Introduction.

If humans can agree on anything, it is that being a human is actually quite difficult. Whether it be from a scientific or lifestyle aspect, human existence can be rather cumbersome. From a societal standpoint, there are so many rules and regulations to living everyday life: an endless number of things that could get you arrested, needing to work for a living, global warming, and the constant pressure to maintain some kind of lifestyle. When one leaves their house, there are so many statistical things that could go wrong in a day that could get you killed. To make matters worse, think about things that all humans inevitably have to go through that are just a massive disaster: puberty, taxes, hangovers, and stomaching the existence of President Donald J. Trump.

From a scientific aspect, the human body is actually quite vulnerable. Humans can easily be subject to parasitic infections, disease, or even cellular damage just from being out in the Sun too long. If someone remains in unideal physiological conditions, they run the risk of their body internally shutting down. Everywhere a human goes, there is something that they could be exposed to that would, inevitably, cause them some kind of harm. One wrong move could find yourself in the hospital for an injury. A human has to watch what they consume and what activities they participate in as an effort to keep their body healthy. And on top of that, there is the chance of cancer, being infected by a parasite, an STD, cold/flu, etc. These are just physiological means of maintaining the body. Take into consideration what it means to live in a structured society and government where to live healthily, you have to be able to make money to thrive. Also take into consideration the struggle it is for humans with regards to psychology and their mental health.

Long story short, there is not really a sense of simplicity when it comes to being a *Homo sapien*. What many may not realize is the fact that with human life being a difficult entity to

navigate, much of the medical, sociological, and economical aspects of living actually go hand-in-hand. In fact, one of the primary gaps in modern medicine is the conflict behind doctors only treating patients utilizing a medicalized mindset, thus dehumanizing their experiences outside of the confines of a hospital. Take stress for example - a common theme in the United States is a person being financially inadequate, thus creating stress to pay bills, provide for a family, etc. This stress can become chronic, which can lead to higher blood pressure and, overtime, could lead to atherosclerosis. This is a prime example of how two aspects of human life - financial and physiological - coincide to become detrimental to a person.

In life, one is bound to hear the phrase, “Like a well-oiled machine,” when it comes to someone with a healthy physique. However unlike machines - which require applied, constant tinkering, adjusting, and repair to remain functional - the human body tries to take care of itself. Unlike cars requiring oil changes every set of predesignated miles to remain functional, human physiology is capable of self-adjusting to maintain homeostasis and optimal performance to a degree. Peristalsis, alone, is an exciting physiological process to consider. Imagine eating a meal, and then having to consciously make your intestines move the meal along to absorb the nutrients. Additionally, imagine how difficult it would be to have to make your heart beat while also remembering to breathe. While this may exclude those with chronic illnesses needing medication/therapy, it is still important to recognize the feat of the human body to maintain homeostasis. The focus of this paper, however, is what can be considered somewhat of an anomaly of the human body - anxiety.

What is Anxiety?

Anxiety is the human body’s natural reaction to stress (Holland 2019). Essentially, anxiety can also be recognized as both the body and brain’s reaction to stressors, fear, and

anything that brings about a level of apprehension for what is about to come. To some degree, virtually every human being has experienced some level of an anxious feeling in their lifetime. Whether it be waiting for a job interview, asking someone out on a date, or even meeting someone new for the first time, there is bound to be at least one common situation among everyone where they have felt as if their heart was going to explode out of their chests. Anxiety is actually a normal everyday experience, it would be odder if someone had never experienced anxiety (Mayo Clinic). Common symptoms of anxiety include: feeling nervous, hyperventilation, sweating, rapid heart beat, and difficulty controlling one's worry (Mayo Clinic). Also, anxiety does not necessarily provide any physiological benefits to the human body. In fact, it can be something quite detrimental if chronic or left festering.

A prime reason why anxiety can be considered an anomaly of the human body is the fact that there is not necessarily a defined mechanism for its occurrence. In fact, the origins of anxiety are still somewhat unknown in medicine, but the most popular hypothesis is that it is due to a combination of one's brain chemistry in coordination with genetics and environment (Holland 2019). Additionally, the levels of anxiety that everyone experiences are different in both trigger and magnitude (NAMI). This can be attributed to the fact that anxiety is not solely a physiological condition but also a psychological and sociological one as well. A hallmark theme of anxiety is the feeling of impending doom looming (NAMI). It is almost as if your body and brain are in a chronic state of fear or nervousness. Even though these feelings are common when it comes to anticipating or being afraid of something, where anxiety separates itself from generalized fear is its almost irrational nature (Craske et al. 2011).

Physiology of Anxiety.

Being as anxiety stems as a reaction to stress it can be hypothesized that to have a broad understanding of the probable mechanism of anxiety, it would be helpful to understand the stress response of the human body. Essentially, the physiological stress response can be summed up as the “fight or flight response” (Shaw 2018). The fight or flight response is characterized by a cascade of hormones that elicit specific physiological responses allowing the human body to tackle a specific situation (Harvard 2018). The part of the body responsible for this activity is the autonomic nervous system (Shaw 2018). More specifically, the autonomic nervous system is separated into two divisions, and depending on which division is activated determines if the fight or flight response is triggered (Shaw 2018). Both divisions of the autonomic nervous system act on smooth muscle, cardiac muscle, and glands albeit in opposing manners. These two divisions are the sympathetic nervous system and the parasympathetic nervous system.

When a person is not stressed and feels safe, the parasympathetic nervous system is active signaling the “rest or digest” response. The way this works physiologically is through a two neuron chain consisting of a preganglionic fiber originating in the central nervous system and a postganglionic fiber which innervates tissue (Shaw 2018). When a parasympathetic nervous system response is triggered, acetylcholine is sent from the central nervous system and down the preganglionic neuron which binds to a nicotinic receptor on the postganglionic neuron; thus signaling the nicotinic receptor to release acetylcholine which will bind to muscarinic receptors on effector tissue (Shaw 2018). The main takeaway here is that this hormonal cascade causes smooth muscle in the human body to slow down and relax. This is, essentially, the time for the human body to perform its maintenance. For example, this is when the digestive system is in full swing. Additionally, the bronchioles are constricted because there is not a need for the

body to take in large amounts of air. Also, heart rate and force of heart contraction decreases. Think of this like the body's time to chill out.

The sympathetic nervous system, on the other hand, is triggered when a stressor is presented thus leading to the fight or flight response (Shaw 2018). What happens with the fight or flight response is in its name: a hormonal cascade which triggers physiological responses that prepare the body to either fight or take flight (run away). Imagine if you were walking down the street, and a bear jumped out at you. This would, naturally, incur a significant level of stress in your body.The ensuing cascade would be somewhat similar to the parasympathetic nervous system. When presented with the stressor, the sympathetic nervous system follows the same initial scheme as the parasympathetic nervous system with regards to the preganglionic neuron and the nicotinic receptor on the postganglionic neuron. The difference here lies in what the nicotinic receptor releases down the postganglionic neuron after being activated by acetylcholine. Rather than sending down another round of acetylcholine, the nicotinic receptor of a sympathetic postganglionic neuron releases epinephrine and norepinephrine which then binds to alpha and beta receptors on the effector tissue (Shaw 2018). The important takeaway here is that this specific hormonal chain response prepares the body for strenuous physical activity. These preparations include decreasing motility of the digestive tract, increased heart contractility, and dilation of the bronchioles. This makes sense because one would not want to have to defecate during a fight or chase with a bear. Additionally in a highly strenuous situation, one would like as much oxygen and blood as possible to supply their muscles, etc.

While understanding anxiety as a reaction to stress acts as a means to truly understand the physiology of the phenomena itself, it is important to note that much of this understanding is not yet fully understood. Research surrounding the physiological mechanism of anxiety is still

relatively young (Harvard 2018). Although much of anxiety is synonymous with a stress reaction in the body, it is not fully accurate to assume that this is governed by the sympathetic nervous system. As mentioned before, the sympathetic nervous system governs your body's ability to physiologically prepare itself to handle a stressor. Assuming ideal conditions, this would imply that your body would not put itself in a position to be jeopardized. With anxiety, though, that is not necessarily the case. In fact anxiety can cause unfavorable, debilitating physical responses that would certainly get you caught by a bear.

As previously mentioned, everyone experiences some form of anxiety in moments throughout their life. It is almost amazing how fast it can occur and sneak up on you. The aforementioned physiological mechanism for the stress response is something that happens to all humans every second of the day. Like peristalsis, there is no need to manually trigger a response. The anomaly-like feature of anxiety, though, is how it affects everyone in various magnitudes.

What Causes Anxiety?

Thus far, the true nature of anxiety has been defined as a response to stress. It is important to note, though, that with heightened levels of anxiety - like a disorder or an anxiety attack - that the mechanism can be defined as the fight or flight response on overdrive. The interesting thing about diagnosing the causes of one's anxiety is that the cause is never purely physical or mental like a physical or psychological issue, respectively. In a medical context, anxiety can be seen as a link to some type of underlying health issue (Mayo Clinic 2018). Common underlying health issues include heart disease, thyroid issues, upper respiratory issues, gastrointestinal issues, diabetes, and even injuries that manifest as chronic pain. The common theme among these health issues is the chronic, physical stress that is subjected to one's body should they be suffering from one of the listed ailments. It is also important to note the

psychological toll on having to live with a chronic medical issue that can cause psychological stress. This, in turn, can trigger high levels of anxiety that can become chronic or a disorder.

Neurologically, anxiety can also be caused by hormonal changes. Diseases, conditions, or medications that cause drastic levels in body hormone composition can alter one's brain chemistry leading to heightened levels of anxiety. An example here is birth control - studies have shown that some women have developed severe anxiety and even panic disorders due to the hormonal shifts caused by their birth control (Ushiroyama 1992). That being said, another primary cause of anxiety can be attributed to one's brain chemistry. While genetic factors play a large role in one's brain chemistry, research has shown that brain chemistry can also be altered due to stress, trauma, illicit substances, and even diet (Mayo Clinic 2018). With this in mind, genetics is also suggested to play a role in causing an anxiety disorder. Research has indicated that having family members with an anxiety disorder makes an offspring more likely to inherit it (Stein 2008). This would imply that there is a possibility that anxiety can be inherited genetically. With this in mind, medical professionals have also indicated that with the trend of heritable anxiety and brain chemistry that there tends to be a strong trend of comorbidity between anxiety and other mental health conditions.

It is important to note here that the medical and psychological context of why anxiety occurs is not completely understood to the extent that depression or a heart attack is. However something not completely relayed by medical professionals or scientific researchers is the fact that life plays a large role in someone being diagnosed with an anxiety disorder. For example, many medical articles do not cite a child's home life for why they may be suffering from an anxiety disorder. This can be especially true for children of parents with anxiety disorders as children tend to adapt to their parents' behaviors. Additionally, it is not always noted in medical

texts how one's environment can play a much larger role in brain chemistry than their physiological condition. For example, some medical professionals cite drug/alcohol abuse as causes of anxiety disorder and state that removal of such substances would aid in prevention. However, what is not taken into account is the context by which the drug/alcohol abuse is taking place. Therefore, it should be implied that there is also a strong environmental and psychological relationship to anxiety development that is separate from a medical context.

The same principle applies to the stress felt by societal pressures. There is a lot of research focused on direct correlations between triggers and anxiety disorders, but a more important correlation may be between poor mental health and the proliferation of an anxiety disorder from this. There is strong research suggesting that societal pressures - economical, social, etc. - can greatly affect one's mental health in a detrimental manner (Abebe 2017). Especially in today's society, there is so much pressure to not only be a productive member of society - but to also be accepted. Abebe notes how economic and political pressures are at an all-time high causing widespread chronic stress across the United States (2017). This chronic stress can easily manifest itself as anxiety under certain circumstances of high pressure. This trend is especially true for many African Americans who experience goal-driven stress in society (Sellers and Neighbors 2008). This is especially notable as the social pressure to be financially successful. This can facilitate crippling stress that is detrimental to your mental health (Abebe 2017). Research has also indicated that living as a minority in America can facilitate the same detrimental mental health due to racial oppression (Abdullah and Graham). These are prime examples of how society can play such a strong role in the manifestation of anxiety and disorders.

Anxiety Disorders.

While anxiety is a common occurrence, it afflicts many people in a magnitude of greater proportions; thus classifying it as a disorder. In a sense, everyday anxiety is like sadness - everyone feels it at some point. With sadness, though, if it persists and affects one's daily life in a negative manner it becomes depression. The same principle applies to anxiety. For many, anxiety affects them so much to the point that it becomes a chronic health issue - both mental and physical. Physically, the health implications of chronic anxiety mirror the implications of living under a chronic state of stress. These health implications include high blood pressure, heart disease, chronic headaches, gastrointestinal issues, etc. The true pathology anxiety lies in its psychological effects and how negatively it can affect day-to-day life, thus classifying it as a disorder.

More than 18 percent of Americans suffer from some type of anxiety disorder (NAMI). The most common types of anxiety disorders are as follows: panic disorder, generalized anxiety disorder (GAD), phobias, obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), and social anxiety disorder (DHHS 2015). A panic disorder is probably the most violent and acute of the anxiety disorders. This specific disorder can sometimes be confused with a heart attack due to its violent nature. The main facet of a panic disorder is the sudden, acute feeling of terror (NAMI). With panic disorder, the person often suffers from chronic panic attacks when under high stress or pressure. In worse cases, a panic attack can set in even without some form of trigger. When a panic attack sets in, a person is subject to intense fear accompanied by physical symptoms of chest palpitations, hyperventilation, and dizziness (NAMI). In very severe cases, a person can pass out from a panic attack.

Phobias are an intriguing type of anxiety disorder centered around intense fear for a particular trigger. This type also forwards the thought of anxiety as an anomaly due to the nature

of a phobia. While some people who suffer from a phobia have a legitimate reason for affliction - possibly due to trauma - there are others who have no true reason to be afraid of a particular trigger. Additionally, a key way to separate phobia from generalized fear is when the individual is irrationally afraid of something to the point of taking extreme efforts just to avoid being triggered (NAMI). Panic disorders are similar to social anxiety disorder in this sense. With social anxiety disorder, though, there are levels to it. The hallmark of social anxiety disorder is the overwhelming fear of social humiliation or inability to fit in (NAMI). In fact people who suffer from social anxiety disorder often cite a crippling fear of societal rejection, or even worse, that the public will pick them out to make a mockery of them (Hoffman and Otto 2017). Interestingly, social anxiety disorder was once thought of as just intense shyness before becoming officially diagnosed as an anxiety disorder (Stein 2008). In a sense, social anxiety disorder can almost be described as a phobia of being social.

GAD is considered to be the most common form of anxiety disorder that afflicts people across the country. GAD is characterized by excessive, chronic worrying to irrational levels despite having no reason to be triggered (DHHS 2015). Studies by Craske et al. have indicated self-reports from participants citing numerous occasions where feelings of apprehension and anticipation were felt to an unnatural degree with no rational context (2011). For example, there was one self-report that indicated her anxiety spiked when ordering fast food from the drive-thru rather than going inside the restaurant in-person (Craske et al. 2011). This provides an intriguing, yet accurate depiction of how high levels of anxiety can lead to interesting thought processes in people. With this self-report, for example, the participant noted that she suffered from no form of psychological social fear or disorder preventing her from interaction in a public setting (Craske et al., 2011). However there was an immense feeling of fear and failure when ordering through

the drive-thru because the participant had convinced herself that her voice may come off as "stuck-up" when ordering causing the workers to intentionally make her order incorrectly (Craske et al., 2011). The participant's logic here seemed to be that ordering in-person allowed the cashier the opportunity to see her face, and assuming the face was kind it would let the entire fast food establishment understand that she was not a "stuck-up" person. The conclusion here is that her face would make up for the interpretation of her voice equating out to a meal ordered and made correctly with no hassle. This case shows how anxiety separates itself from a general feeling of fear. Antisocial perception and behavior is quite common in the United States. Due to the woman's anxiety, however, she was able to manifest an unlikely situation in her head causing her to feel immense apprehension about ordering through the drive-thru - something that is commonly done by millions of Americans at thousands of restaurants across the nation.

OCD is another interesting anxiety disorder that is characterized by literal obsessive thoughts and actions that are recurrent and routine (DHHS 2015). What makes these recurrent actions interesting is the fact that they are almost ritual in nature. This is defined as a disorder because someone with OCD seemingly cannot control the urge to repetitively do the action (NIMH). In fact, a person with one of these recurrent actions must perform it to find some brief form of solace, otherwise their anxiety is markedly heightened. Although someone with OCD may not have a ritualistic action, another key facet is the obsessive thoughts. These thoughts can dominate one's mind, actions, and outlook on life (NIMH). What characterizes these thoughts is how recurrent they are and how it is almost impossible to not have the thought cross one's mind. The thoughts are, in turn, jarring and effectively heighten anxiety. Additionally, a key factor of OCD is how acting on these recurrent thoughts or avoiding things that trigger obsessive thoughts

does not bring about some form of pleasure, rather only comfort the anxiety momentarily (NIMH).

Some suffering from OCD have noted that living with the disorder is crippling (Satya et al.). Some of the most common themes of OCD are: fear of germs, excessive cleaning, handwashing, needing everything in perfect order at all times, constantly having to check if something is on/off, etc. In some cases, OCD can coincide with a phobia if the compulsion is fear-driven. In other cases, OCD can actually drive a phobia. One participant in a study on OCD reported how she became fixated on germs and handwashing that everytime she got home she had to wash her hands a certain amount of times at a certain temperature for a certain period of time (Satya et al.). She went on to note that at one point she was unable to wash her hands for the full amount of needed time and went on to have a panic attack causing her to pass out. Another individual reported that once they had a panic attack because of dishes that were not arranged in a specific color scheme (Satya et al.). These cases illustrate the extremities by which OCD can go to.

What many people may not know is that PTSD is actually a form of anxiety disorder. PTSD generally separates itself from other anxiety disorders due to its core cause. Unlike many other forms of anxiety disorder that stem from irrational standards, PTSD is a product of a traumatic event - usually centered around violence or injury and is always terrifying (NIMH). PTSD can almost be considered the most scarring of the anxiety disorders. When someone goes through a traumatic event that manifests itself as PTSD, moving forward with life thereafter can become excruciatingly difficult regardless of the magnitude of PTSD. What really separates PTSD from general trauma (as everyone is bound to experience trauma in their life), is how it heavily it manifests later on, preventing the person from adequately moving on in life. Someone

with PTSD may experience recurrent nightmares, recurrent memories of the event that manifest as panic attacks, and recurrerent, severe emotional turmoil when reminded of the event. In extreme cases, a person may become severely depressed, emotionally detached, become more aggressive, and even become suicidal. PTSD is interesting in the sense that you do not just remember the event, it is almost as if your brain is actually scarred and you relive the experience (NIMH). The common trend of events that subject people to PTSD include: brutal combat (war), sexual violence, explosions, childhood abuse, physical abuse, etc. (Mayo Clinic 2018). A classic presentation of PTSD is a soldier who relives the trauma of war when hearing a boom of some kind. Medical professionals are unsure of how and why PTSD manifests itself in such a strong manner, but what is understood is the turmoil a person can experience should their PTSD be severe (Mayo Clinic 2018).

Anxiety can manifest itself in a multitude of ways. However despite various types of anxiety disorders, they are not mutually exclusive. As touched on before, many anxiety disorders coincide with one another. Anxiety disorders, also, trend towards being comorbid with other lanes of mental illness. And while much of anxiety research is geared towards the brain, it could be more conducive to also conduct research on how lifestyle affects mental health and anxiety.

How is Anxiety Treated?

What makes anxiety disorders a bit of an anomaly to treat is the fact that its mechanism is not completely understood, and that there is so much more to treat than just the medical aspect in most cases. Another facet of anxiety and its related disorders is that there are more than a plethora of ways to treat anxiety. Unlike other physical conditions - and even psychological - there is no sole way to treat anxiety. The two most common ways of treating anxiety are through therapy and medication.

The most renowned type of therapy for anxiety is cognitive behavior therapy. With cognitive behavior therapy, patients meet with a therapist/psychologist on a regular basis. In sessions, therapists focus on teaching patients coping mechanisms to help them through anxiety attacks and bad days. Additionally, patients are to talk things out through an intake, sometimes a journal, and learn about adaptive ways of thinking to get themselves through an episode (ADAA). Cognitive behavior therapy is centered around adaptive behavior to be able to view one's anxiety in a more productive way.

Cognitive behavior therapy is typically accomodated with some form of medications. The most common medications for anxiety disorders are anxiolytics and antidepressants. A popular antidepressant used is a selective serotonin reuptake inhibitor, or SSRI (Shaw 2018). The main mechanism of an SSRI is prohibiting the reabsorption of serotonin after it is released from a presynaptic nerve ending into the synapse (Shaw 2018). The longer serotonin stays in the synapse, the longer it can be used by postsynaptic nerve endings. While antidepressants are indicated primarily for depressive disorders, they are prescribed off label to treat various anxiety disorders. The specific purpose of anxiolytics is in its name: lysis of anxiety. The most common type of anxiolytic used to treat anxiety disorders are benzodiazepines. The way these work is by being somewhat of a brain sedative. As one could imagine, when anxiety is at a high it is as if the brain is in overdrive. Benzodiazepines work to slow/calm down the brain. The mechanism of action of benzodiazepines is by increasing the activity and effect of GABA, essentially the tranquilizing neurotransmitter of the brain (Shaw 2018).

Another way to treat anxiety is through natural means, mainly by lifestyle changes. This includes getting enough sleep, staying hydrated, avoiding alcohol and caffeine, exercise, and adjustments to one's diet. Essentially healthy lifestyle changes have been proven to aid anxiety

symptoms (Naidoo 2019). The main reason living a healthy lifestyle aids anxiety is due to the simple fact that a healthy body generally equates to a healthy brain. However this is merely a generality due to the fact that even physically fit individuals suffer from anxiety disorders (Naidoo 2019). Living a healthy lifestyle, though, can be helpful since having a healthy body reduces the risk of physiological stress that can manifest anxiety symptoms. Another facet of living a healthy lifestyle is that, generally, having a healthy body incites a level of body positivity. This body positivity, in turn, has the potential to increase one's self confidence and mindset - something that is heavily emphasized in therapy (ADAA). It is important to note, however, that living a healthy lifestyle only plays a small part in aiding symptoms and cannot truly help in high-level cases.

A final, truly interesting form of treatment for some anxiety disorders is actually through animals - specifically emotional support animals and service animals. Emotional support animals (ESAs) differ from service animals in that ESAs do not have any formal training like service animals do (Gibeault 2019). Additionally, ESAs can range from dogs to ducks to insects whereas service animals are generally restricted to dogs (Gibeault 2019). While there is no true physiology as to why an ESA can relieve anxiety or even soothe a panic attack, but what is known is that there is solace to be found in these animals for many people who suffer from anxiety. In fact, ESAs have special clearance to go on flights and even live in college dorms where pets are usually restricted (Gibeault 2019). ESAs have been found to serve as a distraction for people when an anxiety attack occurs, however more intriguing is how a person is able to calm down from making physical contact with their animal. While there is no conclusive research on how ESAs affect brain chemistry, the manner in which they cause a person to calm

down begs to ask the question of if there is a possibility that ESAs can affect GABA or serotonin levels.

Service dogs are a feat of amazement. These dogs are specifically trained to be alert to triggers of panic attacks, etc. of their owner and are trained to perform certain actions to ease their anxiety. Specifically, service dogs are especially used with military veterans and those who suffer from crippling anxiety that prevents them from participating in society (Gibeault 2019). With military veterans suffering from PTSD, service dogs are trained to watch for panic attacks. In many cases should an attack be onset, the dog knows to behave a certain way - whether it be licking their owner, leaning on them to be pet for comfort, or even to lay on top of them. For those with a panic disorder, service dogs are trained to know when a panic attack is coming and ensure their owner is in a safe space to have the attack. Additionally with an anxiety disorder that is physically debilitating, the dog is trained to walk on a leash a certain way that helps their owners stay upright when walking. Regardless of the training, it is truly a remarkable feat that a dog can be taught to help a person with a psychological disorder.

***Toxoplasma gondii* - An Interesting Correlation with Anxiety**

An interesting point of contention that deserves more attention is the possibility that there is a linkage between parasites and anxiety disorders. Especially since there is no defined mechanism for the development of many anxiety disorders, it would make the prospect that a parasite can cause anxiety that much more intriguing. Additionally, understanding the mechanism by which a parasite can cause the development of an anxiety disorder could further expand physiological understanding on how anxiety manifests itself in the body. While there is no conclusive data on parasites causing anxiety to proliferate, there is one study that has found a possible association with generalized anxiety disorder - *Toxoplasma gondii*.

On its own, *Toxoplasma gondii* is a very intriguing cat parasite. In short, the parasite can cause pathology during embryonic development of a fetus if a pregnant woman is infected (Bolek 2019). Specifically, the parasite can be transmitted through the placenta and cause congenital neurological defects in the infant (Bolek 2019). Even more interesting, when *Toxoplasma gondii* infects a rat, the parasite causes a neurological shift in the rat, making it unafraid of cats. This, in turn, makes it much easier for the cat to eat the rat thus completing the parasitic life cycle. For Markovitz et al. it was this parasitic relationship that sparked the study on *T. gondii* and its relationship with three mental disorders: generalized anxiety disorder, PTSD, and depression (2015). With 484 participants from Detroit, Michigan, the study found a strong and significant association between *T. gondii* infection and generalized anxiety disorder (Markovitz et al. 2015). The researchers noted that more studies needed to be done to truly confirm that infection played a role in the development of generalized anxiety disorder but that the strong association was there.

A Personal Anecdote.

As a college student, having anxiety is kind of a given. While I will say college has been the best time of my life, I must admit that I can understand the stigma about college sucking away the will to live for many students. Especially growing up in the age of social media, millennials, and the importance of image, I can fully vouch for the undeniable societal pressure that young people feel nowadays. Something that I have noticed throughout my time in college is how there seems to be a running theme with most students my age of needing to please everyone else rather than themselves. Whether it be eating a meal, having a night out with friends, or even an intimate moment with a loved one - with the generation of students I go to school with, it always seems that if the moment is not documented, then it has been wasted. This trend has only

grown to see our society dominated by the number of likes you receive on a platform to determine your worth. With this in mind, it is no wonder that the younger generation feels more pressure - albeit unjustified - that has grown to levels of anxiety and depression. And through my time in college, I have seen firsthand how this pressure has affected the mental health of students. Sometimes it feels like there is a cloud of perfection that looms over the heads of many students when it comes to performing in college. The sad thing here is that with all this pressure, it takes away from the enjoyment of learning and life experience in college.

I suffer from chronic anxiety. And what I have learned is that society, research, and even the media do not one hundred percent understand the plight of living with something like this. What many people do not understand is just how silly you feel after a nonsensical anxiety attack. I will never forget one of my worst anxiety attacks: during my third exam in Physiology my junior year of college. This particular anxiety attack was especially annoying because of the premise of it. I had one question left on my exam, and for the life of me could not remember the purpose of a myelin sheath. While many might understand the pressure of wanting to perform well on a college exam, this one was no cause for alarm. Why? Because I already knew that I had gotten every other question right on the exam, and I had a high A in the class. Theoretically, missing one question would do absolutely nothing to my grade on the exam, let alone the class. However because of my anxiety, I found myself conjuring up every worst case scenario of getting the answer wrong - right down to manifesting the thought that my professor would think I was an idiot if I did not know the answer to that specific question. This epitomizes what chronic anxiety can do to a person, and just how crippling it can be despite its irrational context. There is a stigma that remaining calm should be easy in a situation like this one that has no true consequences, but the truth is that sometimes you cannot help but feel helpless when your

anxiety is high. Sometimes it feels like living with chronic anxiety is almost like watching a bad sitcom - it does not always make sense, but it is worth a chuckle. For example, I was a Director for Camp Cowboy this past summer. In this position I have had to lead a staff, entertain up to 200 freshmen at a time, and meet the president of Oklahoma State University. None of this makes me nervous, but what gives me so much anxiety is ordering food at a restaurant. Whenever I am at a restaurant I feel an overwhelming fear that I am going to be scrutinized by the employee taking my order. Everyday when I walk around campus, I feel monumental anxiety because I am convinced that everyone is watching how I walk. I am constantly anxious after hanging out with friends due to the irrational fear that everyone hates me. And there are times that I have an anxiety attack when I miss class because I am convinced that my professor will remember this, take it personally, and then take it out on me when grading one of my assignments. The sad thing is that I am aware of these things, their irrationality, and the impossibility of the scenarios, yet I cannot stop myself from feeling anxious. I constantly worry about everything. In fact, as I write this section of my thesis I am becoming anxious because I am now thinking of the worst case scenario - my thesis is bad, I cannot graduate with honors, and my parents will think I am a failure and abandon me for fresh coconut in the Philippines.

This is just a comical example of how anxiety works in my brain. However, I must admit that there have been many times that I have been locked into my bed because my anxiety was so crippling on that given day. There are times when I have had a perfect day only to come home and start feeling anxious about something. This is when the cascade would start. I would begin hyperventilating, sweating, and then just buckle. It would feel like the weight of the world was crushing me, and all I could do to help myself was crawl under my bed and lay there until the moment passed. My anxiety is so chronically afflicting that after having an amazing night out

with friends, I come home to have my emotions crash because I feel so mentally exhausted. In fact, there were many times this past summer at Camp Cowboy where I would go back to my apartment after a great weekend and simply crumble onto my bed. It was something I had to learn the hard way - being chronically anxious really does take a lot out of you physically.

Another struggle I faced with anxiety was growing up with parents who come from a culture where mental health is, essentially, nonexistent. A cultural stigma in the Philippines is that there really is no focus on mental health. In fact, mental health in the Philippines was unheard of for a very long time. It was always chalked up to needing to pray for God to give you guidance. This was so sewn into the society that it was not until I explained brain chemistry to my parents that they finally understood there was a physiological element to mental health. Thankfully, they now understand.

I cope with my anxiety through writing. I have tried anxiolytics, antidepressants, and even therapy - all to no overall positive result. That only goes to show how differently anxiety affects everyone. I will say, though, that I would not trade my anxiety for a brain that does not plague me when I am at McDonalds. Living with anxiety has allowed me to have a different perspective on the world and has molded how I treat people. By this I mean that I will always try to treat people in good taste and try to understand how they view the world because if there is one thing I have learned it is that everyone has a unique way of seeing the world around them. It has given me a better understanding of how to be open and accepting to all people around me.

Conclusion.

If there is one takeaway I would want someone to get from this, it is that anxiety truly is different for anyone. I would argue that it is almost impossible to find a middle ground to physiologically define and treat anxiety as an illness. Anxiety and its associated disorders affect

everyone in a different way on different scale. Additionally for every individual suffering from an anxiety disorder, the magnitude of their affliction varies from day to day. For this, I will always turn to NBA All-Star Kevin Love as the prime example. Love took the media by storm recently when he wrote an article discussing his battles with chronic anxiety. He even admitted to having an anxiety attack during a game and needing to be taken to the locker room. He cited how the Cleveland Cavaliers had a trainer for everything, except there was no team expert who specialized in telling him how to breathe when he had his attack. Many would assume that a basketball player like him; one who makes millions of dollars and has a championship ring would not have a trouble in the world. However not only does he have chronic anxiety, he had a panic attack during a basketball game - something that he has been a part of for years. This exemplifies just how varying anxiety is for every individual.

I would argue that the problem with understanding anxiety - medically, psychologically, and socially - is that it is compartmentalized with other physiological conditions that have defined mechanisms. But research has proven time and time again that there is so much about it that is still not understood. This ranges from why there is not a universal treatment that helps everyone to why some people can go through the same trauma as another but not come away with some form of anxiety to why some can cope with their anxiety whilst others with the same condition are crippled. As mentioned throughout the paper, there is no single, sole reason why an anxiety disorder develops in a person. There are endless reasons and combinations of why a person is affected - whether it be genetic, environmental, learned, or even experienced. This is why I argue that anxiety is an anomaly. The reason it is so sporadic in understanding is because every person is different, and this goes beyond their physiology. It depends on your life, your life experiences, your views on the world, how you think, your actions, and so on. Even animals feel

anxiety. Just think about how interesting it is that an owner can leave their house only to have their dog experience separation anxiety - the same way humans can feel separation anxiety when separated from a loved one. Anxiety is truly an intriguing anomaly of living creatures.I would argue that anxiety should not be understood as a condition - but as a lifestyle.

References.

ADAA. “Therapy.” Anxiety and Depression Association of America, ADAA, https://adaa.org/finding-help/treatment/therapy.

Abdullah, Tahirah, and Jess Graham. “The Link Between Experiences of Racism and Stress and Anxiety for Black Americans.” Anxiety and Depression Association of America, ADAA, https://adaa.org/learn-from-us/from-the-experts/blog-posts/consumer/link-between-experiences-racism-and-stress-and.

Abebe, Nitsuh. “America's New 'Anxiety' Disorder.” The New York Times, The New YorkTimes, 18 Apr. 2017, https://www.nytimes.com/2017/04/18/magazine/americas-new-anxiety-disorder.html.

Bolek, M. (2019). General Parasitology Lecture 18. “Other Apicomplexa”. BIOL4104. Oklahoma State University.

Craske, M. G., Rauch, S. L., Ursano, R., Prenoveau, J., Pine, D. S., & Zinbarg, R. E. (2011, July 1). What Is an Anxiety Disorder? Retrieved from https://focus.psychiatryonline.org/doi/abs/10.1176/foc.9.3.foc369.

Department of Health and Human Services (DHHS) . “What Are the Five Major Types of Anxiety Disorders?” HHS.gov, 21 Aug. 2015, https://www.hhs.gov/answers/mental-health-and-substance-abuse/what-are-the-five-major-types-of-anxiety-disorders/index.html.

Gibeault, Stephanie. “Everything You Need to Know About Emotional Support Animals.” American Kennel Club, American Kennel Club, 22 Nov. 2019, https://www.akc.org/expert-advice/news/everything-about-emotional-support-animals/

Harvard Health Publishing. “Anxiety and Physical Illness.” Harvard Health, May 2018, https://www.health.harvard.edu/staying-healthy/anxiety_and_physical_illness.

Harvard Health Publishing. “Understanding the Stress Response.” Harvard Health, Mar. 2018, https://www.health.harvard.edu/staying-healthy/understanding-the-stress-response.

Hofmann, Stefan G., and Michael W. Otto. “Characterizing Social Anxiety Disorder.” Cognitive Behavioral Therapy for Social Anxiety Disorder, 2017, pp. 1–23., doi:10.4324/9781315617039-1.

Holland, K. (2019, September 17). Anxiety: Causes, Symptoms, Treatment, and More. Retrieved from https://www.healthline.com/health/anxiety.

Markovitz, Adam A., et al. “Toxoplasma Gondii and Anxiety Disorders in a Community-Based Sample.” Brain, Behavior, and Immunity, vol. 43, 2015, pp. 192–197., doi:10.1016/j.bbi.2014.08.001.

Mayo Clinic. (2018, May 4). Anxiety disorders. Retrieved from https://www.mayoclinic.org/diseases-conditions/anxiety/symptoms-causes/syc-20350961.

Mayo Clinic. “Post-Traumatic Stress Disorder (PTSD).” Mayo Clinic, Mayo Foundation for Medical Education and Research, 6 July 2018, https://www.mayoclinic.org/diseases-conditions/post-traumatic-stress-disorder/symptom-causes/syc-20355967.

Naidoo, Uma. “Nutritional Strategies to Ease Anxiety.” Harvard Health Blog, Harvard Medical School, 29 Aug. 2019, ://www.health.harvard.edu/blog/nutritional-strategies-to-ease-anxiety-201604139441.

NIMH. “Obsessive-Compulsive Disorder.” National Institute of Mental Health, U.S. Department of Health and Human Services, https://www.nimh.nih.gov/health/topics/obsessive-compulsive-disorder-ocd/index.shtml.

NIMH. “Post-Traumatic Stress Disorder.” National Institute of Mental Health, U.S. Department of Health and Human Services, https://www.nimh.nih.gov/health/topics/post-traumatic-stress-disorder-ptsd/index.shtml.

National Alliance on Mental Illness (NAMI). (n.d.). Anxiety Disorders . Retrieved from https://www.nami.org/learn-more/mental-health-conditions/anxiety-disorders.

Satya, et al. “Anxiety Disorders.” Anxiety and Depression Association of America, ADAA, https://adaa.org/living-with-anxiety/personal-stories/

Shaw, J. (2018) Mammalian Physiology Lecture. Chapter 7. Oklahoma State University.

Shaw, J. (2018) Pharmacology Lecture. Chapter 21. BIOL 4253. Oklahoma State University.

Sellers, Sherrill L, and Harold W Neighbors. (2008, March 1) Effects of Goal-Striving Stress on the Mental Health of Black Americans. https://journals.sagepub.com/doi/abs/10.1177/002214650804900107.

Stein, MB. (2008, March 29). “Social Anxiety Disorder”. Department of Psychiatry, University of California San Diego. 1115-25. doi: 10.1016/S0140-6736(08)60488-2

Ushiroyama, Takahisa, et al. “A Case of Panic Disorder Induced by Oral Contraceptive.” Acta Obstetricia Et Gynecologica Scandinavica, vol. 71, no. 1, 1992, pp. 78–80., doi:10.3109/00016349209007956.