for repeatedly saying, "When this test is done, you WILL be awesome." To my best friend, Ayanna T. Moore, thank you for listening to my cries, staying by my side from beginning to end, and lifting me up by any means necessary. To my church family, Wake Chapel Baptist Church of Raleigh, North Carolina, and Mt. Moriah Baptist Church of Los Angeles, Inc., thank you for keeping me in your prayers. Thank you all for your patience, sacrifice, and support.

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Chapter 1: Introduction to the Study

Introduction

In the western region of the United States, many psychologists and chiropractors practice a drug-free approach to health care, which includes patient examination, diagnosis, and a devised treatment plan specific to each patient's needs (American Chiropractic Association [ACA], 2014; American Psychological Association [APA], 2015; Nitschke, 2012). Psychologists provide many specific types of psychotherapy designed to treat mental and emotional health problems as well as teach patients how to take control or cope with their moods, feelings, thoughts, and behaviors (APA, 2015). Chiropractors have broad diagnostic skills and receive training on how to recommend therapeutic and rehabilitative exercises as well as provide nutritional, dietary, and lifestyle counseling (ACA, 2015).

Providers of psychotherapy and chiropractic treatment have focused on the nervous system either directly or indirectly in their treatment of patients (ACA, 2014; APA, 2015; Kent, 2013. However, a combination therapy has not yet been implemented (ACA, 2014; APA, 2015; Kent, 2013). While both psychotherapy and chiropractic treatment have independently demonstrated effectiveness in addressing stress-related disorders, there is a lack of information available on whether alternative health care treatments such as a combination therapy would further rehabilitate patients and lessen stressors (Dunn, Burke, & Chicoine, 2009; Kent, 2013; Oths, 1992).

I conducted this study to address the lack of information available on the effectiveness of combination theory on stress reduction. Specifically, I examined the

influence of a combination therapy on stressors among individuals in the western region of the United States. I also examined the impact of this type of therapeutic treatment on whole body health, something which may have implications for the promotion of positive social change. When individuals feel whole, as in taught how to cope though situations with better defenses (ex. less stressed) and aligned (correct vertebral subluxation), individuals are able to be productive. This chapter is divided into 11 subsections including the background, the problem statement, the purpose statement, research questions and hypotheses, the nature of the study, definitions, assumptions, scope and delimitations, limitations, significance, and a chapter summary.

Background of the Problem

Alleviating stressors is on the minds of many people, from college students to adults negotiating everyday life (Ballinger et al., 2002). Individuals experience enduring stress from several aspects of their environment, such as financial, occupational, school, and/or family issues (APA, 2014b; Williams, 2006). For example, according to the Bureau of Labor Statistics and Department of Health and Human Services (2015), there are more than 1.5 million assaults in U.S. workplaces every year. This phenomenon causes stressors to develop. Moreover, these profound numbers of assaults link to the development of stressors among fatalities.

When stress symptoms overwhelm the body and are not resolved or eliminated, a relapse cycle can occur. A relapse cycle is the act of regressing back into a stressed behavior after an apparent recovery (O'Reilly, 2013). This relapse cycle resets an individual's whole body health to a former condition, which is often a state of ill health

marked by bad habits, after what is at most a partial recovery (O'Reilly, 2013). According to O'Reilly, seeking out assistance from both a psychologist and a chiropractor is beneficial to combat specific condition/symptom(s) and set continuous habits. A combination of both psychotherapy and chiropractic treatment could result in an alleviation of anxiety as well as a restoration of damaged nerves of the subjects, which is necessary to set healthy habits (O'Reilly, 2013). This combination treatment alleviated symptoms of stress effectively (O'Reilly, 2013). However, due to the study's limited timeframe for receiving care, the reported non-statically increase may reflect the individuals' capability to conjure up old negative beliefs that caused stress and body ailments to returns (O'Reilly, 2013). This decline continued, and the negative behavior(s) followed, resulting in the relapse cycle (O'Reilly, 2013). If an individual face a financial hardship in their life, without the proper coping skills, often times going back to old behaviors (i.e., spending unnecessary money to feel better) places individual in more stress.

Stress manifest in the formation of several other disorders such as anxiety disorder, obsessive-compulsive disorder (OCD), panic disorder, and social phobia. For example, an individual may witness a severe traumatic event in which posttraumatic stress developed and caused recurring episodes. Posttraumatic stress disorder (PTSD) is a strong risk factor for substance abuse and addiction (National Institute of Drug Abuse [NIDA], 2005). According to NIDA (as cited in O'Reilly, 2013), even after prolonged periods of abstinence from the abused substance, stress can be one of the most powerful triggers of relapse. Maintaining a positive lifestyle must be continuous for recovery from

stress and anxiety to occur (O'Reilly, 2013). Results from my study imply that after a breakthrough the timeframe in which an individual is treated must be continuous (e.g., yearly check-ins).

An individual's recovery time from stressors is fragile. Thus, the recovery time is a pivotal factor to note in order to eliminate any repercussions that will follow especially if this period excludes practiced healthy habits. During this fragile recovery time, the individual's chance of relapse may increase, especially if his or her mood, feelings, thoughts, behaviors, and spinal alignment do not change (O'Reilly, 2013). Relapse occurred after a period of recovery; however, once the body becomes well and recognized continuous support, the mind and body are able to communicate together to fight against any trigger(s) or a silent attack of stress and return immediately to an equilibrium state (O'Reilly, 2013). In addition, true rehabilitation of an individual's nerves (as an indicator of physical health) and mental health cannot begin until the individual has uncovered or authentically expressed the cause or disconnect of their stress/ anxiety (Jackson et al., 2001; Kent, 2013). A health care professional need to know what is causing an individual to endure stress in order to rehabilitate.

On the micro level, individuals who continuously experience stressful symptoms or the effects of stress on their body experience continued deterioration of their health if the relapse cycle is not corrected (Harpaz-Rotem, Pietrzak, Tsai, & Southwick, 2012). In turn, on a macro level, an individual's stress both intellectually and emotionally can disrupt the social balance that functionalism promotes (Harpaz-Rotem et al., 2012). In other words, the brain, spinal cord, and nerves are the body's mechanics; thus, a

combination therapy was implemented as the mechanical tune up that secured each of these vital facets to restore effective communication with the brain in order to think and behave stress free (Kent, 2013; Williams, 2006). Moreover, Kent (2013) focused specifically on abnormal nervous system function and the effects with regard to emotional and psychological health. This area of science, vertebral subluxation, has been a Chiropractor's specialty. One's experiences, or stress, are processed through his nervous system; thus, one's perception is distorted due to nerve interference, which compromised his ability to adapt fittingly to surroundings (Kent, 2013). Therefore, stress has the ability to cause cognitive decline, psychological disturbances, and stress related disorders (Cavigelli & McClintock, 2013; Munoz, Scott, & Hofer, 2015).

Stress and Cognitive Decline

Research in cognitive aging identified the risk factors of cognitive decline, and the results have opened the eyes of public health professionals (Munoz et al., 2015). Achieving and maintaining cognitive health and functional independence began with identifying the risk factors that contributed to cognitive impairments. In adults, stress was a modifiable risk factor of cognitive decline and impairment (Munoz et al., 2015). The biomarkers of stress are cortisol and inflammation (Munoz et al., 2015). Elevated levels of cortisol and the overexposure of glucocorticoids activate the physiological stress response. This chronic routine causes atrophy of the brain (especially the hippocampus and prefrontal cortex) and body (Munoz et al., 2015). In addition, prolonged exposure to stress, lead to the loss of neurons in the hippocampus. Unfortunately, this change in the hippocampus is the contributing factor to memory loss. An individual's experience of

frequent stressful life events contributed to cognitive decline and cognitive impairment depending on the frequency and intensity. Each individual's stressful situation is directly dependent on that individual's idea of intensity. What is intense to one person may not be to another. For example, if an individual experienced a negative argument with someone of intense interest, then that individual anticipated a higher chance of poor performance and exhibited poorer cognitive performance proximal to this negative event. Munoz et al. (2015) reported their own research and paralleled this example to the demanding social world as the burn out emotional feeling, or a combination of psycho-physiological symptoms (chronic role related stress).

On the same accord, Munoz et al. (2015) reported that daily negative events have been associated with memory failures. Moreover, Munoz et al. (2015) reported that chronic stress resulted in a loss of cognitive function. Cognitive decline occurred when long term, unpredictable, and uncontrollable stressors cause a burnout.

Psychological Aspects of Stress

An individual's psychological perception of his environmental demands and negative situations spoke volumes about his health outcomes (Cavigelli & McClintock, 2013). For example, to compete for a high pay rate, an individual decided to stay employed in an unsafe harassing environment, which consumed with impractical deadlines without self-care, has experienced an increased amount of stressors. The demands became overbearing, and day-by-day his morals were tested. Over time, a perception that money was more important than one's health (a stressor) was a common occurrence and lead to vertebral subluxation. Vertebral subluxation refers to a vertebra

that is out of alignment with the neighboring vertebra, which over time has caused physical, chemical, and emotional concerns (Spinal-health, 2015). In other words, these stressors will cause a deterioration of the body. Essentially, an individual's response to this type of stress caused tightening of the muscles and hunching over, in turn, vertebral subluxation occurrred (Frisco, 2013; Spinal-health, 2015).

In addition, racism was a unique and common type of prospective stressor (William, 2010). The continuous historical nature of racism and discrimination as a type of stress has been problematic for individuals in multiple arenas—workplace, school, and social settings (Cavigelli & McClintock, 2013; Williams, 2010). Racism, as a point of view, projected shame and discouragement on an individual, which caused an emotional reactivity, in turn, caused a chronic negative effect (William, 2010). Of course, the racial trigger caused a certain level of emotional activity; however, that negative stress is dependent on the individual's perception of how intense the malignant event appeared to the individual. An individual attempts to manage issues caused by racism in his own unique way based on previous experiences. Thus, the individual's psychological perception began to view environmental factors as perpetual survival insecurity (William, 2010). Racial stress places increased demand on access to resources, impeded social status, and influenced an individual's psychological wellness.

In addition, an individual's psychological negative perception of his quality of life caused stressors to develop, which ultimately lead to unhappiness. In addition, the individual's feelings of overload regarding his immediate timeline became an aspect, with respect to his journey in life. Emotional stress has the capacity to create a false

sense of helplessness and hopelessness, which caused tension in the body. In addition, emotional causes (stress) will deplete the body of the ability to sustain normal functions, especially in the immune system. The tensions in one's body lead to a lack of control over one's body (Williams, 2006). Interestingly, Cavigelli and McClintock (2003) reported that a positive correlation between emotional reactivity and stress hormone activity is a predictor for cognitive decline and a shorter life span (William, 2010). An individual's poor nutritional practices, such as drug and alcohol use and abuse and/or the buildup of toxins due to perceptual emotional state (unstable state of mind or stress), caused spinal subluxation (Jamison, 1999; Spinal-health, 2015). Furthermore, perceived stress triggered emotional, physiological, or behavioral responses that are associated with cognitive impairment. Stress combined with mental health issues manifest in behavioral responses.

Stress and Mental Health Issues

This study offers benefits that promoted social change. Officials and family members have neglected mental health concerns; especially stress related disorders, (Newman, Fox, Harding, Mehta, & Roth, 2004). Individuals received a diagnosis from their mental health professional and then return to their normal routine without any informative direction from health officials to mitigate their diagnosis (Norman et al., 2004). According to Newman et al. (2004), mass shooters rarely display behavioral problems that indicated an inclination towards violent or aggressive behavior. Therefore, officials did not detect an issue until after the shooting event.

Moreover, Norman et al. (2004) identified a shooter's perception of himself as extremely unimportant in the social world, which matters to the shooter. Mass shooters suffered from a psychological problem(s), such as stress, and lack the coping skills to deal with social isolation and in turn, these problems manifested into homicide events (Norman et al., 2004). Stress related disorders have led to an increase in violence or exacerbated mental health issues (Newman et al., 2004). A healthy alternative, such as combination therapy, involved with stress management goals and a healthy alternative, for which men gravitate toward (Fukuda et al., 2011b), is imperative because too many lives are potentially taken due to health issues that have gone untreated or undiagnosed. Psychologists and chiropractors are encouraged to work sensitively with the United States population on preventative healthcare (ACA, 2014; APA, 2015a).

The literature was replete with interventions designed to reduce stress related disorders including relaxation response/training, exposure therapy, systematic desensitization, cognitive behavioral therapy, stress inoculation training, assertiveness training, biofeedback, eye movement desensitization and reprogramming, and pharmacotherapy (Ballinger, Benson, Deckro, Dusek, Greenberg, Hoyt, Myers, Rosenthal, & Wilcher, 2002; Bryant & Femingham, 2012; Westrup & Zappert, 2008). Biofeedback, a popular choice, provided a power of awareness of one's vitals in order to gain slight control over one's health (WebMD, 2016); however, nerve interference was the reason why there was malfunction between the brain and body (Kent, 2013). Due to protocols that were not based upon empirical findings and physiological outcomes

measures are not reported, the process by which biofeedback reduced stress remained uncertain (Burns, Pranikoff, Nochajski, Hadley, Levy, & Ory, 1993).

Moving forward, these interventions, or treatment options, attempted to facilitate an entire mind and body healthcare; however, these treatments do not recover one's nerve interference in order to allow function independence. Today, the link between mind and body is becoming well acknowledged, especially to solve these complex human problems (APA, 2015a). The area of psychology continues to develop new and better ways for the patient to function and thrive (APA, 2015a).

Additionally, vertebral subluxation complex (VSC) is when a bone(s) moves out of position and places pressure on spinal nerves. This pressure causes those nerves to malfunction and interfere with the signals traveling over the nerves, from brain to body. The nervous system is a vital integral system that controls and coordinates all of one's function in the body. If there was interference, parts of the body will not receive the communication to function at 100% (Spinal-health, 2015). Thus, areas of the body will not work properly allowing stressors to increase without relaxation. Moreover, chronic pain has affected the increased stress on the nerve(s). The Doctor of Chiropractic medicine, an expert that corrected subluxation, located the subluxation, corrected and relaxed the pressure or any association of pain on the nerve(s), has significantly reduced stress for individuals (Edlund, Fikar, & Newell, 2015; Bellato, Marini, Castoldi, Barbasetti, Mattei, Bonasia, & Blonna, 2012; Bonello, Brown, Graham, & Pollard, 2010; Duarte, Horst, Kolberg, Kolberg, Moraes, Partata, 2015; Frisco, 2013; Hardy & Pollard, 2006; Jamison, 1999; Kern, Oakes, Stone, McAuliff, Kirschbaum, & Davidson, 2008).

Therefore, there was a need to bridge the literature and treatment gap to explore a combination therapy that reduced vertebral subluxation and accomplished the cognitive behavioral therapy goal to rehabilitate an individual's mental and emotional health (Kent, 2013). The purpose of this study is to examine the efficacy of a combination therapy of CC and CBT in alleviating stress (Nitschke, 2012).

Problem Statement

The greater awareness of mental health issues in society presents a research problem related to whole body health and the alleviation of stress, which is a significant public health issue (Bureau of Labor Statistics and Department of Health and Human Services, 2015). Although many researchers have focused on alleviating stress with unitary treatments (see Ballinger et al., 2002; Capelini et al., 2006; Flaxman and Bond, 2010; Teixeira, 2008), few research satisfied, according to my review of the literature, combining modalities in managing these stressors and their manifestations. Unless health care practitioners diligently establish key components from CBT and CC that tailor to their client's treatment plans, patients' whole body health may continue to deteriorate, which may have a traumatic chain of events for society as a whole.

The problem I studied, stress and anxiety are accountable for a large proportion of disability worldwide, was current. Due to the implementation of previous limited or haphazard treatment plans, the intensity of stressors in day to day among individuals diagnosed or misdiagnosed with mental health deficiencies - indicated that stress needs to be addressed and a new treatment will soon evolve. Stress has become an unpleasant fact for many individuals (APA, 2015b). Living with chronic stress can cause anxiety, other

stress-related disorders, and physical health problems (ACA, 2015). APA (2015a) reported statistics from the National Institute of Mental Health showing that, in a 1-year period, approximately 17 million adult Americans who experienced a compound of stressors suffered from a mood disorder. This is an intriguing report considering the number of past research treatments that have been used by adult Americans and deemed effective (see Ballinger et al., 2002; Capelini et al., 2006; Fernros, Furhoff, & Wändell, 2008; Foa, 2006; Goldfried, 1971; Jaremko, 1980; Jain, 2007; Lin, 2004; Rivas-Vazquez, 2001; Schroeder, 1976; Teixeira, 2008; Wolpe, 1958; Zettle, 2012).

According to APA (2015a), individuals who are happy progressed toward goals and found the resources to alleviate stressors. After achieving whole body health, those individuals were more inclined to attract others with their positive energy and optimism. The American Chiropractic Association (2015) agreed with the APA (2015a) and Hans Selye (1936) that adopting the right attitude transform a negative stressor into a positive stressor, one that help improve focus and performance. The ACA (2015) suggested that when optimism was hard to muster, CBT could be helpful in reducing the risk of chronic stress. CBT refers to training in which the focus is on recognizing negative thinking patterns and replacing such beliefs with ones that are more constructive (Foa, 2006).

Moreover, many Americans have reported that this mental health problem of stress was current, relevant, and significant to the field of psychology. Michelle Obama and supporters recognized that 42.5 million U.S. adults have a diagnosable mental health condition and that millions of these adults are untreated (Treatment Advocacy Center,

2015). According to the Treatment Advocacy Center (2015), in 2015, 90% of U.S. adults with a diagnosable mental disorder committed suicide.

Another problem is that stressors affect an individual internally. The effects of stress on one's body and mental state provide evidence that a combination therapy, joining two arts of science that tailor to stress, might further rehabilitate and lessen stressors for individuals (Nitschke, 2014; Williams, 2006). Thus, there was a need to bridge the literature and treatment gap with respect to exploring the relationship between the combination therapy of the reduction of vertebral subluxation and CBT and mental and emotional health (Kent, 2013).

Purpose of the Study

The purpose of this quantitative study was to determine whether the combination of CBT and CC more effectively decreased stress, anxiety, and nerve interference compared to psychotherapy alone. Having a clear understanding of the stressor(s) that consume an individual and the symptoms may help health care practitioners to correct and eliminate the rise of these common mental health cases. According to Kent (2013), further research is needed to expound on the similarities and differences between the two entities of this combination therapy and consolidate the beneficial practices that eradicate the problem of stressors.

Research Questions and Hypotheses

I developed the central research questions based on information obtained from the literature on stress, CBT, chiropractic therapy, and the collaboration of both therapies to provide whole body health in alleviating stress. The central research question, does the

combination therapy of CBT (i.e., the restructuring of negative thought patterns to improve brain activity as measured by the Stress Questionnaire, and Beck Anxiety Inventory (BAI)) and CC (as measured by nerve conduction velocity test) decrease stress and alleviate nerve interference respectively, compared to CBT independently? My literature review confirmed the importance of alleviating stress, and anxiety, in order to improve mental and physical health. A more detailed explanation of this design of study is provided in Chapter 3.

My research questions and corresponding hypotheses are, as follows:

Research Question 1: Does the combination therapy of CBT and CC decrease an individual's stress (as measured by the Stress Questionnaire) compared to CBT independently?

Null Hypothesis ($H_0 1$): There are no statistically significant differences in the mean change scores of stress (mean scores of the pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined. CBT and CC will not improve brain activity (i.e., alleviate stress) more effectively than CBT independently.

Research Hypothesis ($H_a 1$): There are statistically significant differences in mean change scores of stress (mean scores of the pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined. CBT and CC combined will improve brain activity nerve interference (i.e., alleviate stress) more effectively than CBT independently.

Research Question 2: Does the combination therapy of CBT and CC decrease an individual's anxiety level (as measured by the Beck Anxiety Inventory [BAI]), compared to CBT independently?

Null Hypothesis ($H_0$2): There are no statistically significant differences in the mean change scores of anxiety (mean scores of the pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Research Hypothesis (H_a2): There are statistically significant differences in the mean change scores of anxiety (mean scores of the pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Research Question 3: Does the combination therapy of CBT and CC alleviate nerve interference (as measured by the nerve conduction velocity test [NCV]) compared to CBT independently?

Null Hypothesis ($H_0$3): There are no statistically significant differences in the mean change scores for the nerve interference (mean scores of the pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Research Hypothesis (H_a3): There are statistically significant differences in the mean change scores of the nerve interference (pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Rationale for Hypotheses

Participants who received specialized training in combination therapy, CBT, and CC to manage their stress or anxiety expect to experience less stress (as measured by BAI

and DASS-21 scores) after completion of the treatment than participants who received a unitary, specialized treatment for managing their stress.

Theoretical Foundation

The theoretical framework focused on cognitive neuropsychology, a subfield of cognitive psychology (Scholarpedia, 2008). The cognitive aspect of neuropsychology described the relationship between brain functions and psychological processes. This theory studied individuals with certain disorders such as a person's perception, attention, learning, memory, processing of spoken and written language, thinking, and reasoning or belief formation with the aim of learning more about the normal functional architectures of the cognitive processing systems used to carry out daily activities (Coltheart, Rastle, Perry, Langdon, & Ziegler, 2001). All of these systems are the main lines of communication between various neurons. Daily activities included simple tasks such as lifting up a child, recalling emotional memories, or planning, which may have declined due to a stressor(s) (Harpaz-Rotem, Pietrzak, Tsai, & Southwick, 2012). Additionally, the theory addressed cognitive impairments due to brain damage. This theory respected the idea that with the plethora of neurons working together to insure cognitive processes and the existence of brain damaged areas, two individuals will not have precisely the same pattern of preserved and impaired processing components of the relevant cognitive system (Scholarpedia, 2008). Moreover, there was no need to group individuals together under syndrome labels. Therefore, cognitive neuropsychology used many techniques to study the mind (cognition) or psychological performance. These techniques included neuropsychological tests and methods (Scholarpedia, 2008). The two areas of application

are assessment and rehabilitation. Under the cognitive neuropsychology lens, communication interference between the brain and body lead to impaired emotional responses (Kent, 2013). A combination therapy rehabilitated the communication interference between the mind and body.

Chiropractic care (CC) addressed the vertebral subluxation complex (VSC). The VSC consists of kinesiopathology, myopathology, neuropathology, histopathology, and pathophysiology (Frisco, 2013). These five components disrupt the normal flow of energy along the nerve fibers, in turn; allowing communication along the nerves to become distorted (Nitschke, 2012). More importantly, Chiropractors utilized this scientific component of neuropathology to understand the damaged nerve tissue. When individuals are tensed or stressed, the compression (pinched), stretch, or chemical irritation of nerves from nearby spinal structures occur, which interrupt the neuropathology component. Coincidently, joint dysfunction has affected the muscle tissues and undergoes constant change or congestion (Spinal-Health, 2015). Toxins develop and irritate the nerve endings within the muscle. Moreover, after nerves are pinched, a repeating cycle has occurred. This cycle is the pain that an individual experiences. Systematic review of randomized controlled trials proved that the back and neck pain resulted to psychosocial issues (i.e. psychological outcomes including anxiety/stress) (Williams, Hendry, Lewis, Russell, Westmoreland, & Wilkinson, 2007).

Nerves transmit perceptual data as well as one's adapting data from the brain to the body and vise versa; the interruption is clinically significant and leads to deterioration of the whole body (Frisco, 2013). When the body is not in homeostasis, the body

becomes a better host for stressors (Frisco, 2013). Over time, this may lead to brain dysfunction (Nitschke, 2012). Neuropsychology underlines the understanding of the cognitive effect of brain injury or neurological illness, which may be modified by psychotherapy and vertebrae adjustments. Clinical implications expressed that physical treatments, such as vertebral subluxation, have psychological benefits (Williams et al., 2007). Using a spinal manipulation, Genthner, Friendman, and Studley (2005) verified that an upper cervical vertebral subluxation improved an individual's psychological health. In order to manage and eliminate a relapse of stressors, a novel plan of action required a combination therapy of multidisciplinary approach (Williams et al., 2007). This theory will be furnished in more details in chapter 2.

Nature of the Study

The nature of this study was a quantitative retrospective outcomes research design. The data involved archival data from a clinical database and analyzed using a two-way mixed ANOVA in order to predict and explain the main effects of each independent variable (Gravetter & Wallnau, 2009). The participants were identified as a convenience sample of 112 adults diagnosed with stress related conditions. These adults were comprised of women and men from 30 to 50 years of age. The data consisted of results from a number of instruments. These included the nerve conduction (measured by the nerve conduction velocity test [NCV]), stress (measured by the Stress Questionnaire), and anxiety (measured by the Beck Anxiety Inventory [BAI]).

A quantitative design yields a determination of the outcome for the potential influence of stress on the effectiveness of psychotherapy and CC simultaneously and

examined the relationship among these variables with respect to a sample of the population studied (Creswell, 2009). The research method involved archival data from a clinical database. In other words, the treatment was provided to the participants and the datum was given to the researcher to understand an influence of stress on the effectiveness of psychotherapy and CC simultaneously. From a post positivist worldview of gathering statistical analysis and providing a statistical interpretation, the researcher hoped for a proposed study would yield confirmation of the hypothesis.

Definitions

Chiropractor: A health care professional who focuses on diagnoses and treatment of neuromuscular disorders. Chiropractors are the only health care professionals who are trained to detect vertebral subluxation (Spinal Health, 2015). Chiropractors educated their patients on prevention methods for risky lifestyle behaviors; and how to acquire healthy lifestyles via exercise, ergonomics, and surface counseling—behavioral change (Edlund et al., 2015; Spinal Health, 2015).

Chiropractic adjustment (*vertebral adjustment* or *spinal manipulation*): The common therapeutic treatment for back pain. A chiropractor would apply manipulation (high velocity short level arm thrust) to the vertebrae that had abnormal movement patterns (subluxation) or failed to function properly (Spinal-Health, 2014). This adjustment eliminated the pressure on the nerve and reduced inflammation of the segment (nerve interference recovery). The adjustment accompanied an audible release of gas (joint cavitation) which sounded like a cracking noise (Spine-Health, 2015).

Chiropractic care: The natural, drugless agents of physiological therapeutic, measures with which a chiropractor provide treatment for his or her patients. This care dealt with many spinal complaints, and a chiropractor assisted by means of nerve interference recovery (Spinal-Health, 2015).

Cognitive behavioral therapy: A therapeutic approach, which is an empirically supported intervention for stress-related disorders (Hollon & Ponniah, 2009; NAMI, 2014, Foa, 2006). CBT aimed to change negative, unrealistic cognitions in such a way to identify dysfunctional thoughts and negative beliefs, challenging these thoughts, and then replacing the beliefs with realistic cognitions (Foa, 2006).

Nerve Conduction Velocity Test: The nerve conduction velocity (NCV) test, or nerve conduction study (NCS), provides the clinician with the ability to observe the speed of conduction of an electrical signal traveling from synapse to synapse in the nerve. The chiropractor places two surface electrodes on a patient's skin over nerves (myelinated nerve fiber) at different locations.

A Stressor: The act of pushing the mind and body to perform in a negative way, or overworking (Spinal-health, 2015).

Subluxation Complex: This term refers to the five components of vertebral subluxation. These components are as follow: Kinesiopathology (loss of normal vertebral position and motion), Myopathology (changes in the spinal musculature, such as hypotonicity, spasm, fibrosis, weakness, and improper functioning), Neuropathology (irritation/injury to spinal nerve roots), Histopathology (changes to spinal tissue, such as

bony growths), and pathophysiology (inflammatory biochemicals from biochemical waste products and injured tissues) (Spinal-health, 2015).

Vertebra: This is a term referring to the vertebrate spinal column. Each vertebra is a segment of the backbone (spinal column). A vertebra is one irregular bone composed of bone and cartilage. The intervertebral disc lies between one vertebra and the next (Spinal-Health, 2015).

Vertebral Subluxation Complex (*VSC*): A term used with respect to a vertebra that has lost the normal position and/or motion in relation to the next vertebrae (Frisco, 2013). When the vertebrae is misaligned and do not function properly, mechanical stress is the result. This misalignment accelerates the wear and tear on the whole system. If not treated, pain, palpation tenderness, inflammation, decreased spinal mobility, muscle spasm, and hypertonicity will lead to improper nerve functioning and interruption in the communication between mind and body (Spinal-health, 2015). VSC is also known as spinal subluxation.

Vertebral Subluxation (daily): Addresses the daily strain that an individual places on his/her backbone, or vertebrae. For example, physical and mental health symptoms manifest as an increase in weight. The excess pounds add pressure, shift the vertebrate spinal column, and aggravate one or more nerves overtime.

Assumptions

I considered the assumptions that are critical to the meaningfulness of the study. One assumption was that the stressed adults use their unique pain vocabulary to interpret their intensity of stress and anxiety to complete their individual self-report. It was

assumed that the stressed adults provided this information without coercion or pressure. Second, the assumption was that each participant was able to comprehend and report answers to the questions honestly. Furthermore, the assumption was that each participant saw his preferred psychologist during the 4-week treatment period and reported accurate results, such as his Beck Anxiety Inventory (BAI) results, assuming that the scores were entered into the database correctly.

Scope and Delimitations

The delimitation to the study was for all participants to report all of their scores within the 4-week treatment. For example, the researcher assumed that each of the participants did not terminate his involvement in the study. The community partner informed the researcher that the participants understood that if any participants withdrew from the study, their results were not included in the final report. The scope of this study was to understand the benefits of a combination therapy with respect to alleviating psychological and physical stress(s). The study ruled out individuals having prior treatment to alleviate stress. The combination therapy will reduce vertebral subluxation and accomplish a CBT goal, which will rehabilitate an individual's mental, emotional, and physical health.

Limitations

A limitation to using archival research was that I did not have the ability to track participants' progress or note any errors in the database. The sample size of this study was smaller than what expected which caused unfavorable results. The technique of chiropractic care and CBT was not personalized according to the participants' needs.

Thus, the treatments were not administered in the same way to all participants. Differential administration of treatment may have caused poor results due to the inconsistency of treatment. This inconsistency allowed errors to occur.

Significance

This research is significant and will provide original contribution to the literature by showing the effects of stress on one's body (confirmation from a stress test) and mental state, and the possibility to provide evidence that combination therapy would further rehabilitate and lessen stressors (Nitschke, 2014; Williams, 2006). Combining modalities that focus on managing stress provides results of therapy (discussing issues) as well as the experience of total regeneration of nerves (CC), nerves that were once positioned to block communication to areas of the brain that would not allow an individual to move past certain issues in his life. Palmer (2013) explains that an atlas subluxation causes brain function abnormality (a psychology concern), "thus, attack the cause, adjust the vertebrae and return the brain to normal capacity and capability". Moreover, the chiropractor would understand the reason for the misalignment, or atlas suluxation, and adjust the vertebrae in order to return the brain to normal capacity and capability. This approach will allow individuals to adopt healthy habits as well as focus on their goals (APA, 2014b). The significance of the findings would suggest that a combination therapy (especially with respect to Psychotherapy and CC) would be a more effective way to alleviate stress. A social influence is similar to the psychology discipline. Psychology is the applied science to study the mind and behavior. In order to facilitate a social influence one's mind and behavior are affected by others.

Psychotherapy and Chiropractic treatment is a combination therapy that corrects the mind and behavior in an influential way (e.g. CC is a force for men to gravitate toward (Fukuda, Itoh, Masud, Ogura Shibuya, Tahiro, Watanuki, Yamaguchi, Yanai, 2011b) and Psychotherapy is sensitive safe haven for women to gravitate toward (APA, 2015)). If significant and marketed appropriately, this combination therapy will cause internalization to occur within the community, or throughout society as a whole. The overall social impact will be a great social acceptance of such an approach that conditions how to cope with or alleviate stress, especially in social environments in order to function. Perhaps, this method was not completely successful; the foundation is sound to add to a future method that will implement the same proposed resolution. Therefore, this quantitative study compared the effects of cognitive behavioral psychotherapy in conjunction with CC (understanding the effectiveness of a combination therapy compared to each individual therapy) to CBT independently on individuals diagnosed with stress. This study analyzed the potential significance of finding a combination therapy to be sound and the less likely to relapse. This information would become available to the public by way of health fairs and the department of mental health community organizations.

Summary

Stress and the impact on an individual's life resulted in a negative outcome unless combatted with a positive solution. The problem of stressors targeting the whole body health was relevant in current events. Mental health issues in the society demands a solution that will no longer disrupt the social balance which functionalism promotes

(Harpaz-Rotem, et al., 2012). In a recent study (Cantkier, 2015), trauma to one's nervous system, or damage of nerve fibers with heightened responses to stimuli that sends wrong messages to the brain, caused chronic pain. Over 100 million Americans live with chronic pain (Cantkier, 2015). Individuals who suffer from chronic conditions (e.g. arthritis or severe mental health issues) experience chronic pain, in turn, experience impairment of their cognitive functions that link to memory, behavior, feelings and emotions (Cantkier, 2015) leading to an overwhelming state of stress. A combination therapy was essential for correcting an imbalance of mental states that exasperate with stress.

A substantial literature review concerned for psychotherapy and chiropractic treatment revealed the necessity to understand these two fields in reference to mental health and stress. Psychotherapy and chiropractic treatment have aimed to assist their patients with the overwhelming issues of stressors; however, as a unitary treatment, each of these two fields has been stagnant with respect to alleviating stress.

Cognitive behavioral therapy (CBT) and the recovery from nerve interference simultaneously aimed to alleviate stressors. Neuropsychology underlined similar principles in which psychologists and chiropractors expound upon within their applied science in order to understand and recognize the disconnection for which causes stressors to prevail (Foa, 2006; Kent, 2013). In the following chapters, the researcher developed an understanding for the theory of cognitive neuropsychology which underlined the connection between the psychological processes of the mind and the body's physical response and united the artistic science of chiropractic medicine and psychological care.

The rationale for this research design provided clarification, which needed to advance knowledge in the discipline, by exploring the relationship between the combination therapy of reduction of vertebral subluxation and CBT and mental and emotional health (Kent, 2013). The following chapter will illustrate other treatment options that proclaimed to reduce stress, information regarding the benefits, and effectiveness of CBT and CC with respect to treating stress. In addition, the literature review addressed studies involving stress related disorders, interventions to reduce stress related disorders, the body's ability to function at its maximum capability, CBT, and CC.

Chapter 2: Literature Review

Introduction

According to APA (2014b), stressors limit the ability of individuals to achieve stress management goals. Currently, the common evidence-based treatments for adults to achieve stress management goals include meditation mind and body intervention (relaxation response/training, exposure therapy), systematic desensitization, stress inoculation training, assertiveness training, biofeedback, eye movement desensitization and reprogramming, pharmacotherapy, and CBT (Ballinger et al., 2002; Bryant & Femingham, 2012; Westrup & Zappert, 2008). On a micro level, when individuals continuously experience stressful symptoms, or the effects of stress on their body, this relapse cycle will continue to deteriorate an individual's health (if not corrected). In turn, on a macro level, stress both intellectually and emotionally disrupts the social balance, which functionalism promotes (Harpaz-Rotem et al., 2012). Therefore, in this chapter, I will refer to several sources in order to expound on the attempted treatments used to relieve stress, the ways stressors impact one's mental state and body, and the rationale for a new paradigm shift that calls for a combination therapy, which joins the chiropractic discipline and psychotherapy.

Ultimately, unitary therapies for stress negate rehabilitation of nerve interference within the treatment plan (especially a plan that that eliminates the relapse cycle and promote whole body healing). Also, unitary therapies disregard the simultaneous provision of coping tools to decrease stressors as shown in this combination therapy. In other words, a combination therapy provides more coping tools for alleviating stress than

a unitary therapy. For instance, Kent (2013) provided excellent research to promote an opening toward this study. Kent (2013) confirmed that the brain, spinal cord, and nerves control each facet of the body; thus, one's distorted perception (experience/stress) is due to nerve interference, which involves an individual's ability to adapt fittingly to surroundings. Research regarding CC with CBT as a combination therapy for treating various types of stress is lacking and needs to be expanded (Kent, 2013). The number of documented stressors that affect the body is large (Kent, 2013). Therefore, I have divided the literature review into four areas of focus: a closer view of cognitive neuropsychology theory with respect to the body's maximum capability, stress-related disorders and their impact on the individual, CBT, and changes in brain activity.

This review will include other treatment options for stress and information regarding the benefits and effectiveness of CBT and CC with respect to treating stress. In addition, the literature review entail studies involving stress-related disorders, interventions to reduce stress-related disorders, the body's ability to function at its maximum capability, CBT, and CC.

Literature Search Strategy

A broad and all-encompassing search strategy provides a deeper understanding of the issues at hand as well as a familiarity with the current body of knowledge. Some articles accessed from the APA and ACA websites. Articles obtained from online databases at Walden University Library. These included PsycARTICLES, PsycNet, and PsycINFO. Emphasis was placed on current literature from the past 7 years. The key search terms and combinations of search terms included CBT, chiropractic medicine,

stress, stress related disorders, vertebral subluxation, brain activity, neuropsychology theory, body's maximum health, health, stress interventions, mental illness, and mental and emotional health. In cases where there were a diminutive of current research and dissertations, my inquisitive mind veered off into other articles. I found these articles by reviewing the reference sections of the initial retrieved research. The reference sections provided information concerning specific instances of stress and treatments.

Overview of Stress

Mental illness, which includes alterations in thinking, mood, or behavior associated with distress, is an important public health problem due to its prevalence, early onset, and impact on the individual, family, and community (Ahluwalia et al., 2011). Mental illness exacerbates morbidity from the multiple chronic diseases with which it is associated, including cardiovascular disease, diabetes, obesity, asthma, epilepsy, and cancer (Ahluwalia et al., 2011). Stress, or stress-related disorders, is an issue that effects all generations (Williams, 2011). The most commonly diagnosed stress-related disorders are mood (depression) and anxiety disorders (Ahluwalia et al., 2011; Avenevoli, 2013). In addition, anxiety disorders occur with other health and medical conditions, including asthma, insulin resistance, and other chronic medical conditions (Avenevoli, 2013). These health and medical conditions can manifest as a malfunctioning nervous system (Williams, 2006).

Approximately, 25% of adults in the United States are diagnosed with stress-related disorders each year. This percentage causes an estimated total annual economic cost (i.e., lost earnings/wages, disability benefits, and health care expenditures) of $247

billion to $300 billion (Ahluwalia et al., 2011; Avenevoli et al., 2013). This information was reported and measured in several nationally representative population-based surveys and surveillance systems, including the National Health Interview Survey (NHIS), National Health and Nutrition Examination Survey (NHANES), National Survey on Drug Use and Health (NSDUH), and National Youth Risk Behavior Survey (YRBS), which provided evidence to guide mental illness prevention and treatment programs (Avenevoli et al., 2013).

The 2015 Diagnostic and Statistical Manual of Mental Disorder (DSM) defines the criteria for stress-related disorders within the following disorders: posttraumatic stress disorder (disturbance persists beyond 4 weeks), acute stress disorder, adjustment disorders, reactive attachment disorder, disinhibited social engagement disorder, other specified trauma and stressor related disorder, and unspecified trauma and stressor related disorder. Stress related disorders cause many disease conditions (Ballinger et al., 2002). People experiencing stress report specific ailments and symptoms (APA, 2014c). Some disease conditions are obesity, anorexia, and hypertension (DSM 2015; NAMI, 2014). Stress is a development of characteristic of anxiety -excessive worry with the inability to control the worry or anxiety about numerous events- or stressful life events that occur within 1 month after exposure. These stressors occur within a month and have the ability to progress to extreme traumatic stressors (Criterion A), which can lead to depression (Ballinger et al., 2002; DSM, 2015). The individual may experience three of the following: a subjective sense of numbing, detachment, absence of emotional responsiveness, unawareness of surroundings, de-realization, depersonalization, or

dissociative amnesia (Criterion B). Constant recollection of the trauma (Criterion C) may cause an individual to avoid such stimuli, which in turn, allows for the recollection of the trauma event (Criterion D). This sequence produces the symptoms of anxiety (Criterion E); thus, the excess stress influences behavior patterns and physical health problems (Ballinger et al., 2002; Williams, 2006).

Posttraumatic Stress Disorder is the development of symptoms following exposure to an extreme traumatic stressor(s) (i.e. torture, death, terrorist attack, sexual assault, or military combat). The exposure may be defined as direct personal experience of an event that involves the threat of death or injury, a threat to one's physical integrity, or the witnessing of an event that pertains to death, injury, news of an unexpected (violent) death, or serious harm. The stressors manifest in fear, helplessness, horror, disorganization, nightmares, or agitated behavior. These persistent symptoms of increased arousal of stress may cause physical injuries as a direct consequence (Avenevoli et al., 2013).

Furthermore, the ideology of cognitive neuropsychology is demonstrated in the initial factor when physical, emotional, mental and spiritual stress becomes overwhelming. Essentially, during the initial factor, the brain will reset to peace or develop into a stressful disorder.

Theoretical Foundation

The theoretical framework will focus on cognitive neuropsychology. The cognitive aspect of neuropsychology describes the relationship between brain functions and psychological processes. Using the cognitive neuropsychology lens, communication

interference between the brain and body can lead to impaired emotional responses (Kent, 2013). The nervous system is composed of the central nervous system (CNS) (skull and spine) and the peripheral nervous system (PNS) (nerves that communicate with the furthest areas of the body) (Pinel, 2011). The PNS is composed of the somatic nervous system; interact with the external environment, and the autonomic nervous system, which regulates the body's internal environment. When mental disorders manifest in pain or vise versa, the manifestation that occurs is the efferent nerves from the PNS projecting from the CNS in the lumbar (back) and/or thoracic (chest) and/or from the brain and sacral (lower back) regions of the spinal cord to communicate pain and psychological problems (Pinel, 2011). In other words, when a stressor is present, the nervous system will stimulate, organize, and mobilize energy resources in threatening situations (psychological arousal) or conserve energy (psychological relaxation). The determining factor for arousal or relaxation is how well an individual supports his whole body.

Kent (2013) applied cognitive neuropsychology theory specifically to the case of abnormal nervous system function and its affects with regard to emotional and psychological health. In addition, Pinel (2011) expressed that the brain is a remarkable changeable organ that continuously grows and changes in response to an individual's genes and experiences. For instance, one's experiences, or stress, are processed through the nervous system; thus, one's perception is distorted due to nerve interference, which compromises one's ability to adapt fittingly to surroundings (Kent, 2013).

Chiropractic care addresses the vertebral subluxation complex (VSC). VSC is the component that disrupts the normal flow of energy along the nerve fibers, allowing

communication along the nerves to become distorted (Nitschke, 2012). Over time, this disruption may lead to brain dysfunction (Nitschke, 2012). Neuropsychology emphasized an understanding of the cognitive effect of brain injury or neurological illness, which may be modified by psychotherapy and vertebrae adjustments. To manage and eliminate relapse of stressors, a novel plan of action is needed.

Moreover, cognitive neuropsychology focuses on the brain abnormalities of one's cognitive processing, or the behavior and experience of brain-damaged individuals will reveal information about the cognitive modules that suggest normal behavior and experience. Recent research (Frith, 2015), used cognitive neuropsychology to provide feedback of the brain abnormalities, especially of those individuals associated with schizophrenia. These cognitive processes link to neural activity in the brain. Measuring the neural activity is the substance used to frame research. Prolonged stress will manifest as brain abnormalities, Chiropractic treatment and Psychotherapy, both, affect one's neural activity in the brain. Essentially, this is how cognitive neuropsychology is used to frame research – through understanding one's experience, behavior, and neural activity.

The Impact of Stressors

Stressors from an individual's environment lead to diseases, disorders, or death. The psychosocial stressors that are often neglected involve racism, which leads to increased exposure to traditional stressors (i.e. unemployment). Other forms of racism include institutional discrimination (restricted attainment), segregation (pathogenic residential conditions), discrimination (inability to desirable goods and services), and internalized racism (approval of negative beliefs influenced by society) (Williams, 2010).

These stressors cause a ripple effect and magnify health issues such as subclinical carotid artery disease, coronary artery calcification, and fluctuating emotional states that affect the cardiovascular, immune, and neuroendocrine systems (e.g. stress urinary incontinence) (Avenevoli, 2013; Capelini et al., 2006; Williams, 2010). These stressors are known as the blinded stressors because individuals will convince themselves that they are capable to handle their stress and delay receiving treatment (Williams, 2010).

Stress and anxiety are accountable for a large proportion of disability worldwide (Kalia, 2002). Geographic location determines the amount of exposure to stressful risk factors (Williams, 2010). An individual's environment (where and how one lives, learns, plays, and/or worships) determines the proper or lack thereof opportunities for the individual, as well as the knowledge to recognize which tools to use to resolve an issue in order to be successful in alleviating stress. The American Psychological Association (2014b) found that individuals living in urban areas were less able to achieve their stress management goals than individuals living in other environments. These factors reframe an individual from receiving optimal health. For instance, one's sleep quality and physical fatigue is a result to such stressors (Edlund et al., 2015). When clinically significant stressors cause such sleep disturbance, for example, they interfere with an individual's normal functioning (Criterion F). For instance, the difference between residing in the northern United States or the southern United States (e.g. cultural differences) in the cities or suburban areas (e.g. the suburban areas receive sufficient resources and have a better quality of life), or around the identifying race (pathogenic neighborhood and housing conditions) will contribute to certain stressors (Williams,

2010). Thus, with a combination therapy catered to an individual's needs (changing one's think pattern of negative core beliefs to positive beliefs and encourage recovery to any damaged nerves will facilitate one's thinking process), an individual is able to achieve their stress management goals while living in any environment.

Posttraumatic stress increases stressors in the body. The impairment of posttraumatic stress is irritability, poor concentration, hyper vigilance, motor restlessness, or startle response. The impairment includes yet not limited to social, occupational, or the individual's ability to achieve the obligatory task of simply asking for assistance. Moreover, individuals avoid activities (past times), places, people that arouse recollection of event, as well as have a sense of a foreshortened future. With these impacts, the body's ability to function at its maximum capability decreases. The World Health Organization (WHO) Global Burden of Disease Survey estimates that stress-related disorders will be the leading cause of disabilities by the year 2020 (Kalia, 2002). Chronic Posttraumatic Stress Disorder is reported to link to an increased rate of somatic complaints (DSM). Nevertheless, when an individual is unable to manage symptoms or falls into the relapse cycle, one is unable to increase their resilience to stress.

Stress affects the overall mind and body health (APAc, 2014). An important factor from population-based surveys has concluded that women and men experience stress differently. Men and woman report their stressors differently, physically and mentally, and collectively the percentages are rising (APA, 2016). Women report stress more than man; thus, women report being the primary family's health care decision maker. For instance, woman compared to men report the urge to cry (44 percent vs. 15

percent), or an upset stomach or indigestion (32 percent vs. 21 percent) in a month's time (APA, 2015). Moreover, comparing women with each other married women (56 percent) report experiencing higher levels of stress than single women (41 percent). In addition, married women in comparison to single women report the urge to cry (54 percent vs. 33 percent), feeling irritable or angry (52 percent vs. 38 percent), having headaches (48 percent vs. 33 percent), and experiencing fatigue (47 percent vs. 35 percent) (APA, 2015). Research has revealed that women have episodic memory by nature desiring to retain emotional events, dates, and settings, which may cause stress (Bryant & Femingham, 2012). On the other hand, many jobs entail activities that require movements that places stress on the body, men are more likely to acquire jobs that require 4hours or plus of these activities. Men's and women's perceptions of managing stress successful depicts upon the importance to their well being yet unaligned with the importance placed on these behaviors. For example, only 29% of women are successful in their efforts to be physically active (compared with 54 percent who believe this is important). Only 35% report success in their efforts to manage stress (compared with 69 percent who believe this is important). Furthermore, only 26% of men are successful in their efforts to be physically active (compared with 54 percent who believe this is important) and only 30% report success in their efforts to manage stress (compared with 59% who believe this is important) (APA, 2015). On a micro level, when individuals continuously experience stressful symptoms, or the effects of stress on their body, this relapse cycle will continue to be detrimental to an individual's health (if not corrected); in turn, on a macro level, stress both intellectually and emotionally disrupts the social

balance for which functionalism promotes (Hardy & Pollard, 2006; Harpaz-Rotem et al., 2012). The number one barrier to change managing stress, as recommended by a healthcare provider, for both genders is citing the lack of willpower (APA, 2015). Unfortunately, reports satisfy that women are more unreservedly to report their stressor(s) than men.

Furthermore, men and woman equally need to be able to receive a healthcare plan that satisfies their motivation to relieve stress and adjust their whole body. Due to the fact that men and women perceive stress differently, treatments must be in alignment with the individual's needs. There are countless empirical treatments that have attempted to reduce stress such as CBT, systematic desensitization, Meditation mind/body therapy, stress inoculation training, assertiveness training, biofeedback, eye movement desensitization and reprogramming, pharmacotherapy, and chiropractic care (Ballinger et al., 2002; Bryant & Femingham, 2012; Westrup & Zappert, 2008); however, on a microscope lens the gender perception captures a social need to explore the relationship between reduction of vertebral subluxation and mental and emotional health by way of a combination therapy, which experts in mind and body to alleviate stress (Kent, 2013).

Treatment of Stress Related Disorders

Cognitive Behavioral Therapy

The most effective treatment of stress related disorders is CBT (Foa, 2006). CBT is an empirically supported intervention for stress related disorders (Hollon & Ponniah, 2009; NAMI, 2014; Foa, 2006). CBT aims to change negative, unrealistic cognitions in such a way to identifying dysfunctional thoughts and beliefs, challenging these thoughts,

and then replacing them with realistic cognitions (Foa, 2006). Research (Ballinger et al., 2002) has shown that CBT is the most common method for treating stress, or stressor related disorders. Reason being, CBT is different from the traditional psychodynamic psychotherapy in that the therapist and the patient are working together to help recover from their mental illness (NAMI, 2014; Foa, 2006). According to the cognitive model, stress develops from misinterpretation of danger and benign stimuli (Huston, 2010). Commonly, an individual's emotions are influenced by their thoughts and exaggerations; in turn, stress is caused more by the way we think about a problem then about a problem itself (Ballinger et al., 2002). Chronic posttraumatic stress disorders (one of the extreme mood and anxiety stressors) deliver symptoms of increase arousal following exposure to an extreme traumatic stress, which often leads to physical injuries as a direct consequence (DSM).

Moreover, recent studies suggested (Baker, Brody, Chang, Gorbis, London, Maidment, Mandelkern, O'Neil, Salamon, Saxena, & Schwartz, 2009; NAMI, 2014; Straube et al., 2006) that CBT changes brain activity in individuals with mental illness by improving the brain's ability to cope with stressors (NAMI, 2014; Baker et al., 2009; Straube, Glauer, Dilger, Mentzel, & Miltner, 2006). Any interference to the vital nerve connection, especially between the brain's connectivity and one's cognitive process, may manifest as changes in the behavioral health (heighten stressful situations), decreasing the body's ability to function at its maximum capability (Williams, 2006). Individual are able to use this cognitive behavioral tool to break the cycle in which thoughts are contribute to negative emotional states. CBT consists of all the characteristics that were

reported in the later treatments that detailed solid efficient results for stress related disorders (Foa, 2006). For example, CBT consist of exposure techniques/desensitization (as defined in systematic desensitization, eye movement desensitizal and reprogramming), positive self talk and safely confronting reminders (as defined in assertiveness), pain and anxiety management (as defined in stress inoculation and Biofeedback), and possessing the tools to respond opposite of fight or flight to combat stressful scenarios (as defined in meditation mind and Biofeedback) (Capelini et al., 2006; Lin, 2004; Foa, 2006; Jaremko, 1980; Wilson, Becker & Tinker, 1995), This excellent model was chosen due to being the most current common model that provided coping tools especially after therapy and the capability to increase one's resilience to stress. Many treatments resemble CBT's foundation; yet, their specific construction contains limitations that overtly recognize CBT as the best option in alleviating stressors.

Systematic Desensitization

One of the first highly followed empirically supported treatments for stress related disorders was systematic desensitization outlined by Wolpe (1958) (Goldfried, 1971; Zettle, 2012). The rise of exposure therapy was rewarded to Marks's (1975) review of the systematic desensitization literature. The common theoretical explanations of the treatment are expressed as follow: during short-term effects with an antagonistic inhibition present proved reciprocal inhibition, while long-term effects proved counter conditioning; in turn, short-term effects with antagonistic inhibition absent, proved habituation and long-term effects proved extinction.

In other words, reciprocal inhibition is based on the psychological mechanism that two incompatible psychological states cannot occur simultaneously (Wolpe, 1968; Zettle, 2012). Relaxed excludes what is meant to be anxious, similar to how the parasympathetic nervous activation is known to inhibit sympathetic nervous activation and therefore anxiety. This treatment worked diligently to increase parasympathetic activity through deep muscle relaxation technique in order to decrease stress, or inhibit sympathetic activity. Moreover, counter conditioning theory of systematic desensitization simply refers to the replacement of an old response with a new response over a long term, such as when relaxation replaces stress or to reduce the phobic stimuli (Davison, 1968; Zettle, 2012). Furthermore, habituation is the act of repeated stimulation and has short-term effects. During in vivo exposure, physiological arousal decreased for patients with specific phobias (Tryon, 2005). Furthermore, extinction is characterized by the lack of onset of stimuli with positive or negative reinforcing properties, which are based on the emission, or omission of a response. In addition, extinction refers to a functional relationship between response decrement and absence of reinforcement. Exposure to fearful stimuli without avoidance is the only sufficient means to reduce stress (Tryon, 2005). Overall, the client is taught to become sensitive to his/her cues for tension and to react to these cues, which are underlined in systematic desensitization.

A study obtained 50 highly anxious undergraduate males stressed about their required public speaking course. These males completed assessments at the beginning of the semester and again at the end (6 weeks). The males were divided into five groups (one of which being a systematic desensitization group). The systematic desensitization

group was educated in deep breathing, spatial temporal anxiety hierarchy, which was, related to public speaking, and counter condition events from the hierarchy. The results yielded a significantly greater anxiety reduction on the speech composite and resulted superior to both the insight-oriented psychotherapy, and attention-placebo. Paul and Shannon (1966) reported that group and individual systematic desensitization allowed the subjects to utilize key tools to reduce stress themselves building confidence and how to cope orientation (Lazarus, 1961). For example, group therapy allowed for the opportunity to listen to other subjects as in reflecting on experiences, problems, emotions, as well as collaborating on how to better utilize the treatment in given situation. The incentive of this study was that after therapy termination, key tools provide the client with ways to continue without the therapist. However, the short time in treatment and small population expose limitations to the findings. This effective treatment is a surface assistance to the issue; yet, there remains underlining issues to assist patient's when the body is stressed.

Meditation Mind/Body Intervention

The mind/body intervention train individuals to respond opposite of the fight or flight (stress) response. The fight or flight response, which is part of the sympathetic nervous system that when onset releases adrenaline and norepinephrine which then works with the hypothalamus-pituitary-adrenal (HPA) axis –the organized stress system, is triggered automatically by physical or psychological stress (Hardy & Pollard, 2006). This pertains to the decrease in oxygen consumption, heart rate, respiratory rate, and arterial blood pressure, changes in central nervous system as well as repeating specific

words, phrase, prayers, and muscular activities while ignoring stressful encounters (Ballinger et al., 2002). A recent study reported the effect of a 6 week intervention, *Maximize Your Potential,* on randomly assigned college students' (n=63; or a waitlist control group (n=65) psychological distress, anxiety, and perception of stress. The high level of stress students received six 90-minute group training sessions in the relaxation and cognitive behavioral skills in which ninety students completed the assessment measure. Many studies (Ballinger et al., 2002; Jain, 2007; Fernros, Furhoff, & Wändell, 2008; Teixeira, 2008) reported a significantly greater reduction in psychological distress state, anxiety, and perceived stress. Moreover, a study (Teixeira, 2008) reported that chronic pain sufferers use mind meditation to transcend their pain. However, this study did not emphasize the intervention over a longer period or the need to account for continued support to maintain these benefits. For instance, with insomnia being commonly associated with stress (Ballinger et al., 2002), the domino effect of physical impairments send the individual back into a rapid negative health responsibility, nutrition, and negate stress management.

Stress Inoculation Training

Another study pinpoints on stress with respect to public speaking. Stress inoculation training provides a vast amount of stress management techniques (anxiety management) with phases such as education, stress coping skills, as well as how to utilize these skills for a real or imagined stressor (Foa, 2006; Jaremko, 1980). This treatment has been known to manage pain, multiphobias, and stress. The subjects consist of 62 undergraduate students enrolled in introductory speech classes divided into and no

treatment controls (Jaremko, 1980). The treatment focus on the negative self statements that characterize public speaking and with cognitive restructuring generated positive coping statements. At the end of the study, subjects applied the skills in a short speech.

In addition, Flaxman and Bond (2010) reported a reduction in psychological distress over a three month assessment time with regard to stress among working individuals. Although the rigors of working and public speaking are stressors, stress inoculation would need to withstand a more serious clinical problem that could produce long term physical or psychological issues. On the other hand, perhaps, stress inoculation would need to be utilized on a longer time. Again, in a public speaking scenario, after speaking and preparing for the next public speech, stressors will develop again and become more intense. This study must reveal how an individual is able to maintain the resilience of stress over a wider period of time to insure practice and significant outcomes.

Assertiveness Training

Assertiveness training mimics the earlier training programs with respect to promoting self-esteem and the key tools for the reduction of stress; although, this training has been slow to emerge (Rich & Schroeder, 1976). Assertive behavior exudes all socially acceptable expressions of rights, feeling, anger, disagreement, joy, habit of emotional freedom, and to enhance reinforcement in interpersonal situation (Rich & Schroeder, 1976). This program also expressed to the participants that their stress concerning interpersonal communication (including confrontational situations/disagreements) will decrease. In a recent study (Lin, Shiah, Chang, Lai, Wang,

& Chou, 2004), 69 nurses and medical students participated in the hopes to understand how to reduce stress. The participants who received low scores on the Assertive Scale were chosen. Assessments were collected before, after training, and once more after a month. The 33 subjects in the experimental group received eight 2-hour sessions of assertiveness training once a week. At the end of the trial, the experimental group was significantly improved.

This short training program provides key coping strategies. However, Lin et al. (2004), noted that interpersonal communication satisfaction was not significantly improved after training. Communication is the key to life. Additionally, research (Rich & Schroeder, 1976) expects the construct of assertiveness to have scientific usefulness in order to accommodate operational definitions. Since the participants expected that interpersonal communication would be mediated during the program, a letdown and continued stress will still be present. This study as well as others has found this limitation to impede upon the control of stress. Research recognizes assertiveness training is a complex, unsystematic, unstandardized procedure, unable to deal with true emotions effectively, as well as reliable and objective laboratory and real life measures of assertive behavior have not been developed (Rich & Schroeder, 1976). Stressors encompass more than just the psychological aspect of the body, thus, a program that assist with one's complete perception of stress is sound.

Biofeedback

The implications of stressors have been found to cause urinary incontinence in post menopausal women (Capelini et al., 2006). In addition, stress from childbirth, age

affecting the muscles, or anxiety that has physical manifestations all connect to stress incontinence. The nerves controlling the urinary system cause the bladder to contract too often; due to nervous system issues (MedlinePlus, 2013). Urinary incontinence is an involuntary leakage of urine. After experiencing Biofeedback, a current study (Capelini et al., 2006) was an aid to help participants recognize the correct muscles to use for contraction. During 12 weeks, fourteen participants were selected to partake in a pelvic floor training associated with biofeedback. Capelini et al. (2006), reported results as significant reduction in the number of urinary leakage episodes (from 8.14 per day to 2.57 per day) and daytime frequency (from 7.93 per day to 5.85 per day). However, the quality of life assessment (reports health in general) presented significant differences except in the case of general health perception. Psychiatrists have presented coping mechanisms to combat the problem; yet, incontinence still occurs. Further research concerning one's nerve injury and brain or nerve problems is the solution to eradicate stress incontinence (MedlinePlus, 2013). Nevertheless, to reduce stress, one must report restore to total health.

Eye Movement Desensitization and Reprogramming

Eye movement desensitization and reprogramming (EMDR) was a controversial three 90 minute session exposure treatment (consist of preparation, baseline assessment, desensitization, installation of the positive cognition, body scan, and closure) for posttraumatic stress disorder –traumatic memories (PTSD) (Wilson, Becker, & Tinker, 1995). EMDR is the process for which the client holds an image of the trauma, a negative self cognition, negative emotions, and related physical sensations about the

trauma in mind. Then, following the therapist's fingers, the client is directed to move the eyes laterally back and forth quickly for 15 to 20 seconds. The client reports what emerged. This process continues until desensitization of the trauma is vivid and positive self-cognitions have replaced the previous negative self-cognition. In a study (Wilson et al., 1995), 40 females and 40 males with traumatic memories participated. Wilson, Becker, and Tinker (1995) reported that participants receiving EMDR decrease in anxiety and increase in positive cognitions.

Eye movement desensitization and reprogramming (EMDR) consists of limits such as not utilizing behavioral measures and reporting a small sample size (Wilson et al., 1995). The motive of this treatment appears recognized; however, the closure stage seemed unfinished. The end should provide future tools to relieve stressful images; instead of acknowledging more reports from the participants with respect to being upset. Moreover, the only resolution is to have the participant(s) try a portion of the phase again. Consequently, this appears to be a cycle treatment and not a resolution treatment.

Pharmacotherapy

Pharmacotherapy has been used as the first line treatment for stressor related disorders (Rivas-Vazquez, 2001). The common selective serotonin reuptake inhibitors (SSRIs) are prescribed for the treatment of such disorders. Neuroanatomically, several neural pathways and neurotransmitters mediate the stressor response (Rivas-Vazquez, 2001). The side effects from this treatment may cause nausea, diarrhea, insomnia, headaches, and sedation, sexual dysfunction. Psychologists work closely with prescribing clinicians to monitor symptomatic response, tolerability of side effects, and

level of compliance to optimize therapeutic response as well as achieving benefit from psychosocial interventions (Rivas-Vazquez, 2001).

Pharmacotherapy consists of many side effects that have the capability to cause additional stressors. Rivas-Vazquez (2001) reported that majority of the medication has the ability to cause addiction. If the medications are not used as instructed, the benefits may be prolonged and therapist(s) must work harder to understand the individual's drug personality. This treatment is allowing the client to keep the pebble in the shoe phenomena. In other words, if there is stress present, remove the issues and provide coping tools. As similar, remove the rock (the problem) from the patience shoe instead of always medicating to eliminate pain, and then after the rock is removed the foot may recover.

Overall, CBT utilized by a skilled psychologist(s) has the capability of transforming negative ideations/thoughts to positive outcomes in order to tackle stressful situations. The previous interventions exhibit short term relief from stress; however, they do not change the brain activity that triggers the stress response. Therefore, stress affects the body and disease(s) formulates. In other words, the individual that underwent these interventions may assume that their health has improved; yet, their body (physically) will gradually show signs of deterioration because the brain has not actively communicated to stop the stress response. Due to the coping tools, the benefits will continue throughout one's lifetime. As one changes their brain activity, hormones are controlled (stress response), and equilibrium is obtained.

Chiropractic care

Chiropractic care recognizes that having an abnormal nervous system function affects emotional and psychological health (Kent, 2013). Interestingly, the chiropractic profession owned and operated two hospitals in Davenport, Iowa, which were devoted to mental health: Clear View Sanitarium and Forest Park Sanitarium (Nitschke, 2012). Over a 40 year period, the chiropractic hospitals had greater success than the state mental hospitals promoting brain health (Nitschke, 2012). There is a minute, yet growing emperical evidence concerning the relationship of the spine, vertebral subluxation, chiropractic care, and psychological and emotional health (Williams et al., 2007). Chiropractors specialize in correcting vertebral subluxation. Vertebral subluxation (when one or more of the bones of the spine (vertebrae) move out of position and irritate spinal nerves) causes interference in the communication between the brain and body (Spine-health, 2014). A chiropractic adjustment, vertebral adjustment (CVA) or spinal manipulation (CSM), refers to a Chiropractor applying a high velocity short lever arm thrust to the vertebrae with the objective of reducing the subluxation, or a dislocation of the bones in the spine (Spine-health, 2014). This adjustment eradicates the pressure on the nerve(s) and reduces inflammation of the segment. Any interference to the vital nerve connection, especially between the brain's connectivity and one's cognitive process, may manifest as changes in the behavioral health (heighten stressful situations), decreasing the body's ability to function at its maximum capability (Williams, 2015; Hardy & Pollard, 2006*)*. For instance, when an individual becomes physically limited, depression as a stressor becomes a factor leading to a decrease in immunity and the

susceptibility to disease(s) (Holder, 2014). Moreover, when an individual suffers a loss, depression as a stressor becomes a factor and changes occur (altered posture) resulting a higher susceptibility to injury (Holder, 2014). Following chiropractic care, Genthner, et al. (2005), utilized the Beck Depression Inventory II to measure the baseline of depression and postcare changes to report on a series of 15 individuals with a history of depression. The results from an ANOVA implied that chiropractic care significantly improved depression test scores in individuals experiencing depression. Furthermore, an individual's nerve interference (or the after affect equating to an individual's pain) and psychological health improves by way of a multidisciplinary bio-psychosocial rehabilitation (i.e. a combination of chiropractic care and CBT – 12 systematic review of randomized controlled trials of spinal manipulation reported psychological outcomes (alleviation of stress/anxiety) (Williams et al., 2007). An intensive rehabilitation with a functional restoration approach improved pain, or musculoskeletal pain syndrome, and function compared to other treatments (Williams et al., 2007). Also, Williams et al. (2007), examined psychological outcomes in randomized control trials of spinal manipulation and reported clinical implications that spinal manipulation have psychological benefits.

In recent studies (Bonello et al., 2010; Edlund et al., 2015; Hardy & Pollard, 2006; Kern et al., 2008), Chiropractic care is demonstrated with concern for stress. The prefrontal cortex (PFC) has an active role in higher order cognition, affect regulation, social reasoning/psychosocial stress and the regulation of the HPA axis. Chiropractic adjustments help to regulate the sympathetic nervous system, our fight or flight response,

which is overactive in individuals with excessive stress (Hardy & Pollard, 2006*)*. Metabolic glucose patterns are associated with endocrine stress and subjective ratings on task stressfulness, controllability, and dispositional mood states (Kern et al., 2008). Thus, when the HPA axis is activated from the potent components of social threat and/or uncontrollability, glucocorticoids are secreted and in turn have adaptive effects on the metabolism, immune, and central nervous system (Fukuda et al., 2011; Hardy & Pollard, 2006). Kern et al. (2008) observed individuals comprised of stress containing significantly elevated glucose metabolic rates in the PFC. The effects of Chiropractic spinal manipulation (CSM) on brain responses in respect to cerebral glucose metabolic changes (measured by fluorodeoxyglucose positron emission tomography (FDG-PET)) were observed (Fukuda et al., 2011b). When participants were stressed, increased glucose metabolism was observed in the inferior prefrontal cortex (Fukuda et al., 2011b). The result of this study (Fukuda et al., 2011b) suggests that CSM reduces regional cerebral glucose metabolism related to sympathetic relaxation and pain reduction.

Further, researchers (Bonello et al., 2010; Duarte et al., 2015; Jamison, 1999) concerned with distressed fibromyalgia, hypothyroidism, and chronic neck and back pain (stress) individuals, explored the method of chiropractic manipulation. Fibromyalgia, a rising chronic condition consisting of musculoskeletal pain and tenderness vulnerable of a reversible modulation of the pain threshold, is experienced in 1-12 patients (Bellato et al., 2012; Jamison, 1999). Fibromyalgia individuals have difficulty in coping with various types of environmental stress and psychosocial stress; and the chronic anxiety stress that they experience may cause the increased excitability of the spinal cord, or

muscle spasm, as well as dysfunction of the central and autonomic nervous systems, neurotransmitters, hormones, immune system, external stressors, psychiatric aspects (Bellato et al., 2012; Jamison, 1999). A trial reducing neurotransmitter release from neurons in the spinal cord and brain is clinically beneficial for fibromyalgia patients (Bellato et al., 2012). Participants (N=88; two thirds were undergoing chiropractic care) were placed in two groups in which they completed two questionnaires with their current stress level, chiropractic maintenance, and an interview (Jamison, 1999). In addition, a trial of 102 participants with a diagnosis of stress and overt primary hypothyroidism (51 per group) underwent chiropractic care (Neuro-Emotional Technique (NET) – a 15 step intervention which includes: chiropractic, biology, cognitive behavioural psychology, and Traditional Chinese Medicine) (Bonello et al., 2010). Also, individuals (n=23) with overwhelming stress and chronic neck or back pain underwent chiropractic care (Duarte et al., 2015). This feeling of pain (the symptom) explores the relationship between stress and pain. By the time the individual feels pain, the body has already experienced the stressor. Correcting the subluxation, in turn, alleviates one's stress and nerve interference (i.e. the pain). At the end of each trial, the group that had chiropractic care had a lower stress score (Bonello et al., 2010; Jamison, 1999).

In addition, a global public health burden is non-communicable diseases (NCDs) and one major portion is mental health issues; therefore, the Council on Chiropractic Education (CCE) in the United States set forth principles that every chiropractor must perform prevention methods (assessing patient's health status, screening for risky lifestyle behaviors, and behavioral change) that are implemented in the curriculum of

accredited USA colleges and in outside practice (Edlund et al., 2015). Chiropractors examine approximately 97% for altered posture, 82% for psychosocial, 73% for disturbed sleep, and 80% for verbal advice or goal setting for physical fitness issues (Edlund et al., 2015). Since Chiropractors include physical fitness in goal setting, individuals are able to increase the production of the brain's neurotransmitters (endorphins), improve sleep, relieve daily tensions and irritations, increase mood, self confidence, and lower symptoms associated with depression and anxiety (Edlund et al., 2015; Mayo Clinic, 2015). In a nutshell, Chiropractor's prescribed physical fitness will ease stress levels and create a sense of control over the individual's body and life (Edlund et al., 2015; Mayo Clinic, 2015). The WHO is encouraging individuals to seek chiropractors to assist with lifestyle changes for society as a whole.

Furthermore, the brain, spinal cord, and nerves control each facet of the body; in turn, after a combination therapy, the body will communicate effectively with the brain to think and behave stress free (Edlund et al., 2015; Frisco, 2013; Hardy & Pollard, 2006; Kent, 2013; Kern et al., 2008). The field of Chiropractic medicine has the ability to be a force for men to gravitate toward (Fukuda et al., 2011b). This is due to the aggressive approach to promote health. (As mentioned earlier, men's hesitation to health checks will be rectified by this aggressive preventative care). CBT implemented by a Psychologist(s) changes brain activity by tuning in to one's cognition in such a way to identifying dysfunctional thoughts and beliefs (challenging these thoughts, and then replacing them with realistic cognitions) while Chiropractic care resolves nerve interference; thus, each field results in an equilibrium healthy mind and body. The

following figures is a map of how physical, biological, psychological, and other stressors result in a deterioration of one's health:

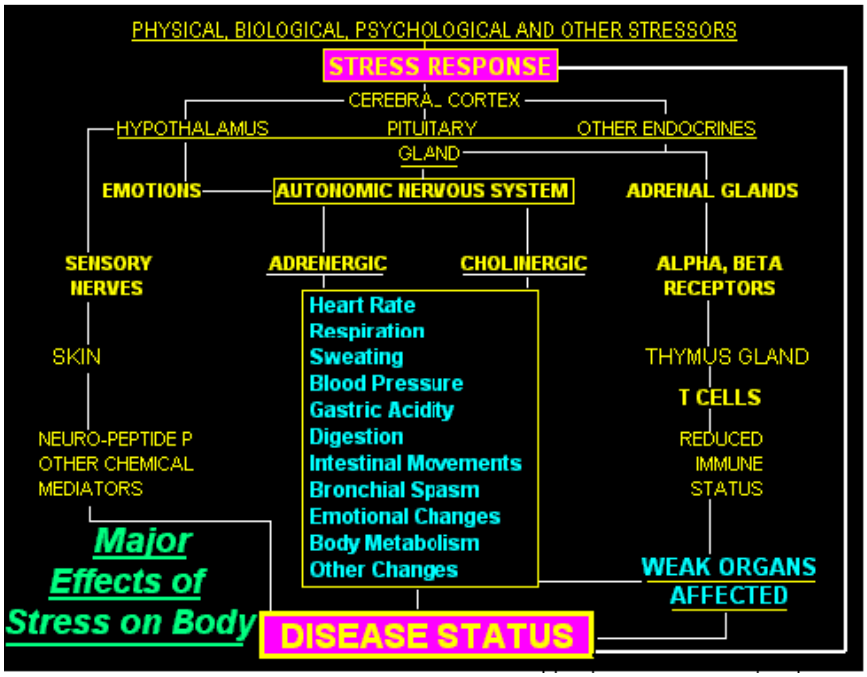

Figure 1. Impact of physical, biological, psychological, and other stressors. Reprinted from "The Art of Stress Free Living: Disease Caused by Stress," by H. Babu, 2007, Retrieved from http://www.lesstress.net/diseases-caused-by-stress.htm. Reprinted with author permission.

To date, these interventions have all been semi-effective in lessening stress with respect to recovery of nerve interference (spinal manipulation) and simultaneously alleviating stress (Williams et al., 2007); however, a combination therapy that highlights the nerves and concentrates on the psychological aspect of a being is sound in order to increase one's resilience to stress. When the expressions arise, "This issue is getting on my nerves" (unknown) or "Calm your nerves" (unknown), the nerve is actually the cause.

As a benefit, alternative health care treatments have the additional benefit of eliminating the negative side effects of medication or surgery (Nitschke, 2012). There is a need to bridge the literature and treatment gap, however, by exploring the relationship between the combination therapy of reduction of vertebral subluxation and CBT and mental and emotional health (Kent, 2013).

Combination versus Unitary Treatments

The necessity to maintain the reliance in stress is to insure longevity and maximal whole body health. Health is the level of functional efficiency of a human being. In other words, health is the condition of an individual's mind and body (Dictionary, 2014). The modern term for health is expressed as whole (Valuable, 1995); thus, to be healthy an individual must report their wholeness. When humans fall short of being whole, such as with symptoms of stress, one's health deteriorates as in a system(s) (i.e. organs, brain, nerves, and glands) fails to perform normally, or in conjunction with the other bodily parts. Then, the system(s) or body's functional wholeness begins to shatter (Valuable, 1995). Health requires that the systems work together for the whole body's welfare; therefore, if an issue is left uncorrected, one health problem will lead to others in a domino effect of illness, physical handicap, and/or mental issues (Valuable, 1995). Importantly, there is a need for research with respect to new techniques to explore the relationship between mental and emotional health (maintained through psychotherapy) and the reduction of vertebral subluxation (maintained through chiropractic care) (Kent, 2013). Due to the fact that CBT is known to be an effective treatment for one of the most

stressors, CBT as a combination intervention provides adequate support for patients (Foa, 2006).

Therefore, a combination intervention that rehabilitates the whole body is huge incentive to assist individual with achieving stress management goals (Foster, Olchowski, & Webster-Stratton, 2007; Kent, 2013). Results suggest that a combination invention highlighting components that cover the whole interacting system of complaint, or stacking intervention components, is cost-effective (Foster et al., 2007). Due to the rise of safety concerns for the use of pharmaceutical agents, a need for alternative nonpharmacological therapies has become increasingly apparent for conditions (Varady & Jones). A recent study (Varady & Jones, 2005) concerning dyslipidemia found combination interventions elicit complementary effects and are an efficacious. Maintaining these components assures wholeness -mind and body. Although these precedent therapies are effective, each of the unitary treatments mentioned does not demonstrate renewal for the whole body health. The issue becomes relevant when individuals lose their health, wholeness, and are treated with one medicinal care (Kent, 2013).

Summary

In consideration for the technological advances reported within the literature, the literature is replete with interventions designed to reduce stress related disorders. However, there is the necessity to bridge literature and treatment gap, by exploring the relationship between the combination therapy of reduction of vertebral subluxation and CBT and mental and emotional health (Kent, 2013). *Hence,* the purpose of this study is

to study the predictive relationship of the combination therapy Chiropractic care (CC) and CBT on the alleviation of stress (Nitschke, 2012). A lifestyle modification entails the correcting of nerve interference to increase function, which will improve with greater expression of human potential.

While both CBT and CC have demonstrated effectiveness in addressing stress related disorders (reporting the greater reduction of stress), little information is available on whether alternative health care treatments such as combination therapy would further rehabilitate and lessen stressors *(*Dunn et al., 2009; Kent, 2013; Oths, 1992). Overall, this research is significant and will provide original contribution to the literature by showing the effects of stress on one's body (confirmation from a stress test) and mental state, and providing evidence that a combination therapy would further rehabilitate and lessen stressors (Nitschke, 2014; Williams, 2006). Chapter 3 will explain in detail the research methodology, procedures, and data analysis techniques, including the variables of the study to reveal the approach with respect to a combination therapy.

Chapter 3: Research Method

Introduction

In this chapter I will addresses the foundation for the design of study and provides the blueprint for the method and procedures that were used in the study. The chapter includes a restatement of the problem; statement of the hypothesis; description and diagram of the research design, including its assumptions and limitations; a discussion of the selection of participants; a consideration of ethical assurances; and chapter summary.

Restatement of the Problem

The purpose of this quantitative study was to determine the effectiveness of a combination therapy in regards to alleviating stressors by psychotherapy and recovery from nerve damage (or CC). This combination therapy involved individuals eliciting a lifestyle modification and recognizing the beneficial effect of correcting nerve interference to correct nerve interference to improve brain and body connectivity. An archival data provided information concerning the outcome of the combination therapy.

Research Design and Rationale

For more than 100 years, chiropractors have assured the public that an individual's wholeness (mind and body) health, or the alleviation of stress, can be improved through chiropractic spinal manipulation or spinal manipulative therapy (Fukuda et al., 2011a; Hardy & Pollard, 2006; Kent, 2013; Williams, 2015). Psychologists have informed the public that an individual with PTSD/chronic PTSD or acute stress disorder can be effectively treated (i.e., have arousal symptoms associated with acute stress disorder be reduced) with CBT (Bryant, Dang, Guthrie, Moulds, &

Sackville, 2014; Hollon & Ponniah, 2009; Foa, 2006; Mok, Chau, Chan, & Ip, 2014; NAMI, 2014). The two treatment groups in this study consisted of CBT independently and the combination of CBT and CC simultaneously. The independent variables were variables that stood alone or were not changed by the other variables. The independent variables in question were the two forms of treatment: CBT independently and the combination therapy of CC and CBT.

The dependent variables were used to assess the effect of the treatment or the variables manipulated by the researcher (Gravetter & Wallnau, 2009). The dependent variables measured before treatment were nerve conduction as measured by the nerve conduction velocity test (NCV), stress as measured by the Stress Questionnaire (DASS), and anxiety as measured by the Beck Anxiety Inventory (BAI). The participant's mental, physical, and emotional health recovery level (stress), or the recovery of nerve interference (the rehabilitation from damage nerves, vertebrae adjustments, and psychotherapy, which are contingent on an individual's determined number of treatments/sessions), were manipulated by the researcher. For example, the key dependent variables included the NCV measurement for after treatment (stress). The working dependent variables after treatment, for example, were the number of treatments per each care, stress as measured by the Stress Questionnaire, and an individual's anxiety as measured by the BAI.

Therefore, the purpose of this quantitative retrospective outcome study and the connection to the research questions allowed for a clear understanding for the predictive relationship of the combination therapy of CC and CBT on the alleviation of stress. A

quantitative design yielded a determination of the outcome for the potential influence of stress on the effectiveness of psychotherapy and chiropractic treatment simultaneously. Moreover, the data expressed the mean difference with respect to the variables between pre-treatment and post-treatment. A qualitative approach did not apply for this study due to this study's disregard of variables in their natural setting. A qualitative approach would have provided the researcher with a non-numerical data of lived experiences. This archival study provided numerical data that assisted the researcher with an understanding of the relationship among the variables with respect to a sample of the population studied.

The method of examination for this study involved a baseline archival data from a clinical database. Quality data are the heart of empirical research (Salehyan, 2015). Obtaining archival data research is an approach of descriptive research (Heiman, 2001), in which the intent of this nonexperimental approach was to observe and record data rather than to manipulate variables (Norman, Berlin, Sundblom, Elinder, & Nyberg, 2015; Webb, 2000). This practical inquiry shortened the time in which the community partner could locate and survey an ethical population in a particular area. A major benefit is that the same subjects were used throughout my study. In addition, an experimental design was unethical to conduct as a treatment research due to liability circumstances. The time and resource constraints were consistent with this design choice.

This archival study's design was more effective due to the supply of quality data. Considering technology, researchers are able to have more information available, which supplied a tremendously improved level of scholarly productivity (Salehyan, 2015). The dataset offered a public high quality to the scholarly community as the researcher had the

ability to conduct their own studies and expand upon the existing resources/dataset (Salehyan, 2015). According to Salehyan (2015), full transparency at the data generation stage allowed the scholarly community to assess the quality of the data and consult the same materials, utilize the same coding rules, and generate an output that was respectively close to the original data. In particular, archival data allowed the researcher to make choices on how to use the data, examine what was missing from sources, address potential biases, ensure reliability of numeric values/extracting information and coding the source, and ensure a new realm of accessible archival data for the next researcher (Salehyan, 2015).

Methodology

Population

The target population identified a convenience sample of 112 adults. The convenient sample was varied races and comprised of woman and men from 30 to 50 years of age. The target population lived in a major city in the western region of the United States of America.

Sampling and Sampling Procedures

This target population agreed to allow their data (information) to calculate in this study. The sample provided an informed consent explaining disclosure of identity, the purpose and use of their data, course of the treatment procedure (awareness of conducting a psychological test), their right to discontinue the study at any time, and their right to

receive the results of the study, once a study in the future would be completed (See Appendix C).

A sample size was determined by computing a two-way mixed ANOVA in order to predict and explain the main effects of each independent variable and the associated interaction effect (Gravetter & Wallnau, 2009). There will be a separate sample for each therapy techniques/treatments being compared (or hypothesizing a difference between group one, CC individually, and group two, CBT and CC simultaneously. ANOVA helps to evaluate the mean differences between the two therapies and scores, and any extra mean differences that will attract attention when reviewing the main effects (or interaction between factors). This corresponded to the power of the test. According to Gravetter & Wallnau (2009), the power of a statistical test has been that the probability that the test will correctly reject a false null hypothesis and identify a treatment effect if one actually exist (p. 265). The power and effect size are related (Gravetter & Wallnau, 2009). The power of a test provided adequate information of the sample size instead of measuring the effect size directly. The power analysis contained influential factors and was as followed: sample size, size of treatment effect, and the value of the alpha level. The treatment effect is to compute eta squared (η^2), measuring the percentage of variance. In addition, using G Power for a power analysis for η^2 with two independent groups, alpha = .05. The results indicated that a sample size of minimum 112 (56 in each group) resulted an effect size of 0.05 and a power of 80% (1-β) suggesting a probability of a Type II error of 20% (β).

Procedures for Recruitment, Participation, and Data Collection

A chiropractor implemented a stress-management treatment plan, consisted of adults who identified their stressors, received outcome assessments, acknowledged how to conquer a relapse cycle, and revealed parallel problems causing vertebral issues. Considering these key factors, individualized therapeutic and complementary chiropractic protocol followed to restore the brain, spinal cord, and nerves, essentially to allow the body to communicate effectively with the brain to behave and think stress-free. The survey data collected as part of a Physical and Mental Patient Improvement (PMPI) study from the Chiropractic office, which occurred from May 2014 to June 2014. The clinical database was stored at a Chiropractic Wellness Center in a large city in the western region. The sample (participants feeling highly stressed) consisted of new patients and chosen by the discretion of the physician (Chiropractor). The physician did not require any follow up interviews or treatments with the participants. This collected data assisted to the understanding of the proposed hypothesis.

Access to the Data

The procedure to gain access to the data set was favorable. Following IRB approval, I provided the community partner with a letter, which served as verification of my student enrollment at Walden University (see Appendix A and B). The community partner provided the data to me to ensure the confidentiality of each participant's identity.

Instrumentation

Nerve Conduction Velocity

Pain is subjective and many factors (emotional state, age, personality, and so forth) became the descriptors of an individual's pain vocabulary, or an individual's pain expressed as a fine source such as visual documentation or objective physiological measurement (Reed & Van Nostran, 2014). The nerve conduction velocity (NCV) test provided the clinician with the ability to observe the speed of conduction of an electrical signal traveling from synapse to synapse in the nerve. The chiropractor placed two surface electrodes on a patient's skin over nerves (myelinated nerve fiber) at different locations. One electrode released a minute electrical impulse designed to stimulate the nerve and the other electrode records the activity. Each electrode released a minute electrical impulse, which stimulated the nerve. The NCV is calculated by measuring the distance between electrodes and the time for which an electrical impulse travels between electrodes (velocity = distance/time; and velocity = change in distance/change in time, for motor nerves). The measurement from the nerve and muscle action potential presents in milliseconds (Weiss, Weiss, Pobre, & Kalman, 2015). A normally functioning nerve will transmit a stronger and faster signal than a damaged nerve. The range of a normally functioned nerve is approximately 50-60 meters per second. In addition, NCV determined one's nerve damage, destruction, and the presence of many disorders (John Hopkins Medicine, 2015).

Reliability

The Correlation coefficients (> 0.80) were considered to have excellent reliability (Zuo et al., 2015). A recent study (Zuo et al., 2015) observed 63 young, middle aged, and old adults, the evaluation of the sural nerve from the forefoot to the knee. An

intraobserver (r= 0.87) and interobserver (r= 0.87) reliability were high (Zuo et al., 2015). The recordings of the sural nerve provided significant reliability and may be valuable patients with length-dependent polyneuropathy to monitor progression and to evaluated treatment response (Zuo et al., 2015).

Validity

The validity was determined by statistical accuracy. Qualitatively, the continuous values (dichotomized into abnormal and normal results) were assessed and compared (Bril et al., 2014). According to Bril et al. (2014), diagnostic validity of the nerve conduction results were analyzed using receiver operating characteristic (ROC) curves. ROC curves were used to determine optimal threshold values (to determine between normal and abnormal readings).

DASS-21

The Stress Questionnaire (Depression, Anxiety, and Stress Scale – 21 items (DASS-21) was a convenient simple assessment recommended for interpreting the intensity of self-reported stress and anxiety in adults. The Stress Questionnaire was a 21 item (divided in three sets) self-report scales designed to measure the emotional states of depression, anxiety, and stress (Antony, Bieling, Cox, Enns, & Swinson, 1998). The scale ranged from 0 to 3.

The depression scale (assessed dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia and inertia), anxiety scale (assessed autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience

of anxious affect), and stress scale (which was sensitive to levels of chronic non-specific arousal) were the subscales. These scale ranged from 0 to 3 (0 -did not apply to me at all- to 3-applied to me very much or most of the time). The total score provided information concerning one's difficulty in relaxing, nervous arousal, and how likely to be easily triggered (i.e. ranged from 0-14 indicated normal level of stress to 34+ indicated extremely severe level of stress).

Reliability

Antony, Bieling, Cox, Enns, and Swinson (1998) presented a sample of 160 diagnostically mixed outpatients with the BAI. The Depression Anxiety and Stress had a high internal reliability (Cronbach's coefficient alpha = .94, .87, .91 respectfully).

Validity

The DASS, an anxiety scale correlated most highly with the BAI, moderately correlated with the STAI–T (State-Trait Anxiety Inventory). The correlation was .85. Studies confirmed DASS-21 as a reliable and valid method for assessing features of stress (Antony, Bieling, Cox, Enns, & Swinson, 1998; Osman et al., 2012).

Beck Anxiety Inventory

The Beck Anxiety Inventory (BAI) has been a convenient simple assessments recommended for interpreting the intensity of self-reported stress and anxiety in adults. The BAI is composed of 21-item rating scale designed to measure the severity of anxiety answered on a 3-point Likert scale (Beck & Steer, 1990). The scale ranged from 0 (the symptom bothered the participant "Not at all") to 3 (the symptom bothered the participant

"Severely; I could barely stand it"). The maximum score is 63 points (i.e. ranged from 0-7 indicating minimal level of anxiety to 26-63 indicating severe level of anxiety).

Reliability

Beck and Steer (1990) presented a sample of 160 diagnostically mixed outpatients with the BAI. The BAI had a high internal reliability (Cronbach's coefficient alpha = .92). In connection, 40 patients diagnosed as having anxiety disorders reported a higher level of internal consistency (Cronbach's coefficient alpha = .94) (Beck & Steer, 1990). Moreover, the internal reliability for the BAI is above .90 and test–retest reliability over 1 week, r (81) = 0.75 (Beck & Steer, 1990). Nevertheless, the instruments captured consistent results ($r > .70$) and were free from random error (Gravetter & Wallnau, 2009).

Validity

The content, concurrent, construct, discriminant, and factorial were considered to ensure that the BAI was drawn from a long term of renowned documented instruments and sample studies. The BAI held the ability to discriminate different combinations of primary and secondary mental disorder. The BAI was not only significant; yet, substantially related to other accepted measures of clinically rated anxiety and self reported.

Considering the fact that two individuals would suggest identical scores, the mechanism of injury or psychological reference (i.e. death in the family) was important to reflect (Reed & Van Nostran, 2014). Therefore, the complicated variables entail weight, location or palpation findings, and mechanisms of injury, and the actual stressor.

Data Analysis

Preliminary Analysis

Prior to interpreting results of a two way ANOVA, the assumptions were evaluated. The validity of the two-way ANOVA depends on three assumptions in order to develop capable conclusions. With this respect, the ANOVA requires the observations within each sample were independent (Gravetter & Wallnau, 2009). The population from which the samples were selected was normal (Gravetter & Wallnau, 2009). The populations had equal variances (homogeneity of variance). I checked the sample variance for closeness to insure that the homogeneity assumption is satisfied. Although, I assessed this assumption of homogeneity of variance by furthering statistical technique in Levene's test. However, for this study, the assumption of normality was insignificant due to the use of large samples.

The data screening consisted of checking for any outliers (i.e., an extreme value on a particular item). If there were outliers present, the outliers were removed. Then, the results factored an amount of variation, based on a standard deviation of 10, the statistical regression technique used for this study accounted for an alpha level of significance of .05. This level of significance constricted the boundaries for the critical region for an unlikely outcome and the determination of the probability of a Type I error. In addition, this boundary reduced the risk that a false report was published and became part of the scientific literature (Gravetter & Wallnau, 2009); in turn, eliminated errors for the researcher to conclude a treatment effect when there was not enough statistical evidence to significantly have an effect during the hypothesis test. The independent variables

entered and equated to a normal population mean per each variable. Levene's test for homogeneity of variance was analyzed to insure the assumptions were satisfied or not violated.

Main analysis

Statement of the Hypothesis

The central research question was, Does the combination therapy of CBT (i.e., the restructuring of negative thought patterns to improve brain activity as measured by the Stress Questionnaire, and Beck Anxiety Inventory [BAI]) and CC (as measured by nerve conduction velocity test [NCV]) decrease stress and alleviate nerve interference respectively, compared to CBT independently?

Research Question 1. Does the combination therapy of CBT and CC decrease an individual's stress (as measured by the Stress Questionnaire), compared to CBT independently?

Alleviation of Stress Hypothesis 1.

Null Hypothesis ($H_0 1$*):* There are no statistically significant differences in the mean change scores of stress (pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined. CBT and CC will not improve brain activity (alleviate stress) more effectively than CBT independently.

Research Hypothesis ($H_a 1$): There is a statistically significant difference in mean change scores of stress (pre-treatment to post-treatment) between CBT independently compared to CBT and CC combined. CBT and CC combined will

improve brain activity nerve interference (alleviate stress) more effectively than CBT independently.

Research Question 2. Does the combination therapy of CBT and CC decrease anxiety (as measured by the BAI), compared to CBT independently?

Alleviation of Anxiety Hypothesis 2.

Null Hypothesis ($H_0$2): There are no statistically significant differences in the mean change scores of anxiety (pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Research Hypothesis (H_a2): There is a statistically significant difference in the mean change scores of anxiety (mean scores of the pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Research Question 3. Does the combination therapy of CBT and CC alleviate nerve interference (as measured by the NCV), compared to CBT independently?

Nerve Interference Hypothesis 3.

Null Hypothesis ($H_0$3): There are no statistically significant differences in the mean change scores of the nerve interference (pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Research Hypothesis (H_a3): There is statistically significant difference in the mean change scores of the nerve interference (pre-treatment to post-treatment values) between CBT independently compared to CBT and CC combined.

Rationale for Hypotheses

Participants who received specialized training in combination therapy, CBT and CC, with respect to managing their stress or anxiety, expected to experience less stress after completion of the treatment than participants who received a unitary specialized treatment in managing their stress.

Although the focus of this study was on the effect of stress (stressors) rather than anxiety, anxiety encompassed stress. Thus, any anxious outcome was measured utilizing the BAI. In addition, given that anxiety often accompanied stress, anxiety may appear as stress (having unsure expectations) during the process of a new treatment (combination therapy). The expectation was that a decrease in anxiety related to the combination therapy effectiveness, CBT and CC.

A two-way mixed ANOVA is a statistical technique used to compare two groups of therapy treatments (Gravetter & Wallnau, 2009). This technique will test the null hypotheses and will be performed using SPSS. When ANOVA was done using SPSS, the F-ratio (numerator equates how much difference exists between the group treatments) is accompanied by an exact value for p. Two-way ANOVA favor this research method due to the fact that the technique provides adequate results with respect to before and after studies. This type of analysis allows for a prediction and explains the main effects. It will analyze variables (Stress Questionnaire, BAI, NCV, and an individual's stressor on pre and post intervention) that may impact stress and nerve restore/damage.

The results for each main effect interpret based on the statistical significance of the outcomes for the ANOVA. If the population variances are equal, then the two sample variances should be similar or the F-max test for the null hypothesis will analyze the F-ratio of the ANOVA. Therefore, a two-way ANOVA will determine if there is a statistically significant effect of psychotherapy and chiropractic treatment on alleviation of stress.

Threats to Validity

Internal validity addressed whether the expected changes based on the treatment occurred for any reason outside of the manipulation of variables. As this study analyzed archival data, it was not possible to influence directly internal validity. Potential issues that affected internal validity included history and maturation (are there factors that occurred between the pre and post evaluations that influenced the results), instrumentation (whether the treatment was administered the same way to all participants), and selection bias. Collection of the archived data included exploration of these potential threats to internal validity through communication with the community partner about the data collection practices.

External Validity

External validity addressed the extent to which the study's results would generalize to other populations and settings. According to the community partner, participants referred for treatment of stress disorders were representative of populations at other chiropractic practices. Prior to retrieval of data, other potential threats to external validity were considered. For instance, whether the treatment, both CBT and CC, were

routine and/or similar to treatments at other settings where participants with stress disorders sought treatment. The community partner received this information and reported to the researcher the differences.

Ethical Assurance

Several steps were in use to ensure this research is in accordance with ethical procedures. According to the community partner, the participants were informed of all relevant aspects of the study. The participants received an Informed Consent Form (Appendix B) indicating their knowledge of documentation, including their right to discontinue participation, their role as participants, their maintained confidentiality, and the activities involved. The participants received a copy for their records. The participants read and signed the consent form to ensure understanding that their scores would be included in the database for future research. Following IRB approval, a scheduled meeting was set with the community partner and researcher to discuss procedures and data documentation. In addition, the assessments and data were stored in a locked file cabinet at the community partner's office for the duration of the study. The data transferred to a computerized data file with password and remained in this safe location until seven years after the study.

Summary

The rationale concerned the instrumentation, which provided an understanding for individual applied psychotherapy and Chiropractic treatment. Moreover, an individual's stress was relieved and accomplished their ability to maintain whole body health. The use of a retrospective outcome design determined if stressed

individuals would experience less stress and a healthier whole body outcome after the administration of a chiropractic and psychotherapy care. Overall, identifying the research design and the connection to the research questions was the backbone to advance knowledge in the psychology discipline. Methods and procedure outlined.

Chapter 4: Results

In this chapter, information concerning the sample and the results of the data analyses to accomplish the three specific aims of study are presented. The chapter includes a restatement of the purpose; research questions and their respective statements of the hypothesis; description of the sociodemographic characteristics of the sample and data collection, followed by the analysis of the results of a combination therapy (CBT and CC) and CBT independently; and a chapter summary.

The purpose of this quantitative research study was to examine the efficacy of a combination therapy of CC and CBT in alleviating stress. Stress and anxiety are accountable for a large proportion of disability worldwide (Kalia, 2002). Thus, the central research question was applicable in order to discover the effects of the study.

The observed dependent variables (anxiety, stress, and nerve Interference) between the independent variables (treatment type: CBT and CC) and within the independent variables (treatment time: conditions before and after treatment [Pre and post-treatment respectively]). The central research question was, Does the combination therapy of CBT (i.e., the restructuring of negative thought patterns to improve brain activity as measured by the Stress Questionnaire, and Beck Anxiety Inventory (BAI)) and CC (as measured by nerve conduction velocity test) decrease stress, anxiety, and alleviate nerve interference respectively, compared to CBT independently? This central question lead to the direct subquestions and their respective hypotheses. Does the combination therapy of CBT and CC decrease an individual's stress, compared to CBT independently? There were statistically significant differences in the mean change scores of stress

between CBT independently compared to CBT and CC combined. After receiving the data, the hypothesis expressed were that there was a statistically significant main effect of treatment type on stress as well a statistically significant main effect of treatment time (i.e., pre and post) on stress. The null hypothesis was that CBT and CC would not alleviate stress (i.e., improve brain activity) more effectively than CBT independently.

Secondly, does the combination therapy of CBT and CC decrease an individual's anxiety, compared to CBT independently? There were statistically significant differences in the mean change scores of anxiety between CBT independently compared to CBT and CC combined (H_2). Again, with the archival data in hand, the hypothesis to tests were that there was a statistically significant main effect of treatment type on anxiety as well as a statistically significant main effect of treatment time (i.e., pre and post) on anxiety. The null hypothesis was that CBT and CC would not decrease an individual's anxiety level more effectively than CBT independently.

Thirdly, does the combination therapy of CBT and CC alleviate nerve interference, compared to CBT alone? There were statistically significant differences in the mean change scores of the nerve interference between CBT independently compared to CBT and CC combined (H_3). Observing the archival data, the hypothesis to tests were that there is a statistically significant main effect of treatment type on nerve interference as well as a statistically significant main effect treatment time (i.e., pre and post treatment) on nerve interference. The null hypothesis was that CBT and CC would not increase the speed of an individual's nerve response more effectively than CBT independently.

To understand the two treatments (CBT and CC) in relation to the dependent variables (stress, anxiety, and nerve interference), the hypothesis to test was that there was a statistically significant interaction effect of treatment type and treatment time on stress, anxiety, and nerve interference. The ANOVA procedure on SPSS provided direct graphs to view these interactions. The presences of interactions have important implications for interpretation of statistical results.

Data Collection

The 56 chiropractic and psychological participants and 56 psychological participants constituted a convenience sample of 112 adults diagnosed with stress-related conditions. Most were of middle to upper-middle class socioeconomic status and college educated. These adults, women and men, participants ranged from 30 to 50 years of age with a mean age of 38 years (*SD* = 38.5). There were more female participants in the CBT treatment group (51%) than in the CBT and CC group (48.3%). As observed, in the CBT and CC group, there were a large frequency of male participants between the age of 35- 38 (f = 9), whereas more female participants were of the age of 48 (f = 4). Women were comprised of 52% of the participants (n = 110). The community partner documented 85% of the participants had full-time (*n* = 56, 50%) or part-time jobs (*n* = 28, 25%). The rest were homemakers (*n* = 17, 15%) and unemployed (*n* =11, 10%). The participants' responses were in accordance with the protocol of the Physical and Mental Patient Improvement (PMPI) study. The archival data appeared to represent the western population well.

Tables 1 and 2 show treatments by group (CBT with CC and CBT alone) and the gender and mean age of participants.

Table 1

Gender Frequency Comparison

Gender	Treatment type	n	%
Female	CBT	30	51
	CBT & CC	28	48.3
Male	CBT	26	49
	CBT & CC	28	51.7

Table 2

Age Frequency Comparison

Gender	Treatment type	Age	*f*
Female	CBT	32	3
		34	3
		41	3
	CBT & CC	30	3
		34	3
		48	4
Male	CBT	30	3
		43	3
	CBT & CC	35	3
		37	3
		38	3

The period for data collection occurred beginning May 2014 to June 2014. There were discrepancies in the data collection from the initial view of chapter 3. For instance, some participants' NCV initial reading did not register; therefore, that participant's results were indicated by the initials, NR, or not read. Thus, the averages for these

individuals calculated with fewer scores (Participant removed; N = 110). In both samples, CC with CBT and CBT alone, the community partner informed the researcher that some participants exercised during the study. Exercising allows for the release of hormones and possibly relieves stress (Sleight, 2016). This factor may have been a potential issue (i.e. during pre/post evaluations) that may affect the internal validity.

Results

Preliminary Analysis

Since having outliers could lead to Type I or II error, the first preliminary analysis done was to compute z scores for each individual score related to pre and post nerve interference, anxiety and stress. Tabachnick and Fidell's (2013) recommend criteria for identifying an outlier, which is any *z* score that is over 3.29 or under -3.29. After examining the *z* scores two out of 112 cases were identified as outliers and eliminated from the inferential analysis. Prior to interpreting results of a two-way mixed ANOVA, the assumptions were evaluated. The results of Levene's test of equality of error variances showed that there was an equal error variance for pre and post-nerve interference, pre and post-anxiety and post-stress scores since the significance value is more than alpha level of 0.01. This assumption was violated for the pre-stress scores (See Appendix D). Also, the results of the K.S. test of normality showed that all group of scores were normally distributed (p>.01) with the exception of post-anxiety scores, and pre and post-stress scores for CBT & Chiro group (See appendix E). Lastly, Box's M tests for three mixed ANOVA based on the nerve interference, anxiety, and stress indicated that the covariance matrices were equal (see appendix F).

Main Analysis

A mixed ANOVA with repeated measures was conducted to find out whether there was a statistically significant change in ratings between pretest and posttest scores on anxiety as a function of type of treatments (i.e. CBT and CBT alongside CC). The results showed there was a statistically significant main effect of treatment time on anxiety: $F(1, 110) = 292.125$, $p = .00$, partial η 2 = .73. Anxiety scores were significantly lower posttest as compared to pretest. In addition, there was a statistically significant main effect of treatment type (CBT & CC) on anxiety: $F(1, 110) = 4.013$, $p = .048$, partial η 2 = .036. The average scores on anxiety were significantly lower for the CBT and the CC group (M=18.16, SD = 5.78) compared to those in the CBT only group (M=20.54, SD = 7.95). However, there was no statistically significant interaction effect of treatment type (CBT & CC) and treatment time on anxiety: $F(1, 110) = .467$, $p = .467$, partial η 2 = .004 (see Table 3). Based on these results, the hypothesis, there were statistically significant differences in the mean change scores of anxiety (mean scores of the pre-treatment to post-treatment values as measured by the BAI) between CBT independently compared to CBT and CC combined *(H_2)* was not accepted. As shown in Figure 2, there was a significant reduction of anxiety among participants in both treatments. The lack of interaction indicates that the relative change (slope of the pretest to posttest mean scores for that group) were the same.

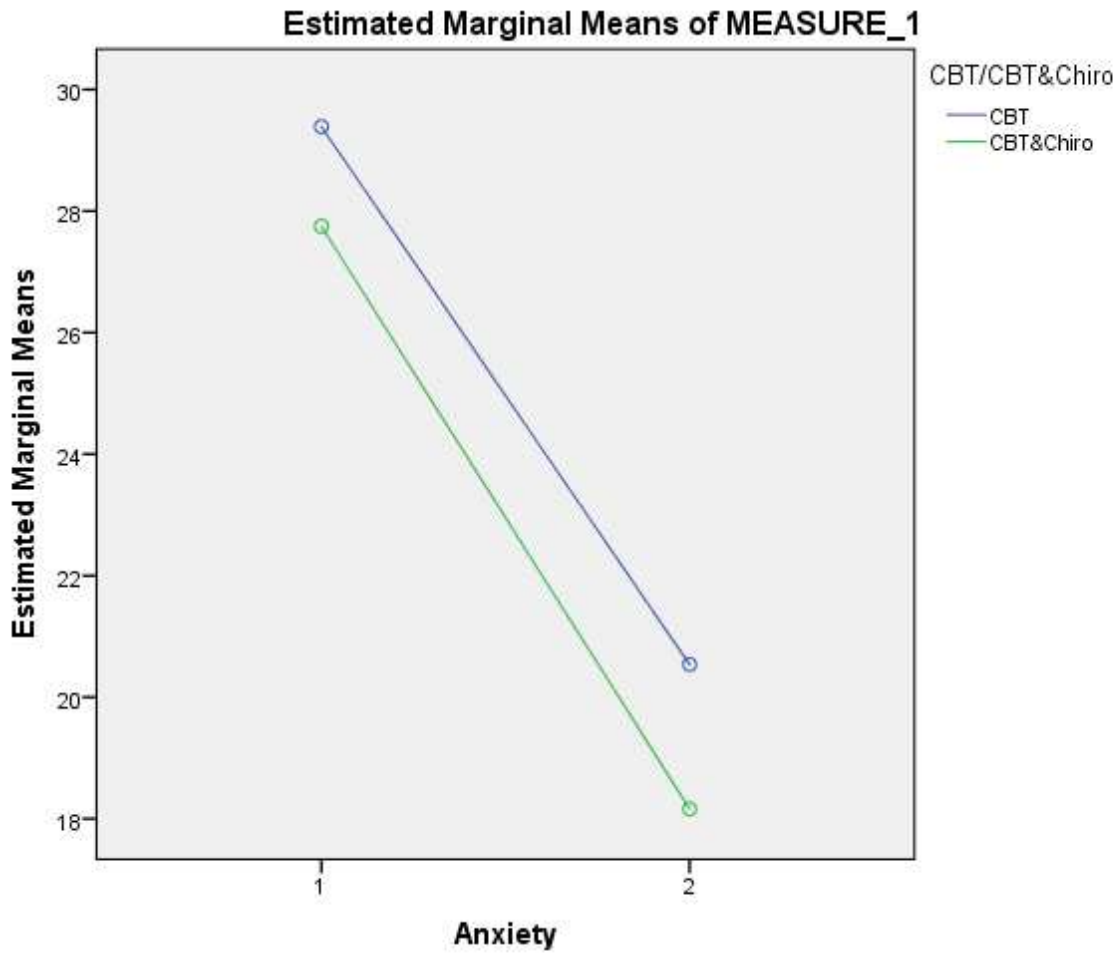

Figure 2. Participants' Anxiety level. This figure shows mean pre-treatment and post-treatment anxiety scores for participants in each of the two treatment conditions.

Table 3

Effect of Treatment Time and Type on Participants' Anxiety

Variable	df	MS	F	partial n^2
Main effect of treatment time	1	4674.49	292.13*	.73
Main effect of treatment type	1	221.603	4.013*	.036
Interaction effect of treatment time and type	1	.467	.496	.004
Within-cells errors	110	16.00		

Note. Analysis of variance results display effects of treatment time and type on participants' anxiety.
*p <.05.

A two-way mixed ANOVA was conducted to find out whether there was a statistically significant difference of stress between the two types of treatments (i.e. CBT and CBT plus CC) and between two treatment time/conditions (i.e. conditions before and after the treatments). The results showed there was a statistically significant main effect of treatment time on stress: $F(1, 110) = 287.02$, $p = .00$, partial $\eta\ 2 = .72$. Stress scores were significantly lower posttest as compared to pretest. In addition, there was a statistically significant main effect of treatment type on stress: $F(1, 110) = 24.82$, $p = .00$, partial $\eta\ 2 = .18$. The average scores on stress were significantly lower for the CBT plus CC group (M=24.89, SD = 7.07) compared to those in the CBT only group (M=30.58, SD = 8.18). However, there was no statistically significant interaction effect of treatment type and treatment time on stress: $F(1, 110) = 2.69$, $p = .10$, partial $\eta\ 2 = .024$ (see Table 4). Based on this results, the hypothesis, there were statistically significant differences in mean change scores of stress (mean scores of the pre-treatment to post-treatment values as measured by the Stress Questionnaire) between CBT independently compared to CBT and CC combined *(H_1)* was not accepted. As shown in Figure 3, there was a significant reduction of stress among participants in both treatments.

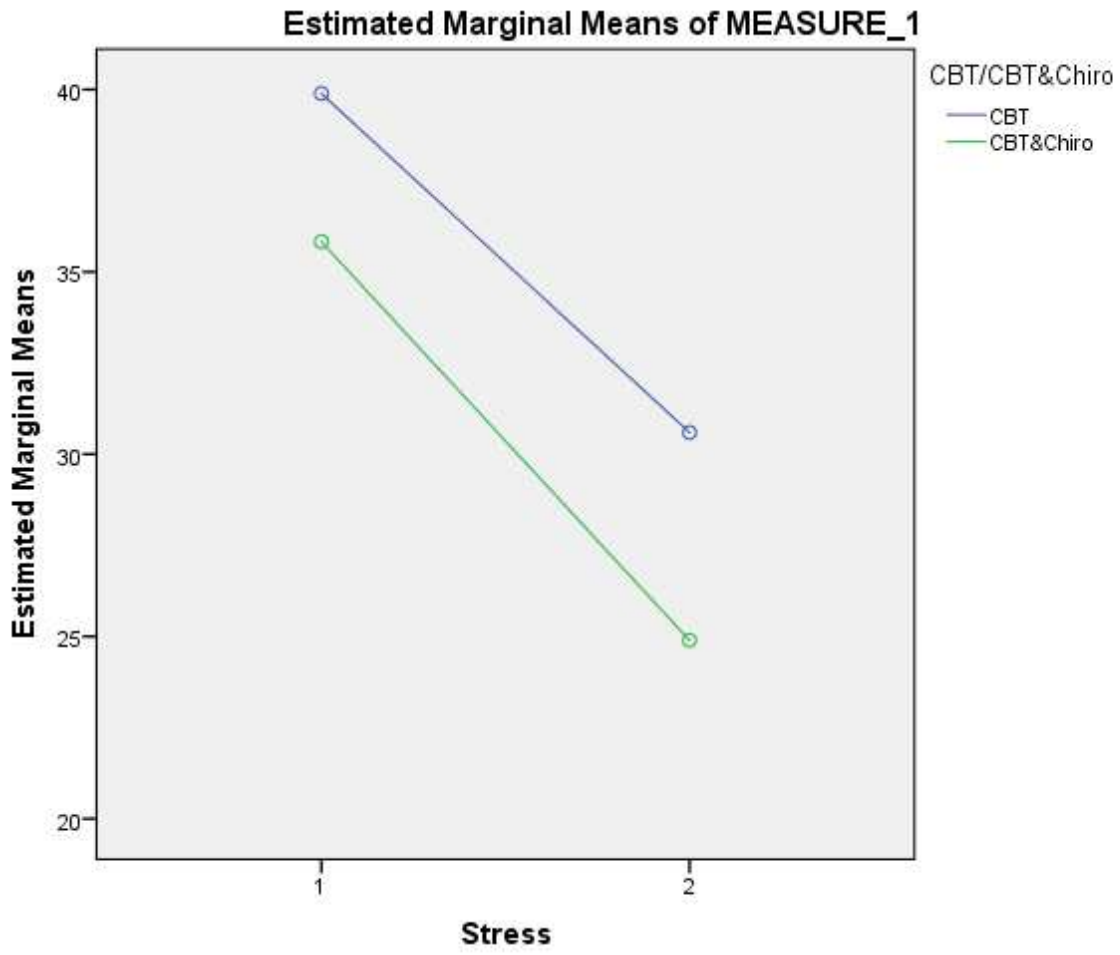

Figure 3. Participants' stress level. The figure displays participants' stress at each condition for the two treatment groups

Table 4

Effect of Treatment Time and Type on Participants' Stress

Variable	Df	MS	F	partial η 2
Main effect of treatment time	1	5622.513	294.132*	.73
Main effect of treatment type	1	1311.290	22.910*	.18
Interaction effect of treatment time and type	1	36.622	1.916	.017

Within-cells error	110	19.116

Note. Analysis of variance results display effects of treatment time and type on participants' stress.
*$p < .05$.

A two-way ANOVA was conducted to find out whether there was a statistically significant difference of nerve interference between the two types of treatments (i.e. CBT and CBT plus CC) and between two treatment time/conditions (i.e. conditions before and after the treatments). The results showed there was a statistically significant main effect of treatment time on nerve interference: $F(1, 110) = 119.32$, $p = .00$, partial η 2 = .52. In addition, there was a statistically significant main effect of treatment type on nerve interference: $F(1, 110) = 9.64$, $p = .00$, partial η 2 = .08. The average scores on nerve interference were significantly lower for the CBT plus CC group (M=47.93, SD = 1.73) compared to those in the CBT only group (M=47.16, SD = 1.96). However, there was no statistically significant interaction effect of treatment type and treatment time on nerve interference: $F(1, 110) = .533$, $p = .47$, partial η 2 = .01 (see Table 5). Based on these results, the hypothesis, there were statistically significant differences in the mean change scores of the nerve interference (mean scores of the pre-treatment to post-treatment values as measured by the NCV) between CBT independently compared to CBT and CC combined *(H_3)* was not accepted. As shown in Figure 4, there was a significant increase of nerve interference among participants in the both treatments.

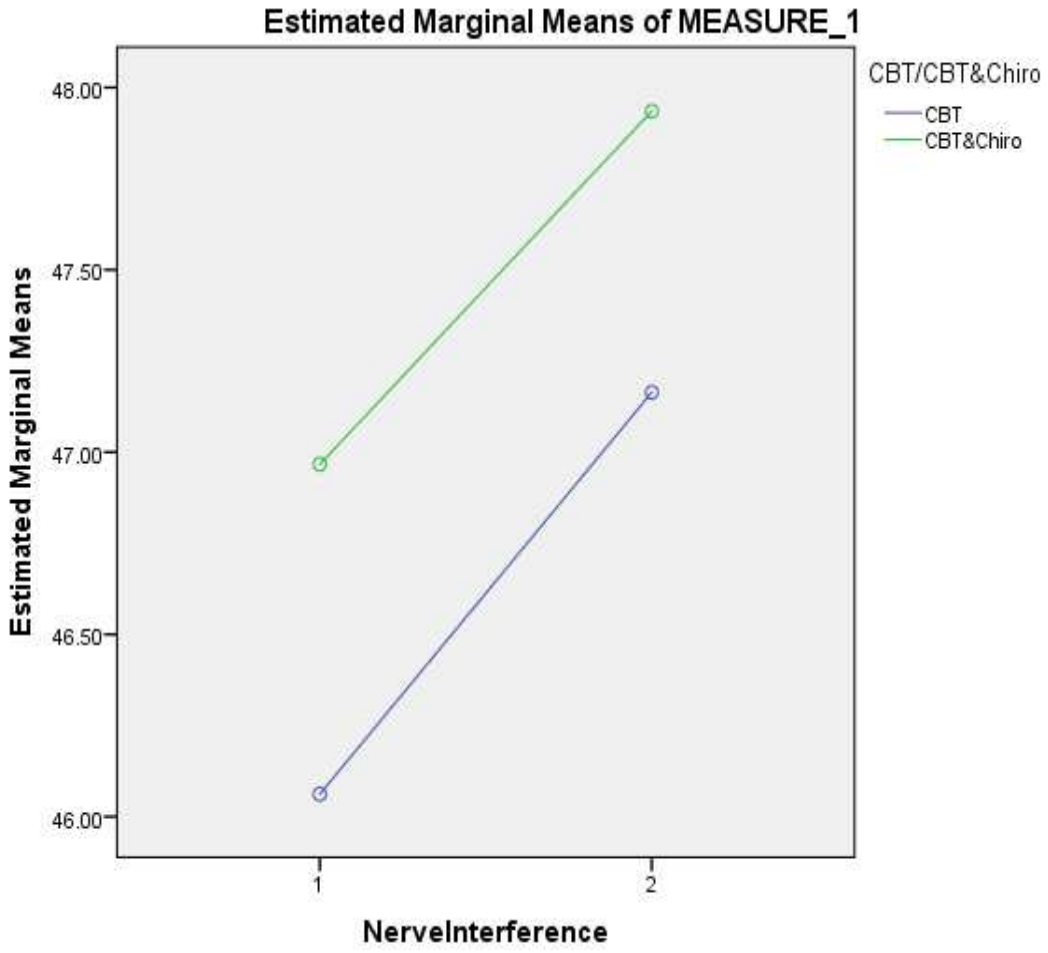

Figure 4. Participants' nerve conduction. This figure displays participants' nerve interference at each condition for the two treatment groups.

Table 5

Effect of Treatment Time and Type on Participants' Nerve Interference

Variable	df	MS	F	partial η2
Main effect of treatment time	1	58.928	115.286*	.52
Main effect of treatment type	1	38.609	7.681*	.066
Interaction effect of treatment time and type	1	.247	.482	.00
Within-cells error	110	.51		

Note. Analysis of variance results display effects of treatment time and type on participants' nerve interference.
*$p < .05$.

Summary

The archival data were analyzed for 110 stressed adults. The combination therapy of CBT with CC has proven to alleviate stress, however, the null hypothesis (H_0, H_2, H_3) for the three aims did not result in a statistically significant differences in the mean change (mean scores of the pre-treatment to post-treatment values as measured by the DASS-21- stress questionnaire, BAI - Anxiety, NCV – electrical signals) compared to CBT independently.

With respect to alleviating stress, CBT and CC did not improve brain activity more effectively than CBT independently. Moreover, with respect to nerve interference, CBT and CC did not improve the speed of the nerve connection in order to alleviate one's nerve interference. Furthermore, with respect to anxiety, CBT and CC combined did not decrease anxiety more effectively than CBT alone. The implications of these results will be discussed in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to examine the efficacy of a combination therapy of CC and CBT in alleviating stress. To date, many researchers have focused on alleviating stress with unitary treatments (see Ballinger et al., 2002; Capelini et al., 2006; Fernros, Furhoff, & Wändell, 2008). Little was known about combining modalities to manage stressors and their manifestations. Without key factors diligently established in the plan (consideration of one's thoughts, behaviors, and nerve interruptions – vetebral subluxation complex), the deterioration of whole body health will continue to occur. In addition, without a good plan, traumatic patterns (i.e., tragedies) in society will occur and the need for social balance that functionalism promotes will be essential (Harpaz-Rotem, Pietrzak, Tsai, & Southwick, 2012).

Stress can have a detrimental effect on the quality of life due to its prevalence, early onset, and impact on the individual, family, and community (see Ahluwalia et al., 2011; APA, 2014c, 2016; Avenevoli et al., 2013; Ballinger et al., 2002; Bureau of Labor Statistics and Department of Health and Human Services, 2015; Capelini et al., 2006; Cavigelli & McClintock, 2013; Edlund et al., 2015; Frisco, 2013; Frith, 2015; Hardy & Pollard, 2006; Harpaz-Rotem et al., 2012; Kalia, 2002; Kent, 2013; Munoz, Scott, & Hofer, 2015; NIDA, 2005; Williams, 2011). Thus, functioning at 100% everyday can be challenging for busy adults. Researchers have suggested that various types of treatments should be used to assist with managing stress (see Ballinger et al., 2002; Capelini et al., 2006; Hardy & Pollard, 2006; Jain, 2007; Fernros, Furhoff, & Wändell, 2008; Foa, 2006; Lin et al., 2004; Rivas-Vazquez, 2001; Teixeira, 2008; Wilson et al., 1995; Zettle, 2012).

A combination therapy provides a multitude of treatment types within the two modalities to combat an individual's stressor(s).

In my study, I found that, after treatment, individual participants who received CBT alone and CBT combined with CC experienced a higher speed for nerve connection and a reduction in stress and anxiety scores. This finding is consistent with the literature, which demonstrates the efficacy of CBT for treatment of stress related disorders (see Foa, 2006). As noted in Chapter 2, CBT is an empirically supported intervention for stress-related disorders (Foa, 2006; Hollon & Ponniah, 2009; NAMI, 2014). Studies suggested (Baker, et al., 2009; NAMI, 2014; Straube et al., 2006) that CBT changes brain activity in individuals with mental illness by improving the brain's ability to cope with stressors (Baker et al., 2009; NAMI, 2014;; Straube et al., 2006). Moreover, CBT alone has been found to change negative, unrealistic cognitions in such a way to identify dysfunctional thoughts and beliefs, challenging these thoughts, and then replacing them with realistic cognitions (Foa, 2006). However, based on my review of the literature, I found that there was insufficient information on the use of combination therapy for stress reduction. Thus, I found out and inquired about this archival data in order to address this gap in knowledge.

Interpretation of the Findings

In this study, CBT was reaffirmed as an effective treatment for stress, anxiety, and nerve conduction. For stress and anxiety, the interaction results were not significant; the two groups had statistically equivalent changes in scores from pre to post treatment. These results are consistent with the overwhelming body of literature espousing the

benefits of CBT for treatment (see Baker et al., 2009; Ballinger et al., 2002; Foa, 2006; Hollon & Ponniah, 2009; NAMI, 2014; Straube et al., 2006). As noted in Chapter 2, CBT is an empirically supported intervention for stress-related disorders (Foa, 2006; Hollon & Ponniah, 2009; NAMI, 2014). Researchers have suggested that CBT changes brain activity in individuals with mental illness by improving the brain's ability to cope with stressors (Baker et al., 2009; NAMI, 2014;Straube et al., 2006). Moreover, CBT alone has been found to change negative, unrealistic cognitions in such a way to identify dysfunctional thoughts and beliefs, challenging these thoughts, and then replacing them with realistic cognitions (Foa, 2006).

Results from my study are consistent with the literature and were expected. Interestingly, there was less support for the use of chiropractic treatment as an add-on treatment for anxiety, stress, and nerve conduction. What was most surprising was that CC along with CBT, statistically, did not seem to provide more nerve conduction than CBT alone. This finding was inconsistent with those of other researchers, who have reported the success of chiropractic treatment for nerve conduction (Genthner, et al., 2005; Kent, 2013; Nitschke, 2012; Spine-Health, 2014; Williams et al., 2007). As noted in Chapter 2, studies reinforcing the effectiveness of chiropractic treatment in relieving stress are fewer in number. It is possible that the challenges I faced in conducting this study are similar to challenges faced by past researchers. The limitations of this archival study may have affected my ability to find significant results for the combination therapy.

Limitations of the Study

After reviewing the existing body of research as well as the results of this quantitative archival study, I have identified the following limitations, which arose during my investigation. One limitation of the study was that the sample size was relatively small. A small sample size is a factor that influences a type II error, the power of the study, and the outcome of a hypothesis test (Gravetter & Wallnau, 2009). Therefore, the findings are not readily generalizable (e.g., to minority populations or those in lower socioeconomic status groups). The sample size should reflect the target population. Also, the power of this study was low, which made it less likely that statistical significance could be found if it existed.

In addition, the technique of CC and CBT was not personalized according to the participants' needs. Thus, the treatments were not administered in the same way to all participants. Differential administration of treatment may have caused poor results due to the inconsistency of treatment. This inconsistency allowed errors to occur.

Moreover, study data consisted of archival data, consisting of set variables, procedures, and participants' scores. I had no control over researching this dissertation problem or choosing variables that would favor better NCV, stress, and anxiety scores. In addition, using archival data limited my ability to contact subjects for clarification (e.g., to ensure accuracy and understand a participant's readiness for change). Use of archival data influenced the results in that I was unable to use new, improved variables. For example, I would have used variables that provided pain values.

Recommendations

After reviewing the existing body of research as well as the results of this quantitative archival study, I have developed the following recommendations. Considering the challenges with using archival data where there is no control over data collection, future researchers should design a treatment study where CBT and CC can be consistently applied. Factors such as using a control group or random assignment to groups may improve the methodological soundness of the study. These changes may enhance the likelihood of finding significant results should they exist. This study was based on data collected from May 2014 to June 2014. Future researchers could build on this study by prolonging the therapy time to more than 1 month. For instance, longer-term therapy may be appropriate for certain treatments such as chronic posttraumatic stress disorders, where the disturbance persists beyond 4 weeks (see Hollon & Ponniah, 2009).

In addition, for future studies, the researcher should consider increasing the sample size. Increasing the participant population may influence results and allow for a higher effect, or power of the study. Thus, increasing the sample size to reflect a desired population may produce favored results. Future studies should also review the measures used to operationalize the variables anxiety and stress to determine the most appropriate ways of measuring anxiety and stress.

This study did provide a solid foundation to recommend clinical review to redo the study with more control (i.e. larger sample size, review of variable, review of treatment procedures, review of timeline and follow up inquiries). For example, the

recommendation is to conduct a follow up with the participant after 1-year. This data may be obtained by having subjects maintain a "stress monthly diary", in which notations on the occurrences are recorded of any relapses and triggers. Perhaps, this practice may provide more data to show the effects of CC alongside CBT. Acquiring more control over the collection of data is key to creating evidence that CBT and CC are beneficial in the participants' lives.

The interpretation from the results of this study suggests that CBT does decrease anxiety and stress. However, there was not enough statistical evidence with CC and CBT to provide the same statistical support. More studies are needed to recommend the addition of CC to CBT to alleviate stress. This study did not provide enough evidence to support a combination therapy in practice. Nonetheless, due to the study's results concerning CBT (i.e. showing decrease in stress, anxiety, and increase in nerve connection), and the trend towards the effectiveness of the combination therapy, Chiropractors are encouraged to add CBT to CC as a supportive tool to alleviate stress.

Implications

A social influence is defined similar to the psychology discipline. Psychology is the applied science to study the mind and behavior. In order to facilitate a social influence, one's mind and behavior are affected by others. Psychotherapy and CC is a combination therapy that may address the mind and behavior connection in an influential way (APA, 2015; Fukuda, Itoh, Masud, Ogura Shibuya, Tahiro, Watanuki, Yamaguchi, Yanai, 2011b). This study suggests that with additional research CBT and CC are two

modalities that alleviate and manage stress to assist individuals with overcoming everyday rigors of life.

Psychotherapy and chiropractic treatment have aimed to assist their patients with the overwhelming issues of stressors each as a unitary treatment. Psychologists and Chiropractors are encouraged to work sensitively with the United States population on preventative healthcare (ACA, 2014; APA, 2015a). Combining the two treatments as an additional means of relieving stress and recovering nerve connection may be useful for society to maintain 100% whole body function with regard to balancing life at work (and/or school). This study provided a foundation in order to expound on and explore this treatment option in the future.

Conclusion

This study provided insight for what researchers are able to do differently to show a combination therapy's value for alleviating stress. There was a need to bridge the literature and treatment gap to explore a combination therapy that reduced vertebral subluxation and accomplished the CBT goal to rehabilitate an individual's mental and emotional health (Kent, 2013). This study provided valuable information to help bridge the gap in order to show the benefits of CBT and CC and push for additional future studies.

From a cognitive perspective, the act of therapy had a positive impact on participants in the CBT and CC group per NCV, BAI, DASS scores. Participants recognized their negative core beliefs and adopted a new perspective to make better decisions, or ultimately discontinue negative patterns (Baker et al., 2009; Foa, 2006;

NAMI, 2014; Straube et al., 2006). Both groups showed a significant increase in nerve communication and a decrease in the level of stress and anxiety.

Based on the literature review, psychology and chiropractic treatment together are key components for alleviating stress for optimal mental health. Future studies with the noted recommendations and review of the limitation may assist in this goal. This research study demonstrates the importance to strive for a new stress management option. As mentioned, reducing stress/anxiety in an individual's life is vital to boost immune function, promote longevity, and allow a more productive society. Even though this study did not support the combination therapy for alleviating stress, future studies may obtain satisfaction supporting combination therapy in alleviating stress (brain, spinal cord, and nerves) and accomplish 100% whole body function.

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Appendix A: Communications with Chiropractor

May 5, 2014

Tracee Johnson
[address redacted]

Chiropractor:

I, Tracee Johnson, am a Ph.D. candidate for Clinical Psychology at Walden University and have begun the dissertation process. Currently, I am completing an internship in Los Angeles, Ca. I volunteer at the West Los Angeles Veteran Administration (VA) location under Aimie and Joanne's supervision, as well as at a Veteran transitional housing for Volunteers of America (VOA) - a contract organization through the Veteran Administration.

I am seeking a sponsor, or mentor, to assist with insight on my dissertation topic. As mentioned, my study falls into the category of Health Services with the intent of doing retrospective outcomes research which is essential for archival data. My goal is to retrieve archival data (past data) from your Patient Record System, or a similar database. Reflecting on our conversation, there may be a database which does not need affiliation or lengthy approvals. In a nutshell, I am in need of data that will allow for analyzing the results of two cares, Chiropractic care and Psychotherapy, for Stress/Posttraumatic stress/Anxiety disorder. The variables include, but not limited to an individual's:

Gender
Age
Nerve conduction velocity
Self (Client) report survey
Visual Analog Scale
Stress report
Number of treatments/sessions per each care over a period of time.
...or other factors that may influence outcomes, if these are unavailable.

I plead to you at this time for finding assistance with this matter. My University and Chair Committee are on standby to represent me, if necessary (for example, if you may need proof of enrollment or any affiliation agreement). Please do not hesitate to inform me of any questions or concerns that may develop which will assist my situation.

Thank you in advance,

Tracee Johnson, MS

Williams Family Chiropractic

Tracee Johnson,

Thank you, Ms. Johnson, for your interest. My data should be adequate for your research intent. I enjoyed your ideas per our conversation over the phone, especially when a community scholar is trying to commit and contribute to social change. I will release this data once your Proposal is approved. Please inform me of this date. As mentioned, confidentiality is my utmost responsibility; thus, please handle the data with care. If any issues arise, I will be your point of contact with assisting you along the way.

Many blessings on this endeavor.

Sincerely,

_____

Dr. Q. Williams

Dr. Quinton Williams
Doctor of Chiropractic
310.598.6020
11340 W. Olympic Blvd. Ste. #301 Los Angeles, CA 90064
www.QWchiropractic.com • **QWchiropractic@yahoo.com**

Appendix B: Verification of Enrollment

WALDEN UNIVERSITY

June 1, 2014

To Whom It May Concern:

This letter serves as ***verification of enrollment*** for the following student:

Student's name:	Tracee Johnson
Enrollment Status:	06/02/2014-08/24/2014 Full Time (9 credits) 2014 Summer Quarter
Program of Study:	Doctor of Philosophy Major in Psychology Concentration in Clinical Psychology
Anticipated Graduation Date:	12/04/2018

Traced Johnson began her program on 12/03/2010. Students seeking a doctoral degree have a maximum of 8 years to complete their program without petitioning for an extension.

All Walden University courses are taught utilizing web-based distance learning technologies. All students are required to have computers, demonstrate online capability, and have internet access at the time of admission. Courses are asynchronous and students communicate with each other and the instructor through an online classroom.

Via the online classroom site for each course, the instructor provides a course syllabus, specifying weekly discussion topics, required readings and individual and group assignments. Courses work involves textbook and journal article reading assignments; term papers, tests and quizzes; independent literature reviews, action research, and application of new knowledge; and other off-line activities. The exchange of views and support from colleagues that occurs in online discussions is the heart of the course. Students are always connected to a community of learners and receive individual feedback and mentoring from faculty.

Students should expect to spend an average of 15 to 20 hours a week per course reading, contributing to discussions, and working on assignments and assessments.

Walden University assigns a course credit hour value on the basis of the number and type of tasks judged by faculty to enable achievement of learning objectives as well as the estimated time needed by student to achieve the learning objectives. Time estimates for assigning a course credit hour are defined as the total time spent by students in fulfillment of course requirements, which may occur inside or outside the online course platform.

The University takes the federal credit hour definition as the institutional definition. Total time is interpreted as one (1) 50 minute hour per week in (equivalent to the abbreviated hour spent in traditional face-to-face course attendance) and two (2) 60

Appendix C: Self Reports

Beck Anxiety Inventory (Beck, 1993)

The 21-items measure the following symptoms and attitudes:

1. Numbness or Tingling
2. Feeling hot
3. Wobbliness in legs
4. Unable to relax
5. Fear of the worst happening
6. Dizzy or lightheaded
7. Heart pounding or racing
8. Unsteady
9. Terrified
10. Nervous
11. Feelings of choking
12. Hands trembling
13. Shaky
14. Fear of losing control
15. Difficulty breathing
16. Fear of dying
17. Scared
18. Indigestion or discomfort in abdomen
19. Faint
20. Face flushed
21. Sweating (not due to heat)

DASS-21 (A 21-item self report instrument designed to measure depression, anxiety, and stress)

DAS S 21 Name: Date:

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree, or a good part of time

3 Applied to me very much, or most of the time

1 I found it hard to wind down 0 1 2 3

2 I was aware of dryness of my mouth 0 1 2 3

3 I couldn't seem to experience any positive feeling at all 0 1 2 3

4 I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion) 0 1 2 3

5 I found it difficult to work up the initiative to do things 0 1 2 3

6 I tended to over-react to situations 0 1 2 3

7 I experienced trembling (eg, in the hands) 0 1 2 3

8 I felt that I was using a lot of nervous energy 0 1 2 3

9 I was worried about situations in which I might panic and make a fool of myself 0 1 2 3

10 I felt that I had nothing to look forward to 0 1 2 3

11 I found myself getting agitated 0 1 2 3

12 I found it difficult to relax 0 1 2 3

13 I felt down-hearted and blue 0 1 2 3

14 I was intolerant of anything that kept me from getting on with what I was doing 0 1 2 3

15 I felt I was close to panic 0 1 2 3

16 I was unable to become enthusiastic about anything 0 1 2 3

17 I felt I wasn't worth much as a person 0 1 2 3

18 I felt that I was rather touchy 0 1 2 3

19 I was aware of the action of my heart in the absence of physical exertion (eg, sense of heart rate increase, heart missing a beat) 0 1 2 3

20 I felt scared without any good reason 0 1 2 3

21 I felt that life was meaningless 0 1 2 3

Appendix D: Levene's Test of Equality of Error Variances for the Three Variables

Variable/Condition	F	df1	df2	Sig.
Pre-Nerve interference	1.113	1	108	.294*
Post-Nerve interference	.703	1	108	.403*
Pre-Anxiety	2.243	1	108	.137*
Post-Anxiety	5.593	1	108	.020*
Pre-Stress	6.971	1	108	.010
Post-Stress	1.173	1	108	.281*

*p >.01.

Appendix E: Kolmogorov-Smirnov Test Results for Nerve interference, Anxiety, and Stress Scores and Their Respective Groups

Condition	Group	Statistic	df	Sig.
Pre-nerve interference	CBT	.091	54	.200*
	CBT&Chiro	.136	56	.012*
Post-nerve interference	CBT	.080	54	.200*
	CBT&Chiro	.099	56	.200*
Pre-anxiety	CBT	.119	54	.053*
	CBT&Chiro	.119	56	.046*
Post-anxiety	CBT	.101	54	.200*
	CBT&Chiro	.143	56	.006
Pre-stress	CBT	.139	54	.011*
	CBT&Chiro	.140	56	.008
Post-stress	CBT	.110	54	.152*
	CBT&Chiro	.166	56	.001

*p >.01.

Appendix F: Box's Test of Equality of Covariance Matrices

Dependent variable	*Box's M*	*F*	*df1*	*df2*	*Sig.*
Nerve interference	10.25	3.35	3	2193869.17	.02
Anxiety	7.16	2.34	3	2193869.17	.07
Stress	6.29	2.05	3	2193869.17	.10

Note. This table includes Box's M test results for nerve interference, anxiety and stress which were the dependent variables.

Appendix G: Figure 1 Correspondence

Hanish Babu <drhanishbabu@gmail.com>

Sun 12/13/2015, 12:42 PM

Dear Tracee,
Yes, you may, with proper acknowledgement.
Regards
Dr Hanish Babu

On Sunday, December 13, 2015, Tracee Johnson <tracee.johnson@waldenu.edu> wrote:

Greetings!

This email is in reference to the picture that is on your website, "Stress Response". (The picture is right below the statement, "How stress affects so many organs in the body and causes these physical stress effects can be understood from the following diagram of the major physical effects of stress on the body"). May I use this picture for my dissertation?

Thank you in advance,

Tracee Johnson, MS