

Review

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Review

The Impact of Anxiety on Athletic Performance

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Abstract: Throughout this paper the impact of anxiety on adolescent athlete's is highlighted through analyzing neurological and psychological aspects involved in sports performance. The neuroanatomy and neuropsychology of the human brain plays a major role in developing athlete's that has only begun to be analyzed within recent years. Especially in young athletes, there are numerous factors that affect performance on the field that originate from the environment and training the adolescent athlete is involved in. Sports performance is viewed as a major physical factor such as training and lifting weights, however the psychological aspect of sports performance often goes unnoticed. Athletes can begin to develop mental fatigue and anxiety which inevitably can decrease their ability to perform. The athlete's internal suffering begins to go unnoticed, as the only tangible factor is watching their performance decrease. This causes the athlete to push themselves further in training resulting in greater mental fatigue. This paper emphasizes the numerous factors neurologically that play a role in athletic performance which should be focused on in adolescent athletes as they navigate the challenges and competition that are apparent within athletics. It is critical to understand the processes and hormonal changes the body undergoes with training and playing a sport, this information can change the way adolescent sports are approached and advanced.

Keywords: sports performance; athletic performance; neuroanatomy; neuropsychology; anxiety; mental fatigue; mental strength; sports psychology; sports anxiety; muscular control; neuronal control; hormone effects; physiology; anatomy; psychology; performance; team dynamics; coping mechanisms

INTRODUCTION

Neurological and psychological issues can directly impact timeliness and quality of performance especially in athletes across all age groups. Neurological issues are most commonly defined as disorders that affect the brain as well as the nerves found throughout the human body and spinal cord [1]. A range of symptoms develop with structural, biochemical or electrical abnormalities within the brain or spinal cord. Psychological issues are most commonly defined as a disorder in an ongoing dysfunctional pattern of thought, emotion, and behavior that causes significant distress. According to the bio-psycho-social model, psychological disorders have biological, psychological, and social causes [2]. The severity of the combination of neurological and psychological issues in young athletes has only begun to be highlighted in recent years. Most athletes join a sport when they are younger for fun and as they grow love for the sport they make a decision to continue playing for as long as they are able to. These athletes endure intensive training for years, usually in different environments on different teams and different training groups. As the years go on the pressure begins to build up which causes increasing thoughts of anxiety, ultimately reaching a point where their performance is affected. As an individual has put their identity in their sport and trained so hard over the years, the decreased performance due to the immense amount of anxiety can be detrimental to the individual's mental health, especially in influential years of youth.

Neurological and psychological issues can go unnoticed as they develop, but finally reach a peak where the athlete is suffering both physically and mentally on and off the field. These issues can both increase and decrease certain hormones in the body, which affects entire systemic functioning, ultimately leading to mental fatigue and decreased performance. The symptoms within young athletes can vary, even if they are experiencing the same type of psychological issue such as anxiety or depression. Their symptoms may increase when in their sports environment because they are so

worried about performing to be the best of the best, but the onset of anxiety can unknowingly cause the body to not function optimally. This causes the athlete to believe they are “not good enough” or “something is wrong with them,” because they are unable to perform to the level of the pressure put on them. This causes increased anxiety that they carry with them off the field into everyday life.

NEUROANATOMY/NEUROPSYCHOLOGY

Neuroanatomy and neuropsychology are important factors when analyzing the impact of neurological and psychological disorders affecting an individual. The structure analysis is vital to understanding the symptoms that arise. Neuroanatomy is the study of the relationship between the structure and function in the nervous system [3]. This includes the study of macroscopic structures, folds of the brain, and microscopic structures, the cellular and molecular level analysis of interactions between neurons and neuroglia. Neuroanatomy studies the areas of the brain that are responsible for specific receptors and electrical activity dealing with thoughts and performance. Neuropsychology studies the physiological processes of the nervous system and relates them to behavior and cognition [4].

The neuroanatomy of anxiety significantly involves the limbic system and its structures. The limbic system is a part of the brain dealing with behavioral and emotional responses. Anxiety can be part of a contextually appropriate and adaptive response alerting an organism to salient events in its environment or internal environment [5]. However, anxiety can also be triggered to an inappropriate degree or at inappropriate times, and when prolonged, severe enough, and disruptive to the individual it is considered a clinical disorder of anxiety. Anxiety is directly related to the processing of negative emotions. The neural circuit of negative emotion has a set of core limbic structures central to it, including the amygdala and insula as well as interconnected structures such as the periaqueductal gray and hypothalamus [5]. These specific regions of the brain will interact with cortical areas and several medial prefrontal subregions.

The amygdala being a complex structure is composed of multiple subnuclei each having their own distinct pattern of afferent (sensory) and efferent (motor) projections. The understanding of the organization and functions of the subnuclei in the amygdala is derived from animal studies. In regards to anxiety the basolateral complex and the central nucleus are largely involved. The basolateral complex is the primary input site within the amygdala receiving sensory information from the thalamic nuclei and the sensory association cortices of the brain. The central nucleus is located dorsal to the basolateral complex and is an output region that projects to the brain stem, hypothalamic and basal forebrain targets. In animal studies it was discovered that in rodents the basolateral complex encodes for the perceived threat value of a stimulus and the central nucleus is essential for the basic species-specific defensive responses associated with fear [5]. The amygdala itself is activated by negative valenced emotional stimuli and responds to anxiety-provoking environmental cues that are actually neutral in valence. The insula functions to regulate the autonomic nervous system, a division of the peripheral nervous system regulating involuntary responses, and is activated during the processing of negative emotions. The insula has an important role in monitoring and interpreting internal physical sensations [5].

The brain regions known as the Dorsal Anterior Cingulate Cortex (ACC) and the Dorsomedial Prefrontal Cortex (PFC) are involved in appraising and monitoring emotion, which is important for the conscious subjective experience of emotion. A recent meta-analysis discovered that dorsomedial PFC activation was commonly noted in studies in which subjects were induced to experience emotion, rather than just perceiving it [5]. A research study was recently developed by Etkin that demonstrated an emotional analog to the color-word Stroop task to analyze how individuals respond to and regulate the impact of emotional conflict. Subjects were exposed to images of fearful and happy facial expression, and were asked to identify the effect from the expressions. Written across the faces were the words “fear” or “happy”, which were either of the same affect (congruent) or of a different affect (incongruent) as the facial expression [5]. Similar to the conclusions of the color-word Stroop task, subjects were to ignore the text but in this study subjects were unable to avoid involuntarily reading the word and extracting its meaning. The conclusion of this study

demonstrated that incongruent stimuli interfered with affect identification, being associated with dorsomedial PFC activation. Therefore this study demonstrates that although an individual is able to ignore the words, they are unable to ignore the feeling associated with the words. This highlights that subconsciously humans interpret everything put in front of them, although ignoring what is in front of them they can not look past feeling the emotion. Therefore, the activation of feeling these emotions will cause the body to react in a certain way that was not intended for. This can be directly related to sports performance, as an athlete can believe they are ignoring a certain emotion however their body is actually feeling the effects of it. It is important that teammates, coaches and administrators recognize this phenomenon as it can directly affect an athletes performance and long term mental health. This is an interesting discovery that not only does an individual need to be aware of their environment and emotions they are subconsciously processing, but individuals around them also need to be aware of the way a negative environment can affect performance.

Explicitly and implicit emotional regulation is an important concept to understand when analyzing the neurobiology and psychology of anxiety. Emotion regulation can either be deliberate or implicit. Deliberate emotional regulation requires conscious top-down intentionality. Implicit emotional regulation engages in top-down regulation of emotional processes without requiring conscious intentionality [5]. This highlights how emotions can be perceived consciously and subconsciously, thus enacting reactions from the bodily knowingly as well as unknowingly. The limbic-medial prefrontal circuit is the main structure involved in regulating these emotional responses from outside stimuli. It primarily represents an implicit and reflexive form of emotional regulation, psychological and neurobiological from explicit and instructed strategies for emotional regulation. This suggests that implicit emotion regulation may be based on an individual's expectation or anticipation of emotional stimuli, which has the ability to be operated outside of their awareness, and be independent of an explicit goal of emotion regulation [5]. This reaction is relevant to young athletes as it states that implicit emotion regulation arrives from an individual's expectation of emotional stimuli, which can inflict rapid anxiety. When individual's recognize a similar situation which has inflicted anxiety in the past, a similar situation can cause their brain to interpret it as the same situation that caused them severe anxiety. Therefore, those who are involved in a lifestyle being exposed to numerous of the same situations are more susceptible to implicit emotional regulation, which can be detrimental to their mental health without recognition of this process.

The neuropsychology of anxiety has been studied for more than a century addressing two main themes. Firstly, there is a history of attempts to model the etiology of anxiety through fear conditioning. Secondly, experiments have focused on the pathophysiology and maintenance of these disorders by examining cognitive domains germane to anxiety, such as executive function, attention, and memory [6]. Anxiety itself is a common state that facilitates performance through learning about outcomes, however it is adaptive within certain limits. Mild anxiety can enhance emotional processing and attentional control under non-challengings conditions of low cognitive load. High levels of anxiety will lead to decrements in cognitive performance, increased in domains such as attention and executive functioning. Anxiety is an important factor in the field of cognition and performance because it is often associated with adverse effects on the performance of cognitive tasks [6]. Increased levels of stress or arousal can be detrimental to performance because of poor efficacy of attentional allocation. Extreme anxiety affects cognitive performance in two different ways. Anxiety first increases the extent to which threat-related stimuli capture attention, after which in turn leads to impaired cognitive control. Anxiety will secondly impairs attentional control, even when no threat-related stimuli are present [6]. Attentional resources of working memory can become consumed by worrisome thoughts causing less availability for present task processing decreasing cognitive performance. Anxiety also leads to impaired cognitive control through increasing the extent to which threat-related stimuli capture attention. Anxious patients compared to relative to healthy patients, focus more of their attention to threatening information than to neutral information. Evolution has enabled the brain to prioritize attentional resources to threat-related stimuli, even when those stimuli are not fully perceived through preconscious fast neural pathways [6]. Anxiety causes an individual to experience pathological worry defined as an excessive out of proportion to

the actual problem, pervasive, present most of the time, focused on several themes or optics, uncontrollable, having a tendency to interfere with functioning, and causing high levels of distress and impairment. Individuals with anxiety also develop an interpretive bias, in which they tend to interpret threatening meanings of emotionally ambiguous events or information. These symptoms can develop quickly and unknowingly within an individual, then one day become incredibly overwhelming. This causes an individual to become even more emotionally stressed as they are not able to perform tasks they want to due to this overwhelming amount of worry interpretation they are experiencing. This is directly affected by athletes as all of the thoughts in their head and the way their neurological system is functioning, causes changes to their overall performance and health status. The intensive training of an athlete is physically exhausting, but in combination with developing anxiety they become mentally exhausted. This combination can be a spiraling moment in an athlete's athletic career, as well as every day in their normal life.

SPORTS PSYCHOLOGY

Sport psychology is defined as an proficiency that uses psychological knowledge and skills to address optimal performance and well-being of athletes [7]. Sports psychology involves the "developmental and social aspects of sports participation, and systemic issues associated with sports settings and organizations" [7]. The interventions are designed to assist athletes and other sports participants from various levels of competition and ages. The range stretches across recreational youth participants to professional and Olympic athletes to master's level performers. The areas that sports psychology covers vary from confidence to conflict resolution, from motivation to performing under pressure, and everything inbetween [8].

The experience of sports itself involves emotion, in which the navigation of the emotion can affect the way an athlete is able to perform. Emotion in sports can reflect an athletes' self-evaluation of expectation of their performances in addition to their perception of others' evaluations and expectations. Typical emotions arise before, during and after their performance in their sport. An athlete will experience anticipatory emotions that can be interpreted as anxiety or excitement. After a performance, depending on the result, can cause an athlete to tear themselves down as to what they could have performed differently to change the result. In sports, the orchestration of emotions begins with the arousal of expectations, provoking a diffuse emotional state that is then directed into a series of discrete and identifiable emotional displays [8]. Usually athletes begin to develop a routine on game days, which can also involve the routine emotions felt during the day. If these emotions of arousal are interpreted negatively, an athlete can be suffering throughout the entire day, due to the sole fact that they have a game. This can affect the athlete as they have become mentally exhausted leading up to game time. An athlete's psychological stress is able to be manifested as somatic complaints. These somatic complaints arise as sleep disturbances, irritability, fatigue, gastrointestinal disturbances, muscle tension, and in severe cases injury can occur [8]. Most athletes will not recognize that their somatic issues can be based on psychological factors causing them to turn to primarily physicians for treatment, and in some cases they will turn to a therapist. In some cases athletes will battle with themselves about reaching out for help due to the perceived stigma of being "weak", since athletes are perceived to be some of the strongest individuals. Sports psychology is a complicated area as athlete's emotional and mental issues can be due to interpersonal problems with a coach, teammate, family member as well as anxiety concerning upcoming competition.

Injury of an athlete can affect their mental health vastly. Especially if they were previously emotionally drained, and such somatic symptoms developed into an injury. Not only is an injury to an athlete physically devastating it can also be psychologically devastating. An athlete's self identity is primarily based on being an athlete, therefore the greater the injury and the longer the recovery period, the more prolonged and profound their emotional disturbance may be [8]. Three emotional responses most injured athletes experience are isolation, frustration and disturbances of their mood. The isolation response refers to how the athlete can become separated from teammates and coaches. The frustration response refers to the focus on the loss of months of training, even though this can be a period of time to focus on mental skills as well as other physical skills to return to competition. The

mood disturbance response is most commonly seen as athletes can become temporarily depressed and are upset by minor annoyances because of their physical state. These emotional responses can be lightened when athletes realize that they are not alone in this journey, and injuries happen to the most elite performers. It is vital that coping mechanisms are introduced prior to an injury situation occurring, therefore it does not entirely affect the athlete in regards to life outside of athletics.

Sports psychology identifies that it is normal to feel increased intensity of emotions in a competition, however when that increased intensity turns into anxiety it can hurt the athlete's performance. It is important for athletes' to recognize that instead of resigning yourself to feeling nervous and performing poorly, active steps to reach and maintain prime intensity can be taken to continue performing at maximum levels [8]. Due to the pressure for performance, athletes most commonly mistake the feeling of adrenaline as negative emotion and spiral into a downward frenzy that they will not perform well. However, the feeling of adrenaline may actually be the athlete being excited that they are able to play and perform in the sport that they love. The addition of pressure causes these feelings to become blurred together, which can be an issue if the athlete becomes susceptible to believing it is something negative instead of positive. Therefore, when these feelings arise the body immediately will enter "fight or flight" mode, trying to bring the body back to normal. It is key to introduce mechanisms to athletes to recognize that they are safe, and are not trapped into the negative emotional spiral. They can implement pre-game rituals to develop a routine to allow themselves the grace of feeling their feelings, but interpreting them in a way to better themselves.

Sports Anxiety and Effects of Psychology on Athletic Performance

The emphasis in sports psychology has shifted away from study of simple arousal in favor of looking at the phenomena of anxiety [9]. There are influential theories seeking to explain the relationship between anxiety and sporting performance. These influence theories are known as the catastrophe model, zones of optimal functioning and reversal theory. The catastrophe model developed by Fazy and Hardy discovered that when athletes are experiencing high cognitive anxiety, a small increase in arousal beyond the optimum level can cause a massive fall in performance [9]. Fazy and Hardy rejected the inverted-U hypothesis that states that a small change in arousal will bring about a small change in performance. It has been observed that under conditions of low cognitive anxiety, when the athlete is not particularly worried, the inverted-U hypothesis is true. However, when cognitive anxiety is high, there comes a part just above the optimum level of arousal where performance drops off sharply [9]. A study was performed by Hardy in 1994, that supports the idea that athletes' best and worst performances occur under high cognitive anxiety. Also, under high cognitive anxiety performance drops off quickly after the optimum arousal level. This study involved eight experienced crown-green bowlers and they were asked to bowl three balls at a jack on two consecutive days. One day before bowling, they were given neutral instructions designed to create low cognitive anxiety, and on the other day they were given threatening instructions designed to raise their cognitive anxiety. The CSAI-2 was administered to confirm that cognitive anxiety was higher after the threatening instructions were implemented [9]. In order to increase psychological arousal, the participants were given shuttle runs to perform and their heart rates were monitored. Under conditions of low cognitive anxiety the results showed a weak inverted-U, and under high cognitive anxiety performance peaked considerably higher but then dropped off quickly which supports the catastrophe model. The theory of zones of optimal functioning discovered by Hanin criticizes other theories of the relationship between anxiety and performance due to the basis that they all under-emphasize individual differences in responses to anxiety. Hanin performed research where he measured the pre-competitive anxiety scores of forty-six elite female rowers, and he found a very wide variety of scores [9]. The mean score was forty-four, but the range of scores was twenty-six to sixty-seven. When compared to the success of the athletes, the variety of anxiety levels suggested that there was a variety of different responses to anxiety. Hanin did not develop a general relationship between anxiety and performance, but suggested that each athlete has their own preferred level of anxiety. This preferred level of anxiety displays that their performance would suffer if their anxiety dropped below or rose above their preferred level. Hanin labeled the athlete's

preferred anxiety level, the individual zone of optimal functioning [9]. The implications of the individual zone of optimal functioning state an athlete should be aware of their own ideal level of anxiety for competition. Athletes can then monitor their current level of anxiety, and be able to make a conscious decision if they need to calm down or become more excited. It is useful for coaches to know an individual athlete's individual zone of functioning in order to support them and set them up for optimal performance.

There is no denial that athletes' performance can be seriously affected by their levels of arousal and anxiety regardless of which theories of arousal and anxiety are considered most correct or useful. It is difficult for an individual to truly regulate arousal levels consciously because there is no accurate way of perceiving how aroused an individual is [9]. The indicators of arousal consist of heart rate, blood pressure and skin temperature are difficult to judge with correct technique or machinery. Biofeedback is a principle stating that once we can receive accurate information about arousal level it can be learned to be controlled consciously. There is evidence that supports the effectiveness of biofeedback in aiding relaxation and improving performance. When in a state of over arousal, if an athlete is able to identify the factors that onset the state of over arousal, gaining control can cause clear minded thinking and a relaxed state to improve cognitive ability and performance.

Mental Fatigue in Athletes

Mental fatigue is defined as a psychobiological state caused by prolonged periods of demanding cognitive activity shown to negatively influence physical performance [10]. Mental fatigue is a common struggle among athletes due to the stigma of being weak, when an athlete is struggling. Athletes are societally assumed to be one of the strongest groups of individuals among the population, therefore when they express that they are struggling there becomes a stigma of being weak and not strong enough to deal with the pressures they are faced with. From a psychological point of view, mental fatigue has two separate components. It can affect drive by increasing the perceived effort necessary for a given task: "I cannot do this, I am too exhausted" [11]. It can also affect drive by decreasing the perceived value of the reward that can be obtained: "I do not want to do this, it is not worth it" [11].

Neurophysiological theories have been proven to confirm the duality of mental fatigue upon athletes. Mental fatigue can directly activate inhibition centers of the brain increasing perceived effort for a given task, which decreases drive and willingness to act [11]. Mental fatigue has been revealed to enact changes in behavior associated with disengagement, decreased motivation and enthusiasm, increased displays of emotion and withdrawal, changes in concentration, and decreased discipline and attention to detail [10]. Therefore, both athletes and associated staff highly believe that mental fatigue directly and negatively impacts sporting performance. Mental fatigue directly enacts changes in behavior through affecting drive in different pathways through two separate systems involved in regulation of behavior. The two systems are a mental inhibition and a mental facilitation system. The mental inhibition system inhibits an athlete's actions by increasing perceived exertion due to the activation of the cortical regions of the cerebral cortex in the brain. The mental facilitation system facilitates athletes' actions by increasing motivation toward reward, but mental fatigue plays a role in deactivating the facilitative system that usually encourages athletes toward action. This influences brain regions involved in cognitive aspects of central motor command [11]. Therefore, mental fatigue impacts motivation as it negatively affects readiness to exert physical work in order to obtain a reward.

Although cognitive functioning seems less crucial for successful endurance performance, mental fatigue causes individuals to perform less well than expected even in long exercise of long duration. After mentally fatiguing tasks, modifications in electric brain activity patterns (EEG) have been observed, and these altered brain patterns are related to increased perceived exertion [11]. Athletes' perceptions of their drive to exercise are mediated by alterations in brain activation and the concurrent changes in brain neurotransmitter concentrations. Brain adenosine concentrations are increased due to prolonged neural activity which induces mental fatigue, in turn decreased drive. The accumulation of extracellular cerebral adenosine may serve to explain the relationship between

mental fatigue and exercise performance by increasing perception of effort during subsequent effortful tasks by impairing motivation [11]. Another neurotransmitter, serotonin, is related to increased sensitivity to negative stimuli. Mental fatigue causes changes within the body that affect an athlete's response to motivation and hard work, without their control. This is due to the neurotransmitters released once the brain is exhausted beyond the point of functioning, and these chemical signals cause the body to respond in ways that are outside of the athlete's conscious control.

HORMONE EFFECTS ON PERFORMANCE

Hormones directly affect an individual psychologically which directly affects physical performance. They are the chemical regulators of the human body in which changes of their levels affect the neuronal networking and mechanisms of cognitive function. Depending on the level of the hormones in the body they can contribute to both positive and negative outcomes. Their critical function is to regulate and maintain bodily processes that include growth, emotions, and cognition. Hormonal effects on cognitive function are investigated through analyzing the source of localization to understand the neuronal network that is involved. Therefore, cognitive function does not rely on any specific area within the brain but it is instead determined by the neuronal network interactions [12]. Cognitive function deficit can occur when there are compromises to language, attention, conceptual reasoning, memory and processing speed. Hormones are outside of an individual's conscious control, therefore if there is level fluctuation the body will respond to compensate for the changes. It is very important to be conscious of keeping the body, as well as the mind healthy in order to continuously perform at the highest potential especially in athletics.

There are numerous different hormones that deal with athletic performance, such as dopamine which is involved in motivational control. The motivation control deciphers good from bad and is able to choose actions to gain the good things and avoid the bad things [13]. The cerebral cortex houses the major sources of dopamine. The subcortical areas contain the dopamine releasing neurons of the ventral midbrain which are located in *substantia nigra pars compacta* and *ventral tegmental area*. The neurons have two modes of dopamine differentiated into the "tonic" and "phasic". The tonic mode of dopamine neurons maintains a steady baseline level of dopamine in downstream neural structures that is vital for enabling the normal functions of neural circuits [13]. The phasic mode of dopamine neurons sharply increase or decrease their firing rates for 100-500 ms, directly causing greater changes in dopamine concentrations in downstream structures lasting for several seconds [13]. The responses to phasic dopamine responses are triggered by different types of rewards and reward-related sensory cues. The phasic response purpose is to fulfill dopamine roles in motivational control, including its roles as a teaching signal that underlies reinforcement learning and as an incentive signal that promotes immediate reward seeking [13]. The two types of dopamine neurons are further divided into differences in their effect on motivation. One type codes for motivation value, excited by rewarding events and inhibited by aversive events. The neurons encoding for motivational value support brain systems for seeking goals, evaluating outcomes, and value learning. The second type codes for motivational salience, excited by both rewarding and aversive effects. Both types of motivational value and motivational salience transmit an alerting signal, triggered by unexpected sensory cues of high potential importance. The transmission of these forms of dopamine is essential in creating a state of motivation in order to seek rewards and establishing memories of cue-reward associations. The release of dopamine is not necessary for all forms of reward learning. Additionally, dopamine release may not be enjoyed in the sense of causing pleasure, but it is crucial for causing goals to become wanted through the sense of wanting to achieve actions.

There has been recent research that dopamine will influence how the brain evaluates if a mental task is worth the effort that it takes [14]. This is due to dopamine supporting reinforcement learning through adjusting the strength of synaptic connections between neurons. Dopamine controlling synaptic plasticity was determined through a modified Hebbian rule that states as "neurons that fire together wire together, as long as they get a burst of dopamine." This is explained by: if cell A activates cell B, and cell B causes a behavioral action that results in a reward, then dopamine would be released and the A to B connection would be reinforced [13]. This phenomenon is the reason an

individual is able to learn the optimal choice of actions to gain rewards, given sufficient trial-and-error experience. Therefore, the levels of dopamine within an individual are incredibly important to everyday activities. It is important that individuals are engaging in such activities to keep positive feelings and emotions flowing. It has been concluded from a study that individuals with higher levels of dopamine in the caudate nucleus of the brain were more likely to focus on the benefits and choose the difficult mental tasks. The individuals with lower dopamine levels were more sensitive to the perceived cost, or task difficulty [14]. This study was followed up by another study to further research the decision making process influenced by different levels of dopamine. The researcher's observed the participants' eye movement as they reviewed information about task difficulty and the amount of money they would receive. The participant's gaze patterns suggested that dopamine didn't alter their attention to benefits vs costs, however it increased how much weight people gave to the benefits once they were looking at them [14]. There is confirmed evidence that dopamine affects the motivational aspects of performance. It also affects the amount of focus put onto a task. In athletics focus and attention is important in order to perform to their best ability. If there are outside factors that are affecting an athlete's dopamine levels, it can unknowingly affect their performance on the field as well as their work ethic to work harder. Hormone imbalances can prompt mental health issues, or beginning to struggle with mental health can alter hormonal levels. Therefore, athletes struggling with mental health may experience a decrease in performance without truly understanding why. The physiological processes become disrupted through hormone imbalance, especially when struggling with mental health and dopamine levels decrease. Athletes that once were very passionate about their sport may lose their motivation to put any work in, especially if dopamine levels become low or begin to fluctuate.

Cortisol is another hormone that is important in regulating vital functions including metabolism and immune function. The human body produces cortisol every morning as a part of the daily hormone cycle [15]. This hormone is normally good for the body as it can help an individual focus and stay energized through a short period of time, due to its essential function in the body's fight or flight response. When the body is exposed to a stressful situation, putting the body into fight or flight mode, more cortisol will be produced and released. However, if the stressful situation or state lingers for long periods of time high levels of cortisol will be maintained and the body goes into overdrive. The prolonged state of stress can either be mental or physical, the elevated cortisol levels will have the same effect on the body. If an athlete does not allow time for sufficient recovery and rest, they can suffer numerous consequences which include muscle soreness, more injuries, slower injury recovery, energy loss and lack of focus [15]. When cortisol levels are elevated, muscles are stagnant in a tense state because they are in a constant state of "readiness" due to the body not being able to recognize if a threat has passed. High cortisol levels are also associated with reduced blood flow and a build-up of lactic acid causing increased muscle soreness, due to blood not reaching the muscles as rapidly and being surrounded by lactic acid. High cortisol levels decrease the body's white blood platelet cells which decreases the rate of recovery of muscles. In addition, high cortisol decreases the bone formation process. High stress levels have been associated with lower bone mineral density and weaker bones [15]. Since high cortisol levels cause decreased performance training it can cause athletes to overwork themselves which causes increased fatigue and depression. This is due to severely high levels of cortisol causing insomnia since cortisol regulates the sleep-wake cycle. The sleep-wake cycle is regulated by cortisol through levels rising in the morning to wake up, and decreasing at night to fall and stay asleep. Therefore, with high levels of cortisol disrupting an individual's ability to sleep, it can lead to additional factors such as fatigue, mood swings and lack of focus.

There has been research performed and analyzed about cortisol levels and athletic performance that has led to the development of the "overtraining syndrome". If an athlete is training excessively, without proper rest and recovery, cortisol levels will be chronically elevated. The chronically elevated cortisol levels can manifest into symptoms of uncontrolled tissue inflammation and suppressed immunity [16]. However, some athletes may not immediately be symptomatic with manifests into poor performance in their area of sport. The overtraining syndrome is defined as an athlete

overtraining but consistently unable to perform to their best ability because their body is overwhelmed by high levels of cortisol produced from overtraining. The overall research of the impact of cortisol on individual athletic performance needs to be more thoroughly studied, however there is enough evidence to show a negative correlation of athletic performance with increased levels of cortisol. There is evidence that cortisol concentrations were found to be positively correlated to speed, power, and strength in professional rugby union players, but in contrast another study on rugby players found values to be negatively correlated with the coaches' evaluation of player performance [17]. Normal cortisol levels are essential to athletic performance, however once they become too elevated it can negatively impact performance. If the athlete is not recognizing performance differences, coaches and staff will be able to pick up on the decrease in performance. Coaches and staff may blindly assume that the athlete is just not training themselves to their full potential or pushing themselves enough, however there is a deeper psychological function occurring.

Norepinephrine is a hormone that has vital functions in the fight or flight response. It is a neuromodulator that regulates the activity of neuronal and non-neuronal cells in multiple ways [18]. Norepinephrine also participates in the rapid modulation of cortical circuits and cellular energy metabolism. On a slower time scale it participates in neuroplasticity and inflammation. The norepinephrine system displays synthesization through further hydroxylation of dopamine. In the central nervous system, norepinephrine is released by the noradrenergic neurons which are present in the locus coeruleus [19]. The axons released by the noradrenergic neurons innervate the cerebral cortex, subcortical areas, cerebellum and brainstem. Norepinephrine, alongside epinephrine, are considered stress hormones that are responsible for many adaptations both at rest and during exercise in individuals [20]. Exercise in general has been proven to enhance neuronal adaptation against harmful stimuli associated with stress. There is a productive mechanism of exercise against stress that has been attributed to the expression of galanin in locus coeruleus, where norepinephrine functions. Galanin hyperpolarizes noradrenergic neurons and inhibits locus coeruleus neuronal firing, leading to a suppression of norepinephrine release [19]. Reduced norepinephrine release from the locus coeruleus to target areas of the body, such as the frontal cortex and amygdala, confines anxiety behavior. Research from human and animal studies has concluded that chronic treadmill and running-wheel exercise increase the expression of the galanin gene in the locus coeruleus [19]. There has also been a conclusion that the levels of plasma galanin are increased in humans after acute exercise. Norepinephrine plays a role in both the physical and psychological side. Norepinephrine participates in commanding the consolidation and retrieval of emotional memory [19]. Research has concluded that both chronic treadmill and wheel exercise increase the levels of norepinephrine in the pons and medulla area, as well as the spinal cord as compared to sedentary controls [19]. In relation to these findings, brain regions linked to cognitive function are elevated by chronic treadmill exercise. These brain regions include the hippocampus and the central and medial amygdala. Additionally, exercise increases the endogenous activity of norepinephrine in which research suggests a linkage between norepinephrine and exercise-enhanced cognitive function [19]. Norepinephrine plays a major role in an athlete's primary functions due to its various involvements in both exercise related activity as well as cognitive functioning. Norepinephrine has a positive correlation with exercise which is important as an athlete's lifestyle revolves around exercise. Although norepinephrine is promising in the activities of exercise and cognitive functions, elevated levels can expose athletes to different consequences such as anxiety. Since norepinephrine is a stress hormone present in the fight or flight response, it can have undesirable effects when stress is maintained for a long period of time. Norepinephrine's primary goal is to direct resources away from maintenance, regeneration, and towards any system required for active movement [21]. Therefore, prolonged exposure to stress with overproduction of norepinephrine can reduce the resources sent to vital organ systems. In addition, norepinephrine has the ability to increase anxiety since it is a hormone involved in the fight or flight response. An overproduction during stressful situations that athletes can be exposed to due to the pressure put on them can increase their susceptibility to anxiety and anxious tendencies. The locus coeruleus, where norepinephrine's noradrenergic neurons are located, is the region of the brain that produces the panic response [21]. There was an animal research study done with mice and rats that

discovered when the neurons that contain norepinephrine fire inside of the locus coeruleus, anxious behavior was observed [21]. Therefore, there has been a conclusion that this mechanism can further exaggerate in individuals diagnosed with anxiety disorders. If an athlete already struggles in day to day life with anxiety, and has developed coping mechanisms to keep it at ease, an overproduction of norepinephrine can be harmful and increase the anxiety causing the individual to believe they have lost control. This can be detrimental to their performance as the athlete becomes more susceptible to struggling with their mental health which then can decrease their performance. This can cause these athletes to spiral into an identity crisis as they begin to not be able to perform at their sport and unable to control their anxiety. Therefore, it is important to recognize how impactful stressful and high pressure environments are on the body. The constant exposure without proper rest and coping mechanisms can cause changes in the body that the athletes are unaware of and believe that they are out of control.

Hormones are incredibly important in the regulation of bodily functions. However, what is not commonly recognized is that environmental factors, even social environmental factors, can directly affect psychological functioning. This lack of knowledge around this can be detrimental, especially in the world of athletics. High stress levels and stressful situations can almost immediately change hormone levels, therefore automatically affecting performance. In the athletic world, usually only the physical is analyzed in order to increase training. It is commonly assumed that training hard and developing the body into the best physical shape will guarantee high performance levels. Although physical training is extremely important in athletics, mental “training” and psychological regulation are just as important in sports performance.

MUSCULAR AND NEURAL CONTROL IN SPORTS PERFORMANCE

Optimal performance of neurological function is important in order for athletes to reach their maximum potential without injury. Electro-chemical processes are combined to dominate in athletic performance. This science is referred to as “biomechanics”, “bio” refers to the biology of physiology dealing with the functioning of living organisms of their parts [22]. Muscles are able to contract through signals sent from the central nervous system, but the muscles will not respond to the signal unless they receive the appropriate stimulation. Muscles require a given signal every time they are sent a signal and expected to perform. The expected performance consists of muscular contraction causing joint angles to change due to the amount of tension produced in the individual fibers of the muscles. The body’s actions are compared to a mechanical link system moved by reciprocating engines. Muscular activities involved both the intricate arrangement of bones, muscles and neural controls. According to the physical laws of cause and effect, performance begins in the nervous system then propagates outward to the muscles associated with the intended performance [22]. The central nervous system consists of cells engaging in electro-chemical operations in conjunction with other body parts permits every action of the body through the incorporation of feedback mechanisms. The central nervous system is composed of specialized nerve cells known as neurons that bundle together to form a nerve which become gateways to speed a constant stream of information from body parts to the brain. There are also different kinds of special neurons, such as motor neurons that are primarily involved in athletic potential and performance. The motor neurons within the brain and at the target sites have control over the movement of the muscles and secretions of the glands [22]. The motor neurons are able to trigger the chemico-mechanical process of working muscles as well as govern the actions performed.

In order for the body to be able to regulate movement in athletic performance it needs to have information about what it controls, therefore a servomechanism is introduced to acquire the information needed. Neurophysiology of locomotion is aimed at clarifying the interaction between what is termed as “central programs” from the brain and “sensory feedback” from outside of the nervous system [22]. Proprioception is also involved as it is described as the organism’s detection of stimuli by the receptors. Muscle proprioceptors can be divided into two different types: one senses elongation and the other senses tension. Muscles have length receptors that send fibers into the spinal cord to form synapses on motor neurons that terminate on the same muscles. Therefore, once there

is any activity of increased length receptors resulting from muscle elongation activation of the motor neuron of the elongated muscle occurs. This activation will give rise to a muscular contraction that opposes elongation. The tension receptors stimulated by this activation will sense force rather than elongation and their activation initiates the inhibition of the associated motor neurons. Muscle tension will activate receptors within the brain leading the response from the brain to act on the associated motor neurons resulting in a reduction in force exerted. The performance mechanisms of the length receptors and the tension receptors can be viewed as components of a negative feedback system that maintains its stability by resisting changes in muscle length and tension. The brain has higher level mechanisms that contain the control mechanisms for the muscles and tendons. The higher level mechanisms rely on hierarchical control. The hierarchical control consists of the sensory information in the muscle itself processes local information and transmits net results to higher centers [22].

Feedback mechanisms are important in muscular mechanisms and control, especially in athletics due to muscle lengthening and tension receptors constantly being activated in different ways. Feedback will enter the hierarchy of hierarchical control at every level. At the lowest levels of entry the feedback is unprocessed resulting in fast acting with a very short delay. At the higher levels of entry the feedback data passes through more and more stages of ascending, sensory-processing hierarchy [22]. At each level in the hierarchy feedback closes a real-time control loop. The lower level loops are simple and fast acting, while the higher level loops are more sophisticated and slower. This combination of lower level and higher level loops generates a lengthy sequence of behavior which is both goal-directed and appropriate to the environment in which the muscles are acting. The behaviors of inducing hierarchical control are intentional or purposive. The higher levels of input commands are a goal or task successively partitioned into subgoals, or subtasks, at each stage of control hierarchy until it goes to the lowest level, output signals drive the muscles and produce observable behavior [22]. The success or failure of a task depends on whether or not the higher level functions are capable of providing the correct information. Hence, hierarchical control is important in order to direct the output to the lower level for successful performance despite disturbances and uncertainties in the environment. Low level feedback loops consisting of minimal sensory data processing being fast acting are usually involved in correcting small disturbances. Low level feedback loops can become overwhelmed by larger disturbances, therefore larger disturbances require strategy changes at higher levels in order to maintain the system within the region of successful performance [22].

In athletics the connection between mind and body is extremely important as actions become fluid and seem to be performed without even thinking about it. Especially athletes who have been competing for years at high levels, execution of difficult maneuvers appears to be performed with minimal physical and mental effort. This appearance of effortless performance can affect other athletes who are struggling, and even become envious of the effortless execution of high level performance. However, there is confirmed biological functionality of the appearance of effortless appearance. The athlete's lower level corrections are so quick and precise that the performance does not deviate significantly from the ideal, therefore there is no need for any higher level loops to make emergency changes in strategy [22]. It is often a misconception within the world of athletics that the same amount of practice is required for all athletes. Instead, each athlete is different and their level of progression can vary. Certain tasks involve different thought processing and muscle coordination which functionality can vary from athlete to athlete. A developing athlete may have great difficulty executing a single performance continually forcing higher levels of muscle functionality in order to prevent failure. The slightest deviation from the "planned" motion will result in failure of execution. Although the athlete works hard, failure still appears due to the muscle response being late and misdirected [22]. This highlights the emphasis on the routine of practice in athletics. Practice in specific sports will enable an athlete to perfect the mistimed functions and to create the capacity to reprogram the movement more efficiently [22]. The methodology of a movement and the degree and precision of muscle performance correction will determine the rate at which the learning process can produce an efficient and successful performance. Athletic performance is not only understanding the

game physically and mentally but involves detailed programming starting in the central nervous system.

NATIVAGATING TEAM DYNAMIC POSES GREATER CONTROL OF MENTAL STRENGTH

Athletics involves a variety of different aspects of life. It is usually assumed to be about the embodiment of the sport, and the physical and mental understanding of the sport itself. However, athletics involves a great amount of navigation around the social environment which can greatly affect the individual athlete's performance as well as mental attitude. In the social aspect of athletes there are different factors pertaining to all the individual athletes on the team being which players start, player's don't have any playing time, players who just joined the team, players who have been on the team of years, players who are battling back from an injury, and any other factor that comes into play physically or mentally in athletics. These factors whether individual or a combination of a few can cause division between athletes on the team, especially in immature youth years. These factors starting at a young age can cause predisposed factors to develop sports anxiety. Also, it is important that coaches understand the role that they take on for teams, not only to develop the team to success but to also be sure they are fostering a positive environment of the team and address any issues that they are approached with or view themselves. Athletes struggling in the social aspect, or being put down by their teammates can be absolutely detrimental to their performance, confidence, and skill development. In the most influential years is usually when athletes decide if they want to step away from the sport, or begin to train to the next level. The social environment of the team may be the sole factor that causes an athlete to step away from their sport, as their happiness has decreased and the pressure has become too much to handle with no support from their teammates.

It is important for coaches to be able to separate each individual athlete from the team itself. There is usually a simple assumption that with a proper training plan and skilled athletes will automatically lead to success, as the coach is only there to give directions and it is up to the athlete to bring the motivation to every session. It has been more recently discovered that what motivates an athlete and keeps athletes motivated is a lot more complex than this simple, although true, assumption [23]. Each athlete has complex and individual motivations, although it is most commonly assumed that an athlete either has the motivation or doesn't. The complexity of an athlete's motivation consists of the constant ebbs and flows of a variety of different factors. The most difficult part about navigating an individual athlete's motivation is to take sufficient physical and mental breaks from training, but also being able to maintain their training progress. Therefore, utilizing positive team dynamics in training can work toward an individual athlete's advantage. There are studies that have been conducted to evaluate specific leadership styles and team dynamics on team performance and individual performance. A leader on a team is described as pivotal for effective team functions, as leaders have responsibility for team members and the direction of all team activity and processes [24]. Through analysis of the studies it was found that leaders who displayed higher cognitive ability, conscientiousness and charisma were more equipped to mediate their teams in order to enhance team performance outcomes. The values and priorities of team members were positively changed by the leadership of charismatic and transformational leaders. It was also found that leaders with these characteristics motivated their teammates to perform beyond their expectations. On the other hand, leaders who prioritized a more centralized structure with the decision making authority concentrated at the top with all others at lower levels mandated to follow the directions from the top levels, were associated with negative effects on conflict and performance [24]. This leadership dynamic was also found to affect relationships between individual team members, being socially and competitively. In relation to leadership within team dynamics, the relationship between supportive team behavior was also analyzed through multiple studies. The analysis of supportive team behavior consisted of the ability to anticipate other team members' needs through accurate knowledge about their roles and responsibilities, team performance, and complement each other [24]. It was determined that teams that developed strong group identity, communication and structural cohesion mitigated the adverse consequences of team conflict and collective team failure [24]. Team conflict was discovered to have negative consequences on task

performance, however task conflict has positive impacts on team performance in teams who have established open discussion and emotional stability. Teams who are more willing to engage in more cooperative behaviors become more efficient, effective, and viable [24]. The supportive team behavior dynamic has positive effects on both individual performance monitoring and team performance. Team dynamics will be influenced by the presence of different characters of the individuals on the team. In team members low on self-efficacy and agreeableness, the team climate will encourage exploitation and exploration respectively deliver increasing performance and creative benefits. If the team encouragement for exploitation increases the returns on such encouragement will diminish causing individuals with high levels of self-efficacy and agreeableness to show less additional performance and creative returns [24]. Therefore, individual attitude ultimately affects team dynamic and performance, as well as individual dynamic and performance. It is important that coaches are consciously aware of the team dynamic that they are fostering for not only overall team success but also the mental stability of the individual players. As shown in the research performed and analyzed, negative team leadership and attitude has the ability to decrease individual performance, which in turn has negative effects on self esteem. The prolonged exposure to a negative team environment will begin to give rise to not only negative team performance, but can induce sports performance anxiety onto the individual players. If a player begins to suffer from sports performance anxiety more than their teammates, they may feel that they are alone and embarrassed to keep trying and not producing any success. Therefore, these athletes become more caught up in the thoughts in their head, than the love that they have for the game. To show up to practice or a game begins to become a mental struggle above all else, fighting to keep themselves in the right headspace to be able to perform decently and keep themselves in a peaceful headspace. The struggle becomes even greater when the social environment is fostering negativity and toxic competitiveness. This development at a young age begins to have the athlete associate their sport with these feelings, instead of separating all of the factors contributing to their anxieties and worries. Therefore, they can become more susceptible to allowing emotions to dominate in situations that have caused negative emotions in the past. The factors causing sports performance anxiety are not highlighted enough for athletes to feel comfortable addressing their concerns, ultimately leading to losing that sense of fun or love for the game, and the entire experience becomes a mental battle within to one day get back that joyful feeling they once had for the game. This becomes mentally and physically exhausting, causing other psychological and physiological issues in the athlete which can begin to affect daily life. As cliché as it sounds, cultivating kindness and support in athletics is critical for optimal performance and team success.

IMPLEMENTATION OF TACTICS AND COPING MECHANISMS TO DIRECTLY HELP ATHLETES ACROSS ALL AGES

To be able to balance demanding schedules, especially student-athletes, poses great challenges in academic, athletic, and social standpoints. If anxiety and mental struggles that arose from athletics begin to interfere with everyday life, it can feel very isolating and debilitating. Most athletes are not equipped with the resources in order to deal with these challenges and manage everyday life. It is normal for athletes to experience an increase in emotions prior to a sporting competition, however if the increase in emotions results in an increase in anxiety and becomes unmanageable, performance is hurt and mental struggle can increase. It is simple for an athlete to resign to feeling intense emotions of nervousness and worry, however it is important for them to recognize that they are fully capable of taking active steps to reach and maintain a healthy prime intensity [8]. There have been coping mechanisms identified such as “psych-down” techniques that can be used for athletes to grasp their emotions and intensity. The most effective technique, although seeming simple, is deep breathing. When experiencing overintensity the first thing that is disrupted is breathing as it becomes short and choppy diminishing the amount of oxygen the body needs to perform at its maximum potential. Therefore, the most simple way to lower the feelings of intensity is to take voluntary control over breathing patterns by taking slow and deep breaths, to consume a sustainable amount of oxygen in order to equip oneself to function optimally. This will also give an athlete a greater sense of control, providing more confidence and enablement to prevent negative thoughts that are caused by feelings

of overintensity. This also has the ability to let go of negative emotions such as fear and frustration that are usually associated with sport competition, and allow an athlete to regain positive emotions such as excitement and satisfaction [8]. Additionally, for an athlete to zone in on control of breathing it can distract the mind from the original causes of negative anxiety provoking emotions and thoughts.

Another tactic that can be utilized as a coping mechanism that can be implemented for athletes is muscle relaxation. Emotions such as nervousness and worry cause athletes to experience muscle tension. It can become a crippling physical symptom as the muscles become tight and stiff due to negative emotions hindering optimal performance. There are two different muscle-relaxation techniques: passive and active relaxation [8]. Muscle relaxation works similarly to the deep breathing technique as it allows an athlete to regain control of the body and force the body into a more relaxed state. Passive relaxation pertains to imagining the tension as liquid filling the muscles creating discomfort interfering with the body's optimal performance. As an athlete goes through this mechanism they should position themselves lying down in a quiet place without disturbance. To begin this mechanism an athlete should start by focusing on their breathing, allowing tension to drain out of the muscles conforming to focusing on the overall state of mental calmness and physical relaxation [8]. Active relaxation is utilized when the body is very tense and the muscles can't be relaxed through passive relaxation mechanisms. Therefore, active relaxation works by first voluntarily tightening the muscles even more than they already are, then relaxing the muscles. This usually works best with the four major muscle groups of the face and neck, arms and shoulders, chest and back, and buttocks and legs [8]. However, it can be individualized to the specific muscles causing issues. Both passive and active relaxation can be utilized in an abbreviated form during competition. When there is a pause in performance an athlete can pause for about 5 seconds to allow the tension to drain out of the tense parts of the body or take 5 seconds to tighten then relax the muscles. In addition to both passive and active relaxation, slowing the pace of competition and breaking it down into play by play can reduce the emotions of anxiety as it allows the body to recenter during each break in performance.

The quickest way to provoke anxiety within an athlete is for them to focus on the outcome of the competition. A helpful tactic implementation is known as process focus, which redirects the focus of the competition away from the outcome and onto the process [8]. The process focus can involve focusing on the technique or tactics, focusing on mental skills such as positive thinking or psych-down strategies [8]. Process focus also involves shifting focus to breathing patterns in order to calm down the fight or flight response and allow optimal oxygen into the body. It has been observed that process-focus coping mechanisms take the mind off of things that cause over-intensity and shift focus onto things that reduce anxiety, build confidence, and give you a greater sense of control over the sport [8]. There are many simple implementation tactics that actually have great effectiveness on athletes. A simple implementation is identifying keywords such as calm, easy, and relax that act as reminders of how you should feel in order to contain the emotion intensity levels to produce optimal performance. Keywords are specifically important when in the height of a competition wrapped up in all of the pressure that blinds an athlete to what they need to do in order to perform to their best ability. Music is another simple implementation tactic that can go a long way with helping reduce anxieties for athletes. Music has the ability to act directly on an individual physically and mentally. It automatically produces positive emotions such as joy and contentment [8]. This last implementation tactic sounds extremely cliché, but has scientific evidence to promote feelings of relaxation and happiness. This is the act of smiling. As an individual grows up and develops they become conditioned to the positive effects of smiling. Therefore, the emotional associations with the physical act of smiling are feelings of happiness, content, and positivity. The physical act of smiling actually induces the brain to release brain chemicals known as endorphins that have a physiologically relaxing effect on the body [8]. It is important for athletes to be reinforced that sometimes the most simple actions and tactics can help them in numerous ways. Therefore, education of these tactics should be implemented into all sports, at all age levels to prevent the spiral of mental health struggle that can become debilitating very quickly.

The coping mechanisms and psych-down techniques can be extremely beneficial and effective, however it is important to actually develop a routine performance of these techniques. These tactics should be rehearsed in practice and less important competitions at first, this is because the goal is to implement them routinely so when the athlete reaches a major competition the tactics will be used almost automatically when feelings of anxiety, nervousness, worry and panic arise. These coping mechanisms should be essential in all sports, because it is important from a young age to develop these tactics to be able to perform under pressure in a healthy and successful way. It is too often that athletes become stuck in a battle with themselves wondering why they can not handle the pressure or even be able to deal with it to make it through their practice or competition. They are often assumed to be able to “fight through it”, and are never educated in ways to process their emotions and develop ways to keep them at bay. There is hope for athletes struggling with mental health, it is critical that they are supported and educated about ways to regain their love and enjoyment their sport originally provided for them.

CONCLUSIONS

The interconnection of the brain and movement is incredibly complex without the addition of outside factors such as pressure building and meeting a certain standard within the sports atmosphere. The pressure put on athletes from a young age until adulthood is intense and overwhelming, yet there is still not enough education or implementation of how to manage the pressure and be able to reach optimal performance levels. Sports performance anxiety is a major struggle for athletes in the athletic world across all sports. It psychologically and physiologically alters the way an individual thinks and performs in sports, and if it is not addressed it can eventually transfer into daily life. Anxiety is a difficult condition to deal with due to the debilitating effects it can have on an individual, as well as the stigma surrounding individuals, especially athletes with anxiety. Some individuals are ignorant to the intense effect of anxiety, and do not believe it is a real condition. However, anxiety affects every aspect of the body and as it increases it can alter the function of the body psychologically, and physiologically in a negative way. Since these alterations can develop subconsciously it can make an athlete feel helpless to themselves as they are stuck in this state experiencing depression and failure, due to the changes prolonged anxiety and stress has implemented in their bodies. There is potential to reverse these effects with the correct coping mechanisms and the development of healthy and effective routines. Most importantly, it is normal to experience these feelings and it is important to understand how the outside environment intensely affects the internal, especially in athletics.

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