

A PASTOR IN MOTION STAYS IN MOTION: THE RELATION BETWEEN EXERCISE
AND MENTAL AND EMOTIONAL HEALTH

BY

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ABSTRACT

Something that often is left out of the discussion among pastors is exercise. God creates us body and soul, and the best way to teach is by example. Several benefits stem from exercise as it applies to the ministry. This thesis will demonstrate that as a pastor exercises, there will be benefits to his mental and physical health in the ministry. The connection between the brain and the body is more significant than most imagine. Exercise increases the size of the brain, shoots chemicals around to improve mood, and makes a person more resilient to stress. Exercise also has a profound effect on physical health. Exercise strengthens a person's heart, bones, and muscles, increase endurance, and boosts the immune system.

INTRODUCTION

“I believe in God the Father the Almighty, maker of heaven and earth.” This quote is the First Article of the Apostles Creed. This Creed confesses the Genesis truth that God created the whole world and everything in it. All things include light, water, plants, stars, animals, fish, birds, and people. After God finished creating, he took a step back and said that all he made was “very good” (Gen 1:31). When God created people, he did not create them just souls or bodies, but both bodies and souls (Gen 2:7; Eccl 12:7; Matt 10:28).¹

When a pastor talks about taking care of God’s creation, often he is quick to mention the earth. It is godly and biblical to care for the world into which God put us (Gen 2:15; Ps 8:6-8). We also speak of taking care of the soul. Pastors are rightly concerned with being a doctor of souls. But the Bible speaks also of concern and awe for our bodies as God’s creation (Job 10:8-12; Prov 23:19-21; Rom 12:1; 1 Cor 6:19, 20, 10:31; Eph 5:28).² There is no way to get around the fact that God made each one of us and gave us our bodies as a wonderful blessing. Psalm 139 says, “I praise you because I am fearfully and wonderfully made; your works are wonderful, I

1. Notice in Genesis 2 that God formed the man’s body. The creation of people is separated from the rest of the creation account. The body was created special, and this was the Creator’s own breath that he breathed into the man. Ecclesiastes makes the distinction between body and soul when speaking about what happens to the person at death. Jesus, in Matthew 10, made the distinction concerning body and soul when talking about fear about those who persecute you. While the emphasis of Matthew 10 is gospel, that the disciples do not need to fear as they go out, it still demonstrates the fact that a person is both body and soul.

2. The Romans, 1 Corinthians, and Ephesians passages, in context, are speaking of keeping the body away from sexual immorality. However, the principle is still there that we take care of our bodies. No Christian desires to trash God’s house. It seems unimaginable to start throwing hymnals around and making a mess. In the same way, Paul makes the point that God dwells in each Christian. We do not want to taint God’s dwelling with sexual immorality or abuse it in any other way; but God desires that we take care of our bodies.

know that full well” (Ps 139:14)³. When speaking about care for God’s creation, this includes consideration for the human body; neglecting this fact is to overlook a part of the First Article.

A pastor teaches both in words and actions. Pastors are examples for their flock (1 Tim 4:12). As pastors—or men aspiring to be pastors—we desire to lead a life that members can follow. There is a Biblical basis for concern for the body’s welfare, and one important way to take care of it is through exercise. Care for the body that God has given us often gets overlooked.⁴

I will demonstrate the value of exercise in a pastor’s ministry related to his physical and mental health. I will show my research through the following parts: Methodology, Literature Review, Exercise, Mental Health, and Physical Health.

Methodology

There were three primary sources for this essay: *Exercised: Why Something We Never Evolved to Do Is Healthy and Rewarding*, *The Joy of Movement: How Exercise Helps Us Find Happiness, Hope, Connection, and Courage*, and *SPARK: The Revolutionary New Science of Exercise and the Brain*.⁵ I then supplemented their findings with other articles.

3. All Bible references are NIV.

4. In the pastoral wellness book, *Dangerous Calling*, Paul David Tripp makes lots of excellent points about how a pastor can keep himself from burnout and difficulty in his congregation. However, he neglects care for the body.

5. Daniel Lieberman, *Exercised: Why Something We Never Evolved to Do Is Healthy and Rewarding* (Pantheon, 2021); Kelly McGonigal, *The Joy of Movement: How Exercise Helps Us Find Happiness, Hope, Connection, and Courage* (Avery, 2019); John J. Ratey and Eric Hagerman, *Spark: The Revolutionary New Science of Exercise and the Brain*, 1st edition (Little, Brown Spark, 2008).

LITERATURE REVIEW

I will discuss these three in my literature review because I based most of my research on them. I had three criteria for choosing the books I did: 1) they had to be recent, within the last twenty years; 2) they are scientific and not solely anecdotal evidence, and 3) they must be about exercise and how it affects either mental or physical health.

In the book *The Joy of Movement*, Kelly McGonigal, a professor of psychology at Stanford University and exercise instructor, proves her thesis that exercise improves mood and boosts attitude for the overall person. As she states in the introduction to her book, “Around the world, people who are physically active are happier and more satisfied with their lives.”⁶ On her website, she said,

My latest book THE JOY OF MOVEMENT explores how physical exercise can be a powerful antidote to the modern epidemics of depression, anxiety, and loneliness. The book is at once a love letter to movement and to human nature, including our remarkable abilities to persist, cooperate, and experience transcendence. It, too, is rooted in my experiences as a teacher—I started leading group exercise classes as a graduate student in psychology, and it continues to be one of the greatest sources of happiness in my life.⁷

McGonigal proves her thesis by talking about the chemicals in the brain and how those are affected by exercise. She spends a decent amount of time discussing motivation and how these benefits increase in workout groups.

6. McGonigal, *The Joy of Movement*, 3.

7. Kelly McGonigal, “ABOUT,” Kelly McGonigal, accessed December 7, 2021, <http://kellymcgonigal.com/about>.

John Ratey, a clinical psychiatry professor at Harvard University, is one of the authors of *SPARK*. He demonstrates how exercise improves brain function to help balance emotions, increase focus, and help the brain function better overall. As Ratey says on his website,

SPARK is a groundbreaking exploration of the connection between exercise and the brain's performance that shows how even moderate exercise will supercharge mental circuits to beat stress, sharpen thinking, enhance memory, and much more. *SPARK* will change forever the way you think about your morning run---or, for that matter, simply the way you think.⁸ (<http://www.johnratey.com/Books.php>)

He demonstrates how exercise changes the brain, both chemically and physically. He illustrates how activity has affected people with different mental disorders such as ADHD, anxiety, and depression. He also takes a deep look at how exercise changes the brain to make learning easier.

The author of *Exercised* is Daniel E. Lieberman. He is a professor of Human Evolutionary Biology at Harvard University. He looks to demonstrate why and how exercise is so beneficial for humans even though humans did not evolve to move.⁹ He first establishes that humans evolved to focus solely on mating. Humans did not evolve to move because it is about reproduction; exercise uses energy and resources that take away from reproduction. Lieberman notices that diseases related to not moving enough are popping up at an alarming rate, and problems are appearing much worse than before. His answer is that exercise can and does limit and prevent many of these problems. As Lieberman says, "Instead, my goal is to explore skeptically and without jargon the fascinating science of how our bodies work when we move and take it easy, how and why exercise affects health, and how we can help each other get moving."¹⁰ He proves his thesis that exercise benefits humans by focusing on a few points. At the

8. "John Ratey M.D. - Books," accessed December 7, 2021, <http://www.johnratey.com/Books.php>.

9. As Christians, we believe what Genesis says about how God created the world in six days. I am not promoting the theory of evolution; however, this author makes some useful observations about exercise and the body. More on that at the end of this section.

beginning of each section, he acknowledges a myth about exercise. From there, he addresses the history of anthropology from the perspective of evolution. He then applies that to the modern era. For example, he explores the myth, “We are born to exercise.”¹¹ He explores this tribe in Mexico, the Tarahumara, and compares their game of running 70 miles with a ball to an Ironman. He points to how it was necessary to endure miles upon miles to hunt on foot. We evolved to run that far, so exercise comes out of need, and we rest when we do not need to move to conserve energy. The urge to be a couch potato is normal.¹²

Each professor who authored the books has deep-rooted knowledge and background with the human body and, precisely, exercise. They come with their experience and expertise. All agree; yes, exercise benefits the body and the mind.

Exercise’s effect on the brain is surprisingly significant. It is stunning! Most people have considered body and mind to be separate for the longest time, but each has a profound effect on the other. Ratey explains, “Our culture treats the mind and body as if they are separate entities, and I want to reconnect the two.”¹³ He then demonstrates that exercise increases chemicals in the brain like serotonin, norepinephrine, and dopamine.¹⁴

SPARK demonstrates that connections in the brain increase in each person who exercises, and the brain even physically changes. Exercise is essential to learning and better attention.

Ratey and Hagerman explain,

The notion that it [exercise] might [boost the brains ability to learn] is supported by emerging research showing that physical activity sparks biological changes that

10. Ratey and Hagerman, *Spark*, 13.

11. Lieberman, *Exercised*, 15.

12. Lieberman, 21–5.

13. Ratey and Hagerman, *Spark*, 4.

14. Ratey and Hagerman, 5.

encourage brain cells to bind to one another. For the brain to learn, these connections must be made; they reflect the brain's fundamental ability to adapt to challenges.¹⁵

Learning happens more effectively because changes occur in the brain due to exercise.

Lieberman in *Exercised* explains that long periods of sitting cause inflammation, which can lead to serious health consequences. "Third and most alarmingly, hours of sitting may trigger our immune systems to attack our bodies through a process known as inflammation. Don't panic, but as you sit comfortably reading this, your body may be on fire."¹⁶ In his attempt at humor, he points out the severe problem of sitting for long bouts, chronic inflammation that leads to dangerous diseases, which this paper will discuss.

Exercise helps curb obesity, preventing a plethora of health problems. Lieberman said, "The mechanisms by which too much fat, especially in and around organs, can ignite low-grade, chronic inflammation suggest that too much sitting may be hazardous simply because it causes weight gain."¹⁷ Not only does he help point out that any movement helps prevent obesity, but he vividly points out the danger.

Critical Evaluation

These authors write for the general public to understand. All three are professors in the field of science. There are tons of terms associated with the body and brain. However, when they use terms and acronyms, they are well explained. Take, for example, this passage from *Exercised*.

Although most fat is healthy, obesity can turn fat from friend into inflammatory foe. The biggest danger is when fat cells malfunction from overswelling. The body has a finite number of fat cells that expand like balloons. If we store normal amounts of fat, both subcutaneous and organ fat cells stay reasonably sized and harmless. However, when fat

15. Ratey and Hagerman, 10.

16. Lieberman, *Exercised*, 62.

17. Lieberman, 65.

cells grow too large, they distend and become dysfunctional like an overinflated garbage bag, attracting white blood cells that trigger inflammation.¹⁸

Notice how Lieberman took a complicated process, broke it down, and used illustrations to make it understandable.

Each author is knowledgeable on their subject. They know a lot about the body, exercise, and the mind. In *The Joy of Movement*, McGonigal said,

Areas of the brain that regulate the stress response, including the amygdala and prefrontal cortex, are rich in receptors for endocannabinoids. When endocannabinoid molecules lock into these receptors, they reduce anxiety and induce a state of contentment. Endocannabinoids also increase dopamine in the brain's reward system, which further fuels feelings of optimism.¹⁹

McGonigal demonstrates her knowledge of the various parts of the brain and how the chemicals interact. While describing these parts of the brain, she explains the result understandably—i.e., “reward system” and “optimism.”

They all make informed observations about people and how the body works and operates, especially with the brain.

Brain scans show that when we learn a new word, for example, the prefrontal cortex lights up with activity (as does the hippocampus and other pertinent areas, such as the auditory cortex). Once the circuit has been established by the firing of glutamate, and the word is learned, the prefrontal cortex goes dark. It has overseen the initial stages of the project, and now it can leave the responsibility to a team of capable employees while it moves on to new challenges. This is how we come to know things and how activities like riding a bike become second nature. Patterns of thinking and movement that are automatic get stored in the basal ganglia, cerebellum, and brain stem—primitive areas that until recently scientists thought related only to movement. Delegating fundamental knowledge and skills to these subconscious areas frees up the rest of the brain to continue adapting, a crucial arrangement. Imagine if we had to stop and think to process every thought and to remember how to perform every action. We'd collapse in a heap of exhaustion before we could pour our first cup of morning coffee.²⁰

18. Lieberman, 64.

19. McGonigal, *The Joy of Movement*, 23.

20. Ratey and Hagerman, *Spark*, 42.

As Ratey explains how exercise is essential for learning, he demonstrates his knowledge of the parts of the brain. He describes how different regions of the brain become active when learning. Surprisingly, some of these regions are activated more through exercise.

These sources—especially *The Joy of Movement* and *Exercised*—are modern and up-to-date, and science can become outdated; for the most part, these books are not. The copyright dates for both of these books are 2020 and 2019, respectively.²¹

However, these authors operate on the assumption of the theory of evolution. Several of the authors' conclusions result from evolution, and these assumptions are not helpful. In *Exercised*, Lieberman said,

Because we evolved from chimpanzee-like apes (more on this later), our early ancestors must have been relatively inactive as well. In fact, there are many lines of evidence to suggest that apes were specially selected to have unusually low levels of physical activity to help them thrive in the rain forest.²²

Lieberman points out that humans have low physical activity levels because they evolved from apes. The teaching of evolution is in stark contradiction to the creation account in Genesis 1, and God created all things in six days, and evolution takes away from the glory of God.²³

While all of three resources were helpful in the writing of this paper, there were a few weaknesses. McGonigal said that *The Joy of Movement* is “a love letter to exercise.”²⁴ Her literature is more informal and focuses on anecdotal evidence, neither proof nor solid evidence.

21. By the time you are reading this, some of the science—or all of it—could be out of date.

22. Lieberman, *Exercised*, 50.

23. You may be asking why I am complaining about the evolutionary teaching of this professor. Of course evolution is in this book. The author is a professor of human evolutionary biology and it is in the title of the book. However, this resource was beyond helpful because he makes several observations due to his background in biology and his access to resources.

24. This is a callback to the quote from Kelly McGonigal's quote from her website.

In addition, all three of these authors come from similar backgrounds, and they are professors at prestigious universities.

Conclusion

As I look to explore the role of exercise on mental and physical health, these three sources provide a framework to base everything on. Exercise improves the brain more than a person may realize, even from careful observation. Exercise is more critical in a person's life than I had even potentially considered and should be on a pastor's radar.

PART 1: EXERCISE

What is Exercise?

Before talking about the benefits exercise has, two terms need to be defined: physical activity and exercise. I will use these throughout the paper. Lieberman describes physical activity in this way: “**Physical activity** (noun): any bodily movement produced by skeletal muscles that expends energy.”²⁵ Lieberman defines exercise as, “**Exercise** (noun): voluntary physical activity that is planned, structured, repetitive, and undertaken to sustain or improve health and fitness.”²⁶ I broke exercise into two types: 1) aerobic and 2) resistance

Types of Exercise

Aerobic

Lieberman has an easy way to measure aerobic exercise. He says,

Regardless of how we measure it, aerobic exercise causes breathing that is fast and deep enough to make singing impossible but not hard enough to prevent conversing in normal sentences. Typical aerobic exercises include fast walking, jogging, cycling, or (ever since Jack LaLanne and Jane Fonda) working out at home in front of the TV.²⁷

Aerobic exercise is an activity that causes someone to be short on breath. It is this delicate balance where the exercise makes singing Handel’s Messiah difficult to impossible, but someone

25. Lieberman, *Exercised*, 4.

26. Lieberman, 4.

27. Lieberman, 261.

could talk about the cute dog video they just watched.²⁸ The quote above lists a few activities that fit into this category. Aerobic exercise is planned out so that breathing becomes somewhat labored and raises heart rate. Aerobic exercise includes 1) weight-bearing and 2) non-weight bearing. Or, it can be looked at by intensity. Aerobic exercise breaks down into high intensity or medium to low intensity.

Weight bearing

Weight-bearing aerobic exercise is just as it sounds, aerobic exercise that requires someone to hold up their own weight. Weight-bearing exercises have significant benefits for those that can perform them. Lieberman said about weight-bearing exercise, “Weight-bearing aerobic activities (alas, not swimming) stimulate bones to grow larger and denser when we are young and to repair themselves as we age, and they strengthen other connective tissues.”²⁹ This quote will be an important point later in the paper, but note the benefit of putting and bearing weight as someone exercises. Some specific activities that fit here include running, soccer, and basketball.

Non-weight bearing

Notice how Lieberman does not include swimming in the list of weight-bearing exercises. That is because workouts like swimming and biking are non-weight bearing. Because weight is not placed on the joints and bones, the benefits seen in weight-bearing aerobic exercise are not seen here.

28. Exercise can be a very effective way to spend some time with someone.

29. Lieberman, *Exercised*, 261.

High intensity

High-Intensity aerobic exercise will have less speaking because breathing is heavier. After all, it is more intense. However, it is done in shorter bursts. Lieberman says, “Short bursts of intense cardio elevate heart rate and oxygen consumption close to their upper limit, usually above 85 or 90 percent of maximum rate.”³⁰ High intensity pushes the upper bounds of heart rate, hence “high intensity.”

An example of this is HIIT. High-Intensity Interval Training is solely about exerting a few minutes of effort several times at high amounts. Lieberman defines HIIT by saying, “HIIT usually involves short bouts, anywhere from ten to sixty seconds, of maximum effort that leaves one breathless (but not dangerously so) interspersed with periods of rest.”³¹ HIIT is typically used to supplement low or medium-intensity aerobic exercise.

Low to medium intensity

Low to medium intensity fits more in the realm of being comfortable to talk, using complete sentences. This intensity is what Lieberman talks about when generally speaking about aerobic exercise. He said, “By convention, aerobic exercise elevates your pulse to between 50 and 70 percent of maximum (most people’s maximum heart rate is between 150 and 200 beats per minute depending on fitness and age).”³² One of the most accurate ways to measure effort is by heart rate, and this heart rate is a more comfortable range.

30. Lieberman, 262.

31. Lieberman, 262.

32. Lieberman, 260–1.

Resistance training

The second type of exercise is resistance training. The benefits of resistance training are different from aerobic exercise. In his section talking about resistance exercise, Lieberman said, “Some exercises involve using muscles against an opposing, heavy weight that resists their efforts to contract.”³³ One can practically consider resistance training to be weightlifting. There are three types of muscle movements in resistance training: 1) concentric, 2) isometric, and 3) eccentric contractions.

It bears repeating that when working against substantial loads, muscles can shorten (concentric contractions), but they are more stressed and grow larger and stronger in response to forceful contractions in which they stay the same length (isometric contractions) or stretch (eccentric contractions).³⁴

In resistance training, these muscles are put through stress, varying in the different contractions, to build stronger muscles. Concentric contractions are when the muscles shorten. Isometric contractions are when the muscles stay the same length. Eccentric contractions are when they extend.³⁵

These are a few core types of workouts. They each have their own benefits. It is valuable to do any type of exercise, whether it is aerobic or resistance training.

33. Lieberman, 263.

34. Lieberman, 263.

35. Lieberman, 263.

PART 2: MENTAL HEALTH

What is Mental Health?

There has been a rise in talking about mental health in our current culture with a greater awareness of depression and ADHD. What then is mental health or good mental health? Dr. Kohls, a licensed professional clinical counselor at Christian Family Solutions, gave a symposium paper on mental health at Wisconsin Lutheran Seminary. He spoke about what it means to have good mental health.

Control, or preferably influence, is about both the actions that we take toward goals and our response to our thoughts and feelings. Wellness is correlated to possessing a perception that what we do matters in the sense that we can influence our thoughts, feelings, and circumstances in constructive ways.³⁶

One way we can do this is through exercise. I will demonstrate how exercise increases helpful chemicals in the brain, it boosts beneficial changes in the body, and it promotes healthy sleep patterns.

Chemicals

Our brain is a wonderfully complex system of neurons, chemicals, and more. It is so complicated that no one fully understands or grasps how it works. Something that happens in the human brain is that chemicals bind to different receptors in the brain. Lieberman said,

Actually, natural selection did adopt this drug-pushing strategy by having our brains manufacture an impressive cocktail of mood-altering pharmaceuticals in response to physical activity. The four most important of these endogenous drugs are dopamine, serotonin, endorphins, and endocannabinoids.³⁷

6. 36. Benjamin S Kohls, "Emotional Wellness: Holistic Care for God's Workmanship," September 9, 2021,

These are the main chemicals that work in the brain, so these are the chemicals that I will be addressing as they relate to exercise and physical activity.

Dopamine

One of these chemicals—dopamine—is essential to reward the brain, and Lieberman pointed this out.

Dopamine. This molecule is the linchpin of the brain's reward system. It tells a region deep in the brain "do that again." Evolution thus geared our brains to produce dopamine in response to behaviors that increase our reproductive success including having sex, eating delicious food, and—surprise—doing physical activity.³⁸

God created the human body in intricate and beautiful ways. The brain is designed to reward certain behaviors, and Rately talks about that in his book, *SPARK*.

Exercise also boosts dopamine, which improves mood and feelings of wellness and jump-starts the attention system. Dopamine is all about motivation and attention. Studies have shown that chronic exercise increases dopamine storage in the brain and also triggers the production of enzymes that create dopamine receptors in the reward center of the brain, and this provides a feeling of satisfaction when we have accomplished something. If the demand is there, the dopamine genes get activated to produce more, and the overall effect is a more stable regulation of these pathways.³⁹

As someone exercises more and more, their receptors for dopamine increase, causing a person to be able to focus more and increase the feeling of satisfaction.

Serotonin

Serotonin is another chemical in the brain which is augmented with exercise. Lieberman added to the understanding of serotonin.

37. Lieberman, *Exercised*, 239.

38. Lieberman, 240.

39. Rately and Hagerman, *Spark*, 121–2.

This still mysterious neurotransmitter helps us feel pleasure and control impulses, but it also affects memory, sleep, and other functions. Our brains produce serotonin when we engage in beneficial behaviors like having physical contact with loved ones, taking care of infants, spending time outdoors in natural light, and, yes, exercising.⁴⁰

As earlier mentioned, the brain is so complex; there are still aspects being discovered. Lieberman notes that serotonin is one of those aspects which is still not fully understood. However, scientists have noticed some benefits of having increased serotonin levels, and one of those listed is “control impulses.” Exercise aids in fighting addiction. When the brain is flooded with this chemical, it has been shown that people are more easily able to resist those temptations.

Serotonin also aids in feeling pleasure, increases memory, and helps with sleep.⁴¹

Another benefit of serotonin is its relation to stress and the brain. Ratey talks about this.

You’ve probably heard of serotonin, and maybe you know that a lack of it is associated with depression, but even many psychiatrists I meet don’t know the rest. They don’t know that toxic levels of stress erode the connections between the billions of nerve cells in the brain or that chronic depression shrinks certain areas of the brain. And they don’t know that, conversely, exercise unleashes a cascade of neurochemicals and growth factors that can reverse this process, physically bolstering the brain’s infrastructure.⁴²

Chronic stress⁴³ and depression have destructive effects on the brain. Chronic stress erodes the brain. The brain is physically changed by these constant states of depression and stress.

Serotonin helps reverse this corrosion.

40. Lieberman, *Exercised*, 240.

41. I will talk about sleep and its relationship to exercise and mental health a bit later.

42. Ratey and Hagerman, *Spark*, 5.

43. The word “stress” gets used in a variety of ways. I used the term “chronic stress” to distinguish from the stresses of everyday living. Certain amounts of stress are helpful and even beneficial for the body and brain to help it improve and grow. Not all stress is corrosive. Ratey discusses this in his book. He says, “At the far end of the spectrum is what you know as being stressed out—a lonely place where issues that might ordinarily seem like challenges take on the proportions of insurmountable problems. Stay there too long, and we’re talking about chronic stress, which translates emotional strain into physical strain. This is where the ripple effects of the body’s stress response can lead to full-blown mental disorders such as anxiety and depression, as well as high blood pressure, heart problems, and cancer. Chronic stress can even tear at the architecture of the brain.” (Ratey and Hagerman, *SPARK*, 59).

Endorphins

When it comes to exercise, endorphins are the most mentioned chemicals in the brain.

Endorphins are associated with the good feelings that come from activity.

Endorphins are natural opioids that help us tolerate the discomfort of exertion. The body's own opioids are less strong than heroin, codeine, and morphine, but they too blunt pain and produce feelings of euphoria. Opioids allow us to go for a long hike or run without noticing our muscles are sore and our feet have blisters.⁴⁴

Endorphins are what make exercise more comfortable and help athletes complete fabulous feats.⁴⁵

Endocannabinoids

The effects of endocannabinoids are similar to the positive effects of cannabis.⁴⁶ McGonigal says this about the impact of these chemicals.

Endocannabinoids alleviate pain and boost mood, which fit Raichlen's requirements for rewarding physical labor. And many of the effects of cannabis are consistent with descriptions of exercise-induced highs, including the sudden disappearance of worries or stress, a reduction in pain, the slowing of time, and a heightening of the senses.⁴⁷

Where does chronic stress come from? Ratey addresses that question. He says, "Like most psychiatric issues, chronic stress results from the brain getting locked into the same pattern, typically one marked by pessimism, fear, and retreat." (Ratey and Hagerman, *SPARK*, 60). Chronic stress occurs when someone gets stuck in a cycle of negative thoughts. Notice the thoughts he mentions. "Pessimism, fear, and retreat." These negative thoughts circle around and around, causing a buildup of stress which negatively affects the person.

44. Lieberman, *Exercised*, 240.

45. For example, in 2015, I ran a 5,000 meter race where a blister formed on my foot, burst, and blistered again with four laps to go. I should not have been able to finish, but because of these chemicals rushing around, I completed the run.

46. I am not endorsing the use of cannabis—actually the opposite. Exercise gets the same benefits without any harm. Exercise is also legal in every state.

47. McGonigal, *The Joy of Movement*, 16.

“Exercise-induced high” is perhaps a term that is not used commonly. It is similar to when people talk about a “runner’s high.” After sustained aerobic exercise, these endocannabinoids are increased, causing euphoria. McGonigal explains this process.

Areas of the brain that regulate the stress response, including the amygdala and prefrontal cortex, are rich in receptors for endocannabinoids. When endocannabinoid molecules lock into these receptors, they reduce anxiety and induce a state of contentment. Endocannabinoids also increase dopamine in the brain’s reward system, which further fuels feelings of optimism. As runner Adharanand Finn observes, “It may only be chemicals shooting around in your brain, but after a long run everything seems right in the world.”⁴⁸

There is a greater sense of optimism when the brain has more endocannabinoids.

Neurologists used to attribute this feeling of euphoria to endorphins. However, it is the endocannabinoids. Lieberman said, “For years, endorphins were thought to cause the infamous runner’s high, but it is now evident that endocannabinoids—the body’s natural version of marijuana’s active ingredient—play a much greater role in this phenomenon.”⁴⁹ Physical activity dramatically affects a person’s attitude and mood.

Challenges with chemicals

I have presented exercise almost as an all-encompassing life-saver. I am not saying exercise will automatically make you a more positive person. But physical activity does help. And, to fully feel the benefits, one must consistently work out. Lieberman said,

Because we never evolved to be inactive and out of shape, the adaptations that make physical activity feel rewarding and become a habit develop only after the several months of effort it takes to improve fitness. Slowly and gradually, exercise switches from being a negative feedback loop in which discomfort and lack of reward inhibit us from exercising again to being a positive feedback loop in which exercise becomes satisfying.⁵⁰

48. McGonigal, 23.

49. Lieberman, *Exercised*, 241.

50. Lieberman, 242.

If someone is not in a regular fitness regime, these effects take a bit to kick in. These chemicals, which make exercise enjoyable, take the brain to become receptive and reactive. The brain is like a muscle, where it needs to be strengthened and exercised like all muscles.

Physical Changes to the Brain

This exercise of the brain occurs when we work out. As chronic stress and depression break down the brain, exercise builds it. Ratey said,

Exercise controls the emotional and physical feelings of stress, and it also works at the cellular level. But how can that be, if exercise itself is a form of stress? The brain activity caused by exercise generates molecular by-products that can damage cells, but under normal circumstances, repair mechanisms leave cells hardier for future challenges. Neurons get broken down and built up just like muscles—stressing them makes them more resilient. This is how exercise forces the body and mind to adapt.⁵¹

The brain is physically built up by exercise and strengthened, making the brain more resilient to stress and anything else that is corrosive to the brain.

Exercise improves the volume of the brain, but it also strengthens the brain cells. Ratey said,

Neuroscientists have just begun studying exercise's impact within brain cells—at the genes themselves. Even there, in the roots of our biology, they've found signs of the body's influence on the mind. It turns out that moving our muscles produces proteins that travel through the bloodstream and into the brain, where they play pivotal roles in the mechanisms of our highest thought processes.⁵²

When someone learns about the brain, it is so complicated and wonderful. As the brain is working, the cells within are strengthened and enhanced.

51. Ratey and Hagerman, *Spark*, 60.

52. Ratey and Hagerman, 5.

Sleep

How exercise improves sleep

Sleep and exercise have a strained relationship. If someone were to exercise before going to bed, it is monumentally more difficult to fall asleep. However, exercise is beneficial for sleep.

Lieberman talks about how exercise benefits sleep.

If you run a mile at top speed or lift heavy weights just before going to bed, you'll probably have a hard time falling asleep because vigorous physical activity turns on this system, stimulating arousal. In contrast, a good dose of physical activity earlier in the day like a game of soccer, an hour or two of gardening, or a long walk helps sleep come more easily. These activities increase sleep pressure, and they stimulate the body to counter the initial fight-and-flight response with a deeper "rest and digest" response (technically the parasympathetic nervous system). Among other benefits, recovery from exercise gradually lowers basal cortisol and epinephrine levels, depresses body temperature, and even helps re-sync the circadian clock. Although physical activity doesn't prevent or cure all sleep problems, a multitude of studies demonstrate that a single bout of exercise (but not immediately before bed) usually helps people sleep, and regular exercise is even better.⁵³

While it is not the best idea to do a hard workout right before going to bed, any physical activity helps put everything back in place for better rest at night.

The benefit of better sleep

Throughout the day, one person takes in tons of data. Everything that occurs throughout the day goes into the brain. The brain needs to figure out what to do with that information. One way it does this is through sleep. Lieberman comments on this.

One conspicuous benefit is cognitive: sleep helps us remember important things and helps synthesize and integrate them. It sounds like magic, but while we sleep, our brains file and then analyze information. I sometimes experience this phenomenon when I stay up late trying to comprehend complex information (like how sleep affects the brain).⁵⁴

53. Lieberman, *Exercised*, 89–0.

54. Lieberman, 78.

Sleep is when the brain analyzes and files all this information taken in throughout the day, and that is why sometimes it is helpful to sleep on a text study. The brain sorts what was learned by analyzing Greek and Hebrew, and the analysis that was done concerning context and commentary work.

The brain, throughout the day, creates tons of waste that it needs to remove. Lieberman comments further on this cleaning function.

The zillions of chemical reactions that make life possible inevitably create waste products known as metabolites, some highly reactive and damaging. Because the power-hungry brain uses one-fifth of the body's calories, it generates abundant and highly concentrated metabolites. Some of these garbagemolecules such as beta-amyloid clog up neurons. Others such as adenosine make us sleepy as they accumulate (and are counteracted by caffeine). Getting rid of these waste products, however, is a challenge. Whereas tissues like liver and muscle wash out metabolites directly into blood, the brain is tightly sealed off from the circulatory system by a blood-brain barrier that prevents blood from coming into direct contact with brain cells. To rid itself of waste, the brain evolved a novel plumbing system that relies on sleep. During NREM sleep, specialized cells throughout the brain expand the spaces between neurons by as much as 60 percent, allowing cerebrospinal fluid that bathes the brain to literally flush away this junk. These opened spaces also admit enzymes that repair damaged cells and rejuvenate receptors in the brain for neurotransmitters. The only catch, however, is that the brain's interstitial pathways are like single-lane bridges that let cars pass in only one direction at a time. Apparently, we cannot think while cleansing our brains. We thus must sleep to flush out the cobwebs left behind by the day's experiences.⁵⁵

Sleep is the only way that the brain can remove this filth. Cleaning this out means that a person can focus better on the tasks before them because their brain is not clogged.

Conclusion to sleep

Sleep and exercise are connected. Lieberman said,

It bears repeating that sleep and physical activity are inextricably linked: the more physically active we are, the better we sleep because physical activity builds up sleep

55. Lieberman, 78–9.

pressure and reduces chronic stress, hence insomnia. In that sense, physical activity and sleep are not trade-offs but collaborators. Maybe it is not so paradoxical that the same well-intentioned people who nag us to exercise sometimes also badger us to spend more time in bed.⁵⁶

Exercise is excellent for sleep. Sleep is necessary for us to function as people, especially as pastors. Sleep makes it easier to learn and clears the fog from the brain.

56. Lieberman, 92.

PART 3: PHYSICAL HEALTH

What is Physical Health?

There is a plethora of information that you can find on the internet. The stigma used to be that the skinnier, the healthier. With the advent and realization of mental health problems, society has pushed the cause that any body type is beneficial if it works for you. However, this deserves some pushback. Lieberman pointed this out.

If mismatches are caused by harmful interactions between genes and environments in which environments rather than genes recently changed, it's hard to find a bigger example than obesity. Although some of us carry genes that make us more likely to become obese, the role of environment is uncontested. Obesity is almost unknown among foraging populations and was much less common a few generations ago, but nearly two billion people are now overweight or obese.⁵⁷

This quote asks the classic “nature or nurture” question. Lieberman says it is both. Even if DNA is against a person, and they are more susceptible to problems similar to obesity, they are not entirely doomed. They can still be physically fit. The question then is, what is physical fitness. This is the definition for physical fitness from Human Kinetics: “Physical fitness refers to the ability of your body systems to work together efficiently to allow you to be healthy and perform activities of daily living.”⁵⁸ Positive physical health is if the different body systems—i.e., cardiovascular, immune, muscular—work properly. To see how exercise affects physical health,

57. Lieberman, 269.

58. “What Is Physical Fitness?,” Human Kinetics, accessed December 13, 2021, <https://us.humankinetics.com/blogs/excerpt/what-is-physical-fitness>.

This paper will look at a few of these systems. There is overlap because each system is connected.

Skeletal System

The skeletal system is the bones in our body. The bones are the body's framework; they hold us rigid. "Weight-bearing aerobic activities (alas, not swimming) stimulate bones to grow larger and denser when we are young and to repair themselves as we age, and they strengthen other connective tissues."⁵⁹ Not only is weight-bearing aerobic exercise important for children as they grow, but also for adults, as it strengthens bones and helps keep someone upright.

Muscular System

The muscular system is composed of the muscles in the body. Their job is to extend and contract so that we can move. It is vital to care for this system. There are monumental problems when someone's muscles do not get used. Lieberman emphasizes this point.

Last, and perhaps most important, prolonged sitting can kindle chronic inflammation by allowing muscles to remain persistently inactive. In addition to moving our bodies, muscles function as glands, synthesizing and releasing dozens of messenger proteins (termed myokines) with important roles. Among other jobs, myokines influence metabolism, circulation, and bones, and—you guessed it—they also help control inflammation.⁶⁰

A result of lack of exercise, from sitting too much, is inflammation. Have you ever noticed if you have sat for a long time, you might see that your legs stiffen? However, there is more going on there. Lieberman says,

The answer has recently become apparent thanks to new technologies that accurately measure minuscule quantities of the more than one thousand tiny proteins that cells pump

59. Lieberman, *Exercised*, 261.

60. Lieberman, 67.

into our bloodstreams. Several dozens of these proteins, termed cytokines (from the Greek cyto for “cell” and kine for “movement”), regulate inflammation. As scientists started to study when and how cytokines turn inflammation on and off, they discovered that some of the same cytokines that ignite short-lived, intense, and local inflammatory responses following an infection also stimulate lasting, barely detectable levels of inflammation throughout the body. Instead of blazing acutely in one spot for a few days or weeks, as when we fight a cold, inflammation can smolder imperceptibly in many parts of the body for months or years. In a way, chronic, low-grade inflammation is like having a never-ending cold so mild you never notice its existence. But the inflammation is nonetheless there, and mounting evidence indicates that this slow burn steadily and surreptitiously damages tissues in our arteries, muscles, liver, brain, and other organs.⁶¹

This inflammation is dangerous. Lieberman demonstrates how tissue in your body is damaged from long periods of sitting. Sitting too much is harmful. New literature has even gone so far as saying, “Sitting is the new smoking.” While this is perhaps an exaggeration, it portrays an important truth. As Levine says, “Sitting is more dangerous than smoking, kills more people than HIV, and is more treacherous than parachuting. We are sitting ourselves to death. How did no one notice?”⁶² While Levine writes to grab attention, sitting for long periods has terrible consequences.

The fact that sitting is harmful can be terrible news for a pastor because pastors sit for long periods. However, there is good news. Lieberman helps point to this good news.

Because the anti-inflammatory effects of physical activity are almost always larger and longer than the pro-inflammatory effects, and muscles make up about a third of the body, active muscles have potent anti-inflammatory effects. Even modest levels of physical activity dampen levels of chronic inflammation, including in obese people.⁶³

The muscles help flush the inflammation right out of the body when active. The inflammation and the damage it causes are preventable and treatable.

61. Lieberman, 63.

62. James A. Levine, *Get Up!: Why Your Chair Is Killing You and What You Can Do About It* (St. Martin's Press, 2014), 22.

63. Lieberman, *Exercised*, 67.

Using our muscular system not only keeps inflammation low, but it benefits the rest of the body.

Aerobic exercise additionally stimulates the growth and upkeep of just about every other system in the body. Within muscles, it increases the number of mitochondria, promotes the growth of muscle fibers, and increases their ability to store carbohydrates and burn fat.⁶⁴

When someone exercise, they stimulate their muscles to grow, which means they are more efficient at getting energy to the body.

Cardiovascular System

The cardiovascular system deals with the heart, blood, veins, and the like. The connection between aerobic exercise and the cardiovascular system has been noticed for quite some time.

Often, aerobic exercise is called “cardio.” Lieberman explains the name “cardio.”

Thousands of studies since 1968 have firmly established the many diverse benefits of aerobic exercise. We will consider their effects on diseases later, but to summarize quickly, the most obvious benefits are cardiovascular, hence the term “cardio.” Because the fundamental challenge of aerobic activity is to deliver more oxygen at a faster rate to muscles and other organs, this demand stimulates the chambers of the heart to grow stronger, more capacious, and more elastic. These adaptations in turn increase the heart’s cardiac output, the product of heart rate and the volume of blood pumped per contraction. In the blood, aerobic exercise augments the red blood cell count but also increases the volume of plasma, reducing viscosity so the heart can pump blood more easily. Sustained increased cardiac output also stimulates the expansion of the many small arteries and capillaries where oxygen exchange occurs in muscles everywhere including the heart’s muscle itself.⁶⁵

The heart is a muscle. Just like the rest of the body muscles, it can be worked and strengthened.

When the heart is strengthened, it has excellent benefits for the body. First, blood is delivered

64. Lieberman, 261. Inflammation is a reaction of the immune system. However, I did not want to focus on the negative, but the positive. This reaction is reversed by the muscles being engaged.

65. Lieberman, 261.

more efficiently throughout the body, and oxygen and nutrients are delivered to the body's cells to be strengthened and repaired more easily.

Second, the blood becomes less viscous when someone constantly participates in aerobic exercise. Less viscous means thinner, making it easier for the blood to travel to the body. Notice that the red blood cell count also goes up. Red blood cells are what carry oxygen to the body's cells.

Immune System

The immune system is our body's defense against disease. This system has caught the attention of people globally at this time.⁶⁶ The immune system fights infection, diseases, and anything unwanted in the body. Exercise helps to activate and boost this system. "In moderation, aerobic exercise stimulates the immune system, providing enhanced ability to ward off some infectious diseases."⁶⁷ Exercise supercharges the immune system to help you fight disease. So, during the height of flu season,⁶⁸ one of the best things to do is exercise.

There was an experiment done on mice to demonstrate this. What follows is the conclusion of their mice experiment. As a disclaimer, the quote is complicated and challenging to understand. Pay careful attention to their ending statement. They emphasize that mild exercise at early exposure to a harmful disease increased the survival rate in the mice.

While the mechanistic underpinnings of the differential dose response to exercise are difficult to reconcile, it may be that moderate exercise and prior training reduce immune-mediated damage without severely affecting immune effector functions. Strenuous exercise, on the other hand, may be of sufficient intensity to reduce effector functions allowing infectious disease progression. In support of this, we have found that moderate

66. At the writing of this paper in 2022, the effects of COVID-19 are still being felt.

67. Lieberman, *Exercised*, 261.

68. Or perhaps during a pandemic

exercise, when applied during the initial stages of a mounting immune response to influenza, causes a shift in the immune response away from a Th1 and toward a Th2 response without altering early anti-viral defences. This may be responsible for the increased survival rates in exercised mice because a strong Th1 response may lead to immune mediated pathology and death.⁶⁹

In the mice, they found that moderate exercise boosted their immune systems. They fought off this deadly influenza strain. It is interesting to note that too much exercise made them weak, but little to no exercise made it so they could not fight it off either. Lieberman talked about this experiment in his book.⁷⁰ Exercise can make all the difference when fighting off disease.

As I focus on the importance of exercise, there is danger to the opposite effect. A lack of exercise typically means an increased risk of obesity. A danger with obesity is that the immune system may begin attacking excess fat around organs, harming those organs. Lieberman demonstrates this point.

If we store normal amounts of fat, both subcutaneous and organ fat cells stay reasonably sized and harmless. However, when fat cells grow too large, they distend and become dysfunctional like an overinflated garbage bag, attracting white blood cells that trigger inflammation. All bloated fat cells are unhealthy, but swollen organ fat cells are generally more harmful than subcutaneous fat cells because they are more metabolically active and more directly connected to the body's blood supply. So when organ fat cells swell, they ooze into the bloodstream a great many proteins (cytokines) that incite inflammation. Telltale signs of excess organ fat are a paunch or an apple-shaped body. Disconcertingly, it is also possible to be "skinny fat" with significant deposits of organ fat in and around one's muscles, heart, and liver without necessarily having a potbelly figure.⁷¹

Excess fat may bloat and cause inflammation. Again, inflammation harms the organs, and exercise helps lower the amount of fat around the organs, preventing anything this uncomfortable from happening.

69. Thomas Lowder, David A Padgett, and Jeffrey A Woods, "Moderate Exercise Early After Influenza Virus Infection Reduces the Th1 Inflammatory Response in Lungs of Mice," n.d., 108.

70. Lieberman, *Exercised*, 257.

71. Lieberman, 64–65.

Respiratory System

The respiratory system deals with breathing, with the lungs. Breathing is everything when thinking about endurance. The *European Journal of Applied Physiology and Occupational Physiology* spoke about the respiratory system.

We have identified the respiratory system as an exercise limiting factor in normal sedentary subjects. Exercising at a constant submaximal intensity (64% $V_{O_{2, peak}}$), subjects increased their ventilation continuously until exhaustion in the respiratory untrained state. Respiratory training abolished this hyperventilation and prolonged cycle endurance by 50%. Therefore, the respiratory system should be considered when exercise limiting factors are discussed except in incremental exercise tests of rather short duration as for instance the determination of $V_{O_{2max}}$.⁷²

There are challenging ideas in this quote. $V_{O_{2max}}$ speaks about the volume of oxygen a person is able to use. A higher number is reflective of someone's aerobic ability.⁷³ Not only does breathing limit exercise, but a poor respiratory system can be a limiting factor in life in general. If the respiratory system is not taken care of, a person's entire life can be limited. Stairs, walking, and youth group events can become a struggle. All is not lost. Lung capacity may be increased through aerobic exercise.

As has been mentioned in this section, exercise is important for everyday living. We want glorify God with our bodies in all we do.⁷⁴ We want to focus on being able to let our light shines, to serve our people to the best of our abilities. When we do not care for our bodies, we limit the

72. Urs Boutellier and Paul Piwko, "The Respiratory System as an Exercise Limiting Factor in Normal Sedentary Subjects," *European Journal of Applied Physiology and Occupational Physiology* 64, no. 2 (1992): 151, <https://doi.org/10.1007/BF00717952>.

73. The measurement $V_{O_{2max}}$ is a number often used by runners and bikers as one measure of the shape they are in. This measurement can be useful for anyone in general to know so they understand their aerobic capabilities.

74. This is an allusion to 1 Corinthians 6:20: "for you were bought at a price. So glorify God with your body." As was mentioned earlier, this section is about fleeing from sexual immorality. However, the conclusion is true for every aspect of our life. Christ purchased and won us at a price. We live for him.

chances we have to do this. Lack of exercise harms every body system. When we care for our bodies, God willing, we are able to go evangelizing with our members door to door, play basketball with our youth group, and serve our members with the means of grace.

CONCLUSION

“I believe in God the Father the Almighty, maker of heaven and earth.” Bodily care is a biblical concept. He created humans with bodies and souls, and he made each wonderfully. Like any creation of God, we wish to take care of it. Pastors demonstrate this through their words and actions. A way to take care of the body is through exercise.

Exercise is voluntary and planned movement. This movement is essential as it, first, boosts mental health. Exercise produces four chemicals: dopamine, serotonin, endorphins, and endocannabinoids.⁷⁵ These boost mood, improve concentration, increase energy, and help alleviate pain. Physical movement improves sleep to clear filth from the brain for better attention. Sleep also sorts and files the information learned throughout the day. Exercise strengthens the brain to be more resilient to stress and harm.

Exercise is also beneficial for physical health. Exercise strengthens bones, muscles, and the heart. Muscle movement helps clear chronic inflammation. Exercise burns organ fat, protecting the organs. And exercise improves endurance for the day.

How has this thesis added to knowledge about the subject?

Any pastor would admit that exercise is good for you. However, most probably could not give solid reasons why. This thesis demonstrates the benefit of exercise for anybody’s mental and physical health. But all of these general examples apply to the ministry—better mood, energy,

75. This is not an exhaustive list, but I just focus on these four.

and less pain all help when conveying God's Word. The troubles and trials faced by the ministry become more manageable when a pastor has control over his emotions.

Better sleep comes from exercising early- or mid-day. This sleep makes it possible to clear the filth from the brain of everyday living, and this makes decision-making easier because it makes it possible to focus as the brain's pathways are clear.

Sleep also files and sorts the information from the day. Sleeping on a tough counseling session to help you realize something that you missed. Or sleep may help you understand what you learned in a text study so that you can properly apply God's Word to his people.

There are many stresses in the ministry. Counseling brings many complex emotions and challenges to sort through. It takes a lot of time to make sure that one is well prepared to teach and preach. Care and concern for people are emotionally draining, especially at the bedside of loved ones about to see their Lord or at funerals. Exercise strengthens the brain to be resilient to the harm that stress brings.

Exercise strengthens bones, muscles, and the heart, which improves the quality of life. It is hard to serve God's people, and it is hard to effectively serve people when a minister of the gospel is sidelined with weak breathing or heart disease.

The muscles work to reduce inflammation in the body, making it possible to serve the greater community easier. It is much more difficult to focus on building relationships and sharing the gospel with the community if your own body is attacking itself.

Exercise boosts endurance. Lungs are strengthened, giving the person who exercises the ability to keep up with a school, parishioners, a family, and any other responsibilities that a pastor may have.

Points for further study

There is so much to cover when speaking about exercise that I could not possibly cover everything. One point of interest that I wished to explore is the connection between exercise and spiritual health. What connection is there, if one at all? Another fascinating study would be the effects of sleep on ministry. There is much more to talk about sleep, and it would be interesting to see how other sleep areas affect the ministry. I did not touch nutrition at all. How does a pastor talk about nutrition? What Biblical premise does a pastor have to speak specifically about nutrition?

A large topic to talk about in the realm of exercise is scheduling. How does a pastor schedule time to work on his physical, spiritual, and mental health while balancing his duties as a pastor, husband, son, friend, and other vocations? Tons can be explored in speaking about balance.

Shortcomings

Unfortunately, this thesis is not perfect. There are some blatant shortcomings—science changes. Scientists find new research that overturns old data. It is not Scripture. What was discovered now may be obsolete in the next couple of years.

I do not speak a lot about theology. I examine the First Article in my introduction and its implication on the treatment of the body God gives us, and I attempt to make it practical at the end. However, the body is straight science.

Exercise here comes across as a panacea, and that is an exaggeration. For good physical health, many things must work together, and one must put together sleep, solid nutrition, hygiene, exercise, and more.

The resources are limited, and I have little knowledge about the science of the brain and the body. There is only so much that this author understands.

There is a multitude of resources on exercise. I chose to focus on a few, but there has been lots of research done on the topic. Research continues today.

I enjoyed Lieberman's book but relied on it too much. He did good work and provided many helpful thoughts. However, I looked to him more than any other source.

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