

PERCEPTION OF DEPRESSION, ANXIETY, AND STRESS IN STUDENT-ATHLETES

Perception of Depression, Anxiety, and Stress in Student-Athletes Before and After Return to  
Campus Following COVID-19 Induced Social Isolation

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PERCEPTION OF DEPRESSION, ANXIETY, AND STRESS IN STUDENT-ATHLETES



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# PERCEPTION OF DEPRESSION, ANXIETY, AND STRESS IN STUDENT-ATHLETES

## Abstract

*Introduction:* To analyze the mental health status of student-athletes following COVID-19 induced social isolation, perceptions of depression, anxiety, and stress were measured before and after athletes return to campus. The primary hypothesis is that there will be a change in the perception of depression, anxiety, and stress in student-athletes before (T1) and after (T2) returning to campus following COVID-19 induced social isolation. The secondary hypothesis is that the rates of depression, anxiety, and stress in student-athletes will be significantly higher than normative values for 20-29-year-olds. *Methods:* One hundred fourteen NCAA Division II student-athletes took part in this study. They took the DASS-21 questionnaire in the Fall semester of 2020 and again in the Spring semester of 2021. *Results:* Between T1-T2 there were significantly lower scores of depression ( $p < 0.001$ ) and stress ( $p < 0.001$ ), but not anxiety ( $p = 0.107$ ). Compared to the normative values, the student-athletes had significantly lower scores of their perceived depression at T2 ( $p < 0.001$ ), anxiety at T2 ( $p = 0.001$ ), and stress at T1 ( $p = 0.009$ ) and T2 ( $p < 0.001$ ). *Conclusion:* The perception of depression and stress decreased as time went on. Compared to the normative values for 20 to 29-year-olds, the student-athletes had lower stress at both T1 and T2 and lower depression and anxiety at T2. This sample of student-athletes showed incredible resilience and the ability to bounce back.

*Keywords:* depression, anxiety, stress, DASS-21, student-athletes, COVID-19

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## Perception of Depression, Anxiety and Stress in Student-Athletes Before and After Returning to Campus Following COVID-19 Induced Social Isolation

### **Introduction**

In recent years mental health issues have been receiving increasing attention. Three mental health disorders that are commonly discussed are depression, anxiety, and stress. The World Health Organization (WHO) ranks depression as a leading cause of disability worldwide (Fitzmaurice, 2018), due to its tendency to diminish the functioning and quality of life (APA, 2013). Depression, in general, can be characterized as an overwhelming feeling of hopelessness.

Anxiety is defined as an anticipation of a future threat. Anxiety is characteristic of excessive worry and fear. Panic attacks are prominent within anxiety disorders but can be observed in other mental disorders. Severe anxiety can trigger panic attacks, defined as sudden episodes of intense anxiety and fear, brought on by the perception of an imminent threat. Furthermore, anxiety comes in two temporal classifications and two manifestations. State anxiety is a temporary state of being and reflects an individual's current feelings, while trait anxiety is a stable and enduring characteristic or pattern of behavior (Cox, 2006). Cognitive anxiety is the negative experience associated with the brain. Symptoms of the mind often going blank, or difficulty concentrating would fall under cognitive anxiety (Parnabas, 2015). Somatic anxiety, on the other hand, is the perspective of one's physiological arousal. Somatic symptoms would include chest pain, dizziness, fatigue, and headache.

Stress is the body's response to physical, mental, or emotional pressure. It can be defined as the negative feeling that arises when an individual encounters a perceived stressor and can be caused by something as extreme as being attacked by a bear or as simple as thinking about

paying taxes. Whether the situation is real or perceived, stress is how the body reacts to a potentially harmful situation (APA, 2013).

### **Review of Literature**

#### **Prevalence in General Population**

Depression affects more than 264 million people worldwide. The overall rate of depression in adults is 6.7% (Wolanin, 2016). In the National Health and Nutrition Examination Survey from 2017 to 2018, 6.9% of men and 10.1% of women reported depression symptoms. During a study conducted in 2020, 21.9% of men and 33.3% of women reported symptoms of depression (Ettman, 2020).

Anxiety disorders can affect up to 33.7% of the population during their lifetime. According to a variety of epidemiology surveys done on anxiety, 10.1% - 21.3% of people will suffer from an anxiety disorder in a 12-month span (Bandelow, 2015). It is estimated that 30 million Americans will suffer from an anxiety disorder at some point in their life (Lepine, 2002). Seven out of 10 American adults claim to experience anxiety daily (Beiter et al., 2015). One study observing anxiety trends among United States adults found that anxiety increased from 5.12% in 2008 to 6.68% in 2018 (Goodwin, 2020).

Each year the American Psychological Association (APA) conducts surveys regarding stress across America. The results for the 2020 survey differed from years past being that COVID-19 has vastly affected people's lives. The APA believes that 2020 is the beginning of a national mental health crisis that could yield serious health and social consequences for years to come. Eight in 10 adults say that the COVID-19 pandemic is a significant source of stress in their life, with 2 in 3 adults expressing an increase in their overall stress in 2020 (APA, 2020).

#### **Prevalence in College Students**

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A meta-analysis done by researchers at the University Malaysia Sabah reports that at any given time, 10 to 20% of students will be suffering from psychological problems (Kumaraswamy, 2012). Prevalence rates of depression are higher in young adults between the ages of 18-25, at 8.7% (Wolanin, 2016). In a 2015 study, almost 10% of college students got diagnosed or treated for depression (Beiter et al., 2015). During a meta-analysis aimed at identifying depression in the university setting, 30.6% of students had depressive disorders (Ibrahim, 2013). In terms of depression, 43% of students identified that they felt “so depressed it is hard for them to get going” (Sharma, 2018).

In a 2017 study, researchers from the University of Virginia collected mobile data to see if time spent at home had any correlation to depression, anxiety, and isolation in college students. There was an association between the time spent at home and negative feelings. Additionally, there was a significant relationship between time spent at home and levels of anxiety in college students (Chow et al., 2017). Through the use of mobile sensing, phone overuse can now be linked to depression in college students (Wang, 2018).

It is important to monitor stress in students since it is often a precursor to depression, anxiety, and other mental health disorders (Yusufov, 2019). Stress is an inevitable part of life and it has become more prevalent among college students. In 2020, 87% of college students reported their education is a significant stressor (APA, 2020).

For academic institutions to effectively address mental health issues, they need to understand what is causing an increase in depression, anxiety, and stress. Common stressors for college students include an increase in academic demands, being away from home for the first time, exposure to new ideas and philosophies, fear of failure, and changes in their relationships with their family and friends (Kumaraswamy, 2012). Stanford researchers found physiological

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distress to be extremely common in college students, with 1 in 3 students describing themselves as anxious or tense (Sharma, 2018).

### Prevalence in Student-Athletes

In the literature, it is proposed that student-athletes must be uniquely assessed because they have different demands compared to non-athletes (Brown et al., 2014). Compared to male athletes, female athletes are at a greater odds of experiencing symptoms of depression ranging from as low as 1.31 to as high as 1.84 times their male counterparts (Yang, 2007; Wolanin, 2016).

A recent study evaluating the mental health of elite athletes found that this population suffers from mental health symptoms that are equivalent to or exceed those in the general population. Mental health disorders occur in 5% - 35% of elite athletes in 12 months (Reardon, 2019). Another study supplements Reardon's work by stating that student-athletes struggling with depression and anxiety are more likely to not report these issues (Brown et al., 2014). With underreporting, there is a possibility that athletes will be overlooked as a population due to the belief that there are no significant differences in mental health issues compared to the general population. The study also suggests that the added strain caused by COVID-19 could increase the vulnerability of athletes. Psychotherapy has been identified as an effective way to treat mental health issues, but with limited and remote access to these tools, athletes may suffer from a lack of resources. This highlights the need to investigate the mental health of this population. One method of treating depression and anxiety is by taking medications. There could be an increase in mental health issues due to the inaccuracy or lack of prescriptions due to telemedicine communication (Reardon et al., 2020).



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A 2020 study conducted by the NCAA surveyed the mental health status of athletes after the announcement of the 2020 athletic season cancelation and a resurvey thirty days later. Compared to the first round of the survey, mental health concerns were 150-250% higher during the second survey. The survey analyzed men and women individually. Regarding feelings of depression, there was a 243% increase in men and a 214% increase in women. One question addressing feelings of hopelessness reports a 297% increase in men and a 255% increase in women. Hopelessness is a stable symptom of depression. Feelings of overwhelming anxiety increased by 215% in men and 188% in women when comparing the two time periods. Feeling overwhelmed is a common symptom when feeling stress. There was a 148% increase in men and a 125% increase in women feeling overwhelmed (Meyer, 2020).

Participation in athletics can help athletes in dealing with stress, but it can also become an additional stressor for student-athletes. Time or rather the lack of it is a common stressor among college athletes, with 40% to 50% of student-athletes feeling they did not have enough time to do their best in both academics and athletics. In addition to normal stressors that students experience like exams and preparing for class, athletes also experience additional stressors such as missing classes due to team travels and making up missed assignments/tests (Wilson, 2005).

### Etiology of Depression

In order to better understand these three constructs as a whole, one must be aware of the causes of depression, anxiety, and stress. While the causation of depression is not well understood, many of the theories regarding it focuses on three major monoamine systems: serotonin, norepinephrine, and dopamine. Serotonin is known for its role in stabilizing mood. Imaging of depressed patients has shown a reduction in the number of serotonin transporter binding sites. There is also a low concentration of serotonin found in the cerebrospinal fluid of

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depressed and suicidal patients (Saveanu, 2012). Researchers believe that the depletion of serotonin provokes depressive symptoms. Norepinephrine (NE) is a stress hormone and neurotransmitter that naturally occurs in the body. NE is released in the bloodstream as a part of the body's response to a stressor. NE dysfunction is commonly found in depressed patients. Stress can lead to a sudden cause of depression in vulnerable individuals (Saveanu, 2012). Dopamine is the main neurotransmitter associated with pleasure. Reduced dopamine neurotransmission has been found in individuals with depression. Lack of dopamine is thought to explain why many people with depression experience anhedonia—the inability to feel pleasure (Saveanu, 2012).

One hypothesis is that patients with depression are unable to suppress their cortisol secretion. Those that are unable to suppress their cortisol secretion have been associated with higher severity of depression. Heritability is thought to account for 30% to 40% of the risk of developing depression. The remaining variability is thought to be impacted by the environment of the individual. Environmental influences like abuse or neglect that occur during the developmental stages of childhood are suspected to influence the development of depression (Saveanu, 2012).

### Etiology of Anxiety

An individual's prior experiences have a lot of influence on whether they develop an anxiety disorder. Individuals with social phobia exhibit excessive fear of situations where they believe they could be evaluated or judged by others. Theorists believe that social phobias can arise as a result of traumatic experiences (Mineka, 2006). A study conducted by researchers at McMaster University set out to see if there is a correlation between individuals that had a history of being bullied or teased and anxiety disorders. They found that being bullied or teased is linked

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to multiple anxiety disorders with 92% of individuals in their study with social phobia experiencing bullying or teasing in their childhood (McCabe et al., 2003). Another type of anxiety is post-traumatic stress disorder (PTSD). This disorder is caused by the occurrence of a traumatic event. When individuals with PTSD experience uncontrollable or unpredicted stressors, the result is heightened generalized anxiety and arousal. In addition to traumatic events, how one responds to stressful events can induce anxiety. An individual's perception of controllability and predictability of stressful events has also been tied to the development of generalized anxiety disorder (Mineka, 2006).

### Etiology of Stress

For a situation to be perceived as stress, it must have personal significance or meaning for the individual. Furthermore, one of the following eight underlying properties of stress must be present for an individual to perceive a situation as stressful (Lazarus, 1984). *Novelty* occurs when a person finds themselves in situations in which they have not had previous experience. Most situations are not completely novel resulting in people making associations with their previous experiences. If the novel situation brings up a previous association with harm and danger, the person will deem the situation stressful (Nisbett, 1980). Novelty itself can become the source of a threat if the person is unclear about the significance or meaning of an event. *Predictability* suggests that there are predictable environmental characteristics that can be discerned, discovered, and learned. A predictable event is desirable since it allows the individual the possibility of anticipatory coping. Predictability can also offer the individual information that they are safe from a stressor. Predictability gives feedback about the individual's environment and gives an idea of how much control the individual has. *Event uncertainty* focuses on the likelihood of an event's occurrence and is expressed in probability. *Imminence* refers to the

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amount of time before an event occurs and is the interval in which the event is anticipated (Lazarus, 1984). Typically, the less amount of time before an event the greater the stress reaction (Elowitz, 1978). With the increase in the amount of time before an event, the individual is allowed to “think through” the situation and apply a variety of coping mechanisms. *Duration* is how long a stressful situation lasts (Selye, 1946). This property is closely related to imminence; the difference between the two is that duration is the time during which the event occurs, while imminence is the time before an event occurs. *Temporal uncertainty* is not knowing when an event will occur. *Ambiguity* is referred to as the lack of situational clarity and can limit the individual’s sense of control over a perceived danger and increase their sense of helplessness. The greater the ambiguity, the more personal factors affect whether the individual interprets the situation as stressful or not. The last property of stress is *the timing of stressful events in relation to the life cycle*. The effects of an event may result in heightened arousal, or suppression if it occurs simultaneously with other events. Additionally, whether the individual perceives an event as “on time” or “off-time” can make any event more threatening. Events that happen too early or too late can deprive an individual of the sense of support from their peers. When events are off time, the individual can be deprived of a sense of fulfillment that would have been present had the event been “on time”. Alternatively, if an event occurs too soon, the individual can miss out on the chance to prepare for a new role (Neugarten, 1976). Hypothetical examples are shown in Table 1 to illustrate possible stressors that student-athletes could face.

**Table 1**

*Definitions of underlying properties of stress*

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Property	Description	Example	COVID-19 Example
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(1) Novelty	Situations that the person has not previously experienced. Previous experience may include both experiencing a similar situation and information that can be read, heard, and inferred	First injury of athletic career	Competing with no fans and masks on
(2) Predictability	When established expectancies are no longer met the situation becomes unpredictable	A change in competition structure compared with usual	Decreasing the number of competitions to prevent COVID-19 exposure
(3) Event uncertainty	The likelihood or probability of an event's occurrence. These can be subjective or objective probabilities although subjective estimates do not necessarily match objective ones	An 80% chance of rain canceling play	A 60% chance of the season being canceled
(4) Imminence	The period of anticipation before an event occurs	Anticipation while traveling to the competition	Quarantining in a hotel before attending an away competition
(5) Duration	The length of an event. Events of a long duration will be deemed more stressful than those of a short duration	A two-day competition	Competing in multiple matches in one trip to avoid traveling for multiple trips
(6) Temporal uncertainty	The individual knows that an event will definitely happen but is unsure of the precise timing	Waiting to be called off a substitutes' bench	Waiting for a negative COVID-19 test result
(7) Ambiguity	When the information needed for appraisal is unclear or insufficient resulting from a lack of situational clarity	An unknown referee umpiring the game	Unsure if the season will be held in the fall or the spring, or cancelled outright
(8) Timing of events in relation to the life cycle	Events occurring at the same time as other stressful events in the individual's life cycle may be appraised in relation to these other events	Competing during university exams	Competing during a global pandemic

*Note:* Adapted from *Stress, Appraisal, and Coping*, Lazarus, R. S., & Folkman, S., 1984, Springer Publishing Company. Copyright 1984 by R. Lazarus. Adapted from “Re-appraising stress appraisals: The underlying properties of stress in sport.” by Thatcher, J., & Day, M. C., 2008, *Psychology of Sport and Exercise*, 9(3), 318–335. Copyright 2008 by J. Thatcher.

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## COVID-19

In March of 2020, little was known about the COVID-19 virus. All the uncertainty caused widespread panic among many. Places of employment were closed causing thousands to lose their jobs. Financial uncertainty brought on by COVID-19 could cause many student-athletes to worry. Since many sports had their seasons canceled, this caused student-athletes to worry about the possibility of having their scholarship taken away (Meyers, 2020). Higher levels of depression, anxiety, and stress have been found in individuals experiencing severe social and physical confinement (Rubio, 2021). The longer the period of isolation, the greater the impact on mental health. The level of stress experienced by an athlete may vary depending on their sport.

Previous research has stated that individual sport athletes are more likely to report symptoms of depression and anxiety compared to athletes that play team sports (Pluhar, 2019). Due to COVID-19 induced social isolation, team sport athletes may have a greater increase in mental health issues compared to individual sport athletes due to decreased interaction. A study conducted by Di Fronso and colleagues found that higher-skilled athletes were better at dealing with adversities and regulating their emotions (Di Fronso, 2020). Another study acknowledged that each athlete has a unique engagement with social isolation (Schinke, 2020).

### Relationships Between Depression, Anxiety, and Stress

Common vulnerability factors which influence depression, anxiety, and stress are neuroticism or negative affectivity. When one appears to be suffering from a couple or all of these disorders it is usually caused by an overlapping condition that activates all three states. Although depression and anxiety are fundamentally different, they both have similar symptoms, making it common to be suffering from both (Becker, 1990). Typically in these situations, there

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is one predominant disorder. Stress is a precursor to anxiety and depression in many cases and often coping style is a predictor of one's likelihood of getting anxiety and depression (Lovibond, 1995). Drastic changes in one's mental health can be brought on by traumatic experiences and neurological imbalance.

### Coping

There are many factors that affect an individual's susceptibility to mental health issues, how an individual copes is a major one. Coping can be split into two categories, emotion-focused coping and problem-focused coping. Emotion-focused coping is more likely to occur when the individual has concluded that nothing can be done to alter the harmful, threatening, or challenging environmental conditions. There are a variety of methods that individuals use to lessen the amount of emotional distress that they are experiencing. Alternatively, some individuals actively increase their emotional stress as a form of coping. This is often seen in athletes as they "psych themselves up" for a competition (Lazarus, 1984). Common behavioral strategies are exercise, meditating, seeking emotional support, drinking, and drugs. Some forms of emotion-focused coping can be harmful like drinking and drugs. Positive forms of coping can lead the individual to feel hopeful. If an individual denies what stressors they are facing and refuse to acknowledge what is going on, it can lead to negative consequences like self-deception and reality distortion (Lazarus, 1984). Problem-focused coping is more likely to occur when the conditions can be changed. Problem-focused coping typically follows the process of defining the problem, brainstorming alternative solutions, and acting upon it. There are two major groups that problem-focused coping falls into strategies that change the environment or the person.

### Social Support

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Social support refers to an individual's perception of whether or not they are valued, respected, supported, and understood by others (Li, 2021). Social support does not come from just friends, but also family, teachers, and coaches. When one has low social support, it is a predictor of psychological problems and is associated with depression and anxiety (Li 2021). Those wishing to serve as social support for student-athletes should work to recognize the needs of student-athletes and make changes when necessary. To plan for barriers and how to move past them when they do arise, confirm the value of being a student-athlete, and create a supportive environment that encourages the student-athlete to make their own decisions over their education and sport (Knight, 2018).

### Gaps in the Literature

Many of the effects of COVID-19 on student-athletes mental well-being are still unknown. There have been a handful of studies addressing the mental health of athletes during COVID-19, but a majority of them have proposed anticipated results based on what has been found in regards to athletes' mental well-being. There is a need for more studies to report observed findings in student-athletes. The literature focuses primarily on social connection and not on the effects of social isolation. As research has started to be published regarding COVID-19, the field regarding isolation involves more diverse populations like athletes.

While there is research to suggest sport-specific stressors, there is a lack of research investigating the etiology of depression and anxiety in sports. Additionally, there is a lack of research analyzing if the sports that student-athletes participate in are the source of their depression, anxiety, and stress. There is a lack of research examining the combination of depression, anxiety, and stress levels using the DASS-21 questionnaire specifically on student-athletes.



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In recent years, there have been major expansions in the literature observing the mental health status of athletes. Research suggests that increased time indoors may impact the mental health of college students. Considering that student-athletes have decreased contact with their teammates, it has been suggested that their mental health will suffer (Jukic, 2020). Being at school also adds additional challenges to the lives of student-athletes and the demands of school may impact mental health status. While many studies acknowledge that athletes face additional stressors, few studies state or identify the percentage of student-athletes that are stressed.

Therefore, the purpose of this study is to identify if there is any change in the perception of depression, anxiety, and stress in student-athletes before and after returning to campus following COVID-19 induced social isolation. The first hypothesis (H1) is that there will be a significant decrease in the perception of depression, anxiety, and stress between T1 and T2. The second hypothesis (H2) is that the student-athletes will have significantly higher levels of perceived depression, anxiety, and stress compared to normative values for 20-29-year-olds.

### **Methods**

#### Participants

This study was approved by the Point Loma Nazarene University (PLNU) institutional review board and followed the National Institute of Health standards for human research testing. Before participation in the study, subjects were presented with an informed consent document and were given the option to withhold all information from the research team. Inclusion criteria included that the participants needed to be on a PLNU athletic team and a willingness to participate in the Athlete Monitoring Initiative (AMI) at PLNU.

#### Materials

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Subjects completed the battery of questionnaires on two separate occasions, once immediately upon returning to campus after spending several months outside a team or campus environment due to COVID (Timepoint 1, or T1), and again upon returning to campus after winter break (Timepoint 2, or T2). One hundred fourteen participants volunteered to have their data used in this study. The participants were presented the questionnaires by an athletic trainer and allowed to ask questions and voice concerns. The athletes completed the questionnaires after the instructions were explained to them in person. The questionnaire was accessible to them by email and completed online. At each time point, the participants took the DASS-21 survey. T1 was conducted at the beginning of the Fall 2020 semester and asked the student-athletes to reflect on their emotional state before returning to campus. For T2, the student-athletes were asked at the beginning of the Spring 2021 semester to reflect on their past week and their feelings now that they are back on campus.

Diagnosis of depression, anxiety, and stress needs to be done by a healthcare professional. Though the DASS-21 questionnaire is not an official diagnosis, the questionnaire is often used as a tool for health care. It was once thought that objective forms of measurements like blood markers or heart rate were the most effective way to measure changes in athletes. Subjective measures, like questionnaires, have been validated as an effective method of assessing well-being (Saw et al., 2016). Questionnaires are frequently implemented as they are a popular subjective form of measurement. Given the nature of this study, those that scored moderate or above in a category, or mild or above in more than one category, were emailed resources that the school provides for those struggling with depression, anxiety, and stress. Twenty-nine students fit this criterion and were contacted by an athletic trainer. In this email, the student-athletes were

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also allowed to meet with the athletic trainer that administered the test about resources and possible next steps.

The DASS-21 questionnaire (Depression, Anxiety, and Stress Scale) serves as a way to assess depression, anxiety, and stress. It has been validated as an accurate way to assess levels of depression, anxiety, and stress in adults and student-athletes (Henry, 2005; Vanghan, 2020). The questionnaire uses three subscales to assess each measure individually.

### Equipment

The DASS-21 questionnaire analyzes three different mental health components: depression, anxiety, and stress. The scale has twenty-one questions with seven questions representing each category, with the rating scale spanning from 0-3. Each number represents the following: 0 - Never (did not apply to me at all), 1 - Sometimes (applied to me to some degree or some of the time), 2 - Often (applied to me to a considerable degree, or a good part of the time, and 3 - Almost Always (applied to me very much, or most of the time). After the completion of the questionnaire, the scores for each category were added up. Since the DASS-21 is an abbreviated version of the DASS questionnaire, the scores of the DASS-21 questionnaire are doubled. Each mental health category has its own scale for rating the severity of the individual. The higher the individual scored in each category, the higher their depression, anxiety, or stress levels were.

### **Data Analysis**

Descriptive statistics (means  $\pm$  SD) were calculated for both pre and post-sessions of the DASS-21 questionnaires. Given the large sample size, the power was set at 95%; to achieve that power, there needed to be at least 42 participants, which was satisfied in this study. Statistical

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analysis will be set at a significance level of less than or equal to 0.05. Data analysis was done using JASP, Excel, and G\*power (JASP Team, 2020; Microsoft Corporation, 2018; Faul, 2009).

**Results**

The primary purpose of this study was to determine if student-athlete perception of depression, anxiety, and stress significantly decreased from T1 to T2. When running the assumptions checks, all three variables had a significant deviation from normality. It is expected that the majority of individuals would be in the mild category for each construct, and therefore not evenly distributed. Between T1 and T2 there was a significant decrease in the levels of perceived depression ( $p < .001$ ) and stress ( $p < .001$ ).

**Table 2**

*Descriptive Statistics*

	Depression T1	Depression T2	Anxiety T1	Anxiety T2	Stress T1	Stress T2
Mean	6.544	2.737	3.982	3.211	9.105	5.035
Std. Deviation	7.011	4.201	5.291	4.727	7.292	5.383

**Table 3**

*Comparing Depression, Anxiety, and Stress at T1- T2*

Measuring	t	p	Mean difference	SE Difference	Cohen's d	95% CI for Cohen's d	
						Lower	Upper
Stress T1 - T2	6.940	*<0.001	4.070	0.587	0.650	0.447	0.851
Anxiety T1 - T2	1.627	0.107	0.772	0.474	0.152	-0.033	0.337

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Depression T1 - T2 5.867 \* $<0.001$  3.807 0.649 0.550 0.351 0.745

\* $p < 0.05$

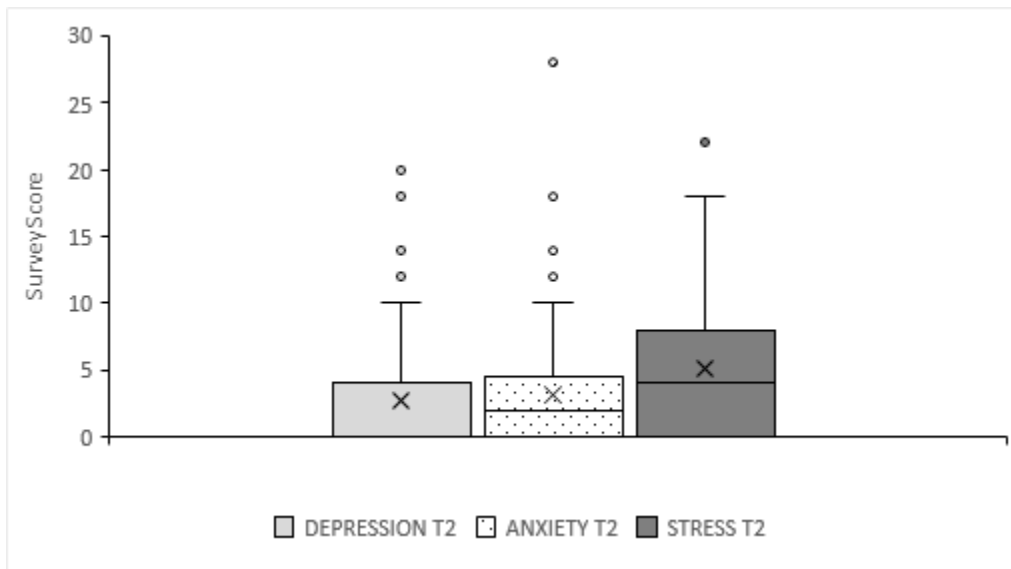
**Figure 2**

*Survey Scores at T1*



**Figure 3**

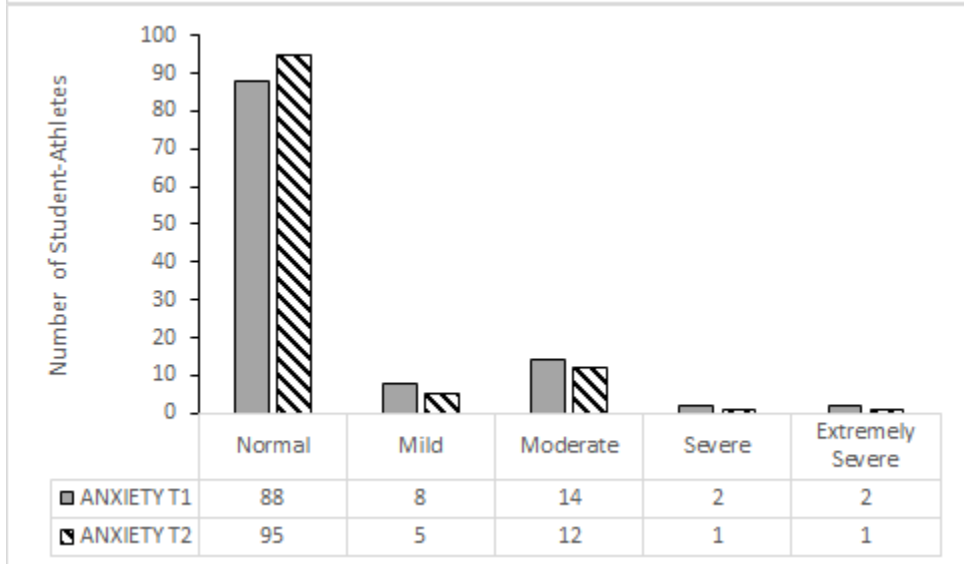
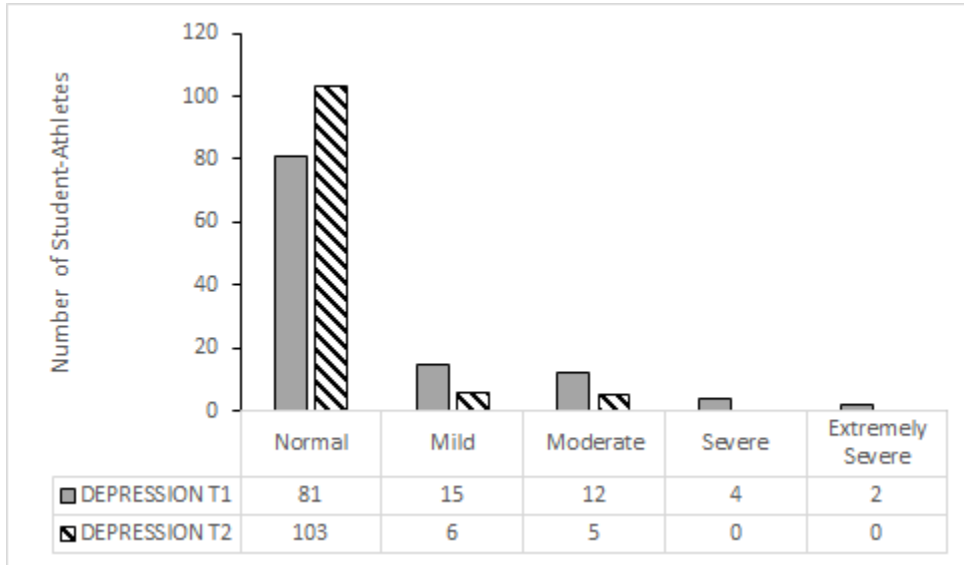
*Survey Scores at T2*



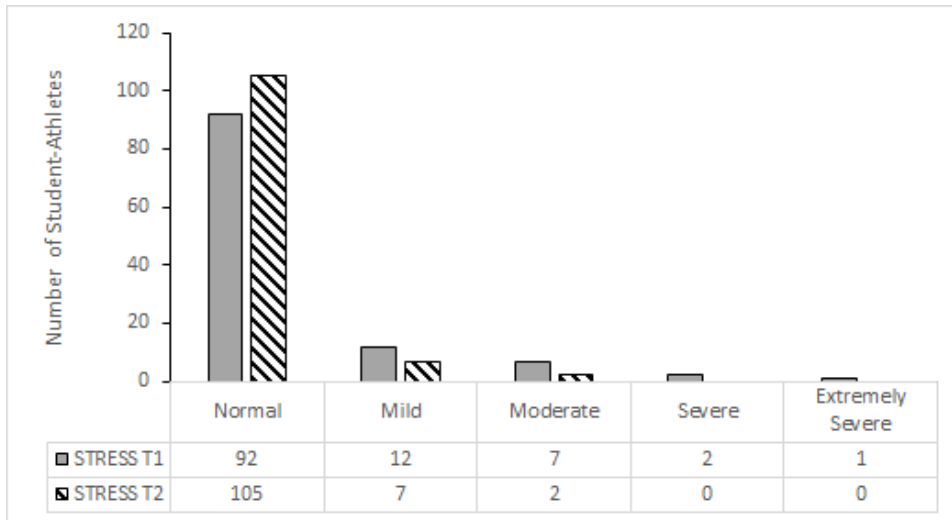
**Figures 4-6**

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## Depression, Anxiety, and Stress Scoring



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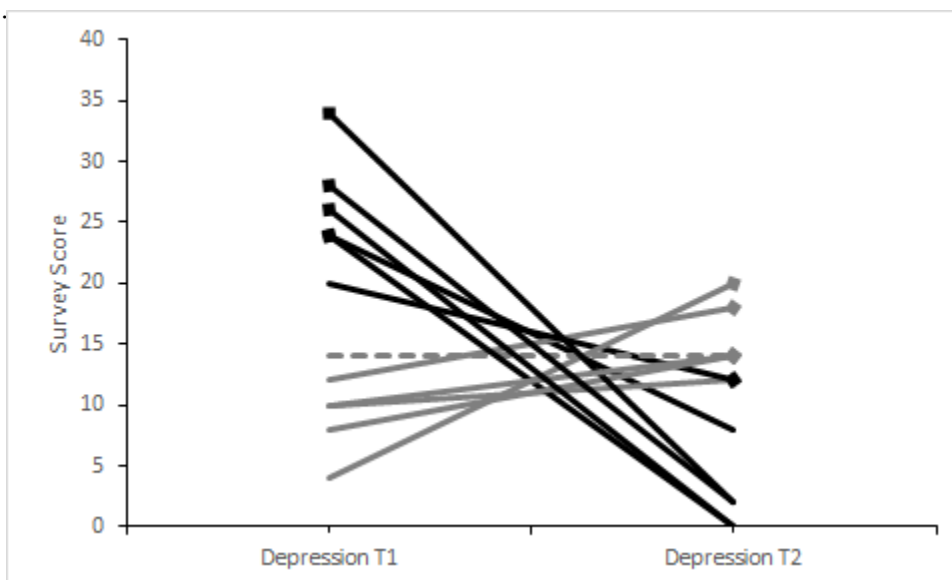


Outliers

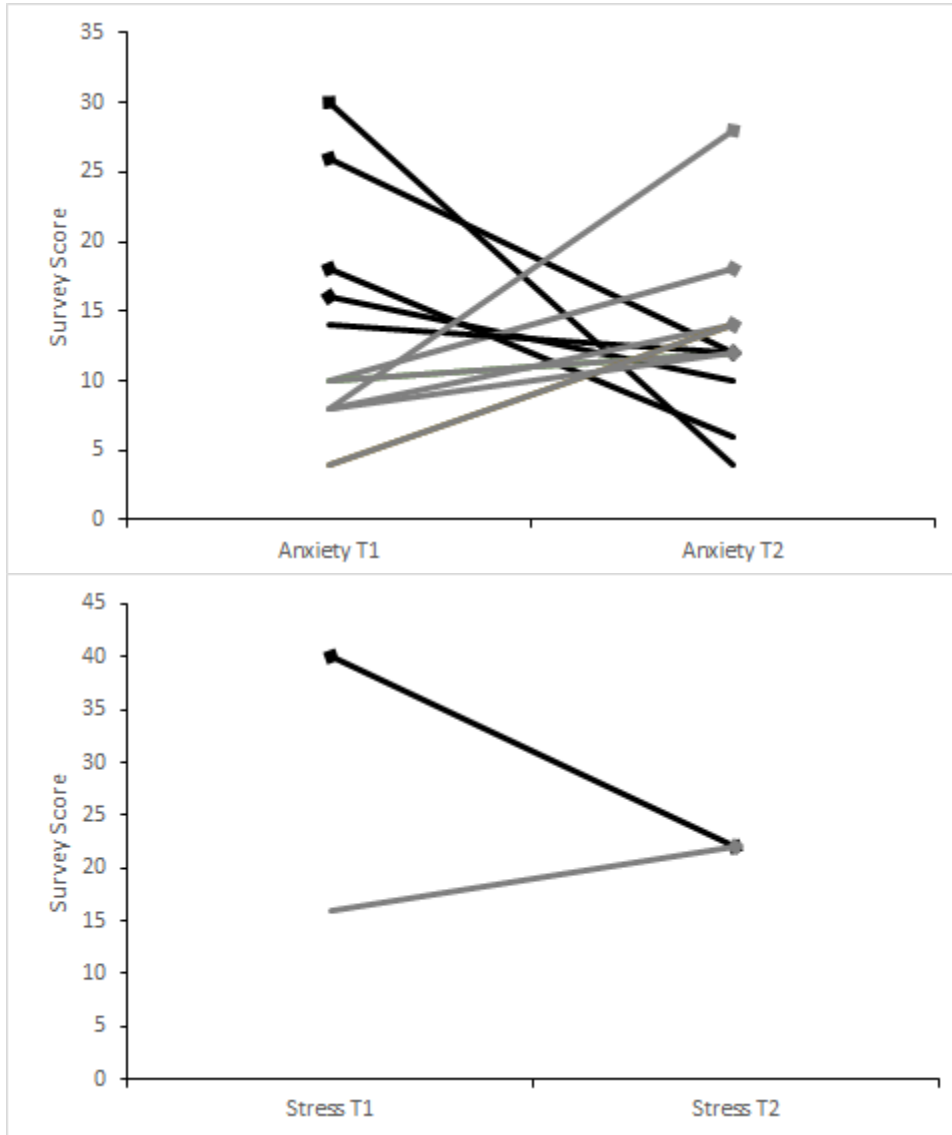
As shown in figures 7-9, the outliers had a lot of variability between the two timepoints. While many perceived themselves as being in a better mental state at T2, there were still student-athletes that were struggling with their mental health at T2. Figures 7-9 depict some student-athletes that even got worse.

**Figures 7-9**

*Change in Depression, Anxiety and Stress outliers from T1 -T2*



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Notes: The diamond indicates that the score was an outlier. A black line indicates that the score decreased from T1-T2, while the grey line indicates that the score increased from T1-T2. A dotted line indicates that there was no change in score between the timepoints.

The secondary purpose was to determine if the student-athletes perception of depression, anxiety, and stress was significantly higher than the normative values for 20-29-year-olds. The student-athletes had significantly lower scores of their perceived depression at T2 ( $p < 0.001$ ), anxiety at T2 ( $p < 0.001$ ), and stress at T1 ( $p < 0.001$ ) and T2 ( $p < 0.001$ ) compared to the normative values.



**Table 4**

*Student-Athletes Compared to 20-29-year-olds Normative Values*

	Depression T1	Depression T2	Anxiety T1	Anxiety T2	Stress T1	Stress T2
<i>p</i>	0.783	< 0.001*	0.135	< 0.001*	< 0.001*	<0.001*
<i>t</i>	0.276	7.717	1.497	3.268	2.591	9.330

\**p* < 0.05

### Discussion

#### Mental Health Disruption

At T1, 29% of student-athletes were in the mild or above category for depression, 23% for anxiety, and 19% for stress. At T2, these percentages dropped to 10% of student-athletes in the mild or above category for depression, 17% for anxiety, and 8% for stress. The findings for depression and stress, but not anxiety, supported the primary hypothesis. Another study found that 54.3% of athletes had mental health disruptions during COVID-19, which is vastly different from the findings in this study (Facer-Childs, 2021).

#### Timing

The findings in this study are drastically different from other studies regarding mental health in student-athletes during the COVID-19 pandemic, this difference can be attributed to the timing of this study. Our study took place in October 2020 for T1, 7 months after the COVID-19 lockdown began. T2 occurred in January/ February of 2021, 10/11 months after the COVID-19 lockdown began. A study conducted by the NCAA first in March of 2020, and one month later in April of 2020 found an increase of 150% - 250% in mental health concerns in student-athletes (Meyers, 2020).

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### Barriers to Seeking Counseling

Underreporting could be a possible explanation for this study's findings. Student-athletes had significantly lower scores compared to the normative data for stress at T1 and all three constructs (depression, anxiety, and stress) at T2. The normative data for 20-29-year-olds omitted students, meaning that student-athletes were also omitted (Lovibond, 1995). Previous research has noticed that there is an increase in the number of students that self-report that they are anxious, worried, and concerned (Leimer, 2014). Even with this increase, there remains a barrier between student-athletes seeking counseling services (Graupensperger, 2020). This barrier is both internal and external. There is a “team” mentality that student-athletes take on which encompasses quick recovery and self-sufficiency. The two main internal barriers that student-athletes face are social stigma, and a win-at-all-cost mentality (Leimer, 2014; Watson, 2006). Student-athletes tend to be well-known around campus and this brings a sense of popularity. Some student-athletes fear the social stigma that can be attached to using counseling services. This type of thought process associates negative results outweighing the possible benefits of seeking counseling. Forty-two percent of student-athletes believe that talking with a counselor is a poor way of dealing with emotional conflicts (Leimer, 2014). The win-at-all-cost mentality suggests that student-athletes need to prioritize the good of their team and winning over their personal issues (Leimer, 2014; Watson, 2006). External barriers that student-athletes face are outside of the athlete’s control. Student-athletes can perceive the athletic department as a separate entity within the university. This belief leads students to seek guidance from coaches and teammates when dealing with mental health issues. Institutions may be hesitant to give out more resources to student-athletes since they often have access to a multitude of additional resources that other students do not. A major stressor of student-athletes is time management;

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they may not seek help since it is an additional activity on top of their athletic demands (Leimer, 2014).

### Faith-Based Institutions

This study took place at a faith-based institution that actively practices religion. Many students practice their faith through conversations that occur within the classroom, in chapel, and in the residential communities on campus. Students' religious practices and spiritual environment contribute to positive coping behavior. The lower scores of depression, anxiety, and stress could be explained by the students having better coping behaviors. Students that attend faith-based schools are less likely to participate in negative coping behaviors such as drinking, drugs, and sexual activity (Jennings, 2018). Previous studies have shown that there is an inverse relationship between those that are religiously committed and stress. When comparing individuals with similar levels of stress, those religiously committed coped more efficiently than those that are not religiously committed (Lee, 2007).

### Home Environment

T1 had the student-athletes reflect on the time that they were at home due to COVID-19 but should have been at school. Their environment at home could have been an additional stressor causing an increase in their perception of depression, anxiety, and stress. One study suggests that up to 21% of college students could be living in a house where there is domestic violence (Plumridge, 2009). Some people may find the idea of increased time at home to be unsettling; during COVID-19 isolation there was a 25% increase in calls to the National Domestic Abuse Helpline. Often school is the only safe place for children and young adults that are in abusive households (Donagh, 2020). This lack of a safe place could lead to increased issues of mental health. For most college students the first time they are away from home, their

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newfound independence can bring them to the realization that they were not living in a good environment. Given the sudden onset of the stay-at-home orders and quarantining for COVID-19, student-athletes may have not had enough time to make arrangements to live elsewhere.

### COVID-19 as a Stressor

In late 2019, several cases of pneumonia in Wuhan, China were caused by a novel strain of coronavirus. The novel coronavirus disease (COVID-19) spread rapidly and with hundreds of thousands of cases, it was registered as a pandemic by the World Health Organization (WHO) (Fronso, 2020). In March of 2020, the United States, along with many other countries, went into lockdown. There was a cessation of mass gatherings, which required quarantining, and social distancing in an attempt to contain this contagious disease.

Research is starting to emerge on the impact of COVID-19 on athlete's mental health, sleep, and training. A study covering one's needs during COVID-19 stressed the importance of increased physical activity to help maintain mental health (Matias, 2020). Sports that require specific facilities, and equipment may suffer from more stressors during COVID-19 due to the restrictions on outdoor activities. One study found that physical activity was disrupted for 78.9% of athletes; since physical activity is a positive method of coping for many athletes, this disruption could contribute to mental health issues (Facer-Childs, 2021; Jennings, 2018) Sleep disturbances are harmful to athletes due to the decrease in performance, impaired recovery, and increased injury risk. COVID-19 caused sleep disruptions in 56.7% of athletes (Facer-Childs, 2021).

While examining sub-elite and elite athletes during the COVID-19 lockdown, they found that mental health was disrupted for 54.3% of athletes (Facer-Childs, 2021). T1 in our study took

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place during COVID-19 induced social isolation, 29% of student-athletes scoring in the mild or above category for depression, 23% for anxiety, and 19% for stress. These percentages are significantly higher than the scores for T2, with 10% scoring a mild or above in depression, 17% for anxiety, and 8% for stress. Research suggests that athletes will have a reduction in mental health issues over time (Rubio, 2021). This aligns with this study's findings over significantly less depression and stress from T1-T2.

### Limitations

The present study has several limitations and should be interpreted with caution. T1 was administered retrospectively due to the student-athletes arriving on campus later than usual to follow COVID-19 restrictions. The student-athletes were asked to reflect roughly two months back. People tend to be unreliable in remembering their emotions. While that is typically true, positive emotions often are remembered with greater detail (Wood, 2006). The normative values that the student-athletes we compared to, were for 20 to 29-year-olds. The normative values for 20 to 29-year-old omitted students. It should be acknowledged that there were student-athletes in this study who were under 20-years-old. There was also a lack of COVID-19 specific questions in the questionnaire that was administered. The student-athletes were sitting near their teammates while they took the questionnaire on their mobile devices. It is unknown whether the student-athletes may have felt less comfortable sharing how they truly felt in fear that someone around them would see their results. Alternatively, the student-athletes may have felt more comfortable taking the questionnaire around their teammates.

### Application

#### Mental Health Screening

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Our findings apply not only to student-athlete mental health during COVID-19 but student-athlete mental health as a whole. One study found that only 39% of NCAA sports medicine departments did a mental health screening (Kroshus, 2016). Although the rates of depression, anxiety, and stress were relatively low, mental health screening is still necessary. Mental health screening can point out symptoms or risk factors for common mental health disorders and help with early identification. In previous years PLNU had a mental health screening administered to the student-athletes. Due to COVID-19, there was a lack of resources and this screening was taken out. Without the implementation of this study, there would not have been any form of mental health screening. I suggest that every school should work towards having some sort of mental health screening. Even if a school is finding that their rates of mental health illnesses are fairly low, similar to the findings in this study, it is important not to neglect the needs of the few that are suffering.

### Coping

The two categories of coping are emotion-focused and problem-focused (Lazarus, 1984). Athletes can incorporate both styles of coping to handle COVID-19 stressors effectively. Many athletes have struggled with the closure of gyms and practice facilities. If an athlete is struggling to get their strength training in a problem-focused way of coping with this issue would be to create a modified lifting workout that one can do at home. Student-athletes can use exercise as an emotion-focused way of coping with the COVID-19 pandemic. If exercise is their source of stress, then they can try reaching out to their teammates and setting aside intentional time to connect and socialize with one another. Student-athletes can seek out assistance from a healthcare provider if they want to inquire about therapy options or taking medication for their mental health disorder.

### Social Support

Social support for student-athletes does not just come from their teammates. Social support can come from teachers, athletic trainers, coaches, parents, and friends. Coaches and team members should work to facilitate opportunities for teammates to engage with one another. Teams getting together, whether virtually or in-person can be a great way for student-athletes to feel supported during COVID-19. Working to build a community and having open communication will not erase the COVID-19 related stressors that student-athletes are experiencing, but having social support will create a connectedness resulting in better mental health.

### Conclusion

From T1 - T2 depression and stress significantly decreased, while anxiety did not significantly change. At T2 there was only 10% of student-athletes scoring a mild or above in depression, 17% for anxiety, and 8% for stress. While there were student-athletes whose scores increased from T1 - T2, the majority of student-athletes had decreasing mental health concerns. Compared to the normative values for 20 to 29-year-olds, T1 stress, T2 depression, T2 anxiety, and T2 stress were significantly lower. While many professionals are fearful of the lasting effects of COVID-19 on mental health, this data gives hope that student-athletes will be able to bounce back from these unprecedented times.

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