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Investigating the Relationship Between Consistent Workout Regimen on Quality of Life among CrossFitters in South Mississippi

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by

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ABSTRACT

Robust literature exists to support the utility of CrossFit in improving metabolic and cardiovascular well-being. However, a metaphorical chasm exists not in the study of the physiological effects of CrossFit but in the psychological effects, namely quality of life (QOL). This thesis aimed to offer an installment into this gap by investigating trends among a population of 81 CrossFitters in south Mississippi. To best fulfill this task, a quantitative study was conducted using a 32-item survey composed of a mixture of questions from the World Health Organization Quality of Life Brief Version (WHOQOL-BREF) to assess reported quality of life in physical, psychological, social, and environmental domains. Additional questions were composed and added to assess consistency in attendance of CrossFit classes. A bivariate analysis with Spearman correlation was then conducted to determine if relationships existed between regular attendance and improved QOL and if so, to what degree. The analysis unveiled a positive correlation between Physical Domain and Consistency. Higher scores on the WHOQOL-BREF for the Physical Domain are associated with higher consistency reported among participants, meaning greater physical QOL appears to be a byproduct of regular attendance. Additionally, Social Domain and Marital Status demonstrated a negative correlation, meaning higher scores on the WHOQOL-BREF for Social Domain were associated with more married participants.

Keywords: Quality of Life, CrossFit, Consistency, Exercise, Health, Regimen

DEDICATION

This thesis is dedicated to my parents, John and Brandy Glass. Without their unwavering support through all challenges, both physical and emotional, I am certain I would have been unable to progress this far in my academic career. Every opportunity I have been afforded can be traced back to their continual encouragement that inspired me to make the most of every opportunity. Receiving the Presidential scholarship disbursed by the Honors College was nothing short of an answered prayer. It has granted me the opportunity to be the first university attendee in my family. Words cannot express the gratitude I possess for the Honors College and for the people who helped me to get there. Thank you, Mom and Dad. I love you both so much.

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LIST OF ABBREVIATIONS

APA	American Psychological Association
BDD	Body Dysmorphic Disorder
BI	Body Image
CMS	Chronic Mild Stress
EA	Exercise Addiction
FSFIT	Fourth Street CrossFit
GDP	Gross Domestic Product
HIIT	High Intensity Interval Training
KAT	Kynurenine Aminotransferase
MDD	Major Depressive Disorder
MNSS	Mental disorders, Neurological disorders, Substance use, and Self-harm
MS	Multiple Sclerosis
NAMI	National Alliance on Mental Illness
PA	Physical Activity
QoL	Quality of Life
SAMHSA	Substance Abuse and Mental Health Services Administration
USM	The University of Southern Mississippi
WHO	World Health Organization
WHOQOL-BREF	World Health Organization Quality of Life Brief Version
WOD	Workout of the Day

CHAPTER I: INTRODUCTION

The world is sick. Race, color, religion, or any other potentially divisive attribute aside, humanity is grievously ill. Yet, with the Bubonic Plague confined to a petri dish, smallpox eradicated since 1980, and polio subject to battle-tested vaccines, what ailment lurks so broadly that it warrants a position alongside some of history's most devastating diseases and a declaration that the world is, indeed, ill? To answer this question, one must first establish an acceptable definition of "ill". Merriam-Webster is succinct, suggesting the term describes a person or thing "not in good health" (n.d. para. 1). Even still, a greater inquiry is necessary to institute an acceptable explanation behind the idea of health and what exactly it entails. The fact is health looks different for everyone, whether it involves the ability to experiment with new physical activities or the capacity to lift one's child from the back seat of a car and into bed. Despite varying opinions and ideas on the subject, one constant remains. Physical health has always taken priority over mental health, and, in the absence of fervent advocacy, will continue to do so.

This claim is not one made based solely on emotion. As the adage suggests, "Actions speak louder than words." The World Health Organization (WHO) advocates "that health spending should be proportionate to burden as a general rule for all health conditions" (Vigo, 2019, para. 3). Even so, the United States budget allocation for mental disorders, neurological disorders, substance use disorders, and self-harm (MNSS) garners only a meager 2.4% of government outlay (Vigo, 2019). Some may question whether this portion of the United States' total expenditure is, indeed, satisfactory to address the effects of MNSS. After all, 2.4% of a large enough budget could total quite a hefty sum. Unfortunately, a substantial gap exists between disease burden and efficiently allocated

spending. This gap has been quantified as a 4:1 imbalance, meaning just one in four people afflicted by MNSS "received minimally adequate treatment for their valid diagnosis of major depressive disorder" (Vigo, 2019, para. 4).

Less affluent countries are disproportionately affected because "the gap in spending is significantly and inversely associated with real GDP per capita" (Vigo, 2019, para. 3). This serves as an unfortunate truth, given that low-income countries typically consist of a substantial MNSS-afflicted population. This is likely a byproduct of inadequate spending, a decision that ensures the afflicted will remain afflicted. Where funds are improperly allocated or altogether unavailable, needs are not addressed. This frugality fails to consider that, in the Americas, "MNSS are the largest subgroup cause of disease burden, both when considering disability alone and combined with mortality" (Vigo, 2019, para. 2). Gaps as large as 312:1 exist today in low-income countries.

Notwithstanding the repeated eschewal of the issue at hand, this is a potentially catastrophic problem. Wainberg et al. suggest that "Common mental disorders are responsible for the largest proportion of the global burden of disease" (2017, para. 2). However, such an ambiguous statement fails to convey the magnitude of the situation. Dr. Vikram Patel, psychiatrist and professor of public health at the London School of Hygiene and Tropical Medicine, provides a more definite encapsulation of the breadth of common mental disorders by noting "By even the most conservative estimates of the most serious mental disorders such as the psychoses, intellectual disability… drug and alcohol dependence, and severe depression, at least 5% of any population is affected" (2014, para. 3). Though this statement is no less ambiguous than its predecessor, Dr. Patel asserts that this metric would suggest, at a minimum, upward of 400 million people

are afflicted worldwide. Though psychological in origin, the ill effects often permeate the physical realm.

Previous research has demonstrated that individuals suffering from mental illness bear a much greater bodily onus than their unaffected counterparts. They face a rate of physical illness that is four to seven times greater than members of the general public. Occurrences of coronary heart disease, stroke or respiratory disease, and premature death proliferate in this population at alarming rates (Shefer, 2014). Of course, no study on mental health would be complete without giving credence to its most harrowing outcome–suicide. The tenth leading cause of death in the United States, suicide is often a byproduct of unrelenting emotional duress. Li and company note that "Many people who had died of suicide have mental disorders, especially major depressive disorder (MDD) which occurred in half to two-thirds of suicide cases" (Li, 2022, para. 2). As unceremonious as the statement is, mental illness kills people. Whether in a moment or over the course of a lifetime, substandard mental health progressively tears at the connective tissue that holds life together. This dilemma is not one that can be addressed retrospectively. It is one that warrants a change in perspective and an action plan to reflect such a shift in mindset.

Though many endorse the idea that a life lasting well into the eighth, ninth, and even tenth decade is one well-lived, there are factors beyond the mere passage of time that play a tremendous role in determining what constitutes a fruitful existence. The notion has become increasingly popular that quality of life should be considered more of a focal point. This is largely because the antiquated suggestion that old age is the determining factor of a satisfactory life leaves much to be desired for those affected by

chronic and mental illness, both of which can abbreviate life expectancy. Therein lies the utility of CrossFit, an exercise methodology that has demonstrated substantial physiological benefits and shows promise for the revival or upkeep of mental well-being.

To best advocate for and investigate this subject, the following research objectives have been formulated to broaden information availability and advance the current knowledge/understanding:

1. The differences in demographics among CrossFitters in South Mississippi
2. The relationship between consistent workout regimen on quality of life among CrossFitters in South Mississippi

By procuring answers to the inquiries above, this research serves to substantiate or refute the claim that, when performed on a regular basis, CrossFit possesses utility for the amelioration of mental prosperity. The claim that the world is sick was not one made on fragile pillars of emotional investment and misplaced zeal. Eight billion psyches present eight billion opportunities for psychological turmoil, and, unfortunately, the effects are widespread. To exacerbate such a daunting reality, many systemic barriers to mental health treatment–stigma, inadequate funding, and lack of primary prevention– exist (Shefer, 2014). Perhaps change is on the horizon for the abolishment of these barriers. However, sound minds should not be neglected in favor of hope alone. CrossFit is an intervention, whether performed in advance, amidst, or following a spell of deplorable mental health, that has the potential to rejuvenate the spirits of human beings while circumventing systemic influences that are not subject to independent decision-making. This honors thesis aims to champion the scrutiny of an under-researched fitness modality for its life-changing, and possibly lifesaving, potential.

CHAPTER II: LITERATURE REVIEW

Effects of Exercise on Mental Health

Most would concede that the primary motivator for many to exercise is rooted in its extensive catalog of somatic benefits. The fact is most people who prioritize fitness do so for physical reasons, whether to cultivate an impressive aesthetic or stave off chronic disease. Robust literature exists to substantiate the claim that exercise can serve to expedite the completion or, at a minimum, progression of both tasks. One panel of medical professionals provided an extensive list of reasons to incorporate regular physical activity in its 2018 study, noting the capacity of exercise to "lower risk of cardiovascular disease… hypertension… type 2 diabetes… cancers of the bladder, breast, colon… adverse blood lipid profile… [and] dementia" (Piercy et. al., 2018, p. 29). Though these tangible outcomes are desirable, significant psychological potential remains untapped.

In addition to providing a hearty catalog of bodily perks, Piercy et al. (2018) also introduce numerous psychological fruits of physical fitness, noting improved cognition, reduced anxiety, and diminished risk of depression as primary attractors ripe for harvest. Many who practice routine fitness have unknowingly reaped these benefits despite naïveté to the role their training plays in producing such fruit. After all, widespread esteem for the use of fitness to introduce a substantial inventory of these benefits has yet to rival its more readily identifiable physical counterpart. Fortunately, greater acclaim is surging to make the mental fruits of routine fitness just as enticing as the physical.

Even more compelling than the cognitive gain associated with routine exercise is the physiological basis for said gain. Excellent research agrees that, while the effects of

therapies can be assumed, they cannot stand alone, nor can they be integrated as routine treatment without substantial evidence to support their repeated efficacy. Mikkelson et al. (2017) confronted this issue directly in their study, which recorded that exercise has elicited greater outcomes on "mood states such as anxiety, stress, and depression, through physiological and biochemical mechanisms, including endorphins, mitochondria… and neurotransmitters" (para. 3). Such a finding is noteworthy because it highlights a physiological response associated with the implementation of exercise akin to pharmacological or other medicinal therapies. Paired with its ability to reduce inflammation, exercise warrants further study as a supplemental or even alternative mode of treatment for an array of mental health issues.

Columnist for Nature Medicine Hannah Stower further reinforced the physiological underpinnings for improved mental well-being related to exercise in her 2014 publication *Depression: Linking Exercise and Depression*. In the excerpt, she identified an established link between exercise and defiance of depressive tendencies. Her focus centered upon the function of Pparg coactivator 1 alpha (PGC-1α), a transcriptional coactivator whose production is increased exponentially with the implementation of exercise that targets improved endurance. The increased production is beneficial because, as demonstrated in repeated trials of mice exposed to endurance-focused exercise, increased PGC-1α production in muscle is associated with decreased neuroinflammation associated with chronic mild stress (CMS). This occurs because PGC-1α aids in the production of Kynurenine Aminotransferase (KAT) enzymes that convert kynurenine to kynurenic acid. This metabolization of kynurenine discourages depressive behavior in mice and has demonstrated possible utility in humans (Stower, 2014). The study asserts

that the reverse is true as well–organisms lacking PGC-1α in muscle experience a disproportionate decrease in KAT enzymes and a subsequent uptick in depression.

Decreased PGC-1α predisposing mice to greater neuroinflammation and more frequent bouts of depressive behavior is noteworthy because it identifies a corporal risk factor. A risk factor, according to the Substance Abuse and Mental Health Services Administration (SAMHSA), is any trait at the biological, physiological, family, community, or cultural level that enhances the probability of adverse outcomes (n.d.). Risk factors are opposed by protective factors, which diminish the likelihood of undesirable outcomes. The influence of Stower's discovery is further amplified by the fact that it demands identification and consideration of additional risk factors. As noted by the SAMHSA, risk factors can disproportionately affect certain communities. He (2022) focuses on one heavily afflicted group in his publication *Physical Activity in the Treatment of Depression in College Students*.

In this study, a claim is made that sports therapy in addition to drug therapy transcends drug therapy alone in the treatment of depression. Stringaris notes in the editorial *What is Depression* that depression may not be defined concretely, as doing so would discredit the wide range of patients, manifestations, and treatments associated with the condition. However, He characterizes depression using expressions like "mental and physical discomfort… low mood, lack of interest, slow thinking…unwillingness to communicate with friends and colleagues," manifestations that better typify signs of depression exhibited by young academics (2022, para. 6). His publication concludes that breathing, gymnastics, and swimming improved depressive episodes, interpersonal communication, and physical symptoms in undergraduates (He, 2022). The three

practices–breathing, gymnastics, and swimming–are key players in the CrossFit methodology, which improves cardiovascular and muscular endurance by utilizing a host of different mechanisms. Recruited from various sports and other dynamic activities, these mechanisms provide CrossFit with justification for its namesake. The work also acknowledges a critically relevant truth. The implementation of exercise does not dismiss the utility of drug therapy for improving depression; it enhances it (He, 2022).

He (2022) tactfully concludes his publication by identifying the sparsity of time as a primary impediment for busy students and professionals to integrate exercise into their daily regimen. It is a barrier that, if overcome, could introduce exercise as a catalyst to "treat depression patients rapidly, safely, and efficiently" (para. 5). This paucity of time is an issue further addressed by Eather and company in *Efficacy and Feasibility of HIIT training for university students*, a publication that expounds upon the barriers of entry to routine fitness in busy individuals. The corps of investigators proposes that, in addition to immense psychological profit, the interval-style training in CrossFit gyms around the world defies the prototypical dissolution of time associated with Globo gym sessions.

One study noted the *Potency of high-intensity interval training for improving physical and psychological health-related outcomes by* explaining how HIIT involves periods of high-intensity exercise interspersed with moments of rest (Eather, 2019, para. 1). For example, one may perform burpees for forty seconds before resting for the remainder of the minute. "The main appeal of HIIT is that… [it] can be completed in a short period of time compared to traditional aerobic training, whilst resulting in comparable physiological adaptations" (Eather, 2019, para. 14). This similar bodily conditioning is captivating because the best exercise regimen is one that can be

maintained. If lack of time is a hindrance to the continuity of healthy behaviors, the HIIT style that typifies CrossFit addresses the need for a quicker workout without sacrificing the physical and psychological metamorphosis.

The Accessibility of CrossFit

With such a vast array of fitness modalities available to consumers, a competitive business culture naturally develops as organizations contend for membership of those seeking to discover their niche. In her publication "Mood State Changes Accompanying the CrossFit Open Competition in Healthy Adults," Box (2018) offers a more informative viewpoint. By referencing Greg Glassman– the architect of the CrossFit methodology– Box educates curious newcomers and fitness habitués on the origin of the approach that makes it distinct from other modes of exercise.

CrossFit is an exercise modality that emphasizes "constantly varied, high-intensity functional movements" (Glassman, 2007, para. 3). Highlighting the scalability of many exercises, Glassman champions the accessibility of this approach to fitness. Scalability refers to the adaptability of an exercise to accommodate an individual's skill set, level of fitness, and degree of physical preparedness on any given day while maintaining the intended stimulus of a particular workout. For example, a banded pull-up might be appropriate for a member in pursuit of the prerequisite strength necessary to perform the movement without assistance. The study notes that, regardless of skill level, "bouts of CrossFit® training result in a positive effect on mood" (Box, 2018, para. 4). The study also records that constantly varied movements executed at high intensity have exhibited decreased negative emotions following strenuous exercise (2018). While

exercise characterized by high intensity often increased levels of negative emotion during the activity, it elicited a higher degree of positive emotions afterward.

Some may question how a fitness regime relying upon high-intensity movement could possibly suit an array of potential participants, many of whom may be limited by physical capabilities or lack thereof associated with illness or old age. Smith and Okonkowo (2021) address the latter group in their work “Truly CrossFit: The association of exercise and clinical outcomes”. Together, the authors observe and elucidate the relationship between a broad spectrum of exercise modalities and how the variance in type of exercise affects cognitive function and mental state. The investigation found that “the association of exercise with improved cognition in older adults with depression was consistently robust” (2021, para. 5). This finding is significant because older adults are more likely to suffer from chronic disease and immobility, which might curtail one’s capacity to participate in fitness. This combination of potential barriers can discourage older adults from even attempting to participate in health-related activities.

Fortunately, CrossFit places great emphasis on scalability, which–as discussed previously–is the ability to modify an exercise movement to accommodate an individual’s physical capacity and sense of preparedness on any given day. Founder and former CrossFit CEO Greg Glassman encapsulated this dichotomy between balancing physical capacity and bodily needs in a CNBC interview where he suggested, “Our understanding is that the needs of Olympic athletes and our grandparents differ by degree, not kind… One needs functional competence to stay out of the nursing home. The other one wants functional dominance to win medals" (2007, Sep. 22). This school of thought serves as a testament to how CrossFit promotes accessibility for new and existing

members to participate in workouts that elicit positive emotional and cognitive effects all while tailoring intensity to accommodate unique needs and desires.

Though this accommodation of bodily limitations serves to underscore the accessibility of CrossFit, the mere adaptation to physical impediments is not exclusive to its methodology. CrossFit's aptitude for accessibility lies in its recognition of and accounting for ancillary hindrances that regularly discourage newcomers from taking the first step toward a healthier lifestyle. In her longitudinal study *Motivations and barriers to initiation and sustained exercise adherence in a fitness club setting,* Gjestvang (2020) accentuates several primary detractors of sustained exercise that account for the substantial attrition rate of more than fifty percent. The greatest of these is fear of mockery or incomprehension related to novelty in the realm of exercise (Gjestvang, 2020). This phenomenon– dubbed gymtimidation by many– is one CrossFit addresses directly.

Keen CrossFitter Allison Belger notes 'community and social connectedness [are] arguably as essential to CrossFit's efficacy and popularity as are the fitness tenets… to which it adheres'" (Dawson, 2017, para. 5). The pre-workout briefing is more than a breakdown of movement standards and time caps. It is an opportunity to see who designated a period of freedom from the busyness of day-to-day life to pursue better physical and emotional health. It is a testament to the power of accountability. Dawson (2017) states that, "In addition to its comprehensive fitness regime, CrossFit claims to offer a supportive community, which aims to ensure that people do not exercise together alone" (para. 1). As far as incomprehension or lack of experience is concerned, certified trainers are required at businesses operating under CrossFit branding. Coaches provide

guidance on movement standards as well as how to appropriately tailor workouts to achieve the intended stimulus. Together, these factors serve to distinguish CrossFit from its competitors by helping to illustrate the approachable community, emphasis on personalized instruction, and, most importantly, the recognition of unique individual goals. This trifecta allows for the construction and reinforcement of frameworks that encourage a better quality of life, regardless of the form it takes from person to person.

Why CrossFit?

This claim that CrossFit possesses the potential to reshape physical and emotional patterns is not one rooted in uninformed zeal and partiality to the CrossFit methodology. In fact, Dr. Matthew Petz unearths several captivating truths in his dissertation *Examining the Contributions of Grit, Mental Toughness, and Conscientiousness to Athletic Performance*. The work examines the relationship between mental toughness and outcomes in athletic performance by measuring attributes of psychological fortitude– grit, mental toughness, and conscientiousness– in 73 CrossFit athletes. Petz notes the utility of such attributes in defying challenges presented by daily living and beyond. For example, mental toughness may be necessary after receiving news that a job promotion was allocated to another individual whereas conscientiousness might serve as the catalyst to gain a separate promotion in the future. The profitability of mental toughness permeates even the upper echelons of society, determining "which police officers prevail in a deadly force encounter, which military academy cadets graduate, which spelling bee competitors win, [and even] which Olympic athletes earn the gold medals" (Petz, 2021, p. 12).

Even so, the appeal of the methodology is not confined to the elite in sport and competition. As Greg Glassman suggested, the dogma of CrossFit applies to the single

mother of three just as readily as it does to the champions that stand atop its podium at the highest level. Petz (2021) states:

> A relatively new but rapidly growing health and fitness methodology – CrossFit – in which athletes are encouraged to "embrace the suck" and endure challenging workouts that test physical and mental capacity" demonstrated a correlation where "psychological factors, grit… and conscientiousness… were found… to be directionally consistent with the hypotheses that mental toughness scores would increase as CrossFit Open scores improved (p. 12).

In short, mental fortification has proven consistent with enhanced physical competency. Success in academia, the workplace, or any other domain requires grit. If these qualities can be cultivated via time spent participating in CrossFit, a subsequent uptick in performance would be logical.

Yet, the reinforcement of psychological tenacity should not be reserved only for those seeking to gain leverage in career, academia, or elsewhere. This suspected application of the avant-garde fitness medium has demonstrated comparable, and perhaps more consequential, effects on those needing support or respite psychologically. Ishmael (2022) calls upon several CrossFit enthusiasts in his more personalized scientific inquiry *The Experience of CrossFit as an Intervention for Apathy: A Qualitative Study*. This study differs from others because it is qualitative rather than quantitative. Ishmael (2022) investigates "CrossFit as a complementary mental health intervention for apathy symptoms of adults ages 18-30" (p. 1). Individual interviews were utilized to gain insight as to how CrossFit affected feelings of self-efficacy and self-worth.

The findings revealed a group of individuals that experienced considerable improvements in mental health. One participant noted “I got more of a sense of worth in myself” (Ishmael, 2022, p. 67). Another mentioned how CrossFit “basically makes you feel good about yourself, being able to accomplish and learn something or… do something you didn't think you would ever be able to do” (Ishmael, 2022, p. 69). The relevancy of the study stems from the demonstrated correlation between participation in CrossFit classes and augmented feelings of self-worth. Many participants expressed how their involvement started as a quest to improve their physical appearance but later gained greater significance as a means of developing a sense of accomplishment that could translate to other aspects of life. Because personal testimony can serve as a more potent mechanism than quantitative data to encourage newcomers to try CrossFit for its psychological perks, its incorporation into this investigation was indispensable.

Quality of Life

Because mental health is a variable determined best via individual psychoanalysis or personalized therapy, it was of paramount importance that this quantitative study utilized a variable that adequately replicated the findings of a one-to-one sit-down while still lending itself to mass distribution for survey participation. Quality of life was decided upon based on a few key tenets. For one, “despite debates on definition and components, it is now widely agreed that QOL issues are central to health care, including mental health care” (Basu, 2004, para. 1). Bearing this in mind, a growing body of evidence has helped to establish the practicality of QOL not only for predicting populations at a greater probability of suffering from psychological turmoil but also for establishing a baseline of disease austerity, continuing to monitor for alleviation or

exacerbation of signs and symptoms, and “setting goals for psychosocial therapies and rehabilitation” (Basu, 2004, para. 1).

Conducted by Nayir et al., (2016), *Does Body Image Affect Quality of Life: A Population Based Study* is one such inquiry that has helped to reinforce the notion that QOL is a more appropriate measure of mental and emotional prosperity than the mere absence of identifiable signs of unwellness. This investigation places tremendous emphasis on the reason why people choose to exercise. Though the study acknowledges differences in motivation between people, a common theme prevails. “Body image (BI) significantly affects the quality of life (QoL) in every sub-domain. It is very important to create a positive BI perception to improve the QoL of individuals” (Nayir, et. al, 2016, para. 2). Because negative body image places individuals at greater risk for psychological distress that frequently leads to depression, social anxiety, and eating disorders, means for addressing body image are of paramount importance.

The authors also note that "working and making regular exercises increased the BI score. Positive effects of exercise on BI have been firmly established in the literature” (Nayir et. al, 2016, para. 15). Though a great deal of quality research is provided, Nayir and his team continually stress the gravity of two conclusions. Negative body image places individuals at greater risk for psychological distress, and exercise has demonstrated sizable mental health profit even in the absence of physical change. Given that more than a third of the U.S. population has reported dissatisfaction with appearance, the proposition that exercise could help to alleviate negative self-talk provides hope for greater emotional welfare in those most frequently burdened (Quittkat, 2019).

Though such widespread acceptance of the legitimacy of QOL did not gain traction until recent years when wellbeing's definition expanded beyond the mere absence of physical maladies, the tools for assessing this variable were introduced quite some time ago. Erected in 1995, the WHOQOL-100 set a precedent for QOL as a justifiable measure of health well before the idea became popular that a life well lived was not defined solely by time spent in a doctor's office. A total of 100 questions investigated statements involving "quality of life, health and well-being from people with and without disease, and health professionals" (WHO, 2020, para. 1). The tool was found to have an impressive positive correlation score of 0.89. However, the name of this avant-garde approach to assessing well-being bore its Achilles heel. According to Subramanian (2018), "the eight-second average attention span of human beings" (p. 1) did not lend itself well to the "100" aspect of the WHOQOL-100. Though strikingly accurate in its predictions, the instrument's unabashed lack of brevity served to impede its integration into a psychosocial investigation.

This stumbling block warranted a condensed version of the implement that preserved the tool's predictability and accuracy while furthering its viability for widespread use. And so, the World Health Organization Quality of Life Brief Version, abbreviated WHOQOL-BREF, was born. Despite its abridgement, "the WHOQOL-BREF produced scores that… demonstrated good discriminant validity, content validity, internal consistency and test-retest reliability" (PubMed, 1998, para. 3). Because the WHOQOL-100 had "been tested for reliability and validity" routinely, the WHOQOL-BREF's capacity to mirror the unabridged version of the tool was notable.

Previous research with the WHOQOL-BREF has taken multiple forms across varied disciplines. Though senior to many of its counterparts, one 2008 study by Carta and company delved into the idea of physical activity as a means of curtailing psychological distress in women between the ages of forty and sixty who had been diagnosed with one or more major depressive disorders (MDD) that were resistant to ongoing treatment. "The study aimed to compare the change in quality of life over 32 weeks in depressed women assuming antidepressant drug with (experimental group) or without (control group) physical exercise" (Carta, 2008, para. 1). This study utilized the WHOQOL-BREF to identify positive or negative trends in clients' depressive symptoms and uncovered a positive correlation between fitness prioritization and abatement of depressive symptoms even in the absence of pharmacological supplementation. This work depicts the instrument's efficacy while doing so in a comparable field of study.

A more contemporary inquiry by Pomeroy and his constituents utilizes the WHOQOL-BREF to investigate a population afflicted by a disease process rather than depressive disorders alone. That disease process is multiple sclerosis, a neurodegenerative condition characterized by the destruction of the protective covering surrounding nerve fibers. MS causes muscle spasms and weakness, vision changes, and difficulty ambulating. Though the disorder hardly affects life expectancy, these symptoms largely alter the capacity for proficiency in performing day-to-day activities. Subsequently, "symptoms of Multiple Sclerosis (MS) differentially impact quality of life (QoL) and a comprehensive measure is required for use in observational… studies" (Pomeroy, 2020, para. 1). The authors agreed that the WHOQOL-BREF best addressed the need for a comprehensive measure to assess quality of life given its multiple

conceptual frameworks that make it a “flexible end-point for use in clinical trials and testing… factors influencing QoL” (Pomeroy, 2020, para. 4).

These inquiries that enlist the assistance of the WHOQOL-BREF depict the utility of the instrument for gauging quality of life while also showcasing it as a plausible means of assessing diverse communities. Because this study seeks to investigate mental health–a subject that encompasses such a myriad of individuals–it is requisite that the tool of choice to determine the degree of prosperity is acceptable for use in multiple groups.

CHAPTER III: METHODOLOGY

Survey

For the purposes of this investigation, the researcher developed a thirty-five-item survey composed of questions coupled with Likert scale response options, questions providing multiple response options, and questions paired with free text response boxes that could be answered by entering numerical values. The survey was organized into four primary sections. The first section opened with an informed consent that included introductory information and channels of communication for the principal investigator. The investigator's contact information was followed by a summary of the survey's purpose, a brief description of the nature of the survey questions, and a synopsis of the psychological risks associated with the survey. The risks were followed by a catalog of potential benefits related to the survey, including an available incentive that willing participants would be entered into a drawing for a chance to win one of three $50 gift cards to NoBull, a brand popular within the CrossFit space. This review of incentives was followed by an assurance that the project had been approved by the International Review Board under Protocol #23-0515, a guarantee that all survey data would remain confidential, and a multiple-choice question where participants could either consent to begin the survey or decline consent to discontinue participation.

Given the study's very personal nature, the researcher considered it paramount that the survey respects the fact that–for some–quality of life may not currently reflect what they consider ideal. Bearing this in mind, a hyperlink was provided both on the recruitment flyer and at the survey's conclusion to the National Alliance on Mental Illness, or NAMI. Founded on values of hope, inclusion, empowerment, compassion, and

awareness, this organization “envisions a world where all people affected by mental illness live healthy, fulfilling lives supported by a community that cares” (NAMI, 2023, p. 2). In the spirit of upholding these key tenets, NAMI provides support groups, help lines, and numerous other free resources for those in need of professional assistance or a listening ear, thereby justifying its inclusion and availability for all survey participants.

The second section was composed of multiple-choice questions designed to gather demographic information of participants. These questions collected data on gender identity, employment, marital status, and age. This gathering of personal information was followed by the third and most extensive section. The third section was composed of questions borrowed from the WHOQOL-BREF. This survey tool gathers data on quality of life using questions related to self-reported quality of life, degree of satisfaction with daily functional capacity, and access to health services, transport, and proper living conditions, among other related factors. The fourth and final section provided participants with a Likert scale question to determine the frequency of attending CrossFit classes, a free text response box to indicate how many days per week classes are attended, and a concluding message that provided a separate link to access another site where they could enter an email address to participate in the gift card drawing. A hyperlink to mental health resources was also provided for all who chose to utilize it.

Procedure

After settling upon the decided topic, a decision was necessary to determine whether quantitative or qualitative data would be more suitable for determining the extent of mental well-being and how it pertains–if at all–to regular exercise. As mentioned previously, the researcher initially believed individual interviews–a more qualitative

approach to research–would allow for the most thorough assessment of emotional prosperity, or lack thereof. However, because a major goal of the project was to evaluate more than one hundred participants, it was concluded that such a laborious–albeit comprehensive–approach would not lend itself well to mass distribution. Numbers aside, such a time-consuming endeavor would not allow for the study to be concluded within the time frame to which the researcher sought to adhere.

Bearing this in mind, it was paramount that the variable of "mental health" be assessed in a manner that gave credence to such an important subject matter while still allowing for extensive participation and conscientiousness to the designated time frame. It was at this point that, rather than arrange countless face-to-face meetings with potential participants, the researcher decided a "continual interview process" conducted via the online data collection service Qualtrics would be more appropriate for the purpose of this investigation. The initial attraction of in-person interviews was the breadth at which mental health could be appraised. However, by deciding upon quality of life as the most noteworthy measure of mental well-being and enlisting the support of the WHOQOL-BREF, the principal investigator was able to emulate the results of a one-to-one assessment of mental health while accommodating the need for widespread participation. As a result, the data could be considered quantitative with a qualitative spirit because of the nature of the subjective variables that were assessed.

Consequently, this study utilized a survey comprised of a demographic assessment that included age, marital status, gender identity, and an opportunity to provide informed consent to continue or decline to do so and cease participation. This evaluation of demographic data was followed by 25 questions borrowed from the

WHOQOL-BREF to assess the degree of satisfaction with physical and mental health as well as the degree of satisfaction with the living environment and available resources. These questions were followed by two questions to determine consistency in participation at CrossFit classes that helped uncover potential correlations between regular participation and improved mental health.

The 32-item survey was distributed via social media announcements and in-person recruiting at FSFIT, a CrossFit affiliate based in Hattiesburg, MS. The principal investigator posted flyers in the designated affiliate that included a ready-to-scan QR code as well as an active URL that could be entered into any web browser to access the survey. The QR code and URL were also made available in a digital format so that individuals recruited via social media could easily access the survey.

The survey was made available from June 20, 2023, to July 11, 2023, a 21-day survey conduction period. As in-person and digital recruits agreed to complete the survey, data was automatically protected and stored in the Qualtrics survey database. This data was immediately accessible to the researcher. Results were then imported from the Qualtrics platform into the Statistical Package for the Social Sciences (SPSS) version 29, a statistical software program tailored to in-depth statistical analysis. Such statistical analysis was conducted after all responses were submitted and verified to match the outlined study requirements.

Participants

Participants for this study included individuals 18 years of age or older who participate or attend CrossFit facilities in South MS. Participants were recruited both in person at FSFIT, a CrossFit affiliate located in Hattiesburg, MS, and via Instagram and

Facebook. In total, there were 111 respondents. Of these respondents, thirty did not meet the required age, did not provide informed consent, or did not complete the survey in its entirety. As a result, 81 valid participants were considered during statistical analysis.

Research Design

A quantitative descriptive method was utilized in this study. Given the distinctive qualities of each research project, no method can claim true supremacy in data collection. In some cases, qualitative data proves to be the more appropriate option. In others, qualitative data better caters to the spirit of the project. Regardless of debate or preference, both have their place in research, and both have unique advantages. Quantitative data is better suited to this research endeavor for several reasons. For one, "a quantitative study is run to collect data and draw a numerically based conclusion about that data" (Albers, 2017, p. 2). Because the author sought to draw conclusions that could be considered relevant in the treatment of mental health conditions, it was paramount that extensive data be collected to aid in drawing conclusions. The inference that CrossFit could yield positive effects on mental well-being based solely on word-of-mouth interviews would not prove substantial enough to potentially alter the way conditions are treated. Moreover, "good quantitative data analysis does not require a comprehensive knowledge of statistics, but, rather, knowing enough to know when it is time to ask for help and what questions to ask" (Albers, 2017, p. 1). Given the paucity of knowledge regarding statistical analysis possessed by the principal investigator, this detail was a deciding factor.

To best advocate for and investigate this subject, the following research questions have been formulated to broaden information availability and advance the current knowledge/understanding:

1. What are the differences in demographics among CrossFitters in South Mississippi?
2. What is the relationship between consistent workout regimen on quality of life among CrossFitters in South Mississippi?

When studied in unison, these queries can underscore the utility of exercise as a catalyst for improving QOL while considering the demographic differences between participants.

CHAPTER IV: ANALYSIS

In total, the survey garnered 111 responses. Of these responses, 81 were included in the assessment and evaluation of data based on 100% completion of survey questions, provision of informed consent, and recorded age of eighteen or older. The 32-question survey was completed anonymously by all participants. However, an option was provided for all participants to be included in a drawing for one of three $50 gift cards in exchange for a valid email address. This participation was completely voluntary, and those who chose to partake were made aware that a point of contact would be necessary for distributing incentives. The final question provided a free text box for disclosure of an email to be contacted if selected for one of the three available incentives. Most participants were able to complete the survey in less than 5 minutes. The survey results were run through the International Business Machines Statistical Package for the Social Sciences (IBM SPSS) to provide an analysis of the results.

Descriptive Statistics

The descriptive statistics of the 81 participants' answers were part of a univariate analysis that supplied the results referenced in Table 1. The univariate statistics demonstrate the frequency and percentage of the qualitative variables as well as the mean and standard deviation of the quantitative variables. The study sample (n=81) includes 64.2% (52) females and 35.8% (29) males, aged 18 to 63 years. The average age for male participants was 30.5 while the average age for female participants was 33.25. Marital status was recorded also. Married participants included 10 males and 31 females, accounting for 34.4% and 59.6% of their sexes, respectively. There were 2 females (3.8% of female participants) and 1 male (3.4% of male participants) who reported living with a

partner. Just one female (1.9% of female participants) reported being widowed. No men recorded this response. There were 2 females (3.8% of female participants) and 2 males (6.8% of male participants) who reported being divorced or separated. And finally, 16 females (30.7% of female participants) and 17 males (58.6% of male participants) reported having never been married.

Table 1: Descriptive Statistics

Variable	Level	Frequency (%)	Mean (SD)
Age			31.85 (10.46)
	Minimum Age	18	
	Maximum Age	63	
Gender			
	Female	52 (64.2)	
	Male	29 (35.8)	
Marital Status			
	Married	41 (50.6)	
	Others	40 (49.4)	
Employment	Working Full-time	50 (61.7)	
	Others	31 (38.3)	
Consistency of CrossFit Attendance	Never	11 (13.6)	
	Seldom	7 (8.6)	
	Quite Often	16 (19.8)	
	Very Often	36 (44.4)	
	Always	11 (13.6)	
CrossFit Days Per Week			3.46 (1.93)

Consistency in attendance at CrossFit was recorded using two questions. When questioned as to how frequently they attended CrossFit classes or utilized the methodology, 9 females (17.3% of female participants) and 3 males (10.3% of male participants) recorded a response of "Never." Comparatively, 5 females (9.6% of female participants) and 1 male recorded (3.4% of male participants) "Seldom" as their answer. A slightly larger subset of 11 females (21.1% of female participants) and 4 males (13.7% of male participants) suggested they utilized the methodology in some fashion "Quite Often." Moreover, 20 females (38.4% of female participants) and 19 males (65.5% of male participants) reported attending classes or utilizing the methodology "Very Often." And finally, 6 females (11.5% of female participants) and 3 males (10.3% of male participants) reported "Always" participating in CrossFit. The second question asked for the number of days attended per week from each respondent. The average for females was recorded as 3.38 and 3.79 for males.

Though its inclusion is vital for understanding the composition of study participants, demographic information hardly captures the most salient findings of this investigation. As depicted by the descriptive statistics of Table 2, the most noteworthy discoveries can be condensed into four primary statements inspired by the four domains utilized in the WHOQOL-BREF. These four domains include the physical, psychological, social, and environmental. To understand statistical findings, readers should note that the respective categories are measured on a scale from zero to one hundred. "Domain scores are scaled in a positive direction (i.e., higher scores denote higher quality of life)" (WHO, 1996, p. 8). Upon assessing the physical domain, the eighty-one participants were recorded to have an average physical QOL score of 21.06.

The highest-rated participant received a mere 39.28. The QOL score for the psychological domain eclipsed that of the physical domain but can hardly be considered impressive. The average score was recorded at 56.95 with a top-end score of 87.5. The social QOL rating offers more hope than the two domains that precede it. This department was granted an average score of 73.36, which is by no means impressive but greater than its constituents, nonetheless. And finally, the environmental QOL rating won the day with an exceptional average rating of 90.5.

Table 2: Descriptive Statistics WHOQOL-BREF

	N	Minimum	Maximum	Mean	Standard Deviation
Physical Domain (TRANSFORMED)	81	10.71	39.28	21.06	14.33
Psychological Domain (TRANSFORMED)	81	37.5	87.5	56.95	22.37
Social Relations Domain (TRANSFORMED)	81	50	91.66	73.36	13.83
Environment (TRANSFORMED)	81	62.5	100	90.50	14.361

These ratings are rather ambiguous when little to no context is present, but four statements may be used to highlight the premier discoveries. For one, most participants perceived that their physical health was less than average. Moreover, most participants concluded that their psychological health was average. The majority of participants perceived that their social health was fair. And finally, most participants believed that

their environmental quality of life was good. The survey questions used to assess each domain are discussed further in the next section alongside hypotheses from both the principal investigator and outside sources that could reveal potential drivers behind each rating for QOL.

Bivariate Analysis

A bivariate analysis was conducted for the WHOQOL-BREF variable on an ordinal scale with the socio-demographic variables, the consistency variable, and the CrossFit Days variable. Each domain of the WHOQOL-BREF (Physical, psychological, social, environment) served as a dependent variable. The demographics, consistency, & CrossFit Days were consequently used as independent variables. A statistically significant relationship at $\alpha = 0.05$ was observed under two conditions. For one, a positive correlation was identified between Physical Domain and Consistency. Higher scores on the WHOQOL-BREF for the Physical Domain are associated with higher consistency reported among participants, meaning greater physical QOL appears to be a byproduct of regular attendance. Additionally, Social Domain and Marital Status demonstrated a negative correlation, meaning higher scores on the WHOQOL-BREF for Social Domain were associated with more married participants. With a Cronbach's Alpha of .70 for the survey utilized, readers can be confident these correlations are reliable. However, further scrutiny is necessary to determine why they exist.

Table 3 Bivariate Analysis

Outcome Variable	Independent Variable	Test	Test Statistic	p-value
Physical Domain		Spearman		
	Age		0.156	0.114
	Marital Status		0.121	-0.132
	Gender		0.431	0.020
	Employment		0.275	0.067
	Consistency		0.009	***0.261**
	CrossFit Days		0.095	0.147
Psychological		Spearman		
	Age		0.196	0.096
	Marital Status		0.372	-0.037
	Gender		0.378	-0.035
	Employment		0.300	0.059
	Consistency		0.484	0.004
	CrossFit Days		0.247	-0.077
Social		Spearman		
	Age		0.455	0.013
	Marital Status		0.043	***-0.192**
	Gender		0.252	0.075
	Employment		0.393	-0.031
	Consistency		0.294	0.061
	CrossFit Days		0.470	0.008
Environment		Spearman		
	Age		0.425	-0.021
	Marital Status		0.196	-0.096
	Gender		0.487	0.004
	Employment		0.396	-0.030
	Consistency		0.385	0.033
	CrossFit Days		0.454	0.013

Bold indicates a significant test statistic, * correlation is significant at the 0.05 level

CHAPTER V: DISCUSSION

Interpretation

Perhaps the most shocking conclusion was an overwhelming consensus of dissatisfaction with QOL related to physical well-being. As mentioned previously, CrossFit is an exercise modality rooted in "constantly varied, high-intensity functional movements" (Glassman, 2007, para. 3). Though deep-seated social connectedness and immeasurable opportunities to master novel skills distinguish CrossFit from countless competitors, there is one truth that CrossFit and its catalog of challengers have been forced to address since their inception. On a grand scale, the primary motivator for people to prioritize fitness is found in the physical realm (Swift, 2018). This is largely a consequence of the repeated conclusion that foregoing physical fitness could mean foregoing a longer lifespan, foregoing metabolic health, and foregoing maintenance or improvement of day-to-day functionality.

Fortunately, these undesirable outcomes are typically preventable. "Physical activity and exercise training are associated with reduced cardiovascular risk, improved cardiometabolic risk factors, and facilitated weight loss through creating a negative energy balance" (Swift, 2018, para. 1) Even so, "50.3% of adults in the US do not meet the aerobic component of the physical activity guidelines of 150 min/week of moderate or 75 min of vigorous physical activity per week" (Swift, 2018, para. 4). Though deserving of attention and further exploration, this conclusion cannot be considered the cynosure of this study. This inquiry is one based on those who desire to capitalize on the physiological gain linked with consistent exercise. So, with such robust literature supporting the notion that exercise yields a bountiful bodily reward, one would expect a

fair degree of satisfaction with physical QOL. Yet, participants in this study reported their QOL in the physical realm with great despondence. Do unseen drivers capable of explaining this phenomenon exist, and if so, what are they?

Physical Domain

The following sections will address the first research question. Research question one explores, what are the differences in demographics among CrossFitters in South Mississippi? The inquiry is simple. The answer, however, is a bit more complex. This is because human beings are unique. What constitutes satisfactory physical QOL will differ greatly between the eighteen-year-old baseball player striving to earn an athletic scholarship and the sixty-two-year-old grandmother aiming to preserve the mobility required to push her grandchild's stroller uphill during an afternoon walk. Is physical health rooted in the absence of apparent hindrances, one's capacity to run a set distance, or the mere ability to expend energy when necessary? The answer is relative to the individual. Bearing this in mind, one might question whether the degree of satisfaction with physical QOL can be fairly assessed across a demographically diverse population that shares only one identifiable characteristic– adherence to an exercise regimen. However, Professor Ornella Corazza of the University of Hertfordshire believes that this single commonality could prove sufficient to explain substandard levels of satisfaction.

In her publication "The Emergence of Exercise Addiction (EA), Body Dysmorphic Disorder (BDD), and other image-related psychopathological correlates in fitness settings: A cross-sectional study," Dr. Corazza notes "a high risk of EA, appearance anxiety, and BDD amongst... gym users internationally" (2019, para. 4). Corazza suggests that fitness enthusiasts seem to possess a heightened awareness of how

routine exercise transforms physique compared to those who do not regularly exercise. This conclusion is logical, given that "initial evidence suggests... concerns with physical appearance may represent a continuum from healthy behaviors to psychopathological manifestations related to various forms of anxiety" (Corazza, 2019, p. 5). Research suggests the primary motivator for most exercise stems from a desire to transform some aspect of physicality. Subsequently, those who do not place as much emphasis on prioritization of exercise exhibit substantially lower levels of BDD and appearance related anxiety, seemingly a result of reduced preoccupation with physical appearance.

Perhaps the individuals regularly attending CrossFit classes have adopted a mentality suggesting they always have some aspect where they believe they could improve in physical health. In the existing gym culture inspired by countless influencers and continually more impressive trainers, it is more exhausting than ever to disregard the echo chamber that encourages exercisers to labor until they are satisfied. Yet, perfection is unattainable. Obsession always finds a detail–no matter how minute–to highlight and abhor as dissatisfactory and altogether unacceptable. This, in turn, creates a widespread condition that guarantees few will ever rate their QOL in the physical domain highly.

Psychological Domain

Physical attributes aside, the essence of this project is inseparable from the psychological realm. Perhaps even more entrenched in ambiguity than its physical counterpart, psychological QOL is difficult to accurately assess with any degree of repeatability. This is because–like the physical domain–psychological well-being is relative. However, a key difference exists that ensures psychological health cannot be so readily appraised. Whereas physical health can be objectively measured via clinical trials

and tests that have been duplicated for confirmation of accuracy, "perceived mental health cannot directly correspond to objectively measured mental health" (Chiu, 2020, para. 6). Simply put, the uniqueness of the human mind preserves its inability to be measured by a tool void of empathy and human insight. This is not inherently a bad thing. It simply suggests that human beings possess a level of perspicacity that has yet to be rivaled by technology. As described by economist Scott Brave in Emotion in Human-Computer Interaction, "Emotion is a fundamental component of being human... [whereas computers are] quintessentially unemotional artifacts" (2007, p. 1).

However, this is only one individual's suggestion, and it certainly does not nullify the utility of the survey conducted. To better understand the reported score in the psychological domain, it is necessary to review the style of question from the WHOQOL-BREF used to obtain the "average" rating of psychological QOL. The survey evaluated participants by asking "How much do you enjoy life?" Though it appears to be a rather straightforward statement, the question could undoubtedly be considered a loaded one. Brené Brown provides a great deal of insight into why a question of this nature could be considered quite difficult to answer. In her publication *Daring Greatly*, Dr. Brown notes that "We [humans] are hardwired to connect with others, yet multitudes possess a fear of vulnerability" (2012, p. 7). In a society enveloped by social media highlight reels and a norm of "hustle culture," much of what people do is inspired by a desire to maintain a façade of prosperity and–for some–invincibility. To hint at anything less than this could compromise the guise that suggests all is well.

While the survey's informed consent promised anonymity, it is logical to think that some participants may have retained a level of hesitancy to accurately portray their

genuine emotions. Dr. Avintan Hassidim, professor of computer science at Bar Ilan University in Tel Aviv, reinforced this idea in his publication "The Mechanism is Truthful: Why Aren't You?" As the title suggests, surveys (the mechanism) are created with a level of objectivity for data collection purposes. However, surveys can only be accurate to the point participants will allow. Hassidim noted that "a substantial percentage of participants do not report their true [survey] preferences" (2017, para. 1) Frankly, this comes as no surprise. As Brené Brown suggested, many possess a fear of vulnerability. This fear is more pronounced in some than in others. Consequently, certain individuals will be more inclined to provide truthful information while others will be more reserved in answering with honesty. The WHOQOL-BREF data for the psychological domain of this study reinforced the validity of the aforementioned statements by demonstrating a range of 50.0, the largest out of the four domains.

Social Relations Domain

Providing more promising QOL results than the physical and psychological, the social relations domain tallied a mean of 73.36. This number undoubtedly leaves room for improvement, but it serves as a stark contrast to the two poorly rated categories before it. The questions utilized for investigating this domain revolved primarily around the degree of satisfaction with personal relationships and, perhaps more interestingly, the level of support received from friends. It was noted earlier that "community and social connectedness [are] arguably as essential to CrossFit's efficacy and popularity as are the fitness tenets… to which it adheres" (Dawson, 2017, para. 5). Fitness goals and capabilities aside, humans are ingrained with a desire for social connectedness. As Brené Brown would go on to suggest in *Daring Greatly*, "We are hardwired to connect with

others. It's what gives purpose and meaning to our lives, and without it there is suffering" (2015, p. 8). This statement is quite striking, especially when considering much of CrossFit's popularity is founded on the seemingly indispensable appreciation for shared suffering among its most avid adherents.

Dr. Brown's quote would seem to suggest that suffering is, at its core, a negative thing. However, "suffering itself is what attracts many to the sport of CrossFit" (Brighton, 2020, p. 117). The communal act of completing a difficult workout of the day (WOD) together yields a rush of endorphins and delivers a sense of social connectedness unparalleled by other fitness methods. This statement is not one designed to contradict Dr. Brown's statement but to introduce the idea that–when discussing social connection and suffering–perhaps the two need not be mutually exclusive. Consider organizations like the United States Marine Corps or the largest municipal police department in America, the NYPD. The individuals that comprise these bodies have witnessed their share of tragedy and suffering. Yet, when discussing their roles in these institutions, many describe it as being part of something greater— family united over a cause they consider worthwhile. To suggest the same spirit resides within the CrossFit community may come across as discrediting the amazing organizations mentioned. However, that is far from the goal of this excerpt. Rather, it seems these groups have set a precedent to make the most of situations that, by all accounts, would be deemed negative. The key to this remarkable optimism is rooted in human relations, a phenomenon for which utility has been widely demonstrated in CrossFit and possesses potential far beyond gym walls.

Environment Domain

The highest rated among the four domains, environment tallied an impressive average score of 90.5. As is the case with previous categories, the title could be considered ambiguous. What exactly constitutes environment? To answer this question, it is worth mentioning that the WHOQOL-BREF asks questions like "How safe do you feel in your daily life?" to assess this domain. These queries are certainly practical. However, one seems to emerge from the rest as being most insightful: "How healthy is your physical environment?" Though at face value it could be overlooked as one of many inquiries amid the WHOQOL-BREF, the question offers more than a mere addition for the purpose of increasing survey breadth. To understand why it possesses such value for determining why CrossFitters in south MS rated environmental QOL with such outstanding satisfaction, one must consider the mission of the CrossFit methodology.

CrossFit.com journalist Alyssa Royse describes it like so: "for us... CrossFit has never been about winning the [CrossFit] Games. It has always been about building a strong community of empowered people who push and support each other to be as fit as possible" (2017, p. 3). As mentioned repeatedly throughout this study, CrossFit's community is what distinguishes it from its competitors. Its appeal is firmly rooted in the awe-inspiring culture of unapologetic support for the physical and emotional well-being of individuals of every creed, race, or conviction, regardless of what form that takes for them. Merriam-Webster defines "environment" as "the circumstances, objects, or conditions by which one is surrounded" (n.d. para. 1). The circumstances, objects, and conditions in CrossFit affiliates are, on a grand scale, conducive to physical and personal growth. That is precisely why environmental QOL was rated so highly. Yes, competition

exists within the walls of any CrossFit affiliate to a certain extent. However, that is not CrossFit at its core. The magic of CrossFit resides in the congratulatory fist bump after the completion of a grueling WOD. It exists in the bear hug of a classmate after devastating news was shared with them well after the final beads of sweat have dropped to the floor. Life has a way of pushing people down. CrossFit and its people have a way of picking them up. This conclusion comes as no surprise. Common interests and communal struggle have yielded strikingly similar effects of social cohesion for millennia. However, can this emphasis on togetherness truly aid in the cultivation of a more prosperous psychological and physical state?

Physical QOL and Consistency

The following section will address the second research question. Research question two investigates, what are the relationships between consistent workout regimen on quality of life among CrossFitters in South Mississippi? An identifiable relationship between physical QOL and consistency in CrossFit class attendance is logical, especially when readers understand that the WHOQOL-BREF's assessment of physical QOL is largely determined by capacity for day-to-day functionality and need for medical treatment or lack thereof. This deduction is one that has been echoed by previous studies. Hungarian professor of exercise science Erzsébet Rétsági utilized the WHOQOL-BREF when she and her colleagues determined a “higher amount of physical activity (PA)... can result in better QoL in all dimensions” (Rétsági et al., 2020, p. 4). Another research cohort concluded that, in addition to being an effective antidepressant for individuals plagued by clinical depression, “exercise [when performed regularly] is a useful strategy to improve physical and psychological domains of QoL” (Schuch et al., 2016, para. 3).

Both presumptions appear to be a consequence of the favorable physiological effects of regular exercise on the body. Again, the WHOQOL-BREF has a propensity to assess Physical QOL via capacity for daily function. The constantly varied, high-intensity functional movements of CrossFit strengthen and condition body systems. Consequently, regular practice of the methodology would produce a more physically capable individual.

Social Domain and Marital Status

The demonstrated correlation between Social Domain and Marital Status seems reasonable as well. As mentioned earlier in the discussion, the survey questions that fall under the Social Domain assess whether participants are satisfied with personal relationships. For married individuals, it seems the personal relationship that would take precedence would be the one with their spouse. After conducting the largest historical study of happily married individuals and what pillars have proven indispensable in their success, psychologist Judith Wallerstein discovered this to be true. “Many regarded their marriage along with their children as their proudest, most lasting achievement” (2019, p. 8). But why is this the case? It is because a successful marriage takes work. It requires diligence and intentionality in how one party treats the other. That is why the achievement is considered proudest and most lasting — because it required the most energy, grace, love, and time that — when invested anywhere else — could deplete one’s very soul.

The fact that children were considered to be another lasting achievement echoes the same sentiment. Rearing a child is no menial task. It requires energy, grace, and love that are very different but equally taxing to those required for a successful marriage. This investment is not in vain. “We find that happiness increases in the years around the birth

of a child... Moreover, happiness increases before birth, suggesting... the broader process of childbearing may include partnership formation and quality" (Myrskyla, 2014, para. 1). The data support the deduction that marriage and its fruits are numerous. This, in turn, helps to explain married participants' unparalleled satisfaction with their social QOL.

CHAPTER VI: CONCLUSION

Assumptions and Limitations

This investigation was carried out under the expectation that participants responded truthfully to all survey questions. Despite a spirited attempt at thorough research conduction, various study limitations exist. For one, this investigation excluded race when recording demographic information. This limitation should be addressed in future studies for purposes of greater inclusivity and familiarity with the survey population. Moreover, the study utilized quantitative data collection methods. In doing so, opportunities may have been missed to employ qualitative methods, which could have served to establish greater rapport with participants and increase the probability of more transparency in response. An opportunity to use mixed methods was also foregone even though it "uses both qualitative and quantitative approaches together as a matter of exploiting the strengths of each – namely, depth and complexity on the qualitative side, vs. representativeness and statistical power on the quantitative" (Starr, 2014, para. 9). These are opportunities that could be capitalized on by future researchers.

Contributions and Moving Forward

When performed consistently, CrossFit induces tremendous growth beyond the mere transformation of body composition. In addition to its repeatedly shown ability to stave off chronic disease and provide members with the strength to complete tasks they never thought possible, CrossFit — with the help of its people — has propagated a culture of unwavering optimism, collective desire for greater competency in movement, and prioritization of atomic habits that — when executed on a routine basis — compound to construct a healthier, more fulfilling lifestyle. As determined via Bivariate analysis and

Spearman correlation, consistency in adherence to the methodology breeds markedly better physical QOL. Additionally, spouses who exercise together have demonstrated healthier social relationships. These findings should not be concealed, nor should they be reserved only for individuals who already consider themselves "CrossFitters."

Instead, this revelation should be shared– inside the walls of CrossFit affiliates, in casual conversations where interest is demonstrated, and in healthcare settings where the regular prescriptions for improving QOL are pharmaceutical in nature. Education and fervent advocacy for as many people as possible on the importance of routine and schedule is vital for widespread change. This is not an attempt to discredit such practices as useless. In fact, the opposite is true. Many existing treatments possess marvelous utility and have displayed striking efficacy. However, the literature is robust and ever-growing that CrossFit "improves physical abilities (strength, fitness, etc.) health-related factors (being or staying healthy) and improvement of functional skills" (Köteles et al., 2016, para. 18). Yes, the potential for existing treatments on improved QOL is substantial. The same can be said for CrossFit as a mode of remedy. However, the possibilities for improved QOL when both are used in combination could lead to a metamorphic shift in healthcare for years to come.

Future Inquiry

As mentioned previously, race was excluded from the demographic portion of this study. Analyzing the role this plays in affecting QOL could serve as an excellent opportunity for further exploration. Additionally, further probing into social relationships might unveil even greater discoveries. Do spousal relationships produce greater QOL, or do friendships have a more noticeable effect? Are the two comparable in influencing the

domains of the WHOQOL-BREF, or does one supersede the other? How are parents of children influenced differently than non-parents? Though much has been discovered, much remains. This gargantuan task should not be considered foreboding. Instead, it should be relished as an opportunity to offer an outstretched hand of relief to those who need it most.

APPENDIX A: WHOQOL-BREF SURVEY

How would you rate your quality of life?

- Very Poor
- Poor
- Neither poor nor good
- Good
- Very Good

How satisfied are you with your health?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

To what extent do you feel that physical pain prevents you from doing what you need to do?

- Not at all
- A little
- A moderate amount
- Very much
- An extreme amount

How much do you need any medical treatment to function in your daily life?

- Not at all
- A little
- A moderate amount
- Very much
- An extreme amount

How much do you enjoy life?

- Not at all
- A little
- A moderate amount
- Very much
- An extreme amount

To what extent do you feel your life is meaningful?

- Not at all
- A little
- A moderate amount
- Very much
- An extreme amount

How well are you able to concentrate?

- Not at all
- A little
- A moderate amount
- Very much
- Extremely

How safe do you feel in your daily life?

- Not at all
- A little
- A moderate amount
- Very much
- Extremely

How healthy is your physical environment?

- Not at all
- A little
- A moderate amount
- Very much
- Extremely

Do you have enough energy for everyday life?

- Not at all
- A little
- Moderately
- Mostly
- Completely

Are you able to accept your bodily appearance?

- Not at all
- A little
- Moderately
- Mostly

- Completely

Have you enough money to meet your needs?

- Not at all
- A little
- Moderately
- Mostly
- Completely

How available to you is the information that you need in your day-to-day life?

- Not at all
- A little
- Moderately
- Mostly
- Completely

To what extent do you have the opportunity for leisure activities?

- Not at all
- A little
- Moderately
- Mostly
- Completely

How well are you able to get around?

- Very poor
- Poor
- Neither poor nor good
- Good
- Very good

How satisfied are you with your sleep?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with your ability to perform daily living activities?

- Very dissatisfied

- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with your capacity for work?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with yourself?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with your personal relationships?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with the support you get from your friends?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with the conditions of your living space?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with your access to health services?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How satisfied are you with your transport?

- Very dissatisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
- Very satisfied

How often do you have negative feelings such as blue mood, despair, anxiety, and depression?

- Never
- Seldom
- Quite often
- Very often
- Always

APPENDIX B: DEMOGRAPHICS SURVEY

How do you describe yourself?

- Male
- Female
- Non-binary/Third Gender
- Prefer to self-describe
- Prefer not to say

What best describes your employment status over the last three months?

- Working full time
- Working part time
- Unemployed and looking for work
- A homemaker or stay-at-home parent
- Student
- Retired
- Other

What is your current marital status?

- Married
- Living with a partner
- Widowed
- Divorced/Separated
- Never been married

How old are you? Please enter a digit, rather than a word. (Ex. “4” instead of “four”)

How often do you attend CrossFit classes on a regular basis?

- Never
- Seldom
- Quite often
- Very often
- Always

I typically attend CrossFit classes ____ day(s) per week. Please enter a digit, rather than a word. (Ex. “4” instead of “four”)

APPENDIX C: IRB APPROVAL LETTER

Office *of*
Research Integrity

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

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NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI using the Incident form available in InfoEd.
- The period of approval is twelve months. If a project will exceed twelve months, a request should be submitted to ORI using the Renewal form available in InfoEd prior to the expiration date.

PROTOCOL NUMBER:	23-0515
PROJECT TITLE:	Investigating the Relationship between Consistent Workout Regimen on Mental Health among CrossFitters in South Mississippi
SCHOOL/PROGRAM	Professional Nursing Practice
RESEARCHERS:	PI: Christian Glass Investigators: Glass, Christian~Watson, Mayantoinette Ferrer~
IRB COMMITTEE ACTION:	Approved
CATEGORY:	Expedited Category
PERIOD OF APPROVAL:	20-Jun-2023 to 19-Jun-2024

Donald Sacco Jr.

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

REFERENCES

Albers, M. J. (2017). Quantitative data analysis—In the graduate curriculum. *Journal of Technical Writing and Communication, 47*(2), 215-233.

Basu, D. (2004). Quality-of-life issues in mental health care: Past, present, and future. *German Journal of Psychiatry, 7*(3), 35-43.

Box, F., Y., Petruzzello, S. J., & Mangine, G. T. (2018). Mood State Changes Accompanying the CrossFit Open Competition in Healthy Adults. Sports (Basel), 6(3), 67–. https://doi.org/10.3390/sports6030067

Brown, B. (2015). Daring greatly: How the courage to be vulnerable transforms the way we live, love, parent, and lead. Penguin.

Carta, M. G., Hardoy, M. C., Pilu, A., Sorba, M., Floris, A. L., Mannu, F. A., ... & Salvi, M. (2008). Improving physical quality of life with group physical activity in the adjunctive treatment of major depressive disorder. *Clinical Practice and Epidemiology in Mental Health, 4*(1), 1-6.

Chiu, M., Amartey, A., Wang, X., Vigod, S., & Kurdyak, P. (2020). Trends in objectively measured and perceived mental health and use of mental health services: a population-based study in Ontario, 2002–2014. Cmaj, 192(13), E329-E337.

Corazza, O., Simonato, P., Demetrovics, Z., Mooney, R., van de Ven, K., Roman-Urrestarazu, A., ... & Martinotti, G. (2019). The emergence of Exercise Addiction, Body Dysmorphic Disorder, and other image-related psychopathological correlates in fitness settings: A cross sectional study. *PloS one, 14*(4), e0213060.

Dawson, M. (2017). CrossFit: Fitness cult or reinventive institution? International *Review for the Sociology of Sport, 52*(3), 361–379. https://doi.org/10.1177/1012690215591793

Eather, N., Riley, N., Miller, A., Smith, V., Poole, A., Vincze, L., ... & Lubans, D. R. (2019). Efficacy and feasibility of HIIT training for university students: The Uni-HIIT RCT. *Journal of science and medicine in sport, 22*(5), 596-601.

Gjestvang, C., Abrahamsen, F., Stensrud, T., & Haakstad, L. A. (2020). Motives and barriers to initiation and sustained exercise adherence in a fitness club setting—A one-year follow-up study. *Scandinavian journal of medicine & science in sports, 30*(9), 1796-1805.

Glassman, G. (2007). Understanding crossfit. *CrossFit Journal, 56*(1), 1-2.

Hassidim, A., Marciano, D., Romm, A., & Shorrer, R. I. (2017). The mechanism is truthful, why aren't you? *American Economic Review, 107*(5), 220-224.

He, X. (2022). PHYSICAL ACTIVITY IN THE TREATMENT OF DEPRESSION IN COLLEGE STUDENTS. *Brazilian Journal of Sports Medicine, 28*(1), 68–71. https://doi.org/10.1590/1517-8692202228012021_0489

Hollerbach, B., DeBlauw, J. A., Jitnarin, N., Poston, W. S. C., & Heinrich, K. M. (2021). Muscular Strength, Power, and Endurance Adaptations after Two Different University Fitness Classes. *Sports (Basel), 9*(8), 107. https://doi.org/10.3390/sports9080107

Ishmael, S. (2022). The Experiences of Crossfit as an Intervention for Apathy: A Qualitative Study (Doctoral dissertation, Capella University).

Li, X., Mu, F., Liu, D., Zhu, J., Yue, S., Liu, M., ... & Wang, J. (2022). Predictors of suicidal ideation, suicide attempt and suicide death among people with major depressive disorder: A systematic review and meta-analysis of cohort studies. *Journal of Affective Disorders, 302*, 332-351.

Mikkelsen, K., Stojanovska, L., Polenakovic, M., Bosevski, M., & Apostolopoulos, V. (2017). Exercise and mental health. *Maturitas, 106*, 48-56.

Nayir, E., Yürekli, M. V., Devran, H., Çelik, A., & Okyay, R. A. (2016). Does Body Image Affect Quality of Life?: A Population Based Study. *PloS One, 11*(9), e0163290–e0163290. https://doi.org/10.1371/journal.pone.0163290

Panek, E. (2014). Left to Their Own Devices: College Students' "Guilty Pleasure" Media Use and Time Management. *Communication Research, 41*(4), 561–577. https://doi.org/10.1177/0093650213499657

Patel, V. (2014). Why mental health matters to global health. *Transcultural Psychiatry, 51*(6), 777-789.

Patterson, M. S., Heinrich, K. M., Prochnow, T., Graves-Boswell, T., & Spadine, M. N. (2020). Network analysis of the social environment relative to preference for and tolerance of exercise intensity in CrossFit gyms. *International Journal of Environmental Research and Public Health, 17*(22), 8370.

Petz, M. R. (2021). Examining the Contributions of Grit, Mental Toughness, and Conscientiousness to Athletic Performance (Doctoral dissertation, Capella University).

Piercy, T., Ballard, R. M., Carlson, S. A., Fulton, J. E., Galuska, D. A., George, S. M., & Olson, R. D. (2018). The Physical Activity Guidelines for Americans. *Journal of*

the American Medical Association, 320(19), 2020–2028. https://doi.org/10.1001/jama.2018.14854

Pomeroy, I. M., Tennant, A., Mills, R. J., TONiC Study Group, & Young, C. A. (2020). The WHOQOL-BREF: a modern psychometric evaluation of its internal construct validity in people with multiple sclerosis. *Quality of Life Research, 29*, 1961-1972.

Rétsági, E., Prémusz, V., Makai, A., Melczer, C., Betlehem, J., Lampek, K., ... & Hock, M. (2020). Association with subjective measured physical activity (GPAQ) and quality of life (WHOQoL-BREF) of ageing adults in Hungary, a cross-sectional study. *BMC Public Health, 20*(1), 1-11.

Royse, A. (2017). Welcoming or Winnowing? The CrossFit Journal https://journal.crossfit.com/article/welcoming-or-winnowing-2

Shefer, G., Henderson, C., Howard, L. M., Murray, J., & Thornicroft, G. (2014). Diagnostic overshadowing and other challenges involved in the diagnostic process of patients with mental illness who present in emergency departments with physical symptoms–a qualitative study. *PloS one*, 9(11), e111682.

Smith, G. E., & Okonkwo, O. C. (2021). Truly Cross-fit: The association of exercise and clinical outcomes: introduction to a JINS Special Section. *Journal of the International Neuropsychological Society, 27*(8), 757-760.

Starr, M. A. (2014). Qualitative and mixed-methods research in economics: surprising growth, promising future. *Journal of Economic Surveys, 28*(2), 238-264.

Stower, H. (2014). Depression: Linking exercise and depression. Nature Medicine, 20(11), 1241. https://doi.org/10.1038/nm.3753

Stringaris, A. (2017). Editorial: What is depression? Journal of Child Psychology and *Psychiatry, 58*(12), 1287–1289. https://doi.org/10.1111/jcpp.12844

Subramanian, K. R. (2018). Myth and mystery of shrinking attention span. *International Journal of Trend in Research and Development*, *5*(1), 1-6.

Vigo, D. V., Kestel, D., Pendakur, K., Thornicroft, G., & Atun, R. (2019). Disease burden and government spending on mental, neurological, and substance use disorders, and self-harm: cross-sectional, ecological study of health system response in the Americas. *The Lancet Public Health, 4*(2), e89-e96.

Wainberg, M. L., Scorza, P., Shultz, J. M., Helpman, L., Mootz, J. J., Johnson, K. A., ... & Arbuckle, M. R. (2017). Challenges and opportunities in global mental health: a research-to-practice perspective. *Current Psychiatry Reports, 19*, 1-10.

Wallerstein, J. (2019). The good marriage: How and why love lasts. Plunkett Lake Press.

WHOQOL Group. (1998). Development of the World Health Organization WHOQOL-BREF quality of life assessment. *Psychological Medicine, 28*(3), 551-558.

World Health Organization. (1996). WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version, December 1996 (No. WHOQOL-BREF). World Health Organization.

Yang, Wang, Y.-T., Xia, L., Zheng, Y.-C., & Feng, Z.-Z. (2022). The Relationships between Prospection, Self-Efficacy, and Depression in College Students with Cross-Lagged Analysis. *International Journal of Environmental Research and Public Health, 19*(22), 14685. https://doi.org/10.3390/ijerph192214685.