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The Relationship between the Practice of Martial arts, Anxiety, Wellness, and Self-efficacy

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Abstract

Although anxiety is a frequently researched topic, the growing numbers of diagnosed cases and the state of the present outcomes warrant the study of alternative approaches to address the causes and conditions of its prevalence, as well as possible adaptive strategies and tactics to improve outcomes for clients with anxiety. Counseling distinguishes itself in part due to its focus on well-being rather than mere alleviation of diagnosed symptoms. As such, it may be useful to measure the likelihood of some strategies and tactics associated with improved well-being in attempting to reduce symptoms of anxiety.

This study measured the practice of martial arts and the perceived importance of martial arts practice as a possible practice that might lower anxiety as well as increase well-being. This was measured through a Kruskal Wallis test and Spearman correlation to compare the practice of martial arts and its importance against scores on the Beck Anxiety Inventory and the Wellness Self-Efficacy Scales, with demographic variables of age, gender, ethnicity, US geographic region, and education level among 527 adult participants residing within the United States or its territories.

Practice of the martial arts and its perceived importance displayed significant relationships on the Beck Anxiety Inventory ($p > .05$ & $p > .001$, respectively), and significant relationships on the Wellness Self-Efficacy Scales ($p > .001$ for both values). Significant relationships ranged from extremely weak to moderate between the practice of martial arts, its importance, the Beck Anxiety Inventory, and the Wellness Self-Efficacy Scales, where a significant and very strong relationship was displayed between the practice of martial arts and its perceived importance to well-being.

Chapter I

Overview

Anxiety is reported to affect 40 million adults in the United States alone, or roughly 18% of the population (National Institute of Mental Health, 2018). Anxiety is defined as the anticipation of a future threat (Steimer, 2002). Anxiety has measurable correlates in biomarkers such as hormones, neurotransmitters, electrical activity, and brain region activity. Behaviors that manipulate these biomarkers may lower reported symptoms (Steimer, 2002). Various developmental and social factors affect baseline sensitivity to the mechanisms of anxiety (Zahn-Waxler et al., 2000). To alleviate these emotional states, active or passive behaviors can be employed. What separates an adaptive response to stress from an anxiety disorder is the excessive or persistent presence of these emotional responses or excessive or persistent use of avoidance behaviors to alleviate them (American Psychiatric Association, 2013). Active behaviors are generally shown to have more desirable results on the biological and psychological mechanisms of anxiety (Steimer, 2002).

Several elements of martial arts involving active response behaviors could serve to, address anxiety satisfying both evolutionary and modern realities and contexts. Physical exercise, social competition and the support of a subculture, systematic desensitization, and mimicking of violent contexts could optimize biopsychosocial states relevant to anxiety for well-being and emotional management. It stands to reason that a better understanding and implementation of behaviors shown to produce an adaptive reduction in anxiety (Maner et al., 2008) could benefit many of the 40 million Americans suffering from anxiety.

Research in medicine (National Institute of Mental Health, 2018) and evolutionary psychology (Buss, 2016) indicates that for limbic-system-oriented symptoms such as anxiety, physical pursuits have shown strong positive outcomes. And further research (Radochonski et al., 2011) indicates that the practice of martial arts demonstrates a significantly stronger outcome on anxiety than even track and other field activities. Desensitization to conflict in a controlled practice environment, along with perceptions of social dominance through mastery of a field, could lead to a considerable reduction in the human stress response underpinning anxiety as a diagnosis (Maner et al, 2008). Given the scope of anxiety and its effects on the human and social condition, the trending of modern lifestyles away from physical labor, the avoidance of direct conflict, the specialization of societal roles, and the dependence on information and mechanical technologies to conduct daily tasks, as measured against the growing cost of care without proportionate improvements in collective outcomes from approaches based on cognitive therapy and psychiatric medications, the exploration of alternatives might lead to meaningful in-roads in the management of anxiety as a condition.

Purpose of Study

The purpose of this dissertation will be to determine whether participants who practice martial arts indicate significantly different scores on the Beck Anxiety Inventory (Beck et al., 1988) as compared to participants who do not practice martial arts. This research observes the practice of martial arts to uncover patterns of anxiety and wellness affected by its practice, a practice that involves exercise, social and physical dominance, team dynamics, cultural tradition, and systematic desensitization. This study will use data regarding gender, age, race, education level, and geographic location to glean information regarding the factors contributing to anxiety scale score differences. Analysis of these data will be compared with scores on the Wellness

Self-Efficacy Scale (Kim et al., 2015), to observe trends between scores in domains of more generalized well-being and those measured by an anxiety inventory. If there is a negative relationship between anxiety scores and martial arts practice, it would be further supported if there was also a positive relationship between wellness and martial arts practice.

Significance of Study

The current standard of treatment for anxiety according to the DSM-5 is the use of counseling and psychiatric medications. Of relevance to the counseling field is the potential to explore supplemental methods to augment the effectiveness of talk therapy as related to anxiety disorders. The martial arts are extensive systems of behavior involving biological, psychological, and social techniques, tactics, procedures, and norms, which have in part served as training programs for stress management in their combatant context (US Army, 2002), and in civilian life (Morgan, 1992). While the obstacles to utilizing a martial arts class to pair with counseling would surpass the resources and scope for the present research, to show a positive comparison could lay the path for future research to do more to bridge both interventions.

The description of anxiety entails the absence or deficit of desirable subjective states, traits, and external outcomes or confidence in their continuity (Steimer, 2002). This is not entirely addressed by an anxiety inventory, and so a scale to measure perception of well-being will be included to widen the comprehension of the research questions posed. The Indivisible Self Wellness Model (Myers & Sweeney, 2007) shows that the physical and coping self subdomains promote well-being through confidence acquired in overcoming challenges. This aligns well with evolutionary psychology literature on the biopsychosocial conditions for optimal human emotional states (Buss, 2016; Miller, 2001). The purpose of this dissertation is to expand upon the research showing positive behavioral and emotional outcomes as related to anxiety

using martial arts as an intervention by displaying a comparison at scale of anxiety inventory and wellness scale results, between groups who practice martial arts and do not.

This investigation is complicated by the many biopsychosocial factors which contribute to the sum of all activities that could be called martial arts (Morgan, 1992; US Army, 2002). The martial arts possess an obvious component of athleticism, which has been detailed above in how exercise and anxiety are related (Steimer, 2002; DeBoer et al., 2012). The practice of karate (Morgan, 1992; Radochonski et al., 2011), a traditional martial arts discipline with a combination of cultural, teambuilding, philosophical, athletic, desensitization, and simulated violent contest aspects, was shown to out-perform track and field activities in the reduction of anxiety (Radochonski et al., 2011). How best would clinicians isolate the advantages of the practice of martial arts while diminishing the obvious risks of injury or the empowerment of practitioners to better commit violence? How do clinicians cross-train with qualified instructors and create a regimen designed for the reduction of anxiety? How would well-meaning clinicians and instructors navigate the potential legalities and ethical boundaries of such a mixture of practices?

Research in evolutionary psychology indicates that for limbic-system-based symptoms such as anxiety, physical pursuits have shown strong positive outcomes. Further research indicates that the practice of martial arts shows a significantly stronger outcome on anxiety than even track and field activities. Evolutionary psychology literature suggests that desensitization to conflict in a controlled practice environment, along with perceptions of social dominance through mastery of a field, can lead to a considerable reduction in the human stress response underpinning anxiety as a diagnosis. Analyzing a potential connection between martial arts practice and differences in the self-report of anxiety scores could contribute to more detailed and comprehensive studies that might further drive clinical practice and policy decisions in the

treatment of anxiety, or in the perceptions of the martial arts in the world of science and academia.

This research has relevance to the field of counseling in that it can lead to a further exploration of supplemental methods to augment the effectiveness of talk therapy in the treatment of anxiety disorders. While obstacles to utilizing a martial arts class combined with counseling would be considerable, to show a positive correlation between the two could set the path for future research that could bridge both interventions. There is research showing the use of martial arts to address anxiety, bullying, anger management, and a host of other concerns with positive outcomes, as will be further outlined. This underexplored set of interventions may prove to be symbiotic with effective counseling for maladaptive stress response patterns that underpin anxiety and a host of other disorders, if greater interest in its study can be fostered.

Conceptual Framework

Evolutionary psychology is a theoretical approach to psychology that attempts to explain useful mental traits as the functional products of natural selection (Buss, 2016). In this branch of the field, states and traits regarding behavior partially serve to increase adaptation to selection pressures. Selection pressures are threats to specimen or group survival or reproductive fitness (Miller, 2001). Evolutionary psychology explains anxiety as a functional product of natural selection to better respond to perceived or actual threats (Steimer, 2002). When relevant neurotransmitters and hormones such as glutamate, cortisol, norepinephrine, and adrenaline are paired with intense and brief physical exercise (DeBoer et al., 2012), and a sensory expectation of having addressed the threat (Steimer, 2002), these chemicals are processed and removed with greater efficiency than with sedentary behavior. At the level of subjective human experience, a survey to measure one’s perception of anxiety could be expected to hint at the background

physiological mechanisms without prohibitively detailed instrumentation. The martial arts mimic physical violence at varying levels of intensity with the purpose of improving adaptation to the selection pressures of simulated or actual combat through systematic desensitization to physical and social threats through physical exercise (US Army, 2002). If a significant relationship is found between the practice of martial arts and higher scores on wellness inventories or lower scores on anxiety inventories, this may indicate a behavioral intervention warranting more detailed study.

Salient Factors of Evolutionary Psychology

To seek biological origins as a guide for optimizing human behavior, a clear definition and avoidance of just-so explanations is required to prevent drift into what philosophers call Agrippa's Trilemma (Vogt, 1998): The necessity of all questions ending in further upstream questions, circular reasoning, or unsupported beliefs accepted as fact constitute the only three potential categories of an answer. A frame of context limiting the scope and relevance of a theoretical framework is therefore required. In this, a proper definition could serve. In coining the term Evolutionary Psychology, Tooby defines it as follows:

> Evolutionary psychology is the long-forestalled scientific attempt to assemble out of the disjointed, fragmentary, and mutually contradictory human disciplines a single, logically integrated research framework for the psychological, social, and behavioral (Tooby & Cosmides, 1990).

A critical point of evolutionary psychology is the role of selection pressures in shaping biopsychosocial mechanisms. Examining these pressures from the standpoint of counseling research and practice, insight may be gained in application of protocols to address previously unexplored mechanisms for optimizing well-being. These pressures can be related either to survival or sexual selection, through individual, environmental, or group pressures. Survival selection refers to the idea that whole species, as well as individuals and genotypes within a

species, will die off or survive long enough to continue to the next generation based on fitness to the environmental contexts with which they are situated. Sexual selection refers to the idea that the pressure of mate selection and the passing of genes to offspring is not necessarily identical to the pressures required to simply avoid death in any given environment. This facilitates development of traits which might, intuitively, be a hindrance to optimal survival, and yet still be selected due to environmental or group pressures for continued proliferation because of the advantages yielded in mate selection.

The methods of survival and sexual selection can come from the ecological context of the environment itself, be it competition over resources, predation, climate fluctuation, etc. It can also come from selection within social groups of the same species. This creates counterintuitive markers of fitness in behaviors that might indicate increased risk, gullibility, or altruism at the expense of personal advantage. According to sociobiology and later evolutionary psychology literature regarding social species, traits such as self-sacrifice, altruism, impulsivity, and aggression toward external threats have a mechanism of group selection for continued proliferation into future generations of a species (Wilson, 1975).

Evolutionary Pressures and Mental Health

A cursory examination of anxiety statistics (e.g., American Psychiatric Association, 2013; National Institute of Mental Health, 2018) and subjective experience of daily pressures in modern life can quickly facilitate a surface-level understanding of how pressure for survival and sexual selection unfolds, for example, through aesthetic adaptation, economic competition, education and status attainment, domestic as well as foreign governance policy, technology, medical care, and cultural contexts. Considering that the pace of genetic drift in a species is across generations, but a change in psychological, cultural, or technological climate can happen

at a more rapid tempo, it seems evident that the humans are no longer as instinctively adapted to their current living contexts as were their original hunter-gatherer predecessors. Even with the debates regarding genetic changes have taken place between early and current homo sapiens, there is little question that the pace of technological and cultural trends move faster than either random or adaptive mutations (Foster, 2000). This it is safe to remark that the environments in which humans live will not necessarily match the specifications of their biology, if they ever have, as environments change more swiftly than the genome. There could be value then, for mental health researchers to study the role of evolutionary drives, their satisfaction, and the their effects upon subjective well-being, even if the satisfaction of these drives does not actually improve the objective lifestyle or performance of a person in any other functional way.

Relevance of Martial Arts to Evolutionary Pressures

Violence is a core threat to members of a species, and several biological imperatives (Steimer, 2002) are similar across a wide range of species to address this risk to survival, that could be well summed up as stress, fear, or anxiety. In sociobiology, group selection is outlined as a mechanism by which the ability to take the risk of violent behavior in a way that enhances the survival of the group at the individual's expense could be a trait that is passed on to future generations, despite the intuitive risks to survival and reproduction involved. An evolutionary psychologist might describe the martial arts as an adaptation by a complex species through the development of conditioning protocols to minimize the risks of violence while maintaining the group selection benefits of engaging in violent behavior for collective benefit. And if the risk of violence is among the most universal of threats to a species, and if stress can be mitigated by certain protocols, the benefits could apply and mitigate the sources of fear, stress, and anxiety

beyond the context of mere violence, given that the biological mechanisms of stress are shared across the sources of stress-inducing stimuli.

The martial arts, defined as the structured education, conditioning, and practice of simulated combat through strikes, grappling, or use of handheld weapons (US Army, 2002) has been recorded across cultures, and is known to be a societal protocol for those most likely to experience expected violent conflict. It is written in certain doctrines of martial arts that the practices involved are in and of themselves useful in diminishing negative emotional and cognitive states involved with receiving and delivering violence (Morgan, 1992).

Limitations of Evolutionary Psychology

Like any theory, there are dissenting opinions and limitations. Evolutionary psychology has come under attack for allegedly provoking unsupported beliefs as truisms. In this, it is important to separate a popular mythology from the research framework of studying human behavior (Rose, 2000). It does the framework no favors when there is already a running debate about reductionism, and potential justification for policies that justify a lack of equity with biological determinism (Kleiman, 1977).

One of the most glaring limitations to evolutionary psychology is that it makes assumptions about causal links which happened so far in the past as to make causal research difficult to impossible in some cases, such as establishing which particular pressures led to the development of what biological mechanisms – mechanisms which play such critical roles in human behavior and cognition today. Much of evolutionary psychology conducts correlational research and links those results to known biopsychosocial phenomena, with projections which are often very difficult to isolate given prehistoric causal factors. In this way, evolutionary psychology is speculative and engages in inductive approaches in its attempt to walk back an

understanding of eons of time within which to find potential causation after observing the effects in present human biology, cognition, emotion, behavior, or systems (Rose, 2000).

Problem Statement

The current standard of treatment for anxiety according to the DSM 5 is the use of counseling and psychiatric medications (American Psychiatric Association, 2013). This has not shown the most desirable of outcomes, with a 14–43% of anxiety disorder patients who do not respond to treatment and who experience an 18–48% relapse within 6 months (National Institute of Mental Health, 2018). Furthermore, well over half of those suffering from anxiety do not initiate or receive adequate treatment due to lack of access to empirically supported treatments, stigma, subcultural disapproval of psychotherapy and psychotropic medication, or aversive medication side effects (DeBoer et al, 2012). Currently, the body of research surrounding the martial arts is sparse. The obstacles surrounding its study in terms of limitations may contribute to this gap in the literature. Furthermore, much of the literature surrounding evolutionary psychology's biological correlates (Metzl, 2020) is dated to the early 2000s. This may further implicate the potential gap between biology, culture, and technology as triggers for anxiety. When even the research struggles to remain current, how much more difficult is it for interventions and policy decisions to do so? Further complicating the study of potential treatments for anxiety is the complexity in a sufficient operational definition of what anxiety entails when accounting for biopsychosocial domains. The pairing of wellness scale results with anxiety scale results aims to shed light on multiple angles of the complex construct that constitutes anxiety's salient factors, as well as to observe multiple pathways by which the practice of martial arts may display relevant patterns within those angles.

Overview of Methods and Research Questions

This study will explore the possibility of a significant relationship existing between martial arts practice and anxiety scores for the Beck Anxiety Inventory (Beck, 1988) in the United States adult population, as well as with wellness inventory scores on the Wellness Self-Efficacy Scales (Kim et al., 2015). The null hypothesis will state that martial arts participants will not score any differently on the Beck Anxiety Inventory or Wellness Self-Efficacy Scale than those who do not practice martial arts. Secondary research questions pertaining to the Beck Anxiety Inventory scores associated with gender, education level, geographic area, race, and type of martial arts practice will also be analyzed. The primary research instrument used was the Beck Anxiety Inventory, which classifies and scores each participant's level of reported anxiety. The secondary research instrument will be the Wellness Self-Efficacy Scales, which measures wellness in physical, spiritual, financial, and occupational domains. These instruments will be used as the study's dependent variables. This study will aim to satisfy a gap in the research that has not focused on the variables of martial arts practice, anxiety, and wellness in American adults. All data will be collected from participants using an internet-based survey instrument. This method of data collection will create limitations to this study, which have been identified. This study will hopefully create a platform for future research to be conducted on the effect of the martial arts on human psychology.

Investigating these questions required the use of an internet-based survey that involved 527 adult survey participants, split between those who practice martial arts, and those who do not. This survey addressed each of the research questions. The collected data was organized using Microsoft Excel so that it could then be imported and statistically analyzed using the SPSS

25 data analysis program; this provided specific information regarding each research question and helped determine how the findings related to the research hypothesis for each question.

Limitations and Delimitations

Several limitations are recognized in this potential study. These limitations may contribute to inaccuracy or inconsistency in the data. This study used a self-report survey to gather relevant data. The use of a survey did not allow the researcher to verify that information provided was factually accurate.

The questions related to the practice of martial arts are merely demographic and entirely trusting of participant self-report. In addition to the risk of inaccuracy, the data gathered will be comparison data rather than data positing causal relationship. There are variables unobserved or identified as possible factors for a participant's anxiety and wellness inventory scores which could prove to be confounding variables.

Whereas the methodology is designed to cause as little disruption to current participants' behavior as possible, the very subjects and the relationships that might be linked between them could be seen as volatile. Anxiety affects about 18% of the population at some point according to the National Institute of Mental Health's 2018 report. The biopsychosocial costs of such an issue are presumably staggering, when one factors in medication, exacerbated health risks, lost productivity, and the detriments to human flourishing when stress exceeds a certain threshold. Martial arts are designed to convey the ability and willingness to exercise the incapacitation of another human being most optimally, and the risk inherent in such activity and skill development must be weighed when considering its implementation or referral.

There are plenty of threats to validity in survey research, but to focus on ethical concerns of the use of surveys for this topic might require some creative speculation. To imagine the most

damaging scenarios from taking the survey, those who participate in the study may suddenly acquire an interest in a sport that is extremely dangerous if undertaken without proper training and facilitation. Injuries to joints, bone structures, vital organs, circulation, and especially brain function are considerable, and the procedures to minimize those risks are much of the subject matter covered under competent instruction. Furthermore, a control group participant suffering from anxiety might find an interest in any potential avenue to reduce symptoms, even if their individual case is one that should not subject their bodies to the rigors of the sport.

With regard to those who already practice full-contact martial arts, this study might inspire them to over-utilize the sport as a coping mechanism to the detriment of their physical health. There are very specific restrictions on how long or how intensely to stress the human body with the involved tasks. In addition, the enthusiasm athletes experience for their sport if paired with a belief that anxiety is reduced through its practice might influence them to recruit more people into a risky sport for less than safe or non-optimal reasons. Another concern might be among martial arts athletes that violent behavior in a subdued and sanctioned context that may reduce anxiety could be indirectly encouraged outside of a proper context if the connection is made that simulated violence provides relief from the stress response that underpins anxiety.

Among clinicians, should this study indicate a strong relationship, there may be a risk that over-eager implementation might draw mental health practitioners toward the implementation of physical conflict-oriented methodology that they have not had the proper screening, training, and experiential practice to conduct.

Among practitioners of full-contact martial arts, coaches could be tempted to further blend into clinical roles, trying to market their physical practices as treatment for anxiety. This could result in unintended consequences, such as ineffective relief of symptoms, all the way to

misplaced violence as a mal-adaptive coping strategy. While these risks seem to be small, there will nevertheless be displayed a detailed warning included where appropriate in the survey instruments as an additional precaution.

The best of correlational surveys will not in and of themselves show an indisputable relationship between engaging in the martial arts and the reduction of trait and state anxiety scores. Future surveys could narrow the scope to martial arts involvement and concurrent engagement in counseling services. From there, more experimental designs could be put forward to measure outcomes with greater validity and precision. Promising results could serve as an initial exploration into a proof of concept, that implementing the martial arts as a response to anxiety and stress might yield previously unexplored beneficial outcomes. Concurrent results could be established to draw funding interest, alleviate ethical review board concerns of risk to reward, and coalesce into a more sophisticated and multidimensional understanding of this topic.

There is already a longstanding precedent of mixing physical activity with counseling to create a multidisciplinary approach to mental health treatment (Jazaieri et al, 2012; see also Chung & Baird, 1999). With a slight adaptation to existing experimental designs, causal relationships can be established to rigorously test the variables in question. This interest could promote funding and encouragement which would allow the department to facilitate new approaches which decentralize treatment options, challenge the existing pharmaceutical-centric paradigm.

Clinical practices follow research paradigms. The counselor education program sits at a convergence of research and clinical practice which could pave the way to generate research findings and then funnel them through to enhance scope-related clinical practices. If the counseling profession helps to pave the way to interventions that are cost-saving, efficacious,

multidisciplinary in connection, and scalable to fit much of the vast population suffering from anxiety, it could do the profession, clientele, and society a considerable service.

The present research was delimited to adults residing within the United States. Other delimitations include that the martial arts were not measured by perceived intensity, doctrine, method, type, or frequency. While this might produce useful subcategories for future comparison, attempt to compare may have created a skewed sample, or confused respondents as to the operational definition of the martial arts for the purpose of the study.

Assumptions of Study

Assumptions of a research study are defined as ideas related to research that are believed to be true, but that cannot be verified. In the present study, the researcher assumed all participants were adults residing within the United States or one of its territories. Second, the researcher assumed that participants answered the entire assessment to the best of their ability. The third assumption was that the participants responded to the assessment instruments honestly. The fourth assumption was that the participants understood the questions as presented. The fifth assumption was that the Beck Anxiety Inventory was an accurate test of anxiety. The sixth assumption was that the Wellness Self-Efficacy Scales served as an accurate test of well-being.

Definition of Terms

Gender: one's sense of self as male, female, transgender, or otherwise.

Geographic Area: geographic areas are identified as East, South, Midwest, West, of the United States. Recognized territories are assigned to a geographic area based on proximity.

Martial arts: A collective term for physical practices designed to improve combat efficacy, develop fitness, compete in athletic endeavor, and/or foster discipline or self-improvement.

Participants: an adult survey taker who currently resides within the United States of America or one of its official territories.

Race: a population of humans categorized by the color of one's skin or perceived ethnicity.

Self-reporting: participants reporting their own accounts of the information requested. Information provided through self-reporting was not verified by the researcher.

Survey: an online questionnaire designed to gather specific information from participants.

Statistical significance: used to reject or fail to reject a null hypothesis. It was determined using an alpha value of .05.

Chapter II: Review of the Literature

Introduction

Anxiety is an extensive, common, and growing set of disorders with great personal, societal, and economic detriment, as well as a trend of worsening prevalence, with treatment outcomes that are not displaying sufficient impact to reverse these outcomes. Other treatments, as will be outlined later in the chapter, show promise but receive limited attention in the academic literature, as well as medical or clinical practice. Among the possible behavioral countermeasures for widespread anxiety, the martial arts have some representation in the literature, with initial results trending toward significant relationships to various behavioral issues, from performance anxiety in sports to adolescent bullying, as well as self-report of adaptive personality traits. Much of this literature is over a decade old, not followed up with more targeted research, nor studied with experimental designs to expand upon survey results.

This review of the literature will attempt to highlight potential value in further exploring the martial arts as a possible set of interventions for the treatment of anxiety. This review of the literature will begin with anxiety's definition and relevance and proceed through the current practices and outcomes in the treatment of anxiety, the subfactors of martial arts practice which might indicate relevance to the problem of anxiety, and then outline the existing literature linking martial arts research to relevant behavioral health indicators.

Conceptual Overview of Anxiety

Anxiety is defined as the anticipation of a future threat. Fear is defined as the emotional response to real or perceived imminent threat. Both emotional conditions cause biological arousal responses to trigger the human body's stress response, and while there is distinction made between the two, psychometrics will not easily separate them in assessment (DeBoer et al,

2012). To alleviate these emotional states, pervasive avoidance behaviors can be employed. What separates an adaptive response to stress from an anxiety disorder is the excessive or persistent presence of these emotional responses or excessive or persistent use of avoidance behaviors to alleviate them (American Psychiatric Association, 2013).

Anxiety disorders differ from one another primarily in the relationship between the sources of the anxiety states, the cognitions, and the avoidance behaviors involved. Whereas every anxiety disorder involves a stress response and some aversion to real or perceived threat, they differ in specificity, further complicating its study and treatment. Generalized anxiety disorder includes persistent and disproportionate worry across external factors, whereas social anxiety may have such effects limited to social interactions, separation anxiety to the removal of a person such as a parent, agoraphobia to leaving the home, and specific phobias limited to a particular trigger. Behaviors and cognitions related to anxiety generally last six months or more before meeting criteria to be considered for a diagnosis of a disorder. Individuals with anxiety disorders tend to overestimate the dangers, threats, or consequences involved in the stimulus which provoked the anxiety state. Many of the anxiety disorders form in childhood and persist if not treated effectively (American Psychiatric Association, 2013), suggesting a reinforcement pattern of behavior which continues the symptomology.

Common conditions which trigger anxiety include separation from those to whom an individual is attached, fear of initiating speech or reciprocating in social interactions, fear of specific objects or situations, fear of entering social or unfamiliar environments, or fear reinforced by a pattern of biological panic symptoms (American Psychiatric Association, 2013).

Behaviors that are employed to alleviate the anxiety-state are many. One behavior pattern common to anxiety disorders is rumination, whether about specific or varied life domains, and

about objects and circumstances that provoke fear. Another behavior pattern is avoidance of the interaction or proximity to the object or circumstance related to the anxiety or fear. Regarding separation and social anxiety, common behaviors involve avoiding social or bonding scenarios, or becoming enmeshed with objects of attachment to the point of being maladaptive. With panic attacks, avoidant behaviors can create their own tensions which only exacerbate the intense biological stress response (American Psychiatric Association, 2013).

Anxiety From a Wellness Lens

Medical models and wellness models share the goal of remediating illness. What separates the medical models and wellness models is the latter's focus on optimization beyond treatment of symptoms of an illness (Myers & Sweeney, 2007). The Indivisible Self Model was framed on the doctrine that physical, intellectual, social, occupational, emotional, and spiritual development are worthy goals for all individuals within society; research in virtually every human development discipline supports the benefits of wellness for longevity and quality of life, and that professional counseling should focus on policies and best practices which promote and support optimal health and wellness for all segments of society (Myers & Sweeney, 2008).

Professional counselors seek to encourage wellness, or a positive state of well-being through prevention of maladaptive behaviors, cognitive patterns, and emotional responses, and by the enhancing of adaptive patterns and beliefs. It is not the removal of a label of illness a client typically seeks, so much as the wellness that such symptoms inhibit (Myers & Sweeney, 2008). It could be viewed that the absence of wellness is the absence of one of the very purposes of treating mental health symptoms in the first place.

Anxiety From an Evolutionary Lens

Framing the origination and functions of emotions in general and anxiety within the context of the evolutionary pressures they were likely designed to address helps to recognize behaviors as functional adaptations for the tasks of survival, mate selection, rearing of offspring, and proliferation of the species (Buss, 2016). Among the core threats and proficiencies of early hominids was the ability to engage in physically risky and threatening behaviors, for a number of tasks ranging from hunting to conflict with other hominids or rivals for resources, such as food or territory (Buss, 2016). It is obvious that technological and cultural change outstrips the pace of biological evolution, and biological mechanisms clearly indicate continued adaptation for threat in the human stress response (Steimer, 2002). And it is well established that routine stressors provoke the same chemical responses as those involving risk to security or social standing in tribal contexts. What differs in the modern age is the increased pace of interactions and stimuli, with reduced physicality as autonomic response to the threats now posed in cultural and technological contexts.

If the stressors are as present as ever if not more, albeit reduced in severity, but the adaptive responses are significantly reduced, and with a greater disconnect between the solution and the physiological sensation of the stressor being solved, it stands to reason that anxiety issues would rise, as is shown in the prevalence of its diagnosis (National Institute of Mental Health, 2018). If it is not desirable nor feasible to return the danger conditions of earlier human history survival threats, then perhaps a controlled alternative could mimic the physiological satisfaction of having triggered feedback responses, as if the perceived threat originated by the current lifestyle stressor had been handled in a physical manner, triggering evolved counter-mechanisms to the stress response.

Biopsychosocial Factors of Anxiety

Biological Factors

The Indivisible Self Model (Myers & Sweeney, 2004) defines the physical self as the biological and physiological processes which comprise the physical aspects of one's development and functioning. The model recognizes the physical actions involved in exercise and nutrition as forming a second order factor constituting the physical self, one of five second order factors which constitute the attainment of wellness. Exercise is defined by the model as engaging in physical activity to keep in good physical condition. Nutrition is defined by the model as eating a nutritionally balanced diet, and maintaining a normal weight (i.e., within 15% of the ideal) and avoiding over-eating. Nutrition will be addressed under the developmental aspects of anxiety. It is also implied under survival selection with evolutionary aspects. Exercise is likewise addressed under survival selection, but greater detail will be covered with martial arts as a possible intervention for anxiety symptoms and to attain wellness.

Functional Response

According to Dr. Steimer, PhD, from the Geneva University Hospital, anxiety is an emotion, or affective state, which is expressed most generally at three inter-related levels: psychological, biological, and behavioral. All basic emotions have a biological corollary and are formed from a specific set of neurophysiological and neuroanatomical substrates which make up basic building blocks, such as anger and fear, from which more complex emotions are built (Steimer 2002). Anxiety is an affective state whose function was to serve as a signal of danger, threat, or some other consequence, and to trigger an appropriate adaptive response. Anxiety shares biological similarities to fear, except that they prepare the body for different purposes.

Anxiety prepares the human organism for an unknown danger, threat, or consequence, whereas fear focuses upon a known external threat (Steimer 2002).

The human organism's natural avoidance behaviors can be described as active or passive. Active avoidance behaviors, such as fight or flight, occur when some sense of action is achievable by the organism experiencing the emotional response of anxiety or fear. Passive behaviors, such as distracting behaviors, such as grooming or freezing in the face of the trigger, are naturally adopted when such active behaviors are unavailable (Steimer 2002). Active and passive methods of addressing fear and anxiety responses have different neuroendocrine and behavioral responses. Active measures induce tachycardia and hypertension, whereas passive measures induce hypotension, bradycardia, and an increased neuroendocrine response in the hypothalamo-pituitary-adrenal axis and increased glucocorticoid secretion. Dr. Steimer suggests but not concludes, that successful adaptation to stress results in greater habitual resistance to the emotional response of anxiety. Active measures, when possible to employ, increase resistance to the emotional responses of anxiety and fear while activating less of the total neuroendocrine stress response (Steimer 2002).

Evolutionary Mechanisms

It has been long understood that species and individuals within species are selected for fitness within their ecological contexts. The two forms of selection are understood to be survival and sexual selection (Darwin, 1859). More recently, it has become understood that human cognition, emotion, and behavior are also adherent to natural selection (Buss, 2016). With human cognition, technology, and culture, it is evident that not all human behaviors, cognitions, and emotions are aimed at maximizing survival and/or reproductive fitness. There are many points of dispute in these overriding principles of evolutionary psychology. To what degree is much of

maladaptive behavior, cognition, and emotion a set of biological processes that attempt to maximize fitness in the evolutionary context of the formation of the human species in its original contexts, and to what degree were they never specifically relevant as adaptive mechanisms to survival or selection? Of more recent study is the seeming conflict between survival selection and sexual selection (Miller, 2001). Species of birds that host elaborate tails and expend caloric energy on mating dances clearly increase vulnerability to starvation and predation. And yet, pairing and reproductive choices are clearly decided by behaviors and features which are poorly optimized for survival selection.

The neurochemical incentives in a human mind are often the same as in other less complex species, which promote appetite, avoidance, aggression, pleasure, and bonding, to name just a few. Given the establishment that emotions have neurochemical correlates, and emotional payoffs and behaviors are directly and indirectly linked to selection, it stands to reason, that negative emotions as expressed could serve an adaptive function in the attempt to preserve survival or sexual selection. It could also stand to reason that given the pull of neurochemistry on behavior across species, that biological incentives may override the cause-and-effect relationships of behavior, cognition, and emotion as expressed in environmental feedback or observable cause and effect. Any treatment of anxiety as a symptom that fails to account for the evolutionary selection drives may find a gap in efficient causation.

Research has been done specifically on anxiety as an evolutionary mechanism for over a century (Darwin, 1872; see also Buss, 2016; Bowlby, 1973; Cannon, 1929; Konner, 1990; Krebs & Davies, 1991; Marks & Neese, 1994). The general trend is that there is a level of optimal arousal to environmental stress to adapt to challenges of survival and sexual selection, and the further the deviation from that point, which depends on the ecological context and the

functioning of the individual of a species, the greater the risk of reducing sexual or reproductive fitness (Marks & Neese, 1994).

Subjects in the context of an environment are rewarded for a high anxiety response when the level of threat is such that there is more to lose with a single failure to identify and respond to a threat and loss of life risk than to perform sub-optimally by taking few risks (Stein & Randolph, 2010; US Army, 2002;). In the context of an environment where chronic low performance is a greater risk than that of permanent consequences for occasional mistakes, lower anxiety temperaments are rewarded. This environmental context, found within much of modernity, favors an individual or group whose performance on routine endeavors is reliable more than one whose performance under duress is optimal at the expense of reliable performance of routine tasks. It would be worthwhile to keep this general statement in mind as psychosocial contextual factors are explored, and the practice of martial arts on those psychosocial factors are considered.

Psychosocial Factors

Wellness is considered the higher order factor measured by the Indivisible Self Model. The second order factors are the physical self, creative self, coping self, social self, and essential self. The physical self was addressed under biological factors. For sake of theoretical guidance, the four other second order factors will be addressed as psychosocial factors relevant to anxiety.

The creative self consists of the following subfactors: thought, emotion, control, work, and positive humor. Thought is defined as being mentally active and open-minded; having the ability to be creative and experimental; having a sense of curiosity and a need to know and to learn; and the ability to solve problems. Emotion is defined as being aware of or in touch with one's feelings; and being able to experience and express one's feelings appropriately, both

positive and negative. Control is defined as belief that one can usually achieve the goals one sets for oneself; having a sense of planfulness in life; and being able to be assertive in expressing one's needs. Work is defined as being satisfied with one's work; having adequate financial security; feeling that one's skills are used appropriately; and the ability to cope with workplace stress. Positive humor is defined as being able to laugh at one's own mistakes and the unexpected things that happen and the ability to use humor to accomplish even serious tasks. The developmental factors of anxiety appear to indicate relevant correlation to the formation of thinking patterns, habitual expression of emotions, and the early stage development of a sense of control. The factors of work and humor are addressed in evolutionary selection, cultural context, socioeconomic context, and technological context.

The coping self consists of subfactors leisure, stress management, self-worth, and realistic beliefs. Leisure is defined as activities done in one's free time; satisfaction with one's leisure activities; having at least one activity in which "I lose myself and time stands still." Stress management is defined as a general perception of one's own self-management or self-regulation; seeing change as an opportunity for growth; ongoing self-monitoring and assessment of one's coping resources. Self-worth is defined as an acceptance of who and what one is, positive qualities along with imperfections, valuing oneself as a unique individual. Realistic beliefs are defined as understanding that perfection and being loved by everyone are impossible goals and having the courage to be imperfect. These subfactors are so widely evident across the entire spectrum of biopsychosocial factors that it would be difficult to encourage a reader to think of one biopsychosocial factor which best represents them. What this does show, is that the coping self as a second order factor might be a prime driver for inquiries related to the efficient causal

principles to best treat anxiety. It would be plausible to consider the practices of martial arts as potentially related to the subfactors of the coping self.

The social self consists of subfactors of friendship and love. Friendship is defined as social relationships that involve a connection with others individually or to a community, but that do not have a marital, sexual, or familial commitment; having friends in whom one can trust and who can provide emotional, material, or informational support when needed. Love is defined as the ability to be intimate, trusting, and self-disclosing with another person; having a family or family-like support system characterized by shared spiritual values, the ability to solve conflict in a mutually respectful way, healthy communication styles, and mutual appreciation. Evolutionary drives for survival and sexual selection resonate strongly here. Developmental attachments indicate patterns of interaction imprinted from early childhood and through the socialization period of youth. Cultural contexts shape the shared beliefs and values of groups which serve as the substrate from which friendship and love factors are satisfied. Technological contexts shape how one pursues and maintains friendships and romantic partnerships.

The essential self consists of the subfactors of spirituality, gender identity, cultural identity, and self-care. Spirituality is defined in the model as personal beliefs and behaviors that are practiced as part of the recognition that a person is more than the material aspects of mind and body. Gender identity is defined as satisfaction with one's gender; feeling supported in one's gender; and transcendence of gender identity (i.e., the ability to be androgynous). Cultural identity is defined as satisfaction with one's cultural identity; feeling supported in one's cultural identity; and transcendence of one's cultural identity. This is a somewhat cyclical definition but, as a construct of satisfaction with one's collective belonging, it may hold more utility. Self-care is defined as taking responsibility for one's wellness through self-care and safety habits that are

preventive in nature. Evolutionary adaptations to belief in the afterlife have been suggested (Buss, 2016) as a means to alleviate the fear of death; culture shapes norms as far as beliefs in metaphysical and moral values and explanations; socioeconomic context shapes religious and spiritual views; and technological integration diffuses ideas based upon access and popularity. Gender identity and cultural identity are likewise subject to evolutionary mechanisms as well as shared societal beliefs. These ideas are adjusted by access to spread and receive information through technological integration.

Developmental Factors

There is a vast body of literature written on the relationship between parenting practices and the development of anxiety disorders in a developing child. A meta-analysis reveals that the level of control a child experiences in their life correlates to their level of anxiety in adulthood (Rapee, 1997). Cognitive and emotion theories bridge factors of helplessness, locus of control, explanatory style, animal learning, biology, parenting, attachment theory, and childhood stress and resilience to articulate a model of the developmental influences in the formation of anxiety disorders (Chorpita & Barlow, 1998). A central conclusion is concurrent with findings of earlier meta-analyses that an early experience of diminished control correlates to an increased prevalence in experiencing anxiety (Chorpita & Barlow, 1998).

A later integrative study ascribed genetic predispositions to the development of anxiety disorders, measured through family aggregation and genetic testing for prevalence of anxiety disorder in parents, expression of behavioral inhibition, and information processing biases (Murray et al., 2009). Further research cited as environmental impacts adverse life events and maladaptive modeling. Parenting behaviors that indicate greater control over a child such as overprotection are stated to correlate with an increased prevalence of anxiety in adult life. Early

life attachment styles in infancy were measured in one study of 172 child participants at 12 months and at age 17 (Warren et al., 1997). The results showed that on the Schedule for Affective Disorders & Schizophrenia for School-Age Children, measurements of anxious or resistant attachments on the Ainsworth's Strange Situation Procedure at 12 months correlated to increased child and adolescent anxiety disorders.

These sources seem to point concurrently to the role of inadequate self-regulation and self-determination abilities in early childhood, troubled attachments, adverse early life events, and genetic predisposition as the most cited factors related to the developmental factors which predict anxiety later in life.

Of further note regarding the developmental aspects of anxiety, it is worth exploring the extremes of malnutrition and environmental toxin exposure, as well as natal parental substance abuse. A meta-analysis of 25 articles with a combined 791 participants age 2 years or under at time of first study, utilizing the Ainsworth Strange Situation Procedure, revealed that child maltreatment, defined as malnutrition, failure to thrive, abuse or neglect, revealed significantly higher problems with attachment (Zahn-Waxler et al., 2000).

A meta-analysis published in *Clinical Psychology Review* indicates that while there is a high correlation between parental substance abuse and childhood affective disorders and childhood substance abuse, it is difficult to measure because of the comorbidity of neglect by parents abusing substances (Dunn et al., 2002). A longitudinal study of the effects of parental post-natal alcoholism on the prevalence of child substance abuse and affective disorders measured 454 families and revealed that maternal alcohol abuse showed a correlation with increased anxiety disorders in children, but not across all measured groups (Chassin et al., 1999).

The meta-analysis by Zahn-Waxler, Klimes-Dougan, & Slattery summarizes the developmental effects on anxiety as follows:

> …for understanding the complex interplay of biological and environmental processes that contribute to the emergence, progression, and amelioration of internalizing problems over time… We highlight the need to study anxiety and depression within a developmental psychopathology framework, as well as to include both categorical and dimensional assessments of these problems in the same research designs.

Socioeconomic Factors

There is a clear, longstanding, and robust multidisciplinary understanding of the correlation between inadequate material, service, technological, educational, and social resources and the prevalence of mental illness (National Institute of Mental Health, 2018; World Health Organization, 2017). Whether from evolutionary (Buss, 2016; Darwin, 1872), economic (Smith, 1976), sociological and political (Weber, 1904), psychological (Lorant et al., 2007; Myers & Sweeney, 2008;) or philosophical (Shaeffer, 1983) perspectives, there is physiological, affective, and cognitive distress when needs are not adequately met. Whatever investigation is made into this topic will be woefully inadequate. But one specific area of interest is that, according to reports from the World Health Organization and the National Institute of Mental Health, despite the comparative economic prosperity of the United States, anxiety has risen 14.9% from 2005 to 2015. While socioeconomic status might play a large role, it would fail to account for the increase in anxiety prevalence by itself.

Cultural Factors

The Oxford Dictionary gives two relevant definitions for culture: The first is the arts and other manifestations of human intellectual achievement regarded collectively. The second is the ideas, customs, and social behavior of a particular people or society. There is no universal definition of culture, and certainly no universally agreed upon set of factors that make up a

culture in its entirety. The American Sociological Association states that culture includes languages, customs, beliefs, rules, arts, knowledge, collective identities, and meaningful memories. Lacking any other more solidly accepted heuristic, this seems like as fitting a collection of subfactors as any.

The literature appears to show that individualistic cultures display higher anxiety than collectivist cultures (Kirmayer et al., 1995). And while lower socioeconomic status cultures display an increase in anxiety as opposed to similar cultures of higher socioeconomic status, Western industrialized democracies often show the highest rates of anxiety despite comparative material prosperity (World Health Organization, 2017). One limitation on cross-cultural prevalence research is that epidemiological and clinical studies do not utilize culturally adapted instrumentation (Kirmayer et al., 1995).

A meta-analysis (Baxter et al., 2013) of studies conducted between 1980 and 2009 which informed the Global Burden of Disease Study revealed that across 44 countries and 88 studies:

> …estimates of current prevalence ranged between 0.9% and 28.3% and past-year prevalence between 2.4% and 29.8%. Substantive factors including gender, age, culture, conflict and economic status, and urbanicity accounted for the greatest proportion of variability. Methodological factors in the final multivariate model (prevalence period, number of disorders and diagnostic instrument) explained an additional 13% of variance between studies. The global current prevalence of anxiety disorders adjusted for methodological differences was 7.3% (4.8–10.9%) and ranged from 5.3% (3.5–8.1%) in African cultures to 10.4% (7.0–15.5%) in Euro/Anglo cultures.

This supports other studies and reports indicating that industrialized and even materially wealthy cultures experience higher prevalence rates of anxiety, but not whether this prosperity is causal. Addressing the substantive factors, among the genders, females experienced higher anxiety cross-culturally. Across age, children and adolescents experienced the highest anxiety prevalence, while persons over 55 experienced the lowest prevalence. Among cultures, Indo-Asians and Sub-Saharan Africans experienced the lowest prevalence of anxiety, while Western

European and Latin cultures experienced the highest prevalence. Across economic status, the least materially wealthy cultures experienced rates half that of emerging and developed cultures. This seems like a contradiction, except that on a smaller scale other research shows a trend for better economic status within the same culture to show lower anxiety (World Health Organization, 2017). Across the factor of urbanicity, there was very little difference (5.4% prevalence in urban and 5.3% prevalence in rural settings) displayed. This may be more pronounced in specific places rather than across 44 countries in aggregate.

It is important to recall limitations in explanatory power of such macro-scale assessments, namely the way each culture defines and understands anxiety, how the scales were administered, whether the scales were culturally adapted, and how evenly each culture was represented in participant selection. Nevertheless, the literature shows predictive trends between types of societies and prevalence of anxiety disorders. The Indivisible Self Model, if tested across these same population models, might yield interesting insights into efficient causes and potentially untapped treatment options.

Technological Factors

The expansion of technology might hold some relevant explanation for the prevalence and treatment resistance of anxiety disorders. The nature of work incorporates a greater degree of computing and telecommunications than in previous years. This could lead to a decrease in required manual labor to complete job tasks, as many physical tasks are automated or made irrelevant. Engaging in a sedentary lifestyle has biological causal effects that increase susceptibility to stress hormones and relevant neurotransmitters, as well as correlate to social anxiety (Smits et al., 2008). Technological dependence, in addition to cultivating a sedentary lifestyle, could diminish engagement with the outdoors, and results in reduced face-to-face

socialization (Matos et al., 2016). Specifically, social media dependence is known to cause developmental delays in emotional regulation, resilience, emotional intelligence, and impulse control among adolescents (Lukianoff & Haidt, 2015), as well as reduce self-esteem and social engagement among adult users (Rosen et al., 2013). Excessive work hours correlate to increased prevalence of anxiety disorders and health concerns, even when income levels are higher (Virtanen et al., 2011). And controversially, a culture of pathologizing aggression and competition has shown outcomes to create emotional fragility, fear, and anxiety prevalence that is higher among children and adolescents raised alongside the trend of a potentially "softening" of US society (Lukianoff & Haidt, 2015; Maner et al., 2008). This could be correlated to a reduction in physical activity as a society becomes more sedentary.

With technological integration in the workplace, obligation to the job often doesn't stop after leaving the office. Many fields must now compete with far cheaper labor existing in developing economies that are accessible to perform many of the same tasks as a local employee. And for as many jobs lost to outsourcing, more are lost to automation, which generally holds an even lower operational cost. It would not be unreasonable to assume that this could create greater pressure on existing workers and demand longer hours, which could reduce time spent engaging in meaningful personal relationships and correlate to an abdication of wellness factors in favor of career demands. In a 2013 study, 1,143 teen, young adult, and adult participants in an online questionnaire, the Millon Multiaxial Clinical Inventory (MMCI-III), showed that 17 of 22 factors indicating higher mood disorder and personality disorder traits correlated to greater social media use (Rosen et al., 2013).

Current Practice and Outcomes

Anxiety is a biopsychosocial problem with many causes and conditions. The treatment of anxiety can be approached from a physiological, psychological, or systemic lens. Counseling modalities address the psychological and systemic factors of anxiety, whereas psychiatric medications attempt to mitigate the physiological effects. There are behaviors and technologies that address the biological, psychological, or societal aspects of anxiety, but some of these practices are currently anecdotal, experimental, poorly understood, out of the frame of tradition, or, sometimes, illegal (Friedman, 2006; Sessa, 2015). The literature is often lacking or has not been updated in several decades. In exploring the existing treatments for anxiety, a reader can attain a baseline understanding of how interventions are conducted and what mechanisms are targeted, and can gain some perspective on their efficacy or lack thereof.

In each of these cases, it is no great stretch to consider what evolutionary pressures might have led to the development of certain mechanisms underpinning human emotion, thought, and behavior as related to anxiety. Each of these interventions must operate within the context of these evolutionarily-informed mechanisms to have any effect, even if there is no convergent evolutionary mechanism, such as is the case with synthesized psychiatric drugs. Even among mechanisms which appear to lack of convergence, it becomes possible to ask a question as to the nearest relevant evolutionary link. In the example of synthesized drugs being engineered outside of any physiological evolutionary pressure to design a genetically encoded knowledge of how to design and create pharmaceuticals, it might be possible with correlational research and anthropological study to make connections between certain plants or fungi and the development of specific cultures. And one can walk the line of reasoning that assumes that any execution of problem-solving by the human brain is an evolutionary response. But at what point does the

broadness of defining an evolutionary effect lack utility? This level of speculative explanation highlights a risk in utilizing evolutionary psychology as a theoretical framework. There is much that can be indicated, but some factors are too numerous or too spread across time to draw causal conclusions. In understanding how anxiety might serve survival, sexual, individual, kin, or group selection factors, there may prove to be insights into what are as of yet unutilized or underutilized methods in the pursuit of comprehensive treatment options for a disorder that affects up to 18% of the US population (American Psychiatric Association, 2013).

Psychiatric Medications

Emotions have chemical substrates. Anxiety is regarded as an emotional reaction to real or perceived stress (Steimer, 2002). The mechanisms of emotions are handled through chemical signals called ligands passing to receptor sites, creating a key and lock mechanism at a cellular level. These ligands are in one of three physical systems, with some chemicals serving multiple roles. Neurotransmitters are chemicals released at the end of a nerve, or a synapse. These are especially prevalent in the brain (Webster, 2001). The endocrine system is a network of glands that secrete hormones, chemicals responsible for several processes, some of which affect emotions (Leonard & Song, 1996). The immune system also affects the state of emotions through stress chemical responses as well as inflammatory processes (Leonard & Song, 1996).

Drugs that target anxiety either directly produce a synthetic set of chemicals to bind to receptor sites or manipulate the reuptake and breakdown of these chemical ligands to affect the mechanism relaying the emotion (Stein & Sareen, 2015). There are several classes of drugs to treat anxiety: anxiolytics, selective serotonin reuptake inhibitors, selective norepinephrine reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors (SNRIs) , tricyclic or tetracyclic antidepressants, benzodiazepines, monoamine oxidase inhibitors, beta blockers,

depressants, sedatives, and mood stabilizers (Davidson, 2009). As stated above, these drugs act through controlling the reuptake mechanisms or by producing synthetic receptor-binding chemicals themselves. Some of these drugs are used when anxiety is co-occurring with some other disorder (Auclair et al., 2013). The most common types of drugs for anxiety are selective serotonin reuptake inhibitors, serotonin-norepinephrine reuptake inhibitors, tricyclic antidepressants, and benzodiazepines (Davidson, 2009).

Selective serotonin reuptake inhibitors (SSRIs) work by inhibiting nerve cells in the brain from reabsorbing serotonin. These drugs are the most prescribed for anxiety despite being classified as antidepressants and are considered the first course of expected pharmacological treatment. They take several weeks to take effect, and the expected course of dosage is expected to last up to a year before reducing dosage. Serotonin-norepinephrine reuptake inhibitors work by inhibiting nerve cells in the brain from reabsorbing serotonin and norepinephrine. The time to see effects and the expected course of treatment mirrors SSRIs, except that norepinephrine is an acute stress chemical and provides another chemical pathway for patients who do not respond effectively to SSRIs, with the risk of increased potential for adverse effects (Auclair et al, 2013). Tricyclic antidepressants work as SNRIs, except that they are older classes of drugs with greater risk of adverse effects, generally reserved for when SSRIs or more modern SNRIs are ineffective (Auclair et al, 2013). Benzodiazepines work as sedatives, and they are addictive. Benzodiazepine is used for short-term treatments or to assist with acute stressors such as substance abuse withdrawals or acute trauma (Davidson, 2009). Common limitations for each of these classes of drugs are a persistent reliance upon further exogenous dosages, with unpredictability and considerable genetic variance in tolerance, adverse effects, and efficacy. The means of diagnosing efficacy often involve trial and error titration with quarterly psychiatrist visits based

on verbal patient report. Benzodiazepines are addictive, and the withdrawal effects can cause sometimes fatal seizures (Koen & Stein, 2011). Pharmacology plays a significant role in treating mental illness in general, and anxiety specifically, but it would be difficult to miss some of the limitations and costs of these methods. There is room for alternative or complementary treatments, if for no other reason than the outcomes, which are not looking particularly favorable (American Psychiatric Association, 2013).

Psychotherapies

The American Counseling Association's definition of counseling is as follows: Counseling is a professional relationship that empowers diverse individuals, families, and groups to accomplish mental health, wellness, education, and career goals (American Counseling Association, 2014). Counseling, or talk therapy, alongside psychiatric medications, is considered the gold standard for treatment of anxiety (American Psychiatric Association, 2013). There are a considerable number of counseling approaches, and it would be exhaustive to attempt to detail each. Most fit into families of theoretical frameworks, which can be summarized by either a common set of methodologies, philosophical principles and traditions, or by the context of the client or clients served (Hersen & Sledge, 2002). Common groups of counseling theories include, but are not limited to: psychodynamic, humanistic or existential philosophy, behavioristic, cognitive psychology, systemic, culturally based, spiritually based, post-modern or political philosophy such as feminist, and recently, mindfulness-based practices (Hayes et al., 1996). Efficacy of mindfulness-based practices will be reviewed as their own section, as the core counseling aspect of mindfulness-based practices are often joined by a traditional counseling theoretical framework.

Review of Theories and Outcomes.

In the psychodynamic model of counseling, anxiety is conceptualized in terms of defense mechanisms employed to alleviate a perceived or real fear or threat (Crits-Christoph, 2002). Psychodynamic models also recognize the expression of worry itself as a mechanism of defense (Crits-Christoph, 2002). Work with anxiety through a psychodynamic lens incorporates a focus on the insight into the signals of worry to the ego, and the feedback loop of avoidance defense mechanisms which flow from the interpretation of that signal (Compton, 1972). Another aspect of focus in the treatment of anxiety is to analyze early childhood events, caregiver patterns, and psychosocial development (Horney, 1950). Psychodynamic theories are not considered evidence-based models despite the presence of efficacy shown in short-term studies (Anderson & Lambert, 1995), and they often face apprehension as a valid model due to the history of psychoanalysis (Hayes et al., 1996). In psychodynamic theory, the focus on the core conflict relational themes and the therapeutic alliance place the psychodynamic therapist in a supportive role rather than one of scientific intervention (Crits-Christoph, 2002). A 1994 process-outcome study posited that significant factors were almost entirely relationship-oriented, rather than any technical focus of the theoretical model (Najavits & Strupp, 1994).

Humanistic models encompass a wide variety of counseling theories, from Gestalt to Person-Centered to Existentialist counseling approaches. The key component of humanistic models is the focus on developing rapport and relationship, respecting the expressed needs and autonomy of the client (Tryon & Winograd, 2011). This focus can lead a practitioner to eschew established scientific protocols or best practices if the client's wishes and the relationship encourage doing so, within confines of professional ethics (Davidson, 2000; Hansen, 2012). Humanistic theories focus on examination of the subjective experiencing of oneself (Scholl et al.,

2014. Client outcome measures for humanistic counseling tend to be qualitative interviews, where research outcomes can be qualitative, quantitative, or mixed methods (Scholl et al., 2014). A 2011 meta-analysis revealed that among 190 alliance-outcome relations, there was a moderate but highly reliable association between the therapeutic alliance, or relationship, and counseling outcomes (Horvath et al., 2011). Counselor empathy has been shown to be associated with reduced symptoms of depression (D.D. Burns & Nolen-Hoeksema, 1992) and ratings of post-therapy change (Hamilton, 2000). While these studies indicate global benefits of functioning and wellness, they are commonly linked to the therapeutic relationship, which in and of itself is not unique to humanistic counseling theories, nor specifically targeting anxiety from a quantitative analysis. To sum up the role of humanistic counseling measurement of client outcomes (Tedeschi & Kilmer, 2005), humanistic counseling "…takes a qualitative approach and describes client outcomes related to healthy developmental trajectories for actual clients engaged in strength-based therapy."

Behavioral therapy, and later cognitive behavioral therapy, are developed and have outcome measures driven by postpositivist research design, frequently utilizing quantitative analysis, and, in the case of Cognitive Behavioral Therapy, is considered evidence based by the American Psychological Association (Gaudiano, 2008). Experimental design with anxiety as a construct was first recorded in 1932 and continues to the present day (Delprato & McGlynn, 1984). Behavioral referents for anxiety are clearly operationalized. The DSM-5 lists Cognitive Behavioral Therapy and psychopharmacology as the gold standard of anxiety treatment (American Psychiatric Association, 2013). Outcomes vary but range from 14 to 43% of anxiety disorder patients who do not respond to treatment and 18 to 48% relapse within six months (National Institute of Mental Health, 2018). Further, while benefits attained do persist longer

than with psychopharmacology, comparative studies and long-term follow-up of outcomes are still lacking (Stein & Sareen, 2015). Criticisms of CBT extend beyond the realm of reductionism; when compared to other counseling theories, there are not usually significant differences in outcomes compared to interventions which do not adhere to the CBT approach (Gaudiano, 2008). Tests of some of the core assumptions of CBT, that is, the relationship between dysfunctional attitudes and treatment outcomes, have failed to show causal links in a study of 521 patients treated with CBT (Gaudiano, 2008). A 2006 meta-analysis highlights a lack of efficacy in the belief that challenging thoughts and their assumptions leads to any meaningful treatment outcomes (Longmore & Worrell, 2007). To date, there is no clear evidence for one model of counseling which outperforms CBT with enough data gathered to make a clear case for CBT's removal as a favored treatment. This does show, however, that results may yet be attained in behavioral activities beyond the scope of psychotherapy alone.

Systemic or multicultural models of counseling seek to address the environment or collective context of a client with anxiety as means of shaping changes in behavior or subjective self-experience. Often used in child and adolescent therapies, systemic therapy for anxiety involves a detailed environmental assessment to ascertain triggers for anxiety as well as obstacles to effective coping (Carr, 2000). Systemic therapy is considered evidence based (Carr, 2000) and has shown beneficial outcomes for anxiety in child, adolescent, adult, couples, and family contexts (Carr, 2009). A 2010 meta-analysis displayed an effect size of .51 for couples and family therapy across diagnoses, with 2 out of 2 randomized controlled trials for anxiety displaying significant improvements (Sydow et al., 2010).

Political or spirituality-driven practice objectives are often multidimensional, including activism or promoting of a worldview, engaging the community, fostering researcher-to-

participant dialog, and to blend the personal and political, in addition to seeking treatment outcomes (Evans et al., 2005). The review of literature did not reveal outcome studies or comparative analyses between theoretical models based on Feminist or spiritual counseling practices and more traditional models of psychotherapy, but qualitative measures reveal efficacy or indicate a strong interest in the topics covered by these models by clients and research participants (Evans et al., 2005; Post & Wade, 2009).

Exercise

The first formal recognition by the National Institute of Mental Health on the value of using exercise to prevent and treat mental illness was during a 1984 meeting which resulted in a consensus statement to emphasize the need for methodologically sound efficacy trials (National Institute of Mental Health, 2018). The first trials following this consensus involved several randomized controlled studies examining the efficacy of exercise for major depressive disorders. The collective findings of these trials suggest that exercise interventions yield large reductions in depressive symptoms. The results were observed to be parallel to those expected with ideal pharmacological interventions (Smits et al., 2008).

Exercise promotes several neurochemical processes that promote better adaptations to the underlying mechanisms of anxiety (Veening et al., 2009 see also Broocks et al., 2001; Pietrelli et al., 2012; DeBoer et al., 2012). These can be summarized as a wealth of neurotransmitters, hormones, and immunologically relevant structures that facilitate mediation of the human stress response. Exercise affects brainwave patterns correlated to improved mediation of anxiety and stress (Crabbe & Dishman 2004). Exercise facilitates systematic desensitization, a process of iterative exposures with the effect of reducing the strength of response to the stressful stimulus and sometimes reduced reactivity to other stimuli (Smits et al., 2008; Smits and Zvolensky,

2006). Exercise has been shown to improve self-report of improved self-efficacy and a reduced score of state anxiety (Katula et al., 1999).

The intensity of exercise has been shown to significantly differ in the reported reductions of anxiety. Examining the relationship specifically between aerobic exercise and anxiety sensitivity, Broman-Fulks and colleagues conducted a study with 54 individuals who displayed high levels of anxiety sensitivity. The participants were subjected to six, 20-minute sessions with 25 participants at a low intensity, and 29 participants at a high intensity. Self-ratings of anxiety sensitivity, fear of physiological sensations associated with anxiety, and generalized anxiety were obtained at pre-treatment, post-treatment, and one-week follow-up. Results indicated that all participants of both high- and low-intensity exercise reported reduced anxiety sensitivity. However, high-intensity exercise caused more rapid reductions in a global measure of anxiety sensitivity and produced more treatment responders than low-intensity exercise (Broman-Fulks et al., 2004).

The type of exercise as well as its intensity yielded different reported results in the effects upon reported anxiety scores. Aerobic exercise is studied with far greater frequency in health fields, including in the benefits to emotional well-being, than does resistance training (Strickland & Smith, 2014). Resistance exercise includes a broad group of procedures that evoke repeated muscle action against resistances above those encountered in daily life. Resistance training usually requires the use of equipment, including elastic bands, free weights, or resistance machines, and it is performed in a series of sets that include a specific number of repetitions (American College of Sports Medicine, 2009). In a 2014 study, it was shown that resistance training at a low-to-moderate intensity (<70% 1 repetition maximum) produces the most reliable and robust decreases in anxiety. Importantly, anxiolytic effects have been observed across a

diverse range of populations and dependent measures. These findings provide support for the use of resistance exercise in the clinical management of anxiety (Strickland & Smith, 2014).

One form of exercise is the martial arts. The martial arts vary in type, intensity, and duration of movement, mimicking potential benefits indicated above. There are studies isolating variables outside of exercise as relevant to martial arts' role in reducing anxiety, such as personality traits, habit formation, social dominance hierarchies, exposure to discomfort, self-esteem, and perceived success in competition (Lakes & Hoyt, 2004; see also Kuan & Roy 2007; Layton, 1990; McGowan & Miller, 1989; Radochonski et al., 2011; Richman & Rehberg, 1986; Wargo et al, 2007), but it bears noting that observed benefits, if found, was not isolated to determine whether the result was that of the exercise specifically, or the martial arts more generally. The literature that exists on this subject is often dated by several decades.

Meditation & Mindfulness Based Practices

Meditation and mindfulness are emerging fields of research in the domains of mental health and performance, but the specifics are often misconstrued or only understood in vague terms. In research variables, meditation is divided into how it engages attention, or rather, subjective awareness of oneself or environment with each studied moment. Focused attention meditation directs attention to a specific object of concentration, be it an external point, a mantra, a pattern of counting, or even a specific breathing rhythm, as examples (Zanesco et al., 2016). Open monitoring is used to describe techniques which passively observe the present-moment object of subjective awareness of attention (Alderman et al., 2016). There are alternative techniques, such as Metta, or cultivation of empathy or loving-kindness or, specifically, the broader act of being mindful. These techniques mix and cycle between focusing of attention and observing of it (Leppma & Young, 2016). One core theme of meditative practice across cultures

is that attention can only be in one place at one moment, and perceptions of multitasking are simply a vague awareness of attention-shifting from moment to moment (Zanesco et al, 2016). With regard to the treatment of anxiety, both open monitoring and focused attention have shown promising results for treating post-traumatic stress disorder symptoms, of which rumination and hypervigilance are factors shared in some subjective measures of anxiety (Heffner et al., 2016). When it comes to specific mechanisms for the short-term treatment of anxiety, Mantra meditation, a focused attention technique called Transcendental Meditation, displayed significant reductions in PTSD symptoms after the implementation of the training program compared to the control group, consisting of 391 veterans at six VA facilities, with a .05 alpha level (Heffner et al., 2016). Even in this study, there is an evident confusion of terms, as they describe utilization of a focused attention methodology but call it mindfulness. Among the techniques, open monitoring is considered a more long-term intervention, and targets several substructures of the brain for change, including the default mode network (King et al., 2016). While this may indicate a secondary benefit for anxiety, this technique does not appear to solely focus on targeting relevant symptoms. There are other studies which focus on trauma and depression with meditation (Khusid & Vythillingham, 2016), and while results are promising, more research needs to be done, and a more thorough understanding of the technical domains of meditation needs to be attained among researchers in this emerging field.

Other Medical or Technological Practices

Several alternative options to address anxiety are emerging, and some of these options merit further investigation into potential efficacy. This section will attempt a very brief look at some of them, without attempting to be comprehensive or exhaustive.

Transcranial magnetic stimulation is the use of a mild electric current to directly stimulate cortical neurons (Pallanti & Bernardi, 2009). There is a growing body of literature indicating its efficacy as a treatment for depression, but few studies target its use for anxiety (Pallanti & Bernardi, 2009). Neurofeedback is brain wave training through designing computer-based activities that only respond favorably when the thinking patterns being measured output an optimal electroencephalogram reading, or EEG. One meta-analysis (Hammond, 2005) notes three studies where anxiety was measured, noting a significant decrease in anxiety compared to a nontreatment group at a 0.001 alpha level for all three studies.

A sauna is an infrared or steam environment kept at high temperatures to facilitate manageable hermetic stress responses in the forms of sweating, stress response, and release of dynorphin (Hannuksela & Ellahham, 2001). A study of hyperthermic effects on mice indicated apoptosis, or death of senescent cells, in areas that correlate to anxiety and anxious behavior in the hippocampus, as well as indicated reduced anxiety in maze-running tests after hyperthermic treatment (Zhu et al., 2011). Psychedelic medicines as clinical interventions remain a controversial topic. Despite their growing displays of efficacy for several treatments in addiction and mental illness (Gasser et al., 2014; Grob et al., 2011), they remain illegal, classified as a Schedule 1 drug.

In questioning the relevance of exploring so many niche domains in the treatment of anxiety, it remains clear that with established treatments, the efficacy is less than ideal, with the gold standard achieving a 46% outcome change in best-case scenarios, with a likelihood of relapse in less than 6 months of treatment cessation (American Psychiatric Association, 2013). A commonality across these alternative treatments involves a lack of research or current research, a lack of consistency or clarity of operation, or a lack of access, even if some of them display

promising results in limited research. The martial arts are, by contrast, consistent, prolific, quality-controlled through tradition due to the risk of injury with poor instruction, potentially affordable, and in most settings legal. If this study should display a relationship indicating efficacy, there may be fewer barriers to implementation for further research than some of the above options mentioned above, and may display promise for future implementation as alternative modalities for the treatment of anxiety.

Salient Factors of Martial Arts Practice

The martial arts as a topic of scholarly interest is thinly researched in comparison to many other sports. There are many disciplines with great variation between them, with origins that span across thousands of years and nearly every culture on the planet which has ever held need for organized methodologies of close combat. For these practices, information must be sought outside the scholarly literature, and across the personal or organizational works and statements of different disciplines. Any attempt to fully encompass the practices involved with every discipline and tradition will necessarily fall short. As a focusing point, those specific practices which show up across the literature as common to many forms, and are relevant to close combat practices -- these will serve as subfactors for this literature review.

The Indivisible Self Model may account for the factors which constitute wellness, and the functional subfactor behaviors of what martial arts practice entails can be shown to fit into the second order factors of Physical Self, Coping Self, Creative Self, Essential Self, and Social Self. The behaviors that make up the martial arts consist in part of physical exercise, mental preparation against negative perceived and experienced emotions and outcomes, impulse regulation displays of regular attendance to habituate to relevant skills, interaction with peers,

instructors, practitioners, as well as a cultural framework which often seeks to create norms and boundaries to mitigate the potential tensions which arise from simulating close combat.

Defining the Martial Arts

The Cambridge Dictionary definition of the martial arts is "a traditional method of fighting or defending oneself, such as judo or karate." In Major Forrest Morgan's book *Living the Martial Way* (Morgan, 1992*)*, he describes the intersection of philosophy, practice, and culture of modern martial arts. In this book, he separates traditional from hobbyist doctrines as the difference between a way of cultivating proficiency in violent conflict and a way of self-development. In the Korean and Japanese cultural milieu of his practices, his conception is taken from the Japanese suffixes of -jitsu, which indicates combat orientation, and -do, which indicates a path of self-development. He also separates forms known for grappling as soft styles, and forms known for striking as hard styles.

The US Army separates the martial arts in its *Army Combatives Manual* as disciplines involving striking, grappling, and handheld or improvised weapons (US Army, 2002). The practice of martial arts is perhaps as old as warfare itself and spans many cultures and applications. Given the mechanical options of the practice and repetitions in patterns across cultures, it can be somewhat well-summarized into three categories by the tasks conditioned in any given form of study: striking or grappling with or without handheld weapons. In addition to these technique sets as specific objectives of practice, there are several physical and cultural aspects which are mimicked in other sports or activities. These aspects are discussed in the sections below to review the literature of what is known about these behaviors' effects on anxiety.

Self-regulation Elements

There are practices specific or unique to one or more cultural doctrines, or one or more forms of martial art, such as bowing before entering the mat space, or performing a local dance before entering a ring for a competitive event (Morgan, 1992). These will not be covered in any specific depth during this literature review, as the focus is on system-agnostic practices which constitute a basis of developing close combat proficiency. Keep in mind throughout the reading, that some of these individual tasks may be a part of the mental conditioning regimen developed by any given discipline in the pursuit of close combat proficiency. The purpose of this section is to explore the potential literature that suggests an anxiolytic effect from any of the mental practices involved in martial arts disciplines, without attempting to delineate every possible name and tradition to which they may be tied.

Focused Attention

The act of directing attention to a single object of focus, be it breathing rhythm, word, image, repetitive sound, or any other sensory input which is discreet enough to be labeled and partitioned mentally from others, is considered focused attention (Hyams, 1992). This aspect is sometimes a formal meditation protocol of a martial discipline, and at other times it is simply a side effect of practice. Drills to perform a single technique in repetition serve as a focus of attention to one-pointedness (US Army, 2002). The control of breath in altercation to generate or conserve power, or to avoid strangulation, also serves as a potential outlet for the singular focus of attention. The precision required to watch the movements of an opponent, or to await a certain condition which indicates optimal timing to enact some technique, is yet another example (Morgan, 1992). Sometimes there is effort placed on utilizing non-dominant limbs with which to conduct a technique, which forces the utilization of specific attention to reconsider default

patterns. The literature on the effects of focused attention as a meditative practice has already shown efficacy in the treatment of anxiety and panic disorders (Rosenberg et al., 2015). Focused attention is known to correlate with the development of the posterior singulate, which is responsible for self-relevance and mental wandering (Lazar et al., 2005). Focused attention shows a reduction in activity in the amygdala, responsible for rumination, fear, & panic responses (Borders et al, 2010). It shows increased activity in the executive function and impulse regulation aspects of the medio-basal and dorso-lateral sections of the prefrontal cortex (Khusid & Vythilingham, 2016). The corpus collosum, or neural switchboard, shows increased efficiency with subjects trained in focused attention meditation (Lazar et al., 2005; Sanchez-Lopez et al., 2014).

Systematic Desensitization

The subfactors of martial arts practice create regular, controlled conditions which are designed to approximate at various levels a threat to survival (US Army, 2002). The environments often create an atmosphere which facilitates through purposeful or incidental conditions a sense of competitiveness, social hierarchy, fatigue, frustration, and escalating challenge to a practitioner's skills ratio (Nosanchuk, 1981). Systematic desensitization is a set of techniques designed to inoculate the participant to the stress of a stimulus through graduated exposure and adaptation (Watson et al., 1972).

Several studies display a correlation between systematic desensitization and reduction in triggers for the biopsychosocial factors of anxiety. In a study involving first-year pharmacy school students in Malaysia, the group given a systematic desensitization intervention displayed significantly lower test anxiety and improved the GPA of students in that group compared to that of the control group (Raijah & Saravanan, 2014). In a meta-analysis of test anxiety in general, it

was concluded that study skills as well as psychological interventions such as systematic desensitization proved significantly more effective than study skills alone (Tryon, 1980). This same analysis stated that any intervention along dimensions of psychological intervention or study skills showed some reported reduction in test anxiety, but that the combination of desensitization techniques and study skills showed the most pronounced result. In a bid to show a more causal relationship, a multi-site study of social phobia was conducted cooperatively between the anxiety clinic at Massachusetts General Hospital, the Center for Anxiety & Related Disorders in Boston, and the anxiety clinic at Southern Methodist University in Dallas. This study combined desensitization techniques with the psychiatric medication D-cycloserine at 50mg. Results measured with the Social Phobia and Anxiety Inventory [SPAI] revealed that while D-cycloserine administered before exposure-based interventions showed an improved treatment effect, the treatment effect of the placebo group engaged in exposure therapy was still significant, with effect sizes on the SPAI shown as high in both instances, 0.98 placebo, and 1.43 with D-cycloserine 50mg dosage (Hofmann et al, 2006).

A 1998 study in the Archives of General Psychiatry compared relaxation techniques with systematic desensitization in the treatment of post-traumatic stress disorder. The concluding findings were that across therapist and rater, prolonged exposure therapies outperformed relaxation techniques at the six-month review of symptoms as measured by distress levels recorded in diaries by participants (Marks et al., 1998). At the time of writing this literature review, there were no known studies that directly measured martial arts as an agent of systematic desensitization directly, so these studies that measure anxiety and social phobia with systematic desensitization techniques are the closest known corollaries. When the existing research on martial arts as a behavior set rather than speculative research about the individual pieces of what

constitute martial arts practice are examined, there will be relationships shown to indicate similar leanings in the relationship of anxiety and performance.

Routine and Ritual

Earlier sections covering the behavioral benefits of exercise indicate a potential corollary between regular routine, habituation to that routine, and reduced physiological expressions of anxiety (Bahrke & Morgan, 1978; DeBoer et al., 2013; Smits et al., 2008;). It stands to reason that a regular engagement in physical exercise, impulse regulation, focused attention, systematic desensitization, and social engagement may fail to explain how much of any treatment effect might be related to the adaptation of a predictable routine itself, rather than merely the combination of previously mentioned sub-factors. A wealth of research exists to explain the benefits of routine behavior, but at this time not enough research has been conducted on the martial arts to effectively compare routine practice to similar behavior sets, such as sports.

There is research showing that the martial arts outperform sports of a similar physical intensity, track and field as the control in that study, in anxiety reduction (Radochonski et al., 2011), but there is no effectively targeted measurement of routine itself as a potential factor. Given that the martial arts necessitate routine conduct and practice standards as safety measures for practice, to obtain valid and reliable data on unpredictable, repeated exposure to simulated or actual close combat presents an ethical obstacle that bears no clear method of safe examination.

Cultural Elements

The *Oxford Dictionary* defines martial arts as any of the fighting sports that include judo or karate. This definition severely limits the scope of the practice, but it does at least touch on the combination of striking and grappling in the modern context of combat sports. The Mirriam-Webster definition seems more encompassing; that is, any of several forms of combat and self-

defense that are widely practiced as sport. If one were to imagine all the influencing cultural contexts which form a definition as broad as the martial arts, the undertaking would be far outside the scope of this literature review. To narrow this wide topic into a relevant and targeted subset of cultural factors, the focus will be on cultural attitudes that seem to apply universally via combat sports disciplines rather than any particular cultural tradition, which might indicate an association with the second order factors of the Indivisible Self Model, and which display a relevance to effective close combat proficiency.

Sportsmanship

The Oxford definition of sportsmanship includes fair and generous behavior and treatment of others, especially in a sporting contest. Even in an atmosphere of competition, controlled violence, physical discomfort, and a social dominance hierarchy, it is common that deep friendships are developed as a result of martial arts practice (US Army, 2002; Morgan, 1992; Vertonghen & Theeboom, 2010). This speaks to the Social Self second order factor of the Indivisible Self Model. If one's spirituality holds a moral component as regards to the treatment of those with less physical or mental capacity to inflict or resist applied violence, the Essential Self is implicated in relevance. In a sport where physical violence is simulated and there is a high competitive spirit, great care must be taken to prevent the simulated violence from spilling into uncontrolled expressions of hostility, or reactive violence in response to pain or frustration (US Army, 2002).

One criticism of the blending of the cultural doctrines of martial arts into a culturally agnostic, system-agnostic integration of physical conflict in competition, now commonly called Mixed Martial Arts, is that the sportsmanship or cultural reverence is disappearing from the martial arts (Sanchez & Malcolm, 2010). The reactions expressed as a tension between

traditional martial arts and combat sports is a common one among practitioners on either side of the divide. The qualitative interviews conducted in Sanchez and Malcolm's study form an international review that attempts to capture the progression of attitudes as mixed martial arts have emerged as a global phenomenon. The article indicates that, with the televising and marketing of combat sports, the public perception balances disdain for the open violence and respect for the impressive athletic spectacles. These interviews demonstrate that even in the culture-stripped, televised, and globalized reduction of martial tradition into a cage fight, the practitioners at least still value, display, and expect a level of mutual respect, decorum, and concern for safety between participants of the sport. This commitment to cooperative exchange, paired with the capacity to display the appeal of controlled aggression as superior in outcome to uncontrolled aggression, morality aside, has made combat sports and traditional martial arts alike the behavior set of choice for several studies attempting to alleviate bullying behaviors in youths and adolescents. A meta-analysis of martial arts studies related to aggression was conducted with 507 participants ages 6 to 18, across 12 studies for the *Journal of Aggression & Violent Behavior*. In nine of these studies, a medium effect size is shown, and three studies failed to show a medium or greater effect size (Harwood, Lavidor, & Rassovsky, 2017).

A recent study of 595 adolescents across 16 schools in Murcia, Spain attempted to measure sportsmanship and its moderating role on aggressive behavior among adolescents. The results concluded that statistically significant relationships exist between a commitment to continuing in a sport, social conventions against poor sportsmanship, respect toward rules and judges, and respect toward opponents, all serving as moderating factors of attitudes about violent behavior outside of the confines of sport (Courel-Ibáñez et al, 2019). While this does not signify

a direct relationship between sportsmanship and anxiety, there is ample, longstanding research displaying a relationship between anxiety and aggression (Maner et al., 2008).

A 1998 Scandinavian study indicates a serotonergic corollary between anxiety, depression, and aggression. The relationship seems to display a significant interaction between decrements in the 5-HT and CSF 5-HIAA serotonergic pathways and anxiety, aggression, and depression (Van Praag, 1998). A 1991 study measuring 210 subjects aged 8 to 17 indicates that, in the Children's Manifest Anxiety Scale, a significantly higher anxiety score was present in subjects with higher verbal or physical aggression capacity (Kashani et al., 1991).

It may stand to reason that the elements of self-regulation and regard for fellow practitioners expressed in a culture of sportsmanship might be a relevant set of subfactors in the potential value of the martial arts in the treatment of anxiety. The present research indicated a wellness instrument in the Wellness Self-Efficacy Scales, and the literature review indicated the Indivisible Self domains in efforts to address these elements, even if vaguely.

Proficiency and Confidence

Research in biology (Birn et al., 2014) and psychology (Maner et al., 2008) alike support the idea that perceived capability alleviates the stress response as related to confronting stimuli aligned with the area of relevant competency. In the 2014 study, fMRI scans were measured on 89 adolescent monkeys and 28 children; behavioral interventions were applied, and plasma samples of cortisol were collected. Among the monkey and human participants with higher cortisol levels and measured anxiety traits in the human subjects, the fMRI scans showed reduced connectivity between the prefrontal cortex and the central nucleus of the amygdala (Birn et al., 2014).

Research in flow states indicate that an effective challenge to skills ratio creates a balance of anandamide, dopamine, serotonin, norepinephrine, and endorphin which indicates a state of absorption in present moment task awareness, and general well-being (Nakamura & Csikszentmihalyi, 2009). The Birn and colleagues 2014 study indicates that the capacity to reduce reliance on frontal cortex activity correlates to higher plasma levels of cortisol and measured anxiety trait scores by stronger connections to limbic system structures during stressful events. This matches the flow state research on absorption into a developed skill that produces a state known as hypo-frontality (Nakamura & Csikszentmihalyi, 2009).

The martial arts by their very nature seek to balance the challenge to skills ratio, not only for the attainment of technical proficiency, but also for the necessary management of emotional fear required to engage in simulated close combat (US Army, 2002). The elements of martial arts proficiency were measured by the Academy of Physical Culture in Kharkov, Ukraine. In their study, a battery of tests sought to measure neurological adaptation to martial arts practice through examining simple motor abilities, such as chrono-reflex metering, the tapping test, responses of choice and distinguishing, and reproduction of geometric figures (Iermakov et al., 2016). Participants included 28 striking focused martial arts practitioners and 22 grappling focused practitioners. Striking arts practitioners demonstrated better mobilization, more optimal readiness for action, more developed differentiation, better space characteristics, and more optimal regulation of muscles. Grappling arts practitioners demonstrated superior response to audio signals, response of choice to required half of screen, reproduction of line, speed of line drawing, and quantity of accurate touches in non-visual tapping test. To summarize the mechanical breakdown of competencies displayed through the battery of tests, the Kharkov study had this to say:

> …closeness of chrono reflex metering data confirms importance of quick reaction to visual and hearing irritators of both groups' sportsmen. Testing of reaction to moving object assesses dynamic parameters of moving object and ability to maximally quickly take necessary decision. That is why this methodic illustrates high level of fitness, without significant differences between sportsmen's groups. This test permits a participant to realize control of own space, distance and prediction of movement. It is an important factor in impact and throwing kinds of martial arts. Closeness of tapping test results underline their similarity of sportsmen's main nervous system indicators. The closeness of tapping test's lability and mobility are important factors for efficiency in sports.

A 2016 meta-analysis published in the *Journal of Sports Medicine* sought to determine physiological variables which determine proficiency in mixed martial arts practice (James et al., 2016). Of 23 studies examined, 16 indicated the importance of maximal strength, 19 indicated anaerobic and aerobic endurance, and all indicated a difference with significant overlap in the required physical characteristics between striking and grappling practitioners.

Given the relationship between perceived social hierarchical placement, physical fitness, desensitization to stressful stimuli, and group belonging, it stands to reason that the sum total of activities which make up combat sports and traditional martial arts indicates a top attainment pattern of resilience to anxiety, in part due to reduction of symptoms and in part due to wellness-enhancing factors which fall under the umbrella of second order factors of the Indivisible Self Model. The next section will seek to compile known results of the available limited martial arts research related to anxiety.

Anxiety and Martial Arts Research

Following the potential for wellness to overcome not only the symptoms of anxiety, but the antecedent causes and conditions which create susceptibility, the various aspects of the martial arts were outlined individually with supporting literature. This section will seek to draw conclusions on how the combined behavior set that constitutes the martial arts has been shown to hold a relationship to anxiety symptoms. Part of the motivation for this proposal is the wide

circumstantial evidence for the relationship when looking at the individual subfactors which constitute the martial arts, with the as you so little existing research conducted to bridge these variables together in the effort to target such a wide-reaching mental health condition.

In a 2011 study, 132 participant athletes, ages 18 to 25, 60 of whom were practitioners of karate and 72 being track and field athletes, were compared for anxiety traits utilizing the Competitive State Anxiety Inventory, or the CSAI, and the Coping Inventory for Stressful Situations, or the CISS (Radochonski et al., 2011).

> Results show that martial arts athletes reported a significantly higher level of self-confidence and lower levels of cognitive and somatic anxiety compared to track and field athletes. The two groups also differed in regard to the use of coping strategies in stressful situations. For example, the karate athletes used more effective strategies such as task-oriented coping. In the next step of the study, the subjects were divided into two groups according to the level of performance (i.e., "winners" and "losers"). The "losers" exhibited higher levels of anxiety, both cognitive and somatic, than "winners". They also had higher scores on less effective coping subscales, e.g., emotion-oriented and avoidance-oriented.

Karate practitioners displayed lower mean scores in cognitive anxiety, 16.8, and somatic anxiety, 15.7, on the CSAI, than their track and field athletes, who scored 20.1 for cognitive anxiety and 19.6 for somatic anxiety. The karate practitioners displayed higher self-confidence at 29.3, as opposed the track and field athletes at 22.8 on the CSAI. On the CISS, karate practitioners had higher scores on task-oriented coping mechanisms at 58.4 as opposed to 53.3 for the track & field athletes; and lower scores on emotion-oriented coping mechanisms at 39.7 as opposed to 44.5 for the track and field athletes, and lower avoidance-oriented coping mechanisms at 41.4 as opposed to the track and field athletes at 49.5. Karate practitioners displayed lower mean distraction subscale scores at 15.9 as opposed to the track and field athletes' 21.7. Karate practitioners scored lower on social diversion subscales with a score of 15.6 as opposed to track and field athletes' 18.2 (Radochonski et al., 2011). Every score

indicated a favoring of karate over track and field in adaptive responses and preparations to address the measured indicators of anxiety in both assessments. The study further speculated that the skill required in maintaining adaptive responses to anxiety would be exacerbated by the violent interactions which constitute the activity as well as the solitary competitive nature of such sports compared to more traditional athletics. This could make the difference in scores more pronounced than even the numbers might indicate.

A 2010 article sought to explore conflicting perspectives about the social and psychological outcomes among youth who practice martial arts (Vertonghen & Theeboom, 2010). The article explores the viewpoint that the practice of martial arts among youth improves personal and social interactions, creates learning experiences, and enhances well-being through confidence and proficiency development. It also explores another view that the practice of martial arts by youth, especially those leaning more toward combat sport, increase familiarity with the exercise of aggressive and violent behavior, and increases risk of medical trauma.

To examine each view, 27 studies were reviewed, with a noted skew of the literature dated from before the middle of the 1990s. The analysis concluded that two of the studies indicated that martial arts practice increased aggression, and three of the studies indicated no significant relationship, leaving 10 of the 15 studies which measured aggression indicating a decrease in aggression (Vertonghen & Theeboom, 2010). Of the 12 studies that measured personality traits in relation to martial arts practice, 10 focused on subfactors similarly phrased to the Indivisible Self Model's subfactors of wellness (Myers & Sweeney, 2008). Of these, nine out of ten of these studies (Duthie et al., 1978; Konzak & Klavora, 1980; Kuan & Roy, 2007; Kurian et al., 1994; Lakes & Hoyt, 2004; McGowan & Miller, 1989; Nafaji, 2003; Richman & Rehberg, 1986; Trulson, 1986) indicated a positive personality trait profile in regards to the measured

variables, whereas one indicated no significant relationship (Wargo et al, 2007). The measured variables on personality traits were: self-confidence, dominance, autonomy, achievement, self-esteem, social adroitness, management of anger, independence, self-reliance and enthusiastic optimism, humility, overall hope, cognitive and affective self-regulation, prosocial behavior, classroom conduct, mental performance, energy control, personal growth, and self-acceptance. Of the 12 studies which measured personality traits in relationship to martial arts, 3 out of 3 that measured anxiety indicated a significant positive relationship in reduced expression, or an improved profile of anxiety traits (Kurian et al., 1993; Layton, 1990; Trulson, 1986).

Summary

Anxiety is a sizeable and growing problem. Current practices do not display favorable outcomes as evidenced by their mediocre performance in individual outcome studies and in statistical data taken from those engaging in such gold standard treatments. The literature conducted in the past has shown initial promise in the use of the martial arts to regulate mood, manage stress, and reduce anxiety, but it has not yet been given much attention in the counseling field. Behavior sets which constitute parts of the martial arts individually display positive outcomes in managing stress and displaying a correlation with lower anxiety scores. Counseling shows a history of willingness to engage in multidisciplinary practices or encourages techniques outside of counseling to attain optimal wellness outcomes (Myers & Sweeney, 2007).

The literature that supports the helpful effects of certain subfactors which constitute the martial arts shows vast support on biopsychosocial domains. The literature of the martial arts as they relate to anxiety is positive but is outdated and narrow compared to many other topics convergent with anxiety. More research is needed to conclude that martial arts could serve as an effective micro and macro scale intervention sets for the treatment of anxiety. There is legitimate

concern that the wide-scale practice of the martial arts, especially those considered as combat sport, could result in detrimental consequences, especially to youth practitioners. "… there is no place in contemporary society for a youth sport which has, as its primary goal, the infliction of acute brain damage on an opponent" (Pearn, 1998). Ethical considerations of connected to this realm of research are profound. This dissertation proposal will seek to utilize survey data from existing practitioners to avoid instigating the practice of martial arts among participants who are not already engaging in them. But even when considering the risks, the vast problem of anxiety in our society, and the less than optimal outcomes resulting from current treatments, indicates the potential worth of exploring this subset of behaviors as a possible behavioral alternative in the treatment of anxiety symptoms, as well as the enhancement of wellness subfactors in the prevention of anxiety's causes and conditions. Should the results of this study prove promising, it could provoke more in-depth analysis that might help open the way to integrating such practices through referral and augmentation to traditional outpatient therapy.

Chapter III: Methodology

Introduction

The purpose of this study was to examine a comparison of means between the practice of martial arts and the anxiety inventory scores of participants. The demographic variables of the practice of martial arts and the perceived importance of martial arts practice were measured to answer the study's primary research questions. The study acquired scores from participants who do not practice martial arts for comparison. Participants completed a wellness inventory to measure comparisons between wellness inventory scores and the practice or lack of practice of martial arts. The variable of anxiety scores was measured utilizing the Beck Anxiety Inventory (Beck et al., 1988). The variable of wellness was measured by the Wellness Self-Efficacy Scales (Kim et al., 2015).

Research Questions and Hypotheses

The choice to conduct survey research rather than experimental design was one of resource and participant access, experience level of the researcher, and the lack of recent, quantitative research addressing the feasibility of the topics of study. The difficulty in developing the research questions related to martial arts practice lies in operationally defining both what constitutes martial arts practice, and in how to prioritize or account for the many variables that come into play within the assorted systems that constitute that definition. There was some consideration of utilizing set increments of time, categories of intensity, or definitions of attainment in their system of practice, or some other artificial filter into scaled questions, such as belt color, years of experience, fight record, or the like. This was dismissed, as the wide range of demands and methods of each system and way it is practiced and instructed, and varying needs of each individual practitioner defy such a standard categorization holding the explanatory or

inferential power that it otherwise might with more easily categorized activities. After deliberating, it occurred that the only reasonable choice was to have the participant standardize his or her own rating of the priority of the importance of the practice. And while it might better aggregate all the varying factors by way of letting the participant filter with greater efficiency, if subjectivity, the sum of the practices, this does mean that the present research must collect non-parametric data. And given the non-parametric nature of the research questions, the Kruskal-Wallis test serves the function that an ANOVA test would have otherwise in the comparison of means. The decision to collect ordinal data also necessitated that reliability was analyzed with a Spearman's Rho test rather than a Pearson's Correlation Coefficient, which is only able to test reliability when collecting interval data.

Research Question 1

- What is the relationship between the practice of martial arts and the results of the Beck Anxiety Inventory?

Research Question 2

- What is the relationship between the practice of martial arts and the results of the Wellness Self-Efficacy Scales?

Research Question 3

What is the strength of the relationships between participant age, gender, ethnicity, education level, region, martial arts experience, martial arts importance, the Beck Anxiety Inventory, and the Wellness Self-Efficacy Scales?

Null Hypothesis 1

- There is not a significant correlation displayed between the practice of martial arts and the scores on the Beck Anxiety Inventory (Beck et al., 1988).

Null Hypothesis 2

- There is not a significant correlation displayed between the practice of martial arts and the scores on the Wellness Self-Efficacy Scales (Kim et al., 2015).

Null Hypothesis 3

- There are no significant relationships between participant age, gender, ethnicity, education level, region, martial arts experience, martial arts importance, the Beck Anxiety Inventory, and the Wellness Self-Efficacy Scales.

Research Design

The study will be a quantitative survey instrument consisting of demographic variables, the Beck Anxiety Inventory, the Wellness Self-Efficacy Scales, and questions related to the practice of martial arts and its perceived importance. The survey will utilize ordinal, non-parametric data. Assumptions of ordinal data, normal distribution, independent observations, and independent variable of martial arts importance with more than 2 levels of answers were checked prior to deciding upon Kruskal Wallis as the method of testing for significance in comparison of means. Spearman correlations will be conducted rather than Pearson due to the ordinal nature of the data to be collected. The difficulty of reducing the many variables that constitute potential aspects of martial arts practice to influence anxiety and wellness drew the research design away from scale questions and interval data. The decision was made to let subjective rating of importance serve as a summary for all of the potential factors that make up martial arts practice.

Participants

Sample Size and Criteria

A survey was completed by 527 participants, with the objective to split the participants into two groups, those who practice martial arts and those who do not practice martial arts.

Demographics and Profile

Participants must have been at least 18 years old and reside within the United States or one of its territories. This was decided to create a sample of at least 385 participants to be generalizable to the United States adult population. This was derived by using a power analysis calculation with the intent to achieve a confidence level of 95% and a margin of error of under 5% to achieve a representative sample of the United States population (George & Mallery, 2010).

Data Collection Methods

Adults in the United States were encouraged to participate in an online survey through word of mouth, social media advertising, and search engine advertising. The researcher emailed local martial arts schools and submitted the survey link on martial arts interest message boards as well. The Google Adwords feature allows 3 text sentences of less than 30 characters. The statement read: “Help study anxiety. Tell us your martial arts experience.” The pitch was uniform for social media advertising and message board outreach. The recruitment statement was as follows:

> Anxiety disorders affect about 18% of adults in the United States alone (American Psychiatric Association, 2013). Martial arts are seldom-studied practices that have shown benefits in other areas of mental health (Radochonski et al., 2011). Whether you practice or not, please take this survey to help us learn what role if any that the martial arts might play in relation to anxiety.

Data was collected through Qualtrics. Only data relevant to the study was collected, and none that could have identified the participants. Data was then exported to a Microsoft Excel file so that statistical analysis could be conducted using the Statistics Package for Social Science [SPSS]. The research design was chosen to be of minimal risk to participants, and that any probability of personal harm or disturbance would be of no greater likelihood or intensity than what would be experienced in participants' daily lives.

Instruments

The two instruments utilized were the Beck Anxiety Inventory and the Wellness Self-Efficacy Scale. The variable of anxiety scores was measured utilizing the Beck Anxiety Inventory (Beck et al., 1988). The variable of wellness scores was measured by the Wellness Self-Efficacy Scale (Kim et al., 2015). Access to both instruments was obtained through PsycTESTS via the University of New Orleans library.

The Beck Anxiety Inventory

The Beck Anxiety Inventory (Beck et al., 1988) is a self-report survey intended to measure the severity of anxiety in psychiatric populations. The BAI is drawn from three prior scales: The Anxiety Checklist, the Physician's Desk Reference Checklist, and the Situational Anxiety Checklist. The 86 items on these three scales were condensed to 21 items which comprise BAI. Symptoms and perceived distress are rated within the past week on a 4-point Likert scale.

The Beck Anxiety Inventory is a method of measuring levels of anxiety in participants who have anxiety-related symptoms. In the *Journal of Anxiety Disorders* (Fydrich, Dowdall, & Chambless, 1992) the validity and reliability of the Beck Anxiety Inventory as compared to the State Trait Anxiety Inventory are discussed by way of the results of two compared studies. In the

first study, the reliability was reported: test-retest reliability and internal consistency of the scale were examined with a sample of 40 outpatients having anxiety disorders. The BAI proved highly internally consistent (Cronbach's Alpha = .94) and proved acceptably reliable over an average time lapse of 11 days (r = .67). In the second study, the convergent and discriminant validity was measured, assessing the convergent and discriminant validity of the BAI between anxiety and depression, and in comparison to the widely used trait Anxiety measure from the State-Trait Anxiety Inventory. Seventy-one outpatients with anxiety disorders completed the revised State-Trait Anxiety Inventory, the Beck Depression Inventory, and submitted daily diary ratings of anxiety and depression in addition to the BAI. The BAI fared better on tests of convergent and discriminant validity than did Trait Anxiety. The correlation between the BAI and Diary Anxiety was significantly higher (.54) than that between the BAI and Diary Depression (.38), and, when compared to Trait Anxiety (.58), the BAI was significantly less confounded with depression as measured by the Beck Depression Inventory (.50).

The Wellness Self-Efficacy Scales

The Wellness Self-Efficacy Scales (Kim et al., 2015) were developed to measure wellness self-efficacy at the end of a wellness training program. The 14 items measure physical, spiritual, financial, and vocational self-efficacy. These components were chosen to draw upon the literature of selection pressures (Buss, 2016) in evolutionary psychology as a theoretical framework to indicate possible relevance of martial arts to anxiety or wellness inventory scores. The items by category are grouped as follows: physical (4 items), spiritual (3 items), financial (3 items), and vocational self-efficacy (4 items). The items are rated on a 7-point Likert scale ranging from 1=Strongly disagree, to 7=Strongly agree.

Where the Beck Anxiety Inventory is well established with conducted comparative analyses to similar inventories, wellness as a domain is less well documented (Myers & Sweeney, 2007) or studied as a construct compared in relation to psychiatric conditions such as anxiety. An exploratory factor analysis was conducted to assess construct validity for the Wellness Self-Efficacy Scales (Kim et al., 2015), and 13 of the 14 items rated above a .63 as a corresponding factor, with 1 item rating at a .57. Internal consistency measures indicate alpha reliabilities were all within acceptable range, with the following coefficients per component: The alpha reliabilities were all well within an acceptable range: physical (T1=.85, T2=.83, and T4=.85); spiritual (T1=81, T2=82, and T4=84); financial (T1=85, T2=72, and T4=80); and vocational (T1=83, T2=83, and T4=88).

Survey Questions

The online survey was designed around the information needed to answer the primary and secondary research questions of this study. The 43-question survey consisted of the following questions:

1. Do you consent to participate in this survey?

This question followed an informed consent statement declaring to each participant the purpose of the study, the role of the participant, and a disclaimer that this survey is not intended to influence views about anxiety or martial arts practice of the participant in any way. This statement displayed a crisis hotline number for resources if the participant felts any duress from participation. If the participant declined, they were thanked for their time and the survey link was closed for them. If the participant answered yes, they were given the survey.

2. What is your age?

This survey required participants to be 18 years of age at minimum. Therefore, anyone younger could not be a participant for the survey.

3. What is your gender?

This survey sought to measure variables that might differ with biopsychosocial factors that favor one gender over another. There was an option to answer as other for gender fluidity, transgender, and/or intersex participants. For the sake of measuring demographic variables, any non-binary participants were measured in the same category, labeled as other.

4. What is your ethnicity?

This survey sought to measure variables that might be influenced by cultural background. The categories followed the US Census categories, labeled as White, Black or African American, American Indian or Alaska Native, Asian, and Native Hawaiian or Other Pacific Islander, and Other (U.S. Census Bureau, 2019).

5. What is your geographic region?

This survey asked participants to select the state in which they currently reside within the United States. This cluster of data can be condensed into a few geographic regions if participant data is not enough to measure by state.

6. What is your education level?

This question sought to expand data about the participant's culture, of which socioeconomic status is a concrete indicator. Participants were given a selection of grades 1 through 12, with a categories for some college, bachelor's degree, graduate degree, or doctoral degree.

The next 21 questions, items 7 through 27, were the questions in the Beck Anxiety Inventory. The Beck Anxiety Inventory uses a scaling answer key ranging from 0 to 3. Participants were asked to rate these next 21 questions from 0 to 3, with 0 being (Not at All), 1 being (Mild), 2 being (Moderate), and 3 being (Severe).

7. Numbness or tingling
8. Feeling hot
9. Wobbliness in legs
10. Unable to relax
11. Fear of the worst happening
12. Dizzy or lightheaded
13. Heart pounding or racing
14. Unsteady
15. Terrified
16. Nervous
17. Feelings of choking
18. Hands trembling
19. Shaky
20. Fear of losing control
21. Difficulty breathing
22. Fear of dying
23. Scared
24. Indigestion or discomfort in abdomen
25. Faint

26. Face flushed

27. Sweating (not due to heat)

The next questions, 28 through 41, were the questions in the Wellness Self-Efficacy Scale. Participants were instructed to list each question on a range of 1 (Strongly disagree) to 7 (Strongly agree). Questions 28 through 31 indicate the physical Self-efficacy subscale. Questions 32 through 34 indicate the spiritual self-efficacy subscale. Questions 35 through 37 indicate the financial self-efficacy subscale. Questions 38 through 41 indicate the vocational self-efficacy subscale.

28. I am confident that I can evaluate my physical condition or fitness.

29. I am confident that I can identify ways to improve my physical condition or fitness.

30. I am confident that I can create a plan to improve my physical condition or fitness.

31. I am confident that I am able to improve my physical health if I decide it is necessary.

32. I am confident that I can evaluate my spiritual well-being.

33. I am confident that I have the resources necessary to improve my spiritual well-being.

34. I am confident that I can improve my spiritual well-being if I think it is important.

35. I am confident that I can evaluate my financial position.

36. I am confident that I can identify steps to improve my financial position.

37. I am confident that I can improve my financial position by implementing my plans.

38. I am confident that I can pursue vocational goals that I think are important.

39. I am confident that I can assess the state of my vocation.

40. I am confident that I have the skills necessary to improve my vocational wellness

41. I am confident that I can improve my vocational wellness.

Questions 42 and 43 were demographic questions to categorize the practice of martial arts, and its importance to a participant's well-being.

42. Have you practiced any form of martial art or combat sport?

This was the question that determined the comparison against the scores on the Beck Anxiety Inventory and Wellness Self-Efficacy Scales instruments.

43. How important would you rate the practice of martial arts to your well-being? Mark this question as 0 if you have never practiced any form of martial art or combat sport.

This question was rated from 0 (Not important or N/A) to 3 (Extremely important).

Sampling Procedures

The sampling method was convenience sampling. The survey was issued via the online platform Qualtrics. Data collection spanned one semester. The data received was used in its entirety, except for incomplete responses regarding independent variables, or cases with more than 2 missing questions, which were discarded. Statistical analysis was conducted on the variables of the Beck Anxiety Inventory scores and Wellness Self-Efficacy Scale scores, and the demographic variables of martial arts practice or lack thereof. Further statistical analysis was conducted on other demographic variables of age, ethnicity, gender, geographic region, and education level to determine any specific results that differed among and between groups that was not captured by analyzing the sample. This study was of a group means comparative and quantitative research design. The benefits to this design included total participant anonymity, discrete categorical and ordinal scale data that was gathered and compared among a representative sample, and the ease of measurement with well-established protocols for statistical analysis. The ability to compare through quantitative analysis allowed for a correlational design to analyze the relationship between variables using descriptive statistics.

Participant identities remained anonymous by not soliciting any answers which could be utilized to identify an individual and through utilizing the Qualtrics platform to create a password protected server with which to store the responses, so that the researcher did not have access to IP address or other respondent data than what was solicited on the instrument. To mitigate risk further, any who had taken the survey were given access to a mental health hotline after taking the survey to increase support without revealing their identity should some awareness or issues arise. All participants completed the survey with the knowledge that participation was voluntary and offered no reward or penalty for participation or non-participation. Data collected through the survey was secured in an online password protected account.

The survey used language free of jargon to account for the widest possibility of adequate comprehension. Language to define the practice of martial arts was as culturally neutral as possible. For this reason, no reference was made to any specific disciplines, only to behaviorally defined criteria that serve as an operational definition of martial arts or combat sports practice. To list doctrines, such as karate, kung fu, or pankration could have created a narrow view of what constitutes martial arts based on disciplines from specific geographic regions or with enough popular culture media coverage (Morgan, 1992).

Data Analysis

Descriptive

In this chapter, descriptive statistics will be analyzed with participants' demographics (age, gender, ethnicity, geographic location, education level), BAI scores, and Wellness Self-Efficacy Scales scores in SPSS. These will be presented in further detail in the next chapter.

Inferential

Internal consistency measures to determine reliability will be conducted. Due to the ordinal nature of the data, Spearman correlations (Eisinga et al, 2013) will be conducted with participants' demographics (age, gender, ethnicity, geographic location, education level), BAI scores, and Wellness Self-Efficacy Scales scores. Correlations at an alpha level of less than or equal to .05 will be interpreted by the following values: .00 to .19 = very weak, .20 to .39 = weak, .40 to .59 = moderate, .60 to .79 = strong, and .80 to 1.0 = very strong (Eisinga et al., 2013; Evans, 1996).

Statistical analysis will be conducted on variables related to the primary and secondary research questions. The primary and secondary research questions will be measured by accepting or rejecting the null hypothesis. The non-parametric, ordinal, normally distributed data will be analyzed using a Kruskal-Wallis one-way analysis of variance for determining group mean rank comparisons of asymptotic significance. Because the data is non-parametric, an ANOVA would not be appropriate. Because one of the independent variables, the importance of martial arts practice, has 4 levels to its answer, a Mann Whitney U test would not fit. A Spearman correlation test will be utilized to test for strength of variable association (Eisinga et al., 2013).

The design of the present study seeks to measure several complex constructs in a quantitative survey format, with several hundred participants across the entirety of the United States, age 18 and older, of any education level, gender, or ethnicity. Anxiety as a construct will be approximated with the Beck Anxiety Inventory scores. Wellness as a construct will be approximated with the Wellness Self-Efficacy Scales, to serve as an opposing variable that one would expect to increase in negative proportion to anxiety inventory scores. The practice of martial arts will be measured by asking if it has ever been practiced, and its influence for a

respondent will be asked through the perceived importance of its practice to the respondent's well-being. These responses will be analyzed by frequency, by significance as measured by a Kruskal-Wallis test, and by direction and strength of correlation to the other measured variables with a Spearman Correlation.

Chapter IV: Results

Introduction

The purpose of this study was to explore the relationship between the practice of martial arts, anxiety, and wellness. Participants were adults living in the United States or one of its territories. Participants (N=527) were recruited through social media and search engine advertising. They were asked to complete a survey consisting of informed consent and demographic questions, the Beck Anxiety Inventory, Wellness Self-Efficacy Scales, and self-identification of martial arts practice and perceived importance questions.

In this chapter, the participants' demographic characteristics and descriptive statistics are presented. Correlations between participants' demographic characteristics, martial arts practice and perceived importance if present, Beck Anxiety Inventory scores, and Wellness Self-Efficacy Scales scores are provided. In addition, results from a Kruskal Wallis analysis are provided on the Beck Anxiety Inventory and the Wellness Self-Efficacy Scales scores grouped in relation to demographic variables, and the presence or absence of martial arts practice, as well as perceived importance of martial arts practice to wellness.

Descriptive Statistical Analysis

Descriptive statistics for demographic variables (age, gender, ethnicity, education level, geographic region), the presence or absence of martial arts practice and the perceived importance of martial arts to the well-being of the practitioner were analyzed. Additionally, the Beck Anxiety Inventory and Wellness Self-Efficacy Scales were analyzed. 673 respondents opened the survey link but 158 did not complete the survey in its entirety. 118 were discarded for mostly incomplete responses. 28 were discarded for leaving the independent variables unanswered. 11 incomplete responses were kept, where 6 did not complete the Beck Anxiety Inventory, 1

missing 2 questions, 5 missing 1 question, and 5 did not complete the Wellness Self-Efficacy Scales, 1 missing 2 questions, 4 missing 1 question. These 11 were kept for being nearly complete, and for having the independent variables answered. 11 incomplete and 516 completed leaves 527 total participants whose scores were counted. The main factors of participant removal were a maximum of 2 questions missing, and the presence of responses for the independent variables.

Table 1 displays Frequencies and Descriptives for Gender, Age, and Race. Of the 527 participants, 384 were male (72.9%), 136 were female (25.8%), and seven were of other gender (1.3%). Of the 527 participants, 140 were age 18-25 (26.5%), 207 were between age 26-35 (39.3%), 118 were between age 36-45 (22.4%), 43 were between age 46-55 (8.2%), 12 were between age 56-65 (2.3%), and 7 were age 65 or older, (1.3%). Of the 527 participants, 400 identified as white (75.9%), 32 identified as black (6.1%), three identified as Native American (0.6%), 40 identified as Asian (7.6%), two identified as Pacific islander (0.4%), and 50 identified as other (9.5%).

Table 1

Frequencies and Descriptives for Gender, Age, and Race (N = 527).

	Male		Female		Other				Total	
	f	%	*F*	%	*f*	%	*M*	*SD*	*F*	%
Gender	384	72.9	136	25.8	7	1.3			527	100
Age										
18-25									140	26.5
26-35									207	39.3
36-45									118	22.4
46-55									43	8.2

56-65	12	2.3
65+	7	1.3
Total	527	100%
Race		
White	400	75.9
Black	32	6.1
Native American	3	0.6
Asian	40	7.6
Pacific Islander	2	0.4
Other	50	9.5
Total	527	100%

Table 2 displays Frequencies and Descriptives for Region and Education Level. Of the 527 participants, 114 indicate living in the Western region of the United States (21.6%), 115 indicate living in the Midwest region of the United States (21.8%), 122 indicate living in the Eastern region of the United States (23.1%), 153 indicate living in the Southern region of the United States (29.0%), and 23 report living in other regions or territories of the United States (4.4%). Of the 527 participants, 37 indicate an education level of high school or less (7.0%), 111 indicate an education level of some college (21.1%), 38 indicate an education level of an associate's degree (7.2%), 233 indicate an education level of a bachelor's degree (44.2%), 93 indicate an education level of a master's degree (17.6%), and 15 indicate an education level of a doctoral degree (2.8%).

Table 2

Frequencies and Descriptives for Region and Education Level (N=527).

Region			Education		
	f	*%*		*F*	%
West	114	21.6%	High School	37	7.0%
Midwest	115	21.8%	Some College	111	21.1%
East	122	23.1%	Associate's	38	7.2%
South	153	29.0%	Bachelor's	233	44.2%
Other	23	4.4%	Master's	93	17.6%
			Doctorate	15	2.8%
Total	527	100.0%	Total	527	100.0%

Table 3 displays Frequencies for Martial Arts Practice and Perceived Importance. Of the 527 participants, 356 have practiced martial arts (65.7%), and 181 have not ever practiced martial arts (34.3%). Martial arts practice was highest among the age group of 18-25, at 122 out of 140 respondents. Martial arts practice was lowest at age 66 and older, with 2 out of 7 respondents. Martial arts practice was more prevalent among male respondents at 275 out of 384, than female respondents at 66 out of 136. Other gender categories display a high proportion of participation in martial arts at 5 out of 7. While this may not be sufficient sample size to infer much, it could be an area of further study for gender researchers. Geographic region displayed no clear trend of martial arts practice being much higher than others, with the exception of Other region. This also included overseas military assignments for bases that are technically US territory due to Status of Forces Agreements. The fact that all US Army and Marine Corps personnel undergo rudimentary martial arts training may have skewed this total, with 20 out of 23 respondents from Other region reporting martial arts practice. 263 White respondents out of

400 report martial arts practice, 2 out of 3 Native American respondents report martial arts practice, 22 out of 40 Asian respondents report martial arts practice, and 45 out of 50 Other ethnicity category respondents report martial arts practice. While the US Census categories were employed, there is ambiguity when classifying race and ethnicity. Currently, Hispanics, West and South Asians, Eurasians, and some North Africans would constitute a White ethnicity, according to current categories. It could be of interest to cultural researchers to study potential factors for the high proportion of respondents of unclear ethnic category who report martial arts practice. Black and Pacific Islander participation in martial arts were lowest, with 13 out of 32, and 1 out of 2 respondents respectively, having practiced martial arts. Education levels with the highest proportion of martial arts practice were those with high school education at 28 out of 37, some college at 87 out of 111, and doctoral degrees at 11 out of 15. Age may play a role in the education level of martial arts practice among respondents, but the proportion of doctoral respondents defies the trend that with increased age, martial arts practice lowers among respondents. This could be an area for future study, of what factors common to both variables defy the trend of reducing practice with age?

Any who have not practiced martial arts have their answer for martial arts importance as not important/never practiced. Eight participants rate the experience as unimportant (1.6 % of respondents, 2.3% of those who have practiced martial arts). 19 participants rate the martial arts of minimal importance (3.6% of respondents, 5.5% of those who have practiced martial arts). 108 participants rate the martial arts to be somewhat important (20.5% of respondents, 31.2% of those who have practiced martial arts). 211 participants rate the martial arts as extremely important, (40.0% of respondents, 60.9% of those who have practiced martial arts).

Table 3

Frequencies for Martial Arts Practice and Perceived Importance (N = 527).

Martial Arts Practice			Martial Arts Importance		
	f	*%*		*f*	*%*
Yes	346	65.7%	Not important/never practiced	189	35.9%
No	181	34.3%	Of minimal importance	19	3.6%
Total	527	100.0%	Somewhat important	108	20.5%
			Extremely important	211	40.0%
			Total	527	100.0%

Frequencies for the Beck Anxiety Inventory and Wellness Self-Efficacy Scales were collected. Six participants did not complete every question on the Beck Anxiety Inventory (one did not fill question seven, two did not fill question eight, one did not fill question nine, one did not fill question 10, and one did not fill question 11), and five participants didn't complete every question on the Wellness Self-Efficacy Scales (one did not fill question 28, one did not fill question 29, one did not fill question 30, and two did not fill question 31).

Table 4

Frequencies for Beck Anxiety Inventory and Wellness Self-Efficacy Scales (N = 527).

Beck Anxiety Inventory			*Wellness Self-Efficacy Scales*		
Score	*f*	*%*	*Score*	*f*	*%*
0	24	4.6%	0	1	0.2%
1	18	3.4%	19	3	0.6%
2	18	3.4%	24	1	0.2%

3	23	4.4%	25	1	0.2%
4	17	3.2%	27	2	0.4%
5	26	4.9%	28	2	0.4%
6	22	4.2%	29	1	0.2%
7	28	5.3%	30	6	1.1%
8	24	4.6%	31	1	0.2%
9	19	3.6%	32	2	0.4%
10	19	3.6%	34	2	0.4%
11	21	4.0%	35	4	0.8%
12	15	2.8%	37	1	0.2%
13	19	3.6%	39	5	0.9%
14	11	2.1%	40	1	0.2%
15	14	2.7%	41	2	0.4%
16	4	0.8%	42	6	1.1%
17	12	2.3%	43	4	0.8%
18	6	1.1%	44	4	0.8%
19	5	0.9%	45	2	0.4%
20	9	1.7%	46	2	0.4%
21	7	1.3%	47	3	0.6%
22	5	0.9%	48	5	0.9%
23	6	1.1%	49	8	1.5%
24	9	1.7%	50	6	1.1%
25	10	1.9%	51	8	1.5%

26	7	1.3%	52	8	1.5%
27	4	0.8%	53	8	1.5%
28	9	1.7%	54	9	1.7%
29	8	1.5%	55	6	1.1%
30	4	0.8%	56	8	1.5%
31	8	1.5%	57	10	1.9%
32	8	1.5%	58	18	3.4%
33	11	2.1%	59	9	1.7%
34	7	1.3%	60	9	1.7%
35	8	1.5%	61	13	2.5%
36	5	0.9%	62	6	1.1%
37	5	0.9%	63	14	2.7%
38	5	0.9%	64	24	4.6%
39	5	0.9%	65	15	2.8%
40	3	0.6%	66	7	1.3%
41	9	1.7%	67	16	3.0%
42	7	1.3%	68	15	2.8%
43	2	0.4%	69	12	2.3%
44	5	0.9%	70	26	4.9%
45	2	0.4%	71	14	2.7%
47	1	0.2%	72	14	2.7%
50	3	0.6%	73	21	4.0%
51	2	0.4%	74	23	4.4%

52		1	0.2%	75	12	2.3%
53		1	0.2%	76	11	2.1%
Missing	System	6	1.1%	77	12	2.3%
Total		521	100.0%	78	16	3.0%
				79	11	2.1%
				80	9	1.7%
				81	15	2.8%
				82	5	0.9%
				83	6	1.1%
				84	37	7.0%
				Missing	5	0.9%
				Total	522	100.0%

Findings by Research Questions

Research Question One

What is the relationship between the practice of martial arts and the results of the Beck Anxiety Inventory?

Data Analysis

A Kruskal Wallis test was conducted to analyze mean score differences to test the null hypotheses between the Beck Anxiety Scores and demographic variables (age, gender, ethnicity, region, education level), the practice of martial arts, and the perceived importance of martial arts practice. Table 5 displays results of the Kruskal Wallis test for Beck Anxiety Inventory by all Demographics. Prior to utilizing a Kruskal Wallis test, preliminary analyses for homogeneity of

variance and normality were conducted. Of the variables tested for comparison among the Beck Anxiety Inventory scores, none of the demographic variables displayed significant *p* values. Both variables related to the martial arts (presence or absence of practice history, perceived importance of practice) displayed significant *p* values. Table 6 displays Kruskal Wallis test results for the Beck Anxiety Inventory by Martial Arts Practice and Importance. The independent variables both displayed significant p values: martial arts practice ($p < .05$), importance of martial arts practice ($p < .01$), indicating that the practice of martial arts indicated lower Beck Anxiety Inventory scores, and the more important the martial arts were perceived to be, the lower the Beck Anxiety Inventory scores. BAI scores for respondents who practiced martial arts was 14.46 and 18.96 for those who did not practice martial arts, indicating a 4.5 mean difference in favorable BAI result to martial arts practitioner respondents.

Table 5

Kruskal Wallis for Beck Anxiety Inventory by all Demographics (N = 527).

Kruskal Wallis for Beck Anxiety Inventory	Kruskal Wallis H	*df*	Asymp. Sig
Age	1.096	5	0.954
Gender	3.088	2	0.214
Ethnicity	8.482	5	0.132
Region	3.170	4	0.530
Education	3.779	5	0.582

Table 6

Kruskal Wallis for Beck Anxiety Inventory by Martial Arts Practice and Importance (N = 527).

Kruskal Wallis for Beck Anxiety Inventory	Kruskal Wallis H	*df*	Asymp. Sig

Practiced Martial Arts	6.465	1	0.011
Importance of Martial Arts	15.801	3	0.001

Research Question Two

What is the relationship between the practice of martial arts and the results of the Wellness Self-Efficacy Scales?

Data Analysis

A Kruskal Wallis test was conducted to analyze relationships between the Wellness Self-Efficacy Scales and demographic variables (age, gender, ethnicity, region, education level), the practice of martial arts, and the perceived importance of martial arts practice. Table 7 displays test results for the Kruskal Wallis for Wellness Self-Efficacy Scales by Scales by all Demographics. Of the demographic variables tested for comparison among the Wellness Self-Efficacy Scales scores, only region ($p < .05$) displayed a significant p value. The Other geographic region displayed a disproportionate result, with 20 out of 23 reporting martial arts practice. Given that overseas embassy and military base addresses were counted in this region, as well as territories with high proportion of military personnel, this may have skewed the result, as the US Army and US Marine Corps require rudimentary martial arts introduction as part of basic training requirements. Participation in martial arts might be higher among servicemembers than the general population, a topic which might interest future researchers. Table 8 displays test results for the Kruskal Wallis for Wellness Self-Efficacy Scales by Martial Arts Practice and Importance. The independent variables both displayed significant p values: martial arts practice ($p < .001$), importance of martial arts practice ($p < .001$). This indicates that Wellness Self-Efficacy Scales mean scores increase as martial arts practice is reported. This further indicates

that the higher the rated importance of martial arts practice, the Wellness Self-Efficacy Scales mean scores increase further. For those respondents who practiced martial arts, the mean WSES score was 67.48, as opposed to 59.93 for those who did not, for a 7.55 difference in favor of respondents who reported martial arts practice.

Table 7

Kruskal Wallis for Wellness Self-Efficacy Scales by Scales by all Demographics (N = 527).

Kruskal Wallis for Wellness Self-Efficacy Scales	Kruskal Wallis H	*df*	Asymp. Sig
Age	4.498	5	0.480
Gender	3.088	2	0.214
Ethnicity	4.980	5	0.418
Region	11.838	4	0.019*
Education	3.779	5	0.582

Note. *$p < .05$; **$p < .01$.

Table 8

Kruskal Wallis for Wellness Self-Efficacy Scales by Martial Arts Practice and Importance (N = 527).

Kruskal Wallis for Wellness Self-Efficacy Scales	Kruskal Wallis H	*Df*	Asymp. Sig
Practiced Martial Arts	26.881	1	0.000
Importance of Martial Arts	46.567	3	0.000

Research Question 3

What is the strength of the relationships among participant age, gender, ethnicity, education level, region, martial arts experience, martial arts importance, Beck Anxiety Inventory, and Wellness Self-Efficacy Scales?

Data Analysis

Table 9 displays Spearman correlations for Demographics by Martial Arts Practice and Importance. Spearman correlations were conducted to analyze the demographic variables of participants' gender, age, ethnicity, education level, and region, the independent variables of martial arts practice and the importance of martial arts practice, and the dependent variables of the Beck Anxiety Inventory and the Wellness Self-Efficacy Scales. Correlations were conducted to determine relationships between the demographic variables and independent variables, the demographic variables and dependent variables, and the independent and dependent variables. Correlations at an alpha level of less than or equal to .05 were interpreted by the following values: .00 to .19 = very weak, .20 to .39 = weak, .40 to .59 = moderate, .60 to .79 = strong, and .80 to 1.0 = very strong (Evans, 1996).

Demographics by Martial Arts Practice and Importance

Correlations were conducted to measure for relationships between the demographic variables of age, gender, ethnicity, region, and education level, and the independent variables of martial arts practice and the importance of martial arts practice. For age, a weak, significant positive correlation was found for the practice of martial arts (r =.243, p < .01), and a very weak, significant, negative correlation was found for the importance of martial arts practice (r = -.196, p < .01). This displays that as age increases, martial arts practice decreases. For gender, a weak, significant positive correlation was found for the practice of martial arts (r =.201, p < .01), and a weak, significant, negative correlation was found for the importance of martial arts practice (r = -.209, p < .01). Male respondents reported a higher percentage of martial arts participation, but both genders displayed over 50%. Other genders displayed the highest participation, but there were only 7 respondents with an Other gender identified. For education, a very weak, significant,

positive correlation was found for the practice of martial arts (r =.095, p < .05), and a very weak, significant, negative correlation was found for the importance of martial arts practice (r = -.113, p < .01). The highest percentage of report of martial arts practice was in the high school or less, some college, and doctoral levels. The 11 out of 15 doctorate respondents who report martial arts practice might be worth further consideration for study. The practice of martial arts displayed a very strong, significant, negative correlation to the importance of martial arts practice (r = -.856, p < .01). The report of martial arts practice is coded as 0 and 1 for not practiced, and importance is coded 0 to 3. This means that a negative correlation means that the more martial arts is reported, the higher its likely importance will be reported.

Table 9

Correlations for Demographics by Martial Arts Practice and Importance (N = 527).

Spearman's Rho		Practiced Martial Arts	Importance Martial Arts
Age	Correlation Coefficient	.243	-.196
	Sig. (2-tailed)	.000	.000
	f	527	527
Gender	Correlation Coefficient	.201	-.209
	Sig. (2-tailed)	.000	.000
	f	527	527
Ethnicity	Correlation Coefficient	-.027	.058
	Sig. (2-tailed)	.531	.181
	f	527	527
Region	Correlation Coefficient	-.020	.023
	Sig. (2-tailed)	.640	.599

	f	527	527
Education	Correlation Coefficient	.095	-.113
	Sig. (2-tailed)	.029	.009
	f	527	527
PracticedMartialArts	Correlation Coefficient	1.000	-.856
	Sig. (2-tailed)	.	.000
	f	527	527
ImportanceMartialArts	Correlation Coefficient	-.856	1.000
	Sig. (2-tailed)	.000	.
	f	527	527

Demographics by Beck Anxiety Inventory

Table 10 displays Spearman Correlations for Demographics by the Beck Anxiety Inventory. For gender, a very weak, significant, positive correlation was found for the Beck Anxiety Inventory (r =.147, p < .01). This indicates that male respondents displayed lower mean scores on the BAI, at 247.30, as opposed to 298.54, for female respondents. This is consistent with general anxiety literature (Steimer, 2002; American Psychiatric Association, 2013; National Institute of Mental Health, 2018).

Table 10

Correlations for Demographics by the Beck Anxiety Inventory (N = 527).

Spearman's Rho		Composite Beck Anxiety Inventory
Age	Correlation Coefficient	-.020
	Sig. (2-tailed)	.650
	f	521

Gender	Correlation Coefficient	.147
	Sig. (2-tailed)	.001
	f	521
Ethnicity	Correlation Coefficient	.002
	Sig. (2-tailed)	.972
	f	521
Region	Correlation Coefficient	-.035
	Sig. (2-tailed)	.425
	f	521
Education	Correlation Coefficient	.017
	Sig. (2-tailed)	.698
	f	521

Demographics by Wellness Self-Efficacy Scales

Table 11 displays Spearman correlations for demographics by the Wellness Self-Efficacy Scales. For region, a very weak, significant, positive correlation was found for the Wellness Self-Efficacy Scales (r =.095, $p < .01$). The US South region displayed the highest mean WSES scores, with 293.36 as mean score, with the next highest region being the East with 258.62. The lowest mean WSES score by region is the Midwest, with 231.61. Most respondents, 152 of the total respondents, reported living in the South region, which might skew results. It could be of interest to future research to explore geographic region and wellness further.

Table 11

Correlations for Demographics by the Wellness Self-Efficacy Scales (N = 527).

Spearman's Rho		Wellness Self-Efficacy Scales
Age	Correlation Coefficient	-.019
	Sig. (2-tailed)	.672
	F	522
Gender	Correlation Coefficient	-.070
	Sig. (2-tailed)	.112
	F	522
Ethnicity	Correlation Coefficient	.072
	Sig. (2-tailed)	.100
	F	522
Region	Correlation Coefficient	.097
	Sig. (2-tailed)	.027
	F	522
Education	Correlation Coefficient	.033
	Sig. (2-tailed)	.452
	F	522

Beck Anxiety Inventory and Wellness Self-Efficacy Scales by Martial Arts Practice and Importance of Martial Arts Practice

Table 12 displays Spearman Correlations for Beck Anxiety Inventory & Wellness Self-Efficacy Scales by martial arts practice & importance. For the Beck Anxiety Inventory, a moderate, significant negative correlation was found for the Wellness Self-Efficacy Scales (*r* = -

.436, $p < .01$), a very weak, significant, positive correlation was found for the practice of martial arts ($r = .112$, $p < .05$), indicating that as respondents report lower BAI scores, they report higher WSES scores. A weak, significant, negative correlation was found between the importance of martial arts practice ($r = -.160$, $p < .01$) and the Beck Anxiety Inventory scores, indicating that as martial arts practice importance increases, respondents display lower BAI scores.

For the Wellness Self-Efficacy Scales, a weak, significant, negative correlation was found for the practice of martial arts ($r = -.227$, $p < .01$), and a weak, significant, positive correlation was found for the importance of martial arts Practice ($r = .297$, $p < .01$), indicating that mean WSES scores were higher for respondents who reported martial arts practice than for those who did not, and higher for those who reported high importance to martial arts practice than lower importance.

Table 12

Correlations for Beck Anxiety Inventory & Wellness Self-Efficacy Scales by Martial Arts Practice & Importance (N = 527).

Spearman's Rho	Beck Anxiety Inventory		Wellness Self-Efficacy Scales	Practiced Martial Arts
Beck Anxiety Inventory	Correlation Coefficient	1.000	-.436	.112
	Sig. (2-tailed)	.	.000	.011
	F	521	516	521
Wellness Self-Efficacy Scales	Correlation Coefficient	-.436	1.000	-.227
	Sig. (2-tailed)	.000	.	.000

	F	516	522	522
Practiced Martial Arts	Correlation Coefficient	.112	-.227	1.000
	Sig. (2-tailed)	.011	.000	.
	F	521	522	527
Importance of Martial Arts	Correlation Coefficient	-.160	.297	-.856
	Sig. (2-tailed)	.000	.000	.000
	F	521	522	527

Summary

In this chapter, three research questions about the relationship between scores on the Beck Anxiety Inventory and the practice and importance of martial arts, between scores on the Wellness Self-Efficacy Scales and the practice and importance of martial arts, and among the correlations between demographic variables of age, gender, ethnicity, region, education level, the practice and importance of martial arts, scores on the Beck Anxiety Inventory, and scores on the Wellness Self-Efficacy Scales, were answered. Descriptive statistics were analyzed for the demographic variables of age, gender, ethnicity, region, education level, independent variables of the practice and importance of martial arts, and dependent variables of the scores on the Beck Anxiety Inventory, and scores on the Wellness Self-Efficacy Scales.

For research question one, a Kruskal Wallis test examined the relationship between martial arts practice and perceived importance and the scores on the Beck Anxiety Inventory. Both the practice of martial arts and its perceived importance displayed significant p values:

martial arts practice ($p < .05$), importance of martial arts practice ($p < .01$). For research question two, a Kruskal Wallis test examined the relationship between martial arts practice and perceived importance and scores on the Wellness Self-Efficacy Scales. Both the practice of martial arts and its perceived importance displayed significant p values: martial arts practice ($p < .001$), importance of martial arts practice ($p < .001$).

For research question three, a Spearman correlation was conducted to examine the strength, significance, and direction of the relationship between the demographic variables of age, gender, ethnicity, region, education level, the independent variables of the practice and the importance of martial arts, and the dependent variables of the scores on the Beck Anxiety Inventory, and the scores on the Wellness Self-Efficacy Scales. Age was significantly and weakly correlated to martial arts practice, as well as significantly and very weakly correlated to the perceived importance of martial arts practice. Gender was significantly and weakly correlated to martial arts practice, significantly and weakly correlated to the perceived importance of martial arts practice, as well as significantly and very weakly correlated to the Beck Anxiety Inventory scores. Region was significantly and very weakly correlated to the Wellness Self-Efficacy Scales scores. Education level was significantly and very weakly correlated to martial arts practice and the importance of martial arts practice. The practice of martial arts was significantly and very strongly correlated to the importance of martial arts practice, significantly and very weakly correlated to the Beck Anxiety Inventory scores, as well as significantly and weakly correlated to the Wellness Self-Efficacy Scale scores. The Beck Anxiety Inventory scores were significantly and moderately correlated to the Wellness Self-Efficacy Scale scores.

Chapter V

Discussion

In the present research, to measure for the presence or absence of statistical significance, a comparison was studied between scores on the Beck Anxiety Inventory and the practice of martial arts through a Kruskal-Wallis test, as well as between scores on the Wellness Self-Efficacy Scales and the practice of martial arts through a Kruskal-Wallis test. The demographic variables of age, gender, ethnicity, geographic region, and education level were compared between the practice of martial arts, the Beck Anxiety Inventory, and Wellness Self-Efficacy Scales, through Kruskal-Wallis tests to look for statistical significance among these variables. Between demographic variables, the Beck Anxiety Inventory, Wellness Self-Efficacy Scales, and martial arts practice, the strength and direction of correlations were measured using a Spearman analysis.

Discussion of Research Findings

The purpose of this research was to examine the comparisons between and among scores for the Beck Anxiety Inventory, Wellness Self-Efficacy Scales, martial arts practice and its importance to well-being, and demographic variables of age, gender, ethnicity, geographic region, and education level with Kruskal-Wallis tests and Spearman correlation analysis to discern if the practice of martial arts might display any significant patterns in the scores on instruments intended to measure anxiety and wellness. Lower scores on the Beck Anxiety Inventory would indicate less perception of anxiety, and higher scores on the Wellness Self-Efficacy Scales would indicate a higher perception of well-being. Differences and correlations were found in participants' demographics, gender, age, ethnicity, geographic region, and education level, Beck Anxiety Inventory scores, Wellness Self-Efficacy Scales scores, martial

arts practice, and perceived importance of martial arts practice. These differences are detailed in the previous chapter.

The underlying premise of the conceptual framework for this study, evolutionary psychology, is a theoretical approach to psychology that attempts to explain useful mental traits as the functional results of natural selection. The data points suggests that the differences of scores on the Beck Anxiety Inventory and the Wellness Self-Efficacy Scales, as well as differences in the practice of martial arts and the demographics of the study participants could indicate and highlight artifacts of lingering biopsychosocial states and traits that could date at least as far back as the original evolutionary context of the human species (Buss, 2016; Miller, 2001; Wilson, 1975). Bear in mind that earlier remarks in the review of the conceptual framework reveal that a gap exists between theoretical assumptions, current observations, and conclusive evidence for presumed evolutionary preferences (Rose, 2000).

The participants of the study were overwhelmingly male, 72.9%, and 85.7% of participants were age 35 or younger. Pair this with the descriptive totals that 65.7% of all participants have practiced martial arts and that of these, 60.9% rate the practice of martial arts as extremely important and that 31.2% rate the practice as somewhat important. The alpha level of .05 for the Beck Anxiety Inventory and martial arts practice, and the alpha level of .01 for the Wellness Self-Efficacy Scales and martial arts practice further indicate a trend that a connection is worth further exploration. It is established fact that throughout the history of human violence, most combat actions have been conducted by men. With such large data sets as the entirety of human combatants over so long a period as all human history, the certainty of a relationship could hardly be questioned, even with such a gap in the specifics of historical recording of violent conflict. Nevertheless, the proportions of young to early middle-aged males engaging in

simulated violence and reporting its importance, would parallel our understanding of human history.

It could be the case that the predominant demographics of the study reflect the specific biopsychosocial factors which selected for proficiency in violent acts in the formation of human biology and culture throughout history. It could also be the case that a large dataset might indicate trends of present interest and utility in regulating anxiety and enhancing wellness that parallel historical and evolutionary trends. But more research is needed to move from intuition to conclusion.

Beck Anxiety Inventory Scores and Demographics

The present research findings indicated no significant difference among demographic variables on Beck Anxiety Inventory scores. This contradicts the prevailing literature that anxiety disorders are more prevalent among women than men. According to a 2017 comorbidity study involving 9,282 participants, the prevalence of anxiety disorders was higher for females (23.4%) than for males (14.3%), (Harvard Medical School, 2017). In this same study, anxiety disorders are shown to drop off sharply by age after age 60, with ages 18-29 displaying a prevalence of 22.3%; 30-44, 22.7%; 45-59, 20.6%; with a sharp drop age 60 and older at 9.0%. This may also contradict results of the survey as age is not indicated as a significant factor in the Beck Anxiety Inventory score differences.

A 2010 analysis which included 10,485 White Americans, 3,615 of whom were Hispanic Americans, 4,598 African Americans, and 1,628 Asian Americans. Results indicate that members of minority ethnic groups are less likely to endorse criteria for anxiety disorders than White Americans. African Americans are less likely to endorse criteria for anxiety disorders than White Americans, except for Post-Traumatic Stress Disorder (Asnaani et al., 2010). Thus, the

endorsement of criteria with some instinct toward historical patterns of disparate access to and acceptance of mental health services might serve as confounding variables.

While geographic location did not display a significant difference in Beck Anxiety Inventory scores among participants, the general literature (Somnath, 2015) indicates that most documented patients with anxiety disorders were in the South (33.9%) and West (31.9%). Education level did not display a significant difference in Beck Anxiety Inventory scores, but in this same study that analyzed the prevalence of different types of anxiety by demographic factors (i.e., Somnath, 2015), one-third of generalized anxiety disorder patients had a high school education, and 11.5% had not graduated from high school. Panic disorders were most common among patients with some college education, 42.3%, followed by college graduates, 24.5%, and high school graduates, 20.2%.

These indications counter that the study results could be a factor of the convenience sampling method, indicating disproportionate responses from the US South region, with white ethnicity and male gender in the study, or that the Beck Anxiety Inventory may not capture all forms of anxiety symptoms in the same way as hospital and pharmacy reporting data captures diagnosed cases.

Beck Anxiety Inventory and Martial Arts Practice

The results of the Kruskal-Wallis test indicate that the practice of martial arts displays a significant difference in Beck Anxiety Inventory scores, with the presence or absence of martial arts practice ($p < .05$), and ($p < .01$) for the importance of martial arts practice to well-being. The results of the Spearman correlational analysis indicate a weak, positive, significant relationship ($r = .112$, $p < .05$) between the practice of martial arts and scores on the Beck Anxiety Inventory,

and a weak, negative, significant relationship (r = -.116, p < .01) between the importance of martial arts practice to well-being and scores on the Beck Anxiety Inventory.

Higher Beck Anxiety Inventory scores indicate more symptoms and severity of anxiety, whereas lower Beck Anxiety Inventory scores indicate fewer or less severe symptoms. Participants who answered yes on the practice of martial arts were scored at a 0, and 1 for those who did not. A positive relationship indicates that participants who do not practice martial arts had higher anxiety scores. The importance of martial arts to one's well-being was rated from 0 for not important or have never practiced, to 3 for extremely important to one's well-being. This is to say, that as the importance of martial arts practice increases, the respondents displayed lower scores on the Beck Anxiety Inventory. Both the practice of martial arts and the rating of its importance to one's well-being display a reduction in Beck Anxiety Inventory scores, very likely to be explained by the practice and perceived importance of martial arts.

Considering that the Beck Anxiety Inventory measures anxiety symptoms within two weeks of responding to its items, it could be that longer term indications of reduced anxiety symptoms might be partially explained by an increase in ratings of well-being. Much of martial arts practice could escalate short-term anxiety symptoms, given that it simulates violent conflict, even if within in a controlled context, which is one of the core selection pressures for which the chemical substrates of anxiety exist across a range of species. Given that despite the simulation of violence, the engagement of sometimes intense physical activity, the potential for social dominance posturing, and the opportunity for frustration with ever-escalating difficulty in task completion, that there would be a significant reduction in Beck Anxiety Inventory Scores, despite potential for increased short-term anxiety, may indicate a greater effect than could be currently captured by the present research.

Wellness Self-Efficacy Scales and Demographics

The findings of this research indicated a significant difference between geographic region and scores on the Wellness Self-Efficacy Scales. A Kruskal-Wallis test revealed a significant difference between geographic region scores ($p < .05$). A Spearman correlational analysis indicated a very weak, positive, significant correlation between geographic region and scores on the Wellness Self-Efficacy Scales ($r = .097$, $p < .05$). Geographic region displayed no clear trend of martial arts practice being much higher than others region to region, except for Other US region. This also included overseas military assignments for bases that are technically, often temporarily, US territory due to Status of Forces Agreements. The fact that all US Army and Marine Corps personnel undergo rudimentary martial arts training may have skewed this total, with 20 out of 23 respondents from Other region reporting martial arts practice. It may also be an indication that military personnel engage in martial arts practice at a higher prevalence than the general population. This could be an area of interest to future research.

No other demographic factors indicated a significant difference or correlation with Wellness Self-Efficacy Scales scores, nor were the strengths of correlations ever above very weak among any of the other demographic variables. Wellness literature is less well-defined, but some broad scope data exist indicating relationship between wellness and demographic variables as revealed by the Center for Disease Control's epidemiology study questionnaire, the Health-Related Quality of Life questionnaire (Center for Disease Control, 2020), which seeks to track wellness and good living conditions and attitudes, so as to influence policy. Education and regional variables were not noted. Variables of gender do not appear significant to well-being at a national level, but younger and older adults display better wellness ratings than middle aged adults (Kobau et al., 2010). The lack of significant differences or correlations among factors

other than geographic region in the study may be related to convenience sampling procedures and disproportionate responses from the US South region, with its preponderance of participants of White ethnicity and male gender in the study, as well as that 85% of respondents were aged 45 or younger.

Wellness Self-Efficacy Scales and Martial Arts Practice

A Kruskal-Wallis test indicated that a significant difference was found on Wellness Self-Efficacy Scales scores based on the presence or absence of martial arts practice (p <.0001) and the importance of martial arts to well-being (p <.0001). A Spearman correlation indicated a weak, significant, negative correlation for the practice of martial arts (r = -.227, p < .01), and a weak, significant, positive correlation for the importance of martial arts Practice (r = .297, p < .01). The lower the scores on the item indicating presence or absence of martial arts practice indicates more martial arts practice, as participants who answered yes scored 0, while participants who answered no scored 1. The higher the score on the importance of martial arts to the well-being item, the higher was the rated importance to well-being, as it ranged from 0, not important or never practiced to 3, extremely important. Both the presence or absence of martial arts practice, and its perceived importance to well-being display higher mean scores on the Wellness-Self-Efficacy Scales Scores, very likely to be explained by the practice and perceived importance of martial arts.

Comparison to Other Anxiety & Martial Arts Research

The present research is consistent with similar studies on the relationship of martial arts and anxiety. In a 2011 study, 132 athletes, ages 18 to 25, 60 practitioners of karate, and 72 track and field athletes were compared for anxiety traits utilizing the Competitive State Anxiety Inventory, or CSAI, and the Coping Inventory for Stressful Situations, or CISS (Radochonski et

al., 2011). The karate practitioners scored significantly higher self-confidence and significantly lower cognitive anxiety, as well as significantly lower somatic anxiety than the track and field athletes. This further supports the historical record in an evolutionary context of the martial arts' utility for young adults, as well as the significant results with relation to both instruments as martial arts practice or absence compares to scores indicating anxiety or wellness. A 2010 meta-analysis (Vertonghen & Theeboom, 2010) indicates that in most of the studies analyzed, mal-adaptive aggressive behavior is shown to reduce after youths engage in martial arts practice. Furthermore, every study analyzed which specifically mentions anxiety as a variable indicates that the practice of martial arts indicates a significant positive relationship in the reduced expression, or improved profile, of anxiety traits (Kurian et al., 1993; Layton, 1990; Trulson, 1986).

Limitations to this data consist largely of the age of participants as well as the scarcity of relevant studies, as very little current research is available on the topic of martial arts and its effect on anxiety as a measured variable. The nature of the practice could vary by cultural contexts as it has for several millennia across nearly every culture that has ever engaged in warfare in the pre-modern context (Morgan, 1992; U.S. Army, 2002), or it could be drastically different than the three-decade range of the studies' contexts, because of the increased trend toward combat sports rather than forms or points sparring light to no contact (Pappas, 2007). The biopsychosocial differences between casual, light or no contact martial arts practice and combat sports that closely mimic unarmed violence may yield different results if the studies were repeated with the latter's current prevalence at the time of this study. The broad spectrum of an anonymous survey instrument across an unfocused range of hundreds of participants may account for the weakness of the relationships despite their significance, as these studies show a

smaller number of participants in greater detail. Similar studies could be useful to repeat in a current context without any methodological changes, and they would still have utility in indicating how much of the results are specific to or irrespective of context or the martial arts culture of the time.

Implications

This study presents several implications for counselors, anxiety researchers, and wellness researchers are provided that include Beck Anxiety Inventory scores and Wellness Self-Efficacy Scales scores as related to the practice of martial arts and its perceived importance to well-being.

Implications for Counseling Assessment

The Spearman correlation results between Beck Anxiety Inventory and Wellness Self-Efficacy Scales indicate that the treatment planning for anxiety might benefit from looking at the factors of wellness. The Indivisible Self (Meyers & Sweeney, 2008) is an evidence-based counseling wellness model designed to assist counselors with the implementation of wellness assessment concepts and tools. Given the complexity of anxiety as a biopsychosocial construct with origins in biological evolution that predate the existence of vertebrates (Buss, 2016), it could be beneficial to simplify case conceptualization and treatment planning efforts with a supplemental measurement of wellness domains. These domains could serve as anxiety treatment goal metrics, given that anxiety as a functional impairment interdicts the pursuit of task performance and adaptive mood through the perception and sometimes avoidant behavior of a real or perceived threat (American Psychiatric Association, 2013; National Institute of Mental Health, 2018; Steimer, 2002).

The pairing of anxiety and wellness as assessment constructs could yield data distinguishing pathology from normative stress response to external factors. By themselves,

biological markers and subjective reporting instruments do not effectively distinguish between internal and external causation. If behaviors and perceptions otherwise indicate adaptive viewpoints and actions regarding the pursuit of wellness, but anxiety persists, it could indicate internal causes and facilitate psychiatric referral, if there are no clear external stressors which clarify the emotional response.

The practice of martial arts is a broad system with implications ranging from systematic desensitization to physical exercise to social competition to indoctrination to team or philosophical subculture to cognitive practices to enhance performance within and beyond the context of its application. It has been a practice across cultures for as long as recorded history in some form for either combat preparation or the cultivation of personality traits and states found desirable within a given societal context (Morgan, 1992). During the case conceptualization and treatment planning phase, performance and perception markers could be cultivated during initial visits to utilize the existing practice of martial arts as additional data points to determine client progress in the broader achievement and maintenance of other treatment goals. For example, if a client reports that the practice of martial arts assists with anger management through providing exercise, distraction, and moral accountability, then a reported reduction in any of these areas may warrant further assessment into the others which the client has identified as related to the system of practice.

Implications for Counseling Research

This data analysis of this research provides several implications. First, there is a need to differentiate between present and longer-term anxieties through a more comprehensive overall assessment or through a pairing of assessments. Second, it is important to distinguish between anxiety as a persistent trait or as a state of external selection pressures that would make anxiety

symptoms a normative response. Third, it is necessary to correlate the scales on the Wellness Self-Efficacy Scale with those on the Beck Anxiety Inventory (r = -.436, p < .01). This could, in future and more broadly aggregated research, indicate that increasing the understanding of wellness and facilitating its promotion may effect a reduction of anxiety symptoms. Fourth, of those who indicate any history whatsoever of martial arts practice, a significant number of them rate its practice as extremely important to well-being, displaying a very strong, significant, negative correlation (r = -.856, p < .01) between the practice of martial arts and its importance to personal well-being. Considering with the martial arts participation results slanting to either no practice at all or to its practice being very important, the results would indicate that of those who practice the martial arts, a large portion report its impact as extremely important to well-being. This could mean that for a sizeable, though not universal, portion of the adult population, the practice of martial arts might have a meaningful impact on lowering anxiety, increasing wellness, or both. A fifth implication is to consider the strength of relationships in the context of the efficacy of current practices for the treatment of anxiety or the promotion of wellness (American Psychiatric Association, 2013; National Institute of Health, 2016). Even a weak relationship that is reliably attributed to a specific protocol could have value in application, if more conventional methods show less than desirable treatment or maintenance outcomes.

Implications for Counseling Practice

The integration of allied health and wellness professionals as referral sources or as supplemental training to those engaged in the counseling process may make in-roads that improve outcomes. This could be attained by interdisciplinary mental health research, cultivating a diversity of skill sets in a behavioral health clinic, or by enhancing the skills of a counselor to

include holistic qualifications in some evidence-based, wellness-oriented skill set, as covered in the literature review under treatments for anxiety.

The potential contribution of counselors to facilitate martial arts practice as an intervention could vary widely, from offering literature to provide information for the client to consider to cultivating a referral network of martial arts schools whose instructors would exhibit a supportive and informed milieu. It could even include cross-training for counselors in the martial arts to enable them to sufficiently instruct their clientele and for counselors to merge some aspect of its practice into their counseling process.

It stands to reason, given the difficulty of attaining professional proficiency in two distinct domains, that a majority of counseling support of a martial arts practice would be in the form of offering information and conducting a review of the literature on the effects of martial arts, while applying multicultural awareness to draw themes of its utility or detriment to clients' anxiety symptoms. It would seem worth exploring for a counseling practice to widen its interdisciplinary cooperation to incorporate practitioners of health-enhancing professions, such as fitness coaches, nutritionists, meditation teachers, and maybe even martial arts instructors. When it isn't reasonable to incorporate the allied expert into the treatment team, maybe it would be less demanding to cultivate a relationship with practitioners who display an adaptive mindset and approach to the fostering of wellness, or the recognition of their profession as a supplemental anxiolytic or prophylactic intervention to anxiety disorders. For the rare counselor who has attained professional instruction proficiency in some form of the martial arts, it could be possible to go so far as to develop a concurrent treatment plan of martial arts practice and talk therapy.

It would not be advisable, even if such dual proficiencies are present, that the counselor would be the direct martial arts instructor in any form of training involving direct physical

contact between counselor or instructor, and client or student. The act of training simulated physical violence could be counterproductive to the safe environment of a counseling relationship. And while the role of mentorship is common and well-documented (Morgan, 1992; U.S. Army, 2002) from student to instructor in areas beyond the domain of the martial arts, the very common suffix of -do, or practice for personal development noted in certain Japanese martial arts, in certain martial arts translating to a shift from -jitsu, a way of war-time unarmed combative training or augmentation to armed conflict training noted in certain Japanese martial arts (Morgan, 1992), the societal contexts of such practices and their risk profiles are different enough as to call into question the costs and benefits of so direct a merging of roles.

Extensive research should be conducted before an ethical guideline is developed in support of a counselor-instructor engaging in physical striking and/or the grappling arts with a client-student. In the meantime, we can look to the American Counseling Association Code of Ethics warning against dual relationships and boundary crossings (ACA , 2014), which indicates support of a more conservative approach to the support of the martial arts as alternative or supplemental interventions.

Limitations

There were several limitations in the present research regarding the design and the data collection. The first limitation was the use of a convenience sample. The survey participants were chosen because they were accessible and cooperative in the research participant recruitment process. Thus, the present research captures the responses of a small number (n = 527) of the United States' total population with a disproportionate number grouped to specific demographics, and therefore the results may not be generalizable to the American adult population.

A second limitation was a disparity in timeframes, first, of the practice of martial arts as opposed to the Beck Anxiety Inventory, which includes symptoms within the past two weeks, and the Wellness Self-Efficacy Scales, which indicate present perceptions about a participant's well-being, whereas in both cases the martial arts were measured as having ever been practiced in a participant's life-course. This could mean that any indication of score differences on either assessment might be under-reported, given that the impact of regular and recent practice might yield different outcomes than an infrequent practice in the past. This could dilute the effective interaction between those who have participated and those who have not. Regarding the assessments, the short timeframe of perceptions which inform scores might not capture long-term anxiety or wellness perceptions.

A third limitation is the societal disruption marking the timeframe in which responses were captured. At the time of data collection, Covid-19 has taken over 200,000 lives in the United States, and caused vast economic damage with escalating unemployment, social isolation, sectarian violence related to political divisions, and negative impacts on healthcare, education, and other civil system shortages and disruptions, impacts not yet fully examined or made apparent. Many of the responses have come from the US South region, where a record number of hurricanes have caused considerable damage and disruption to infrastructure, economic and housing instability, and collective distress. Given that the study seeks to measure anxiety and wellness scores, the United States population, including the participant sample, might provide an unrepresentative cross-section at the time of analysis.

A fourth limitation is that the participation was voluntary, and that those who were available to take the survey may have certain demographic biases that might tilt anxiety or well-being, or interest in the martial arts. Given that recruitment was done online through social media

and search engine advertising, those who spend more time on social media or search-related topics might have a greater engagement with any of the keyword topics involved than would be representative for the United States population.

The final limitation is with online survey research itself. Survey questions could be misunderstood or answered dishonestly. It is possible that misaligned button clicks could skew answers. Internet connection strength could limit participation for socioeconomic reasons and could be influenced by geographic factors. The format of surveys may discourage participants who mostly utilize mobile phones for internet activity. With an online survey there is no guarantee that the participant is not watched or influenced. The narrow range of response options per demographic could result in independent or dependent variable question not adequately capturing a participant's perceptions accurately. The questions might provoke emotional distress that a facilitator cannot debrief when the participation is anonymous and online, even if resources are provided at the end of the survey. The research is nonparametric and non-experimental in design, meaning that only differences can be captured by the Kruskal-Wallis Test, and correlations by the Spearman test. There is no way to approach the establishment of causation between measured variables with ex-post-facto survey research.

Recommendations for Future Research

Prior to the present research, studies examining the martial arts at all, much less as a mental health intervention, were limited. The current research has provided several avenues for future researchers to explore. First, future researchers should explore the reasons why the indicated practice of martial arts displayed a significant difference on both the Beck Anxiety Inventory and Wellness Self-Efficacy Scales scores. More research is needed to understand why

the practice of martial arts appears to indicate a difference on the Beck Anxiety Inventory and Wellness Self-Efficacy Scales scores which might hint at lower anxiety and enhanced wellness.

A second area where more research is needed is to examine the effects with participants from diverse cultural and demographic backgrounds. The majority of the study's participants were white, male, and aged 18-45. This comparison between inventories and martial arts practice could be run to better target specific age groups, genders, education levels, and regions, as well as variables not addressed in the present research, such as income levels, histories of mental illness or trauma and violence, military service, religious or spiritual affiliations, or even broadened to include international participation.

More thorough survey research could be conducted with increased specificity of martial arts practice. This could account for type, frequency, timeframe, duration, perceived intensity, and purpose of its practice. As the present research stands, no distinction was made between combat sports or casual practice, military or law enforcement training objectives, self-defense, or personal development, with no distinction by the intensity of contact rules, nor whether the arts were striking, grappling, or handheld weapons practices. There might be a difference of effect on anxiety or wellness scores based on any of these factors. More thorough survey research could be conducted with increased specificity of anxiety symptoms. More thorough research could be conducted with increased specificity of wellness or well-being. A qualitative experiential section could be added to future research. This seems worthwhile, given that a high frequency was displayed of participants who rate the practice or martial arts as extremely important to their well-being.

Experimental designs could be aimed at taking two or more untrained groups of participants, giving one practice in martial arts, be it forms-based, point-sparring based, or full

contact, differentiated by type of practice from striking, grappling, handheld weapons, or combination, at varying levels of intensity or duration. This can be conducted with the general population or with participants who present with anxiety disorders. The combinations yield a great number of potential studies, with a great number of ethical and observational challenges. To address these, any such research is likely to require extensive institutional review, and a multidisciplinary team to monitor for efficacy, safety, and risk of exacerbating anxiety symptoms.

Given the physical nature of martial arts practice and the evolutionary context of simulated violence across several species including humans and other primates (Buss, 2016; Maner et al., 2008), and across the vast instances of concurrent martial arts studies cross-culturally (Morgan, 1992; US Army, 2002), experimental designs under supervised conditions with varying degrees of intensity of practice and metric standards could yield much more data. A combination of survey research, qualitative interviews, and biological metrics from bloodwork to SPECC and fMRI scans, with a separation of groups that perform no martial arts, practice kata or no-contact drills, point-sparring or light contact, full-contact to submission, incapacitation, or supervisory intervention conditions, such as in mixed martial arts, with differences by the separation or integration of striking, grappling, and handheld weapons arts, could yield an, as of yet, untapped field of mental health and wellness studies.

Conclusions

Based on the results from the present research, comparisons between demographic variables, Beck Anxiety Inventory Scores, Wellness Self-Efficacy Scales scores, martial arts practice and its perceived importance to well-being were provided. Correlations between these variables were also provided. Significant group differences were found by the practice of martial

arts and its perceived importance to well-being on both the Beck Anxiety Inventory scores and Wellness Self-Efficacy Scales scores. Significant correlations were found by geographic region and wellness on this as well.

Both the Kruskal-Wallis and the Spearman tests indicated significance of differences in scores by the practice of martial arts and its perceived importance to well-being. The Spearman test indicated weak, significant relationships. Both the Kruskal-Wallis test and Spearman test indicated that the Beck Anxiety Inventory scores decrease and that Wellness Self-Efficacy Scales scores increase with the practice of martial arts. Accepting the limitations stated above as qualifying factors, the present research indicated that practicing martial arts at any point in one's background lowers the BAI scores and raises the WSES scores. The present research also indicated that while scores differ, the strength of that difference is weak. This could indicate that whatever effect martial arts practice might have on anxiety or wellness would be minor. The number of participants who have taken martial arts at any point who indicated that its practice is extremely important to their well-being was high, 62.4%. This could indicate a more meaningful interaction with a certain subset of the population, as most respondents were white 75.9%, male 72.9%, aged 18-45 88.2%, and that 64.1% of respondents have practiced martial arts at any point in their background. This could indicate that the martial arts might in general slightly reduce anxiety and increase wellness, with greater specific effects by subsets of the population, but such potential effects are beyond the scope of the present research and more thorough study is required.

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