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College athletes often experience burnout related to the high demands of academics and their sport. As a result of these demands, they face potential stressors which influence their overall level of wellness, including symptoms of burnout. Despite the fact stress and burnout are important factors to consider in the overall wellness of college football players, there is a lack of longitudinal literature evaluating these issues and the role that additional factors such as sleep and perceived wellness have on burnout within a competition season. The purpose of this research was to gain insight into the prevalence of athlete burnout on a single collegiate football team, and how the symptoms of burnout and other commonly used metrics for athlete wellness change over the course of a competition season. This study evaluated athlete burnout, sleep behaviors, mental wellness, and specific identifiers of stress at four time points during the competitive season. The prevalence of high burnout ranged from 13-18.4% with no significant change in global burnout scores over the course of the season. Mental wellness scores at mid-season were significantly lower (i.e., improved) compared to all other time points. Even though there was no significant change in sleep behavior scores over the season, categorically sleep quantity and satisfaction worsened throughout the competitive season. Most athletes did not obtain the minimum recommendation for nightly sleep quantity. At preseason 45% reported obtaining < 7 hours of sleep/night, and this increased to 75% obtaining < 7 hours of sleep/night at mid-season. This analysis provided important information about sleep quantity and other behaviors that can be improved through sleep hygiene education. Furthermore, categorical changes were found for identifiers of stress. Academic stress was reported at a greater frequency than sport and personal life stressors for both midseason and post-season time points. Knowing

how stressors change over a competitive season gives rationale for providing targeted resources at various time points in future competitive seasons to help combat these stressors. A greater understanding of the manifestation of burnout and stress in collegiate athletes can help provide sport performance professionals the information to recognize potential factors associated with athlete burnout to then intervene before burnout happens, and better integrate this information with metrics that are already collected on student-athlete health and performance.

BURNOUT IN COLLEGE FOOTBALL PLAYERS:

PREVALENCE AND CHANGE OVER

A COMPETITVE SEASON

by

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Approved by

Dr. Pam Kocher Brown
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DEDICATION

This work is dedicated to my family. To my parents for their unconditional love and support through this process and my career. My education would not have been possible without you and the positive example and work ethic that you set for us. To my siblings for always brightening the room and ensuring we have some fun too.

And to my Sports Medicine colleagues for supporting this project and all endeavors that seek to improve the health and wellness of student-athletes. Your dedication to providing world-class patient care for those we serve, and engagement in service and research opportunities is inspirational. This work would not be possible without your support and collaboration.

APPROVAL PAGE

This dissertation written by Alessa Rae Lennon has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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CHAPTER I: PROJECT OVERVIEW

Athlete burnout is characterized by three main dimensions: (1) emotional and physical exhaustion secondary to the training demands; (2) athlete's perception of decreased sense of accomplishment (i.e., unfulfilled goals/dreams); and (3) sport devaluation (i.e., cynicism towards sport; Cresswell & Eklund, 2006; Gustafsson et al., 2014, 2017). Even though the definition of athlete burnout has been well documented, the prevalence of burnout in NCAA college athletes is largely an estimate, partially due to inconsistent research methodology. Recent data found that 66% of NCAA college athletes have experienced symptoms of burnout at some point during their athletic career (Martignetti et al., 2020). However, this statistic includes athletes from a variety of sports and there remains a lack of literature evaluating the prevalence of burnout and influence of other factors on symptom development specifically among NCAA Division I football players over the course of a competition season.

Despite the fact the literature on NCAA college athletes and the impact of burnout is limited, many theories exist to explain the phenomenon of burnout in sport. One of the most cited explanations of athlete burnout is the Cognitive-Affective Stress Model that surmises that burnout is a result of chronic stress manifesting in a predicable manner (Smith, 1986). The term "stress" is complex, and similar to burnout, several multifactorial frameworks attempt to understand it. In simplest terms, stress is the subjective experience to various stimuli that causes a stress response to the brain (Ursin & Eriksen, 2004). For the purposes of this research, stress can be used as an umbrella term to refer to an individual athlete's subjective response and experience to the various stimuli or stressors (i.e., academic, physical, organizational, and psychological) that they regularly encounter. Smith (1986) notes that athletes live in an environment filled with many stressors and appraise the balance between these challenges and

the resources they have to overcome them. If an athlete feels underprepared for a situation and experiences negative consequences, the athlete may then experience negative physical and/or psychological responses. Finally, the imbalance of having high demands that outweigh the resources over a long period of time result in chronic stress that can cause symptoms of burnout, decreased performance, and ultimately withdrawal from sport (Smith, 1986). Because this study is largely grounded on the stress-based theory of burnout, it will evaluate how other factors that have been linked to stress are commonplace in the student-athlete experience.

More research is needed to determine the impact of physical or emotional fatigue, poor sleeping behaviors, increased perceived stress, and cynicism towards sport to help sport performance identify potential factors associated with athlete burnout. It is equally important to understand how these symptoms can change over time, and better integrate this information with metrics that many sport performance professionals in the collegiate setting are already collecting on student-athlete health and performance. Some of the data currently being collected on college football athletes include measures of acute and chronic training loads, mood states, rate of perceived exertion and perceived recovery, biomechanics (movement efficiency), and injury incident trends (Chandran et al., 2021; DeMartini et al., 2011; Saw et al., 2016; Wellman et al., 2019). Even though many sport performance professionals collect data to monitor athlete wellness and performance, student athletes still report increased stress and burnout symptoms. Knowing how factors related to stress and burnout influence one another will also allow the performance team to provide resources and education (i.e., stress management, sleep hygiene, academic support) during times in the competition period result in less-than-ideal overall wellness. Furthermore, the data from this research can provide the performance team with specific identifiers for burnout based on specific symptoms that are reported in this population

(e.g., physical exhaustion, mental exhaustion, perceived increased stress, dissatisfaction with performance).

Athlete Burnout

College athletes are positioned as a population for research into burnout due to the high demands of academics and sport, creating many potential stressors that can influence overall wellness (O'Neil et al., 2021). The term burnout was first described in 1974 to characterize the prolonged stress and anxiety experienced by volunteer healthcare workers (Schaufeli, 2017). Maslach (1981) further described burnout as emotional exhaustion, cynicism, and a sense of lack of accomplishment influencing one's overall wellbeing. Student, or academic, burnout similarly refers to exhaustion, cynicism, and low self-efficacy from the intense demands of studying (Amelia, 2022). College students are unique as they are expected to respond to increased academic workload and pressure to get good grades, increased autonomy, desire for social interaction, and financial concerns (Lopes Dos Santos et al., 2020). Student burnout may manifest as poor academic performance, sleep disturbances, fatigue, emotional instability, depression and alcohol or drug use (Dyrbye et al., 2006). NCAA student-athletes are at a greater risk for burnout due to life stressors from both academics and sport (Chyi et al., 2018).

The three dimensions of athlete burnout that are widely accepted include: (1) emotional and physical exhaustion secondary to training demands; (2) athlete's perception of decreased sense of accomplishment (i.e., unfulfilled goals/dreams); and (3) sport devaluation (i.e., cynicism towards sport; Cresswell & Eklund, 2006; Gustafsson et al., 2014, 2017). Athlete burnout is complex and multifactorial with physical, mental, and behavioral considerations (Smith, 1986). Emotional and physical exhaustion is characterized by the perception of depleted resources (i.e., energy) secondary to training loads. A reduced sense of accomplishment is defined as one's

disposition to negatively evaluate ability or performance, and sport devaluation means having a cynical attitude towards participation in sport. Inventories aimed at measuring burnout address all three dimensions, but there is no agreement in the literature on how to define or quantify the relationship between dimensions.

The use of the Athlete Burnout Questionnaire (ABQ) has allowed researchers to gain a better understanding of the expression of burnout in a variety of athletic populations and is the most widely used tool to assess burnout in the athletic population (Cremades et al., 2011; Garinger et al., 2018). However, the ABQ does not have reliable cut-offs to categorize athletes in terms of burnout severity or consider additional stressors such as academics that collegiate athletes are exposed to (Cresswell & Eklund, 2007). Due to these limitations, Sorkkila et al. (2020) aimed at validating an instrument, the Sport Burnout Inventory Dual Career Form (SpBI-DC), to assess athlete burnout and academic burnout in parallel. The SpBI-DC is a valid and reliable instrument for assessing burnout in adolescent student athletes, but it has not been widely tested with NCAA collegiate athletes. Regardless of the inventory used to evaluate athlete burnout, research has not substantially evaluated how the three dimensions of burnout influence each other over time (Gerber et al., 2018; Gustafsson et al., 2016, 2017; Isoard-Gautheur et al., 2018). Furthermore, solely assessing athlete burnout with the current questionnaires does not provide sport performance professionals with enough information regarding the factors that can contribute to these symptoms. Therefore, it would be advantageous to evaluate symptoms of burnout in conjunction with other variables that sport performance professionals are already monitoring (i.e., sleep behaviors, mental wellness, objective workload, injury data, biomechanics).

Measuring Athlete Wellness

Athletes are exposed to psychological, physical, and organizational stressors regularly (Hanton et al., 2005). In addition, college athletes must navigate stressors from academic workload and the demands of early adulthood (i.e., living independently for the first time, financial autonomy, social connection, personal identity). Even though stress and burnout are important factors to consider in the overall wellness of college football players, and the combined stressors of sport and academics may place athletes at a higher risk for burnout (Lu et al., 2012), there is a lack of longitudinal literature evaluating these issues and the role that additional factors such as sleep and perceived wellness have on burnout (Eklund & DeFreese, 2015; Gustafsson et al., 2017, 2020). One possible reason sleep behaviors and perceived wellness have not been substantially examined in relation to burnout is that most research on athlete burnout focuses on youth and elite athletes. There remains a gap in the literature assessing the prevalence and dimensions of athlete burnout in the college athlete population. This gap in the literature makes it difficult to appreciate and compare the symptoms of burnout that college football players experience.

While no substantial literature specifically assesses burnout in NCAA college football players, there are trends in college athletics measuring other factors such as sleep behaviors and perceived wellness. Many of these factors have either direct or theoretical links to athlete burnout, although the relationships are often not clearly defined, and no direct cause and effect interactions can be made with the current available literature.

Sleep

Many athletes do not achieve the recommended nightly sleep quantity and report poorer sleep quality compared to non-athlete peers (Halson et al., 2017; Lastella et al., 2015; Leeder et

al., 2012; Mah et al., 2018; Sargent et al., 2014; Walsh et al., 2021). The National Sleep Foundation recommends that healthy young adults achieve seven to nine hours of sleep per night, but athletes may need more to recover from the physical and psychological demands of sport participation (Hirshkowitz et al., 2015). Specifically, 52% of elite athletes and 42.4% of college athletes are categorized as poor sleepers (Halson et al., 2022; Mah et al., 2018). Poor sleep quality is described by regular sleep duration of less than seven hours, sleep dissatisfaction, day-time sleepiness, and prolonged time before falling to sleep. Even when obtaining a total sleep time of at least eight hours, athletes still report increased time to fall asleep (i.e., sleep latency) and lower sleep quality (Leeder et al., 2012). Specifically in college football athletes, 67% score above the clinical threshold for a sleeping disorder on at least one measure, and average sleep duration decreases over the course of the competition season (Burke et al., 2020). Sleep duration may decrease over the competitive season due to academic responsibilities leading to poor sleep hygiene, impacting sport performance and academic achievement (Burke et al., 2020; Penggalih et al., 2021; Turner II et al., 2021).

Evidence in both athletes and college students suggests a relationship between sleep behaviors and factors such as burnout, mental wellness, perceived stress, athletic performance, and academic achievement (Brandt et al., 2017; Charest & Grandner, 2020; Gerber et al., 2018; Turner II et al., 2021; Watson, 2017). It is important to understand the relationship between burnout and these factors because NCAA athletes are uniquely positioned to respond to demands of both academics and athletics. One hypothesis for how sleep and burnout influence one another relates to chronic stress. Additional evidence suggests a bidirectional relationship between sleep and burnout in which a negative feedback loop is created (i.e., burnout causes poor sleep

behaviors which in turn can worsen symptoms of burnout; Ekstedt et al., 2009; Gerber et al., 2018; Pagnin et al., 2014).

Because sleep behaviors are often a low hanging fruit for making positive changes, many collegiate Athletic Trainers (ATC) rely on the use of commercial wearable devices, or subjective tools such as sleep questionnaires and diaries to measure sleep behaviors. However, traditional sleep inventories such as the Pittsburgh Sleep Quality Index (PSQI) do not consider travel or environmental factors including training load, competition anxiety, travel schedules, or relationships with coaches and teammates (Halson et al., 2022). Because of these limitations, the Athlete Sleep Behavior Questionnaire (ASBQ) and the Athlete Sleep Screening Questionnaire (ASSQ) have been developed to evaluate sleep behaviors and clinically relevant sleep problems in athletes (Driller et al., 2018; Samuels et al., 2016).

Subjective Wellness

Even though college students have always been vulnerable to burnout and poor mental wellness, more recently college students in the United States report increased rates of stress (Son et al., 2020). Specifically in athletes, the 2021 *NCAA Student-Athlete Well-Being Study* found that 22% of male athletes felt mentally exhausted "constantly" or "most every day," and 71% reported feeling mentally exhausted in the previous month. The same study found that the most reported factors negatively impacting student-athlete mental wellness included: academic worries, planning for the future, financial worries, and the athlete-coach relationship (*NCAA Student-Athlete Well-Being Study*, n.d.)

The Counseling Center Assessment of Psychological Symptoms (CCAPS) is the most widely used survey to assess mental wellness in college students (Ghosh et al., 2018; Locke et al., 2011; McAleavey et al., 2012). The CCAPS comprises eight domains including: depression,

academic distress, social anxiety, generalized anxiety, hostility, family distress, eating concerns, and substance use (Locke et al., 2011). Currently no substantial literature aims at evaluating the relationship between mental wellness measured on the CCAPS and dimensions of burnout in college football players. In addition to specific measures of mental wellness such as the CCAPS, ATCs often implement additional questionnaires to assess overall perceived wellness. Previous literature using a custom wellness survey in NCAA Division I football players supports evaluating four subscales: fatigue, soreness, stress, and sleep quality (Wellman et al., 2019). Subjective measures of athlete wellness are reported to be just as good as objective measures for evaluating the acute and chronic response to training (Saw et al., 2016).

Future Research Directions

There are several gaps in the current literature on athlete burnout. Areas for further investigation include longitudinal research within a single competitive season, accurate incidence rates in college football athletes, and information evaluating the relationship with other wellness factors. Furthermore, a lack of consistency in evaluating what other factors can contribute to symptoms of burnout exists, such as perceived wellness and sleep has led to a knowledge gap. Because of this gap, longitudinal research is needed to evaluate the prevalence of burnout in NCAA college football players, and changes in other factors such as sleep behaviors and perceived wellness over a competitive season to have a more accurate assessment of potential changes over time.

Statement of Purpose

College athletes are vulnerable to burnout due to academic and sport demands causing various stressors. Even though the definition of athlete burnout has been well documented, the prevalence of burnout in NCAA college athletes is largely an estimate. Recent data has alarming

rates of stress and burnout across all college athletes, but few have evaluated the prevalence of burnout in conjunction with other factors of wellness in college football players. The purpose of this research is to gain insight into the prevalence of athlete burnout in NCAA football athletes, and how the symptoms of burnout and other commonly used metrics for athlete wellness change over the course of a competition season. The specific aims for this study are:

Aim #1 – To assess the prevalence of burnout symptoms in single NCAA Division I football team during a competitive season.

Aim #2 – Assess change in symptoms of athlete burnout, sleep behaviors, and mental wellness in single NCAA Division I football team over the course of a competitive season.

Methods

All data used for analysis in this study was collected as part of the current practices of a Division I football team in the Southeast by the institution's football athletic training (AT) staff. The AT staff administered several questionnaires at various time points throughout the 2023 competitive football season. Measures included the SpBI-DC (burnout scores), ASBQ (sleep behaviors), CCAPS-34 (mental wellness), and responses to open-ended questions about identifiers of stress and additional sleep habits not on the ASBQ. In addition, review of the primary investigator's weekly journal provided a more holistic view of each part of the competitive season and additional context to which comparisons can be drawn.

Assessments

The specific assessments chosen for analysis were all specific to the experiences of collegiate athletes and reflected the recommendations from the current available literature and practices of the Sports Medicine (SM) staff (i.e., ATCs, team physicians, and sport psychologists). Completion of the questionnaires was voluntary for each student athlete. Because

many questionnaires included sensitive information about athlete health and wellness, the SM staff and mental health providers administered the instruments and referred players to additional medical personnel as needed.

Sleep and Burnout Questionnaire. The ASBQ and SpBI-DC questionnaires were administered using a single questionnaire (see Appendix C) on the digital platform, Office 365 Forms, and provided to each football athlete via a custom QR code. The ASBQ is an 18-item survey that asks participants to rate how frequently they engage in certain behaviors on a 5-point Likert scale. The ASBQ has been clinically validated in the literature and is both cost effective and time efficient for evaluating sleep health in a larger athletic population (Driller et al., 2018). The SpBI-DC is a 10-item questionnaire that uses a 5-point Likert scale. Additional questions that are not part of the SpBI-DC or ASBQ were included in this single questionnaire. Specifically, athletes were asked to report sleep quantity and satisfaction in addition to respond to an open-ended question about their primary stressors during each time point (i.e., sport, academic workload, personal life), and if they had any current injuries that limited athletic participation.

CCAPS-34. The CCAPS-34 is a multidimensional instrument normed for college students that is free to administer, clinically relevant, and can be used as a tool for both research and evaluation efforts (Locke et al., 2011). This assessment was completed via a Qualtrics survey sent to each athlete's institution e-mail by the mental health providers monthly (see Appendix D). For confidentiality, each athlete had a unique link and ID number associated with their survey responses that only the mental health and AT staff had access to. Data points from CCAPS-34 responses were excluded from analysis if an athlete reported "0" (i.e., not at all like me) for all questions. The rationale for this exclusion is that the CCAPS-34 includes both

positive and negative statements, so a score of "0" across all questions may indicate that the athlete did not read the directions or answer truthfully.

Investigator Journal. Throughout the 2023 competitive football season, the primary investigator kept a weekly journal to reflect on the competitive season, clinical pearls (i.e., clinically relevant information based on experiences), and future questions. The journal entries were created using Office 365 OneNote application and further explain the experiences of the football athletes over the season.

Data Analysis

The data from four time points throughout the 2023 competitive football season were selected, de-identified by another member of the SM staff, and analyzed by the primary investigator for descriptive and correlational statistics using the Statistical Package for Social Sciences (SPSS) Premium 28.0 for Windows (SPSS Inc.; Chicago, IL, USA). The specific time points selected for analysis of each questionnaire (ASBQ, CCAPS-34, and SpBI-DC) included: (1), training camp reporting day, (2) one day following the end of training camp, (3) the midpoint of the 2023 twelve game regular season, as defined by the week between the sixth and seventh games of the regular season, and (4) the week following the last regular season game. The decision for the specific timing of the repeated measures analysis was based on conversations surrounding the clinical usefulness of collecting this information with the sport performance team, and the natural transitions between parts of the competitive football season and academic calendar. Per the IRB, consent to use the de-identified data was not required.

Global scores on the SpBI-DC were used in descriptive statistics and then each survey response was divided into subgroups (i.e., "high," "average," and "low"). Subgroups were determined based on the recommendations from the developers of the SpBI-DC as there is little

guidance in the literature on reliable cutoff scores from previous studies (Sorkkila et al., 2020). Subgroups were based on the sample scores in this study, with "high" burnout being >1 standard deviation (SD) from the mean, "average" burnout being the standardized mean score, and "low" burnout being <1*SD* from the mean. Based on the results of the descriptive statistics, the scores on the SpBI-DC were also divided into subgroups based on the dimension of burnout assessed in each question. The distribution for each dimension of burnout was visually examined, and skewness and kurtosis were quantified. For each dimension, if any of the time points were non-normally distributed, then Wilcoxon signed-rank tests were used to assess pairwise differences between dimensions of burnout.

Open-ended responses on the burnout and sleep inventory related to perceived causes of stress, sleep satisfaction, and sleep quantity were reported by frequencies and compared across time points. Chi-square (X^2) goodness of fit tests were used to compare the distribution of sleep quantity, sleep satisfaction, and specific stressors identified at each time point. This analysis was done to more accurately report differences in the distribution of sleep quantity and satisfaction at each time point as well as to compare distribution differences from latter time points to baseline (preseason). Furthermore, a review of the primary investigator's journal identified themes related to overall attitudes for the competitive season and perceptions of various stressors at specific times (i.e., exam periods). Each weekly entry of the investigator's journal was examined for information about the preceding game (i.e., location, kickoff time, opponent, game result, current college football ranking, season record, time loss injury numbers from the game), injury notes from the practice week, and observations about the overall mood of the football facility. The journal included additional entries on the weeks that the surveys were administered for insight into compliance, mental health referrals, and clinical tips to share with the entire SM staff. Even

though a specific qualitative analysis approach was not used to ensure trustworthiness of the primary investigator's journal entries, this review informed the clinical usefulness of the analysis to professional practice and changes for future data collection.

Responses on the SpBI-DC, ASBQ and CCAPS-34 were evaluated for changes from preseason, post-camp, midseason, and postseason time points. All primary analyses were restricted to compliant athletes who completed measurements at all four time points. The distribution of each variable was visually examined, and skewness and kurtosis were quantified. For each measure, if any distributions at any of time points were not normally distributed, then Wilcoxon signed-rank tests were used to assess pairwise changes, correcting for multiple comparisons. A combination of related-samples Wilcoxon signed rank test and one-way repeated measures analysis of variance (ANOVA) were conducted to assess change over time for: (1) ASBQ global score, (2) SpBI-DC global score, and (3) C-CAPS-34 score. Main effects of time were decomposed using pairwise t-tests.

Further, a pair of exploratory analyses was conducted to determine if there were changes in sleep behavior or burnout symptoms when after stratifying responses based on commonly used cutoffs for sleep quality on the ABSQ ($\leq$36 = Good; 37-41 = Average; $\geq$42 = Poor) and burnout dimension (exhaustion, cynicism, inadequacy). The additional burnout analysis was done to better understand if specific components of the SpBI-DC inventory changed, even if the overall score did not.

Given that compliance has historically been an issue for monitoring collegiate student-athletes, it is possible that changes at each time point from pre-season differed in those who were fully compliant and those who were not. Change scores from pre-camp to each follow-up time point were computed. Differences between the original compliant group and those who were

only responsive at each time point were tested by Mann-Whitney U tests. Differences in these groups might indicate that the SM staff should consider changing current practices around data collection from student-athletes to improve survey compliance. Descriptive statistics were also stratified based on years of collegiate football experience (zero to five years), academic credit load (≤11 hours, 12 hours, 13-14 hours, and ≥15), and football position type. Differences between groups on the SpBI-DC (burnout) were tested by a one-way ANOVA, and differences on the ASBQ (sleep behaviors) and CCAPS-34 (mental wellness) were tested using independent-samples Kruskal-Wallis H test.

Results

To address the first aim, the final sample of data in this analysis was defined by the number of athletes who completed the SpBi-DC at each time point, as well as descriptive statistics for demographic information including self-reported history of sleep disorders, years of collegiate football experience (i.e., year and semester of enrollment in college), primary football position, and the number of academic credit hours taken during the Fall 2023 semester (see Appendix A). Each football position group (quarterback, outside linebacker, running back, tight end, specialist, defensive line, inside linebacker, wide receiver, offensive line, and defensive back) and years of college football experience (zero to five) was represented in this analysis. For the second aim looking at changes in symptom scores across a competitive season, the final sample of data for analysis is defined by the number of athletes who completed all four time points of each questionnaire being analyzed as a repeated measure. Because fewer athletes completed all repeated measures, position groups were further categorized by position type (offensive line, defensive line, offensive skill, defensive skill, specialist). Descriptive statistics for position group and years of experience are included in Appendix B.

For Aim #1, 87.5% (*n* = 105) of football athletes completed the preseason measure of the burnout questionnaire (SpBI-DC), 57.5% (*n* = 69) completed the post-camp measure, 63.3% (*n* = 76) completed the midseason measure, and 86.6% (*n* = 104) completed the post-season measure. Of the 87.5% football athletes who completed the initial sleep and burnout survey, 3.7% (*n* = 4) reported having a previous diagnosis of a sleep disorder (i.e., insomnia or sleep apnea). Frequencies for each question on the SpBI-DC at each time point are found in Appendix E. Descriptive statistics in SpBI-DC global scores, scores for each dimension of burnout, and subgroups of severity are reported in Tables 1-3. Furthermore, differences between dimensions of inadequacy and cynicism are reported in Table 4.

Table 1. Descriptive Statistics for the SpBI-DC Global Scores

	N	*Response Rate (%)*	*Min.*	*Max.*	*M*	*SD*
Preseason	105	87.5	10	50	19.57	7.91
Post-camp	69	57.5	10	43	20.86	7.64
Mid-Season	76	63.3	10	36	21.65	6.91
Post-Season	104	86.6	10	43	20.95	7.8

Table 2. Burnout Sub-groups

Burnout Category	Preseason		Post-camp		Mid-Season		Post Season	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Low burnout	20	19	16	23.1	13	17	26	25
Average burnout	69	65.7	44	63.8	49	64	59	56.7
High burnout	16	15.2	9	13	14	18.4	19	18.2

Note. Burnout category was determined by computing the mean and standard deviation for the SpBI-DC global scores at each time point. Low burnout is defined as any response <1*SD* from the mean, high burnout is defined as any >1*SD* from the mean, and average burnout is defined as within 1*SD* of the mean.

Table 3. Burnout Dimension Descriptive Statistics

		Min	*Max*	*M*	*SD*
Preseason	Cynicism	3	15	4.39	2.21
	Exhaustion	4	20	8.45	3.80
	Inadequacy	3	15	6.72	2.97
Post-Camp	Cynicism	2	11	4.52	1.93
	Exhaustion	4	20	8.94	3.82
	Inadequacy	2	15	7.41	3.04
Mid-Season	Cynicism	3	11	4.86	2.07
	Exhaustion	4	16	9.19	3.58
	Inadequacy	3	15	7.78	2.62
Post-Season	Cynicism	3	14	5.04	2.54
	Exhaustion	4	19	8.62	3.67
	Inadequacy	3	14	7.27	2.88

Note. Cynicism score is derived from the sum of questions #2, #5 and #6 on the SpBI-DC. Inadequacy is the sum of questions #3, #7 and #9. Dimension for exhaustion is the sum of questions #1, #4, #8 and #10.

Table 4. Differences between Cynicism and Inadequacy Score

Time Point	Dimension	*n*	*Median*	*IQR*	*Z*	*p-value*
Preseason	Cynicism	105	3.0	3.0-6.0	7.36	<.001*
	Inadequacy	105	6.0	4.0-9.0		
Post-Camp	Cynicism	69	4.0	3.0-6.0	6.52	<.001*
	Inadequacy	69	7.0	6.0-9.0		
Mid-Season	Cynicism	76	3.5	3.0-6.0	6.87	<.001*
	Inadequacy	76	8.0	6.0-10.0		
Post-Season	Cynicism	104	3.5	3.0-6.0	6.73	<.001*
	Inadequacy	104	7.0	5.0-9.75		

Note. *indicates statistical significance. Median scores for the inadequacy dimension of burnout are significantly greater than scores for cynicism at all four time points.

For Aim #2, a total of 29.2% (n = 35) football athletes completed all four repeated measures of the mental wellness questionnaire and 34.2% (n = 41) completed each measure of the burnout and sleep survey over the course of the competitive season. Descriptive statistics for

each measure are reported in Appendix F. No significant difference in mean scores on the SpBI-DC (burnout) was found over the course of the competitive season $F(3,38) = .470$, $p = 0.704$. Furthermore, no significant difference was found for any dimension of burnout across the competitive season including cynicism (see Appendix G), inadequacy $F(3,38) = 0.950$, $p = 0.419$, or exhaustion $F(3,38) = 0.156$, $p = 0.926$.

No significant differences were found between median scores of the ASBQ (sleep behaviors) at any time point, but significant differences were found for CCAPS-34 (mental wellness) global scores between three time points (see Table 5).

Table 5. Changes in ASBQ and CCAPS-34 Global Scores

Time Point	ASBQ (n = 41)		CCAPS-34 (n = 35)	
	Z	*p-value*	*Z*	*p-value*
Preseason to post-camp	-1.574	0.115	-1.227	0.220
Preseason to midseason	-0.151	0.880	2.788	0.005*
Preseason to post-season	-0.637	0.524	-1.493	0.135
Post-camp to midseason	1.418	0.156	2.613	0.009*
Post-camp to post-season	1.210	0.226	0.047	0.963
Midseason to post-season	-0.153	0.878	-2.458	0.014*

Note. * indicates statistical significance. CCAPS-34 global scores at midseason were significantly lower than scores at preseason, post-camp, and post-season.

When assessing changes in the scores for negative and positive questions on the mental wellness questionnaire, no significant differences were found for the sum of the positive questions over the course of the competitive season $F(3,32) = 1.967$, $p = 0.135$. Like the results for global CCAPS-34 scores, negative scores were significantly lower at midseason compared to preseason ($Z = 2.977$, $p = 0.003$), post-camp ($Z = 2.663$, $p = 0.008$), and post-season ($Z = -2.630$, $p = 0.009$).

Frequencies of the stratified responses on the ASBQ are reported in Table 6.

Table 6. ASBQ Subgroup Frequencies

	Preseason (*N* = 106)		Post Camp (*N* = 69)		Mid-Season (*N* = 76)		Post Season (*N* = 104)	
	n	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Good sleep behavior	37	34.9	28	40.5	27	35.5	34	32.6
Average sleep behavior	31	29.2	21	30.4	22	28.9	41	39.4
Poor sleep behavior	38	35.8	20	28.9	27	35.5	29	27.8

Note. ASBQ global score of ≤ 36 equates to "good sleep behavior," 37-41 = "average sleep behavior," and ≥ 42 = "poor sleep behavior."

There was no significant difference in the distribution of sleep behavior subgroup (good sleep behavior, average sleep behavior, poor sleep behavior) for any time point (preseason X^2 (2, N = 106) = 0.811, p = 0.667, post-camp X^2 (2, N = 69) = 1.652, p = 0.438, midseason X^2 (2, N = 76) = 0.658, p = 0.720; and post-season X^2 (2, N = 104) = 2.096, p = 0.351). Furthermore, no significant difference was found in sleep behavior subgroup for the latter time points compared to baseline (preseason). Specifically, post camp X^2 (2, N = 69) = 1.577, p = 0.455, midseason X^2 (2, N = 76) = 0.013, p = 0.994, and post-season X^2 (2, N = 104) = 5.670, p = 0.059 compared to baseline.

Change scores for the compliant and non-compliant groups reveal a significant difference on the CCAPS-34 (mental wellness) from preseason to mid-season (n = 63, W = 2.96, p = 0.003) in which the compliant group had a median global score eight and a half points higher (worse) than the non-compliant group (see Appendix H). However, no significant differences were found between the compliant and non-compliant groups for any other surveys and time points.

Frequencies for the greatest stressor reported at each time point are in Table 7.

Table 7. Frequency Distribution of Self-reported Largest Stressor

	Preseason		Post-camp		Mid-Season		Post Season	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Personal Life	29	27.6	16	23.2	10	13.2	22	21.2
No Stress	26	24.8	13	18.8	11	14.5	12	11.5
Football	24	22.9	23	33.3	21	27.6	22	21.2
Academics	20	19	14	20.3	26	34.2	37	35.6
Other	6	5.7	3	4.3	8	10.5	11	10.6
Response Rate	105	87.5	69	57.5	76	63.3	104	86.6

Note. Frequencies are arranged based on the greatest stressor reported at the preseason time point.

The distribution of frequencies (i.e., the three most common stressors reported) is significantly different at midseason X^2 (2, N = 57) = 7.053, p = 0.029 and post-season X^2 (2, N = 81) = 14.237, p = 0.062. Specifically, academic stress was reported at greater frequency than sport and personal life stressors for both midseason and post-season time points. No significant difference was found in the distribution of stressors at preseason X^2 (2, N = 73) = 1.671, p = 0.434 and post-camp X^2 (2, N = 53) = 2.528, p = 0.282. There was a significant difference in the type of stressor reported at midseason compared to preseason X^2 (2, N = 57) = 14.237, $p < 0.001$ and at post-season compared to preseason X^2 (2, N = 81) = 13.906, $p < 0.001$. At midseason and post-season, academic stress was reported at a higher frequency and personal life stress at a lower frequency compared to the stressors reported at preseason. No significant difference was found between the type of stressor reported at post-camp compared to preseason X^2 (2, N = 53) = 3.016, p = 0.221.

Responses from the athletes who chose to provide more information about what their greatest stressor was included personal life stressors such as relationships, family matters, and worries about the future, and football stressors such as injuries, desire for playing time, and receiving less sleep (see Appendix I). Aside from open-ended responses about stressors,

descriptive statistics for specific sleep quantity, satisfaction and other behaviors are reported in Appendix J. Significant differences were found in the distribution of sleep quantity at preseason X^2 (3, N = 106) = 17.396, p <.001, post-camp X^2 (3, N = 69) = 12.681, p = 0.005, and post-season X^2 (3, N = 104) = 20.308, p <0.001. At each of these time points, significantly fewer players obtained ≥8 hours of sleep/night than would be expected. No significant difference was found in the distribution of sleep quantity at midseason X^2 (2, N = 76) = 3.342, p = 0.188. Significant differences were found between the distributions of sleep quantity at midseason X^2 (2, N = 76) = 16.833, p < 0.001 and post-season X^2 (3, N = 104) = 8.672, p = 0.034 compared to baseline (preseason). Specifically, fewer athletes obtained ≥8 hours of sleep/night and a greater number of athletes obtained five to six hours of sleep/night at midseason and post-season than would be expected based on baseline frequencies. No significant difference was found for the distribution of sleep quantity at post-camp X^2 (3, N = 69) = 2.198, p = 0.532 compared to baseline.

Significant differences were found in the distribution of sleep satisfaction at midseason compared to baseline X^2 (4, N = 76) = 9.526, p = 0.049. More athletes reported being "very dissatisfied" with their sleep quality and fewer reported being "very satisfied" with their sleep quality from what was expected based on preseason responses. No significant difference was found between the distribution sleep satisfaction at post-camp X^2 (4, N = 69) = 7.880, p = 0.096, and post-season X^2 (4, N = 104) = 1.659, p = 0.798 compared to preseason baselines. Furthermore, no significant differences were found between global scores for any measure between groups based on years of collegiate football experience, football position type, or academic credit load (see Appendix K).

Discussion

As concerns over stress and mental wellness in athletes is on the rise, understanding the prevalence of athlete burnout and how measures change across a competitive season is critical for the performance team to best assist athletes in mitigating and/or managing these symptoms. The metrics chosen for analysis in this study will assist the SM staff in better serving student-athletes. One way this analysis supports the SM staff is by identifying if the factors of wellness currently being collected in football athletes are providing answers to the problems that are being noted in meetings amongst the staff. Repeated measures analysis of three inventories also provides useful information for the development of a custom wellness survey, focusing on the questions or areas that are of most concern from results in this analysis. Even though it was not a specific aim of this analysis, recognizing specific identifiers of stress that the football players experienced over the course of the competitive season is clinically relevant for providing stressor specific resources (i.e., increasing social and academic support, sport psychology for returning from injury or fear of injury, exercise recovery strategies, social worker support for family matters). Strategically providing additional resources to mitigate these stressors, and sleep hygiene education to improve sleep quantity and satisfaction can have a direct impact on the football players in future seasons.

Burnout

While the overall scores of burnout did not significantly change over the course of the competitive season, this analysis was the first attempt to measure the prevalence of burnout among football players at the institution. It is interesting to note that approximately twice as many football athletes were considered to have “high burnout” at midseason and post-season compared to post-camp. Specifically, the prevalence of “high burnout” ranged from 13-18.4% of

players during the competitive season. This percentage is greater than the findings of Gustafsson et al. (2007) who found that 2-6% of male adolescent athletes expressed high levels of burnout symptoms. Finding no change in burnout dimension scores over the competitive season is also different from the current literature. Cresswell & Eklund (2006) reported increased inadequacy over a competitive rugby season due to performance frustrations and unfulfilled expectations. When comparing results of this analysis to notes in the investigator's journal, inadequacy scores remained clinically similar when the team had a first half of the season record of 6-0, and a second half record of 2-4. The worsening record in the latter half of the season may explain some of the lack of change (i.e., improvement) in scores for inadequacy even as experience (i.e., the amount of practice and games) increased. Consistency in exhaustion scores may mean that the current strategies for exercise recovery that the sport performance team (i.e., strength and conditioning, nutrition, AT) uses are adequate for managing acute and chronic workloads and preventing worsening physical exhaustion. Even though burnout dimension scores did not change over the season, the dimension of burnout that had the most surprising contribution to the overall score was inadequacy. If each dimension contributed equally to the overall score, it would be expected that the scores for inadequacy and cynicism would be similar, yet the scores for inadequacy were significantly greater. Additionally, the fact that no significant difference in athlete burnout global scores were found between the compliant and non-compliant groups indicates that trends from burnout assessments collected at any given time point are an accurate representation of the entire football team. Clinically this indicates that the SM staff does not need to be overly concerned about athletes in the "non-compliant group" having worse symptoms that are going unreported.

Even though global scores, change scores, and dimensions of burnout did not change over the course of the competitive season, the type and magnitude of specific stressors that the football athletes experienced did change. Specifically, a greater percentage of football players reported academics being their largest stressor at midseason and post-season compared to personal life stressors being of greatest concern during preseason, and football related stressors post-camp. Other than the preseason time point, football related stressors accounted for the second largest cause of stress at each time point. These changes coincided with the investigator's journal at the mid-season and post-season time points. The exam periods noted during the mid-season and post-season assessments can partially explain why academics were reported as the largest stressor at those time points. Injury was also increasingly noted as a specific football related stressor at mid-season and post season. Specifically, only 6% of the respondents at preseason reported currently dealing with an injury or illness preventing them from participating fully in football related activities, but there was an increase to 17% of respondents at the mid-season and almost 24% at post-season. Changes in attributes of stress and burnout over the course of a competitive season have also been noted in professional ruby players (Cresswell & Eklund, 2006, 2007). Although these changes may not be surprising due to the physical demands of collegiate football, knowing which stressors contribute most at different time points in the season can inform the provision of resources for subsequent seasons at these specific time points. Examples include providing academic counselors with this information to help combat school-related stressors or provide more academic resources during the mid-season and post-season time points, and having sport psychologists provide athletes with information on coping with injuries and stress management techniques for physical performance throughout the year.

Many of the specific examples that the football players provided for being their largest stressor at each time point coincide with literature on competitive and organizational stressors in elite athletes. Hanton et al. (2005) notes common stressors such as inadequate preparation (i.e., mental, physical, technical preparation), injury (i.e., ability to perform post injury or competing despite injury), pressure to perform, and expectations (i.e., pressure from others, meeting own high expectations). Many of these themes overlap with the football-related stressors that the football players in this analysis reported (i.e., playing level, injuries, desire for playing time, and expectations to be perfect). These themes are also like the findings of Lu et al. (2012), citing specific stressors that correlated with higher burnout scores in college athletes (i.e., injury, performance demand, coach relationship, training adaptation, relationships, and academic requirements).

Sleep Behaviors

Similar to athlete burnout scores, ASBQ (sleep behavior) scores remained consistent over the course of the season. Even though based on frequencies, it seems that sleep behaviors slightly improved during training camp, the distribution of frequencies for sleep behavior category and sleep quantity is not significantly different from preseason to post-camp. This is different from literature on elite athletes suggesting that total sleep time and sleep efficiency decreases during periods of higher training load, such as football preseason training camp (Fullagar et al., 2019; Haines Roberts et al., 2019). One explanation for the lack of change in sleep behaviors found in this analysis is that the preseason measure captured the two weeks prior to the start of training camp, when many athletes were either finishing summer session exams or out of town, a period of relatively low structure. Even though the change was not statistically significant, clinically small improvements may have occurred during football training camp because the athletes had to

stay in a hotel for two weeks away from other distractions and had a very rigorous but regulated schedule that was controlled by others (i.e., coaching staff). Based on this analysis, the sleep behaviors for six football players improved during training camp, which also may be clinically important. However, the fact that sleep behaviors did remain consistent over the course of the season may suggest that not only is keeping a regular schedule important, but if some of the poor behaviors can be changed, those changes may carry throughout the semester. Specifically, behaviors that were the most problematic in this analysis and could potentially be changed through sleep hygiene education include achieving the recommended hours of sleep per night, eliminating the use of light-emitting technology an hour before bedtime, maintaining regular wake times and bedtimes, and decreasing the amount of worrying about sport performance while in bed (see Appendix J).

Despite consistency of ASBQ scores over the competitive season, there is a striking difference in the average hours of sleep per night that the football athletes reported. Prior to the competitive season, many did not obtain the recommended seven to nine hours of sleep per night for healthy young adults (i.e., 45.2% reported achieving less than seven hours of sleep per night and only 14% achieved eight or more hours; Hirshkowitz et al., 2015). Sleep quantity did not significantly change during training camp, likely due to strict wake up and curfew times during that period. However, after awakening and curfew times subsided, and the academic semester began, the sleep quantity only worsened as the football and academic load increased in the mid-season and post-season time points. By the middle of the competitive season, a third of the football players reported obtaining less than six hours of sleep per night in the previous two weeks, and 75% obtained less than the National Sleep Foundation's minimum recommendation (i.e., seven hours of sleep per night for healthy adults; Hirshkowitz et al., 2015). Midseason was

the only time point in which the distribution of sleep quantity was not significantly different. One reason for this is because zero athletes obtained ≥8 hours of sleep/night at this time point, meaning that the X^2 test was used to evaluate differences between three categories (< 6 hours, 6-7 hours, and 7-8 hours) and not four categories like the other time points. One of the potential reasons for the significant findings at each of the other time points is because so few athletes obtained ≥8 hours of sleep/night compared to their teammates.

For sleep satisfaction, the percentage of football athletes who reported being "very satisfied" with their sleep decreased from 27.4% at preseason to 13.2% at midseason. At the same time, the percentage of athletes who reported being "very dissatisfied" with their sleep quality almost doubled from preseason to midseason. The trend of sleep quantity decreasing over the course of the season is similar to the findings of Burke et al. (2020) and Sargent et al. (2014), and the findings of sleep quantity and dissatisfaction in college athletes are like those noted by Mah et al. (2018). Finally, similar to the change score findings for burnout, the fact that there is no difference between the compliant group and non-compliant group in this analysis demonstrates that even if a portion of the football team takes this survey, the responses are likely representative of the entire team. Clinically this is an important finding of this analysis and can help inform methodology for future data collection around sleep behaviors.

Mental Wellness

The global and negative question scores from the CCAPS-34 had significant changes over the season, but not all changes were in the direction that one would expect. Even as sleep quantity decreased and academic stressors increased, mental wellness scores at the midpoint of the season were better compared to pre-season, post-camp, and post-season. The post-camp time point demonstrated the worse mental wellness (i.e., higher scores on the CCAPS-34) compared

to the other time points. This score reflects the overall mental wellness of the football athletes coming out of training camp. It is interesting to note that during the training camp period mental wellness may have worsened, burnout symptoms and sleep behaviors remained consistent. Even though statistical correlations were not completed to see if/how these factors may influence one another, the result of this analysis demonstrates the importance for the SM staff to evaluate a variety of factors related to overall wellness.

By doing repeated measures, mental health providers were able to identify and intervene with four student-athletes that otherwise may not have sought help at the post-camp and midseason points. This is an important clinical distinction to make. Results from this analysis also beg the question of whether completing a mental wellness questionnaire prior to the start of the season should suffice on its own, or if repeated measures should be more of a common practice. A 2021 study by Drew et al. found that only 64.5% of Division I athletic programs screened for mental health concerns annually. Furthermore, 72.7% of the mental health screenings were administered during pre-participation physicals (PPE), and only 13.7% of programs screen throughout the calendar year (Drew et al., 2021). However, compared to a 2016 study that found fewer than half NCAA programs administered a mental health screening, great strides in improving the policies and procedures around mental health screening in the collegiate athlete population have been made (Kroshus, 2016). In the collegiate athlete population, it may be advantageous to continue and improve the current policies and procedures for administering mental wellness questionnaires by including repeated measures. Specifically, for collegiate football athletes at this institution to complete the CCAPS-34 questionnaire before preseason and after training camp or at least a few weeks into the regular season when mental health providers were able to intervene with additional student-athletes. Completing a mental wellness

questionnaire may still be beneficial in identifying athletes who could benefit from extra support during the training camp period, and a second mental wellness questionnaire later may identify athletes who may have been excited to start the season but are struggling later.

Furthermore, the timing for the midseason time point coincided with midterm exams for many of the student athletes. At that point in the season not only was the team record a successful 6-0, but the greatest stressor reported was academics. The fact that the football team was having great athlete and team success at that point, but academic load was higher may provide insight into what specific stressors influence mental wellness to a greater extent (i.e., academics vs. sport). Clinically this demonstrates the need to provide additional academic support throughout the competitive season, regardless of what the football team's record is. The change scores being significantly different for the compliant group between preseason and midseason time points is also interesting. While not a question for this analysis, the difference highlights if the compliant group is made up of high achievers who may be more likely to be impacted by higher levels of stress when there are multiple demands at the same time. On the other hand, the fact that the other two time periods measured (i.e., preseason to post-camp and preseason to post-season) did not find any differences between the compliant and non-compliant groups could mean that there is not enough information at this time to draw conclusions between the two groups that are clinically relevant.

Additionally, this analysis did not find any differences in global scores on any inventory between football players with different years of experience, different position groups, and varying academic loads. If academic stress and workload contributes more than sport specific stressors to overall wellness, there would have been greater differences between scores based on the number of academic credits taken during the competitive season. Furthermore, it would be

reasonable to assume that the experiences of the freshmen and sophomores vary from those of the seniors, so it is noteworthy that this analysis did not find any differences between any experience groups. This finding is different from Giusti et al. (2022) who found higher burnout (specifically sport devaluation) in athletes in the second half of their NCAA eligibility. One could also argue that the quality or difference in coach-athlete relationship may create differences amongst position groups like the findings of Isoard-Gautheur et al. (2016) and Cresswell & Eklund (2007), yet this analysis did not find any differences between football position groups.

There are several limitations of this study. This study analyzed responses to surveys in which completion was voluntary, creating a low response rate for athletes who completed each measure at all four time points. Having additional support and/or other strategies for improving compliance can result in a more thorough analysis. Although not the study's aim, this study did not analyze correlations between variables to see if/how factors of wellness may influence one another, and burnout scores from this analysis cannot be compared to a greater population. Strengths of this study include being the first comprehensive and longitudinal analysis of athlete burnout, specifically using the SpBI-DC and several contributing dimensions in college football athletes. Additional research using the SpBI-DC will help establish norms for global and dimension scores that groups can be compared to. An additional strength of this analysis is using the investigator's journal to provide additional context to the findings and improved clinical relevance to drive change. Future analysis should explore additional factors of athlete wellness (i.e., fatigue, injury, nutrition), if/how factors of wellness influence one another, and a longitudinal design to assess change over the entire calendar year. A recent study of NCAA athletes found that athletes with prolonged or overuse injuries have a higher decreased sense of

accomplishment compared to non-injured athletes (Giusti et al., 2022). This can potentially be explained by the impact that injury can have on athlete identity, which has been negatively linked to burnout (i.e., athletes with weaker athletic identities are more likely to report burnout; Martin et al., 2022). Additional research should explore all injury types and the impact that injuries or time loss from sport has on all dimensions of burnout or identifiers of stress.

Based on the results of this analysis, there are several changes that the SM staff can make in future seasons to improve specific sleep behaviors and the practices of implementing mental wellness questionnaires. These results highlight the clinical importance of doing repeated measures of a mental wellness survey and a custom perceived wellness survey based on the specific changes or problems that the football athletes face throughout a single season. In this specific population, it may be advantageous to continue using a survey that incorporates the inadequacy dimension of burnout and factors related to specific stressors and sleep quantity and quality. Not only may practices for administering mental wellness questionnaires change (i.e., doing repeated measures instead of a single measure prior to training camp), this analysis provides insight into what education or additional resources should be provided to the football athletes at each time point to combat some stressors such as sleep hygiene after the academic semester begins, sport psychology techniques for building confidence in football performance or decreasing the feelings of inadequacy, additional academic counselling resources at midseason and post-season, and potentially even identifying resources to deal with family-related stressors after athletes have spent some time at home or away from football.

CHAPTER II: DISSEMINATION

Because this is the first attempt to measure burnout, sleep behaviors and mental wellness over the course of a season with the football team, there were many stakeholders interested in the results of the analysis and informed the sports performance team to develop action items moving forward to mitigate the risk of these symptoms. Immediate actions following analysis included disseminating findings with the rest of the SM staff including team physicians, ATCs, mental health providers, registered dieticians (RD), and the sport administrator at the bi-annual staff meeting in January 2024. Initial information was disseminated via an infographic (see Appendix L) for visual representation of the results followed by a 20-minute monologue and subsequent staff discussion for future plans and questions. The discussion included review of each survey and rationale for time point selection and providing the staff with the same QR code that the football athletes used to complete their surveys. The infographic and staff discussion were organized based on the inventories (i.e., review of statistical analysis for sleep behaviors, and then for CCAPS-34 and burnout). Frequency statistics were also provided for the open-ended questions used in the surveys, takeaway points and ideas for future directions.

Of particular importance was identifying the number of athletes with worsening burnout scores over the course of the semester, identifying what stressors were most relevant at each time point, and identifying how many student athletes were referred to mental health providers during the season based on results of repeated measures of CCAPS-34. With the mental health providers in the room for input, one of the main takeaway messages was that four athletes were referred to them because of doing repeated measures, thus only administering a mental wellness questionnaire on an annual basis may not be enough. Particularly if the SM department wants to

be able to promptly identify and refer to additional services or resources, making a greater impact on the student-athlete population.

During the staff discussion portion of the dissemination process, questions about some of the specific questions that are included on the ASBQ were answered (i.e., what the wording of the question about napping, and wake-up and bedtimes were). Initial feedback from the infographic was both positive and helpful. The staff was most interested in exploring whether the procedures for administering mental wellness questionnaires should change for all student-athletes at that institution. Specifically, what time points moving forward is most advantageous to collect mental wellness surveys if the staff decides to not do repeated measures for all athletes moving forward. Because responses on the CCAPS-34 are slightly higher mid-season, it may be a "truer" assessment of mental wellness and knowing what athletes the mental health providers may need to follow up with.

The investigator's weekly journal entry was useful in the staff discussion for providing additional insight to the other ATCs interested in measuring similar variables on their own teams. One of the ways that this analysis and dissemination can impact professional practice is by being a starting point for other ATCs who can not only then emulate the methodology but do it better by learning from the strengths and weaknesses of this study. The current analysis evaluated a single athletic team, and the potential to expand these assessments to all sports or athletes can have even greater implications for the entire athletic department. One of the advantages of using an online platform such as Office 365 Forms and a custom QR code is that the assessments can be easily modified to meet specific demands or interests of other sports. The AT staff is most interested in exploring more about sleep behaviors. Specifically assessing if there are differences amongst teams based on annual training volume and number of

competitions and/or teams who practice or compete in the morning versus at night as some research has suggested (Haines Roberts et al., 2019; Sargent et al., 2014). Many of these questions related to sleep extension have already been added to an updated custom wellness survey that a couple of other ATCs have expressed interest in using during the Spring and Fall 2024 seasons. By expanding a custom survey to other sports, one of the additional factors discussed at the SM staff meeting included if and how to get coach buy-in for improved compliance with completing surveys. Getting coach buy-in will require additional action items in the future to show coaches and administrators how knowing this information and being able to intervene can help improve the overall wellness and performance of the student-athletes.

Additional dissemination and subsequent discussion with the football sport performance staff will tentatively occur before the 2024 summer training program in May. Due to the academic and athletic calendars, the summer training block is generally the most optimal time to implement new strategies with the football athletes. Having input from the strength coaches and RDs will ensure that the football athletes are receiving the same message from all areas. This collaboration will also allow for the opportunity to utilize the survey data in conjunction with other metrics of player athletic performance and wellness. In closing, initial dissemination of this analysis provided a good starting point for action plans that the AT staff can take moving forward to better serve the student-athletes and increase collaboration with other sport performance professionals.

CHAPTER III: ACTION PLAN

The first action item included dissemination of the results and infographic to the full SM staff at a bi-annual meeting. Staff discussions during this meeting helped initiate plans for additional action times for the following year. Specific action plans moving forward aim to expand on the current practices of the SM staff through more directed patient education, the development of a custom wellness survey, integrating the data into other metrics that the sport performance staff is collecting on athlete wellness and performance, and disseminating the information to other ATCs and sport performance professionals through conferences and publication.

Patient Education

Due to the striking percentage of football players not achieving sleep quantity recommendations, initial actions have included individual discussions with injured athletes when they are in the AT facility. These discussions center around the importance of adequate sleep quantity for exercise recovery and physical and mental performance, setting regular bedtime schedules, and exploring their barriers to increasing sleep quantity. Many of the football players have cited difficulty with time management, scrolling on their phones or playing videogames until the early morning hours, and significant academic workload being reasons for why their nightly sleep quantity is often is lower than it should be. While initial patient education included athletes currently seeking treatment by the AT staff for an injury, future action items include expanding sleep hygiene education to the entire football team. This may be in the form of an infographic displayed on the televisions or lunchroom tables in the football facility about sleep hygiene and recommendations for napping (i.e., how close to physical activity or class one

should avoid taking a nap). With coach buy-in, other action items may include having a guest speaker who is an expert on sleep and athletic performance speak during a team meeting.

Custom Survey Development

Early action items for the SM staff include the development of a custom wellness survey using the same Microsoft 365 Forms platform based on the results of this analysis (see Appendix M). Using a combination of questions from both the ASBQ and SpBI-DC, as well as questions related to fatigue and subjective readiness to participate in physical activity or the sport demands of that week. This custom wellness survey also includes questions related to sleep extension (i.e. napping habits), and if the athlete does take naps, how close in time does the nap occur to participating in physical activity or academic session (i.e., class or tutoring). Furthermore, the inclusion of specific wake up times and bedtimes, practice and competition times, and recent travel information can help expand on current athlete sleep behaviors. The question about quantity of sleep over the previous two weeks in this analysis was categorical. Greater insight might also come from having athletes select on a scale how many hours of sleep they typically get per night.

Evaluating sleep quantity and behaviors in the 2024-2025 academic year will provide further insight into changes specifically with the addition of two universities in California and one university in Texas joining the Atlantic Coast Conference (ACC). While the ACC is geographically large, traditionally all programs compete in the same time zone unless there is a matchup at a tournament or neutral site. Adding ACC programs in other time zones may provide additional challenges with further travel and differing competition times causing worse sleep hygiene. Previous studies in elite or professional athletes have found differences in sleep quantity and quality depending on location (home vs. away) and time of competition (Fullagar et al.,

2016; Haines Roberts et al., 2019; Kölling et al., 2019). Specifically, sleep quantity was shorter following away and/or nighttime competitions (Fullagar et al., 2016; Kölling et al., 2019). It would be beneficial to know if sleep behaviors in college athletes follow similar trends as elite athletes. If so, ATCs can provide education to prepare for competition in another time zone and implement strategies for training recovery upon traveling home.

One challenge in expanding a custom wellness survey for use in the future is increasing student-athlete compliance over the entire competitive season or academic calendar year. Having additional buy-in from sport coaches and administrators may help increase compliance. To have buy-in, these groups need to see how a wellness survey can improve athletic performance. Information learned from this analysis can help provide these groups with education about what the current trends are with collegiate football athletes, and a vision for where the SM department would like to go in the future with data collection or analysis. To argue for the impact that these factors can have on performance, the SM staff can lean on previous literature, while also including additional performance-based metrics in future analysis.

One of the objectives for the development of a custom wellness survey is that it can be used for other sports beyond football. Since initial dissemination, other ATCs have expressed interest in using a custom survey for their sport assignment. The ease with which information can be collected using an online platform such as Microsoft 365 Forms is that the surveys can be easily modified to include sport specific questions as needed.

Performance Staff Integration

In addition to expanding repeated measures of a wellness survey to other athletes, action plans for the football performance staff to utilize this information in conjunction with other data that the group is regularly collecting on student-athletes, and what additional questions or factors

can be explored in the future. Some of the other data that is regularly collected on the football team is GPS acute and chronic workloads, metrics for strength, power, and speed during strength and conditioning sessions, DEXA scans for body composition, and injury data. For example, if subjective wellness questions correlate to worsening performance measured by GPS workload or higher injury rates, these are additional variables that the sport performance staff can potentially intervene with to prevent the drop in performance and mitigate the risk of injury. Sampson et al. (2019) aimed at evaluating acute and chronic workloads with subjective wellness variables in college football players, including a potential higher risk of injury. Even though perceived wellness was worse following days of high workload, the association between wellness and injury risk was unclear (Sampson et al., 2019). Adding additional variables for wellness may provide greater insight into the potential relationship between these factors.

While it may not be surprising that the greatest stressor at the mid- and post- fall football season largely coincides with mid-term exams and stress over passing classes at the end of the semester, this analysis is helpful to gain better insight into just how large of a stressor academics is at that time point. Action items based on this analysis also include providing the football athletes with additional resources and information at strategic points during the next competitive season. For example, collaborating with the RDs on the sleep hygiene infographic to include nutrition strategies and recommendations for improving sleep quality, and the impact that having good sleep behaviors can have on physical activity or performance.

Long Term Goals

Additional action items include disseminating this information to other ATs at the ACC Health and Safety Summit or College Athletic Trainers Society (CATS) annual meeting. These are important platforms because both organizations are made up of akin professionals with

similar goals and resources. By sharing the possibilities of creating an individualized wellness survey and experiences from this longitudinal analysis, others might be empowered to do the same, making a tangible difference in student athletes across the NCAA. In addition to presenting to other collegiate ATCs the final action item is to use data from this analysis, in addition to future data collection, to seek publication in a peer-reviewed journal, such as the *Journal of Athletic Training* or the *Journal of Strength & Conditioning Research*. The immediate action item to achieve the longer-term goal of publication is to continue with a perceived wellness questionnaire during the Fall 2024 competitive football season, incorporating feedback and discussions with the sport performance staff to potentially have a greater scope of information to share with other ATCs.

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APPENDIX A: BURNOUT INVENTORY PARTICIPANT DEMOGRAPHICS

Table A8. Frequency of Primary Position Group

	Preseason (*N* = 105)		Post-Camp (*N* = 69)		Mid-Season (*N* = 76)		Post-Season (*N* = 104)	
Position Group	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Quarterback (QB)	4	3.8	3	4.3	3	3.9	3	2.9
Outside Linebacker (OLB)	5	4.7	2	2.9	2	2.6	7	6.7
Running Back (RB)	6	5.7	4	5.8	2	2.6	3	2.9
Tight End (TE)	7	6.6	3	4.3	5	6.6	7	6.7
Specialist (SP)	8	8.5	8	11.6	8	10.5	9	8.7
Defensive Line (DL)	11	10.4	5	7.2	8	10.5	8	7.7
Inside Linebacker (ILB)	11	10.4	7	10.1	7	9.2	13	12.5
Wide Receiver (WR)	16	15.1	14	20.3	13	17.1	19	18.3
Offensive Line (OL)	18	17.0	11	15.9	16	21.1	15	14.4
Defensive Back (DB)	19	17.0	12	17.4	12	15.8	20	19.2

Table A9. Frequency of Years of Collegiate Football Experience

	SpBI-DC Survey (*N* = 120)					
	0 (freshman)	1 (sophomore)	2 (junior)	3 (senior)	4 (grad)	5 (6th year)
n	28	30	20	24	13	5
%	23.3	25.0	16.6	20.0	10.8	4.1

Note. Results are compiled from question #1 on the burnout and sleep questionnaire administered at training camp and post-camp time points. Duplicate responses were deleted (i.e., each athlete is represented once).

Table A10. Frequency of Academic Credit Hours during Fall 2023 Semester

Academic Credit Hours	Midseason time point (n = 76)	%	Athletes who completed all four time points (n = 41)	%
≤ 11 academic hours	10	13.1	5	12.1
12 academic hours	32	42.1	17	41.5
13-14 academic hours	19	25.0	11	26.8
≥ 15	13	17.1	6	14.6
Unknown	2	2.6	2	4.9

Note. Results are from question #3 in the mid-season ASBQ & SPBI-DC survey. Because of the open-ended nature of the question, responses were grouped to encompass responses that reported half a credit.

APPENDIX B: LISTWISE PARTICIPANT DEMOGRAPHICS

Table B11. Frequency of Primary Position Type

	ASBQ & SpBI-DC (n = 41)		CCAPS-34 (n = 35)	
Position Type	*n*	*%*	*n*	*%*
Offensive Skill (OS)	11	26.8	10	28.6
Offensive Line (OL)	9	22.0	5	14.29
Defensive Line (DL)	3	7.31	6	17.17
Defensive Skill (DS)	11	26.8	8	22.85
Specialist (SP)	7	17.1	6	17.14

Table B12. Frequency of Years of Collegiate Football Experience

	ASBQ & SpBI-DC (n = 41)		CCAPS-34 (n = 35)	
	n	*%*	*n*	*%*
0 (freshman)	11	25.6	6	17.1
1 (sophomore)	11	25.6	11	31.4
2 (junior)	8	18.6	6	17.1
3 (senior)	7	16.3	7	20.0
4 (grad)	4	9.3	4	11.4
5 (6th year)	2	4.7	1	2.9

Note. On the first and second ASBQ & SpBI-DC survey, athletes were asked what semester and year they entered college. That response was then calculated to provide the number of years of collegiate football experience that each had. Only responses from the 41 athletes who completed all four repeated measures are included in this table.

APPENDIX C: SLEEP & BURNOUT QUESTIONNAIRE

What semester and year did you first begin college?

What is your primary football position?

a. Offensive Line
b. Wide Receiver
c. Tight End
d. Running Back
e. Quarterback
f. Defensive Line
g. Cornerback
h. Safety
i. Inside Linebacker
j. Outside Linebacker
k. Specialist (Kicker, Punter, Long Snapper)

How many academic credits / load are you taking right now?

Have you ever been diagnosed with a sleep disorder (i.e., insomnia, sleep apnea)?

a. Yes
b. No

During the recent past, how many hours of actual sleep did you get at night?
(This may be different than the number of hours you spent in bed.)

a. 5 to 6
b. 6 to 7
c. 7 to 8
d. 8 to 9
e. More than 9

How satisfied/dissatisfied are you with the quality of your sleep?

a. Very satisfied
b. Somewhat satisfied
c. Neither satisfied or dissatisfied
d. Somewhat dissatisfied
e. Very dissatisfied

During the recent past, how long has it usually taken you to fall asleep each night?

a. 15 minutes or less
b. 16-30 minutes
c. 31-60 minutes
d. Longer than 60 minutes

How alert do you feel during the first half-hour after having awakened?

a. Not at all alert
b. Slightly alert
c. Fairly alert
d. Very alert

Athlete Sleep Behavior Questionnaire

Please answer the following questions based on your sleep habits in the past two weeks.

Q1

I take afternoon naps lasting two or more hours.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q2

I use stimulants when I train / compete (i.e., caffeine).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q3

I exercise (train or compete) late at night (after 7pm).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q4

I consume alcohol within 4 hours of going to bed.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q5
I go to bed at different times each night (more than 1 hour variation).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q6
I go to bed feeling thirsty.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q7
I go to bed with sore muscles.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q8
I use light-emitting technology in the hour leading up to bedtime (i.e., laptop, phone, TV, video game).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q9
I think, plan and worry about my sporting performance when I am in bed.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q10
I think, plan and worry about issues not related to my sport when I am in bed.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q11
I use sleeping pills/tablets to help me sleep.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q12
I wake to go to the bathroom more than once per night.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q13
I wake myself and/or my bed partner with my snoring.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q14
I wake myself and/or my bed partner with my muscle twitching.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q15
I get up at different times each morning (more than 1 hour variation).

a. Never
b. Rarely
c. Sometimes
d. Frequently

e. Always

Q16
At home, I sleep in less than ideal environment (i.e., too much light, too noise, uncomfortable bed, too hot/cold).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q17
I sleep in foreign environments (i.e., hotel rooms).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Q18
Travel gets in the way of building a consistent sleep-wake routine.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Sport Burnout Inventory – Dual Career Form
Please answer the following questions based on how you feel at this moment.

Q1
I feel overwhelmed with my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q2
Sport doesn't interest me anymore.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q3
I often have feelings that I am not doing well in my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q4
I often sleep poorly because of matters related to my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q5
I feel that I am losing interest in my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q6
I wonder whether my sport has any meaning.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q7
I often feel like I'm not doing my best in my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q8
I worry a lot over matters related to my sport during my spare time.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree

e. Strongly Agree

Q9
I used to achieve more in my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Q10
The pressure of my sport is affecting other parts of my life

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Additional Questions

What is the biggest cause of stress in your life at the moment?

a. Football
b. Academics
c. Personal life
d. Other
e. I do not have any stress

If you feel comfortable providing more information to your response in the previous question, please explain further what is causing you the most stress?

Are you currently dealing with an injury or illness that is preventing you from participating fully in football related activities?

a. Yes
b. No

Is there anything else that you feel the Athletic Training staff should know at this time?

APPENDIX D: CCAPS-34

Name _____ Date _____ CCAPS ID # (Staff use only) _____

Instructions: The following statements describe thoughts, feelings, and experiences that people may have. Please indicate how well each statement describes you, **during the past two weeks**, from "not at all like me" (0) to "extremely like me" (4), by marking the correct number. Read each statement carefully, select only one answer per statement, and please do not skip any questions.

	Not at all like me	Slightly like me	Moderately like me	Mostly like me	Extremely like me
1. I am shy around others	0	1	2	3	4
2. My heart races for no good reason	0	1	2	3	4
3. I feel out of control when I eat	0	1	2	3	4
4. I don't enjoy being around people as much as I used to	0	1	2	3	4
5. I feel isolated and alone	0	1	2	3	4
6. I think about food more than I would like to	0	1	2	3	4
7. I am anxious that I might have a panic attack while in public	0	1	2	3	4
8. I feel confident that I can succeed academically	0	1	2	3	4
9. I have sleep difficulties	0	1	2	3	4
10. My thoughts are racing	0	1	2	3	4
11. I feel worthless	0	1	2	3	4
12. I feel helpless	0	1	2	3	4
13. I eat too much	0	1	2	3	4
14. I drink alcohol frequently	0	1	2	3	4
15. I have spells of terror or panic	0	1	2	3	4
16. When I drink alcohol I can't remember what happened	0	1	2	3	4
17. I feel tense	0	1	2	3	4
18. I have difficulty controlling my temper	0	1	2	3	4
19. I make friends easily	0	1	2	3	4
20. I sometimes feel like breaking or smashing things	0	1	2	3	4
21. I feel sad all the time	0	1	2	3	4
22. I am concerned that other people do not like me	0	1	2	3	4
23. I get angry easily	0	1	2	3	4
24. I feel uncomfortable around people I don't know	0	1	2	3	4
25. I have thoughts of ending my life	0	1	2	3	4
26. I feel self-conscious around others	0	1	2	3	4
27. I drink more than I should	0	1	2	3	4
28. I am not able to concentrate as well as usual	0	1	2	3	4
29. I am afraid I may lose control and act violently	0	1	2	3	4
30. It's hard to stay motivated for my classes	0	1	2	3	4
31. I have done something I have regretted because of drinking	0	1	2	3	4
32. I frequently get into arguments	0	1	2	3	4
33. I am unable to keep up with my schoolwork	0	1	2	3	4
34. I have thoughts of hurting others	0	1	2	3	4

APPENDIX E: SpBI-DC DESCRIPTIVE STATISTICS

Table E13. SpBI-DC Descriptive Statistics

		Preseason (*n* = 105)		Post Camp (*n* = 69)		Mid-Season (*n* = 76)		Post Season (*n* = 104)	
Category	Response	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
I feel overwhelmed with my sport	Strongly Disagree	34	32.38	17	24.64	19	25.00	30	28.85
	Disagree	37	35.24	25	36.23	29	38.16	37	35.58
	Neutral	26	24.76	21	30.43	23	30.26	30	28.85
	Agree	7	6.67	5	7.25	5	6.58	6	5.77
	Strongly Agree	1	0.95	1	1.45	76	0.00	1	0.96
Sport doesn't interest me anymore	Strongly Disagree	74	70.48	45	65.22	45	59.21	59	56.73
	Disagree	26	24.76	19	27.54	23	30.26	31	29.81
	Neutral	3	2.86	5	7.25	8	10.53	10	9.62
	Agree	1	0.95	0	0.00	0	0.00	3	2.88
	Strongly Agree	1	0.95	0	0.00	0	0.00	1	0.96
I often have feelings that I am not doing well in my sport	Strongly Disagree	30	28.57	20	28.99	15	19.74	25	24.04
	Disagree	40	38.10	20	28.99	24	31.58	31	29.81
	Neutral	24	22.86	21	30.43	25	32.89	33	31.73
	Agree	8	7.62	4	5.80	10	13.16	13	12.50
	Strongly Agree	3	2.86	4	5.80	2	2.63	2	1.92
I often sleep poorly because of matters related to my sport	Strongly Disagree	41	39.05	24	34.78	23	30.26	38	36.54
	Disagree	35	33.33	25	36.23	27	35.53	31	29.81
	Neutral	14	13.33	12	17.39	17	22.37	29	27.88
	Agree	9	8.57	4	5.80	8	10.53	4	3.85
	Strongly Agree	6	5.71	4	5.80	1	1.32	2	1.92

Table E13 continued.

		Preseason (*n* = 105)		Post Camp (*n* = 69)		Mid-Season (*n* = 76)		Post Season (*n* = 104)	
Category	Response	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
I feel that I am losing interest in my sport	Strongly Disagree	71	67.62	41	59.42	44	57.89	54	51.92
	Disagree	25	23.81	20	28.99	21	27.63	29	27.88
	Neutral	6	5.71	7	10.14	10	13.16	15	14.42
	Agree	1	0.95	1	1.45	1	1.32	5	4.81
	Strongly Agree	2	1.90	0	0.00	0	0.00	1	0.96
I wonder whether my sport has any meaning	Strongly Disagree	65	61.90	35	50.72	43	56.58	57	54.81
	Disagree	26	24.76	28	40.58	22	28.95	28	26.92
	Neutral	11	10.48	3	4.35	10	13.16	16	15.38
	Agree	1	0.95	2	2.90	1	1.32	1	0.96
	Strongly Agree	2	1.90	0	0.00	0	0.00	2	1.92
I often feel like I'm not doing my best in my sport	Strongly Disagree	45	42.86	18	26.09	17	22.37	35	33.65
	Disagree	29	27.62	24	34.78	23	30.26	30	28.85
	Neutral	22	20.95	13	18.84	29	38.16	32	30.77
	Agree	7	6.67	8	11.59	6	7.89	6	5.77
	Strongly Agree	2	1.90	5	7.25	1	1.32	1	0.96
I worry a lot over matters related to my sport during my spare time	Strongly Disagree	34	32.38	18	26.09	19	25.00	38	36.54
	Disagree	28	26.67	22	31.88	18	23.68	17	16.35
	Neutral	29	27.62	15	21.74	20	26.32	33	31.73
	Agree	9	8.57	9	13.04	15	19.74	14	13.46
	Strongly Agree	5	4.76	5	7.25	4	5.26	2	1.92

Table E13 continued.

		Preseason (n = 105)		Post Camp (n = 69)		Mid-Season (n = 76)		Post Season (n = 104)	
Category	Response	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
I used to achieve more in my sport	Strongly Disagree	29	27.62	17	24.64	11	14.47	25	24.04
	Disagree	21	20.00	11	15.94	15	19.74	22	21.15
	Neutral	29	27.62	19	27.54	27	35.53	23	22.12
	Agree	18	17.14	16	23.19	13	17.11	19	18.27
	Strongly Agree	8	7.62	6	8.70	10	13.16	15	14.42
The pressure of my sport is affecting other parts of my life	Strongly Disagree	43	40.95	24	34.78	21	27.63	39	37.50
	Disagree	31	29.52	19	27.54	25	32.89	26	25.00
	Neutral	21	20.00	19	27.54	20	26.32	27	25.96
	Agree	6	5.71	6	8.70	8	10.53	8	7.69
	Strongly Agree	4	3.81	1	1.45	2	2.63	4	3.85

APPENDIX F: LISTWISE DESCRIPTIVES STATISTICS

Table F14. Compliant Group Descriptive Statistics

Survey	Time Point	*Min.*	*Max.*	*Mean*	*SD*	*Median*	*IQR*
CCAPS-34 Global Score (*n* = 35)	Preseason	4	77	17.03	12.71	15	11.0-19.0
	Post-camp	6	60	22.55	13.49	20	12.0-32.0
	Midseason	5	62	15.54	10.96	13	8.0-18.0
	Post-season	3	47	14.42	8.60	14	8.0-18.0
CCAPS-34 Positive Score (*n* = 35)	Preseason	4	8	6.22	0.87	6	6.0-7.0
	Post-camp	2	8	5.97	1.50	6	5.0-7.0
	Midseason	2	8	5.31	1.36	5	4.0-6.0
	Post-season	1	8	5.91	1.80	6	5.0-7.0
CCAPS-34 Negative Score (*n* = 35)	Preseason	0	71	10.80	12.75	8	4.0-12.0
	Post-camp	0	58	9.57	11.35	7	2.0-13.0
	Midseason	0	57	17.57	14.25	15	5.0-27.0
	Post-season	0	41	8.51	8.37	7	5.0-7.0
ASBQ Global Score (*n* = 41)	Preseason	22	67	38.48	8.79	38	32.5-42.5
	Post-camp	20	51	37.24	6.52	37	33.0-41.5
	Midseason	22	52	38.26	6.46	38	33.5-43.5
	Post-season	25	53	37.95	6.99	39	32.5-43.0
SpBI-DC (*n* = 41)	Preseason	10	43	20.21	8.12	20	13.0-25.5
	Post-camp	10	38	20.51	7.49	21	13.5-26.5
	Midseason	10	31	21.24	6.20	21	16.0-26.0
	Post-season	10	34	20.80	7.72	21	13.0-27.0
Cynicism Dimension (*n* = 41)	Preseason	3	10	4.29	1.88	3	3.0-5.5
	Post-camp	2	11	4.34	1.82	3	3.0-6.0
	Midseason	3	8	4.36	1.59	4	3.0-6.0
	Post-season	3	11	4.70	2.21	3	3.0-6.0
Inadequacy Dimension (*n* = 41)	Preseason	3	14	7.04	3.11	6	4.0-9.5
	Post-camp	2	15	7.22	3.07	7	5.0-9.0
	Midseason	3	11	7.70	2.29	8	6.0-10.0
	Post-season	3	14	7.12	3.13	7	4.5-10.0
Exhaustion Dimension (*n* = 41)	Preseason	4	19	8.87	4.01	8	5.0-12.0
	Post-camp	4	17	8.95	3.72	8	6.0-11.0
	Midseason	4	16	9.17	3.52	9	6.5-12.0
	Post-season	4	16	8.97	3.77	9	5.5-12.0

APPENDIX G: CYNICISM SCORE CHANGE

Table G15. Difference in Cynicism Score (*n* = 41)

Time Point	*W*	*p-value*
Preseason to post-camp	104.50	0.691
Preseason to midseason	83.50	0.737
Preseason to post-season	110.60	0.110
Post-camp to midseason	104.00	0.712
Post-camp to post-season	129.00	0.169
Midseason to post-season	126.50	0.198

APPENDIX H: CHANGE SCORE DESCRIPTIVE STATISTICS

Table H16. Change Score Descriptive Statistics

Survey	Change time point	Group	*N*	*M*	*SD*	*Median*	*IQR*	*W*	*p-value*
SpBI-DC	Preseason to Post-camp	Compliant	41	0.29	5.92	1.00	-3.00-3.00	-1.33	0.183
		Non-Compliant	20	3.05	7.22	1.50	-1.00-6.00		
	Preseason to Midseason	Compliant	41	1.02	6.37	-1.00	-2.50-5.00	-1.16	0.245
		Non-Compliant	31	2.77	12.41	2.00	-3.00-9.00		
	Preseason to Post-season	Compliant	41	0.58	5.54	0.00	-3.00-3.50	-1.51	0.130
		Non-Compliant	50	2.24	8.77	1.00	0.00-6.00		
ASBQ	Preseason to Post-camp	Compliant	41	-1.24	6.82	-1.00	-4.50-1.50	-1.01	0.310
		Non-Compliant	21	0.85	5.78	1.00	-4.00-6.00		
	Preseason to Midseason	Compliant	41	-0.46	6.90	-1.00	-4.00-4.00	-1.12	0.262
		Non-Compliant	31	0.90	14.20	3.00	-4.00-5.00		
	Preseason to Post-season	Compliant	41	-0.53	6.08	0.00	-4.50-3.00	0.118	0.906
		Non-Compliant	51	-0.94	12.61	0.00	-5.00-3.00		
CCAPS-34	Preseason to Post-camp	Compliant	35	-1.48	14.84	0.00	-6.00-2.00	-1.11	0.264
		Non-Compliant	19	1.31	7.10	0.00	-3.00-2.00		
	Preseason to Midseason	Compliant	35	5.85	18.18	4.00	-1.00-18.00	2.96	0.003*
		Non-Compliant	28	-4.07	14.90	-4.50	-14.74-6.00		
	Preseason to Post-season	Compliant	35	-2.60	12.58	-2.00	-7.00-3.00	-0.15	0.875
		Non-Compliant	48	-1.50	6.58	-2.00	-5.75-1.75		

Note: * indicates a significant difference. The compliant group had median CCAPS-34 scores that were four points greater at midseason compared to preseason, compared to the non-compliant group whose scores decreased by four and a half points between the same time periods.

APPENDIX I: EXAMPLE OF STRESSORS REPORTED

Table I17. Specific Stressors Reported at Preseason (*n* = 79)

Largest Stressor	#	Example Responses
Personal Life	29	Family matters, missing out on moments with family, future (i.e., jobs, relationship, family), relationships, family member health
Football	24	Playing level, injuries, desire for playing time, striving to be 100% all the time, less sleep
Academics	20	Getting into a specific major, workload
Other	6	Adapting to a new environment, coach perception, worries over performance the night before

Table I18. Specific Stressors Reported at Midseason (*n* = 65)

Largest Stressor	#	Example Responses
Personal Life	10	Worrying about future post-graduation
Football	21	Expectation to be perfect, injuries, desire for playing time, sport performance, time management, anxiety about practice and games
Academics	26	Pressure to achieve academic goals, ability to pass classes, grades, workload, midterm exams
Other	8	Injuries, mixture of several stressors

APPENDIX J: SLEEP DESCRIPTIVE STATISTICS

Table J19. Additional Sleep Question Descriptive Statistics

		Preseason (*n* = 106)		Post Camp (*n* = 69)		Mid-Season (*n* = 76)		Post Season (*n* = 104)	
Category	Response	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Hours of sleep per night	5 to 6	17	16.0	12	17.4	25	32.9	24	23.1
	6 to 7	31	29.2	25	36.2	32	42.1	36	34.6
	7 to 8	42	39.6	24	34.8	19	25.0	36	34.6
	8 to 9	15	14.1	7	10.1	0	0	8	7.7
	More than 9	1	0.9	1	1.4	0	0	9	8.6
Sleep satisfaction	Very dissatisfied	2	1.9	1	1.4	3	3.9	2	1.9
	Somewhat dissatisfied	10	9.4	11	15.9	9	11.8	10	9.6
	Neither satisfied or dissatisfied	20	18.9	11	15.9	19	25.0	16	15.4
	Somewhat satisfied	45	42.5	35	50.7	35	46.1	50	48.1
	Very satisfied	29	27.4	11	15.9	10	13.2	26	25.0
Time to fall asleep	15 minutes or less	36	34.0	28	40.6	27	35.5	39	37.5
	16-30 minutes	47	44.3	31	44.9	30	39.5	41	39.4
	31-60 minutes	19	17.9	8	11.6	15	19.7	21	20.2
	Longer than 60 minutes	4	3.8	2	2.9	4	5.3	3	2.9
Alertness	Not at all alert	14	13.2	5	7.2	9	11.8	15	14.4
	Slightly alert	9	8.5	5	7.2	4	5.3	4	3.8
	Fairly alert	31	29.2	25	36.2	30	39.5	42	40.4
	Very alert	52	49.1	34	49.3	33	43.4	43	41.3

Table J19 continued.

		Preseason (*n* = 106)		Post Camp (*n* = 69)		Mid-Season (*n* = 76)		Post Season (*n* = 104)	
Category	Response	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Afternoon naps > 2 hours	Never	20	18.9	23	33.3	19	25.0	22	21.1
	Rarely	51	48.1	25	36.2	35	46.1	43	41.3
	Sometimes	24	22.6	14	20.3	17	22.4	30	28.8
	Frequently	8	7.5	5	7.2	4	5.3	6	5.8
	Always	3	2.8	2	2.9	1	1.3	3	2.9

Note: All responses are based on habits from the preceding two weeks. Category of alertness is from the question: "how alert do you feel during the first half-hour after having awakened?"

Table J20. ASBQ Question Descriptive Statistics

		Preseason (n = 106)		Post Camp (n = 69)		Mid-Season (n = 76)		Post Season (n = 104)	
Category	Response	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*
Use of light emitting technology	Never	17	16.0	8	11.6	4	5.3	6	5.8
	Rarely	4	3.8	2	2.9	1	1.3	7	6.7
	Sometimes	14	13.2	16	23.2	18	23.7	21	20.2
	Frequently	47	44.3	26	37.7	30	39.5	42	40.4
	Always	24	22.6	16	23.2	23	30.3	28	26.9
Worry about sporting performance	Never	13	12.3	9	13.0	10	13.2	22	21.2
	Rarely	24	22.6	17	24.6	13	17.1	20	19.2
	Sometimes	39	36.8	25	36.2	33	43.4	43	41.3
	Frequently	19	17.9	8	11.6	13	17.1	19	18.3
	Always	10	9.4	10	14.5	7	9.2	0	0.0
Use of stimulants	Never	60	56.6	45	65.2	48	63.2	69	66.3
	Rarely	23	21.7	11	15.9	12	15.8	18	17.3
	Sometimes	11	10.4	8	11.6	7	9.2	10	9.6
	Frequently	7	6.6	5	7.2	7	9.2	5	4.8
	Always	5	4.7	0	0.0	2	2.7	2	1.9
Bedtime variation	Never	8	7.5	4	5.8	7	9.2	11	10.6
	Rarely	30	28.3	24	34.8	23	30.3	26	20.0
	Sometimes	50	47.2	28	40.6	39	51.3	54	51.9
	Frequently	15	14.2	11	15.9	5	6.6	12	11.5
	Always	3	2.8	2	2.9	2	2.6	1	1.0

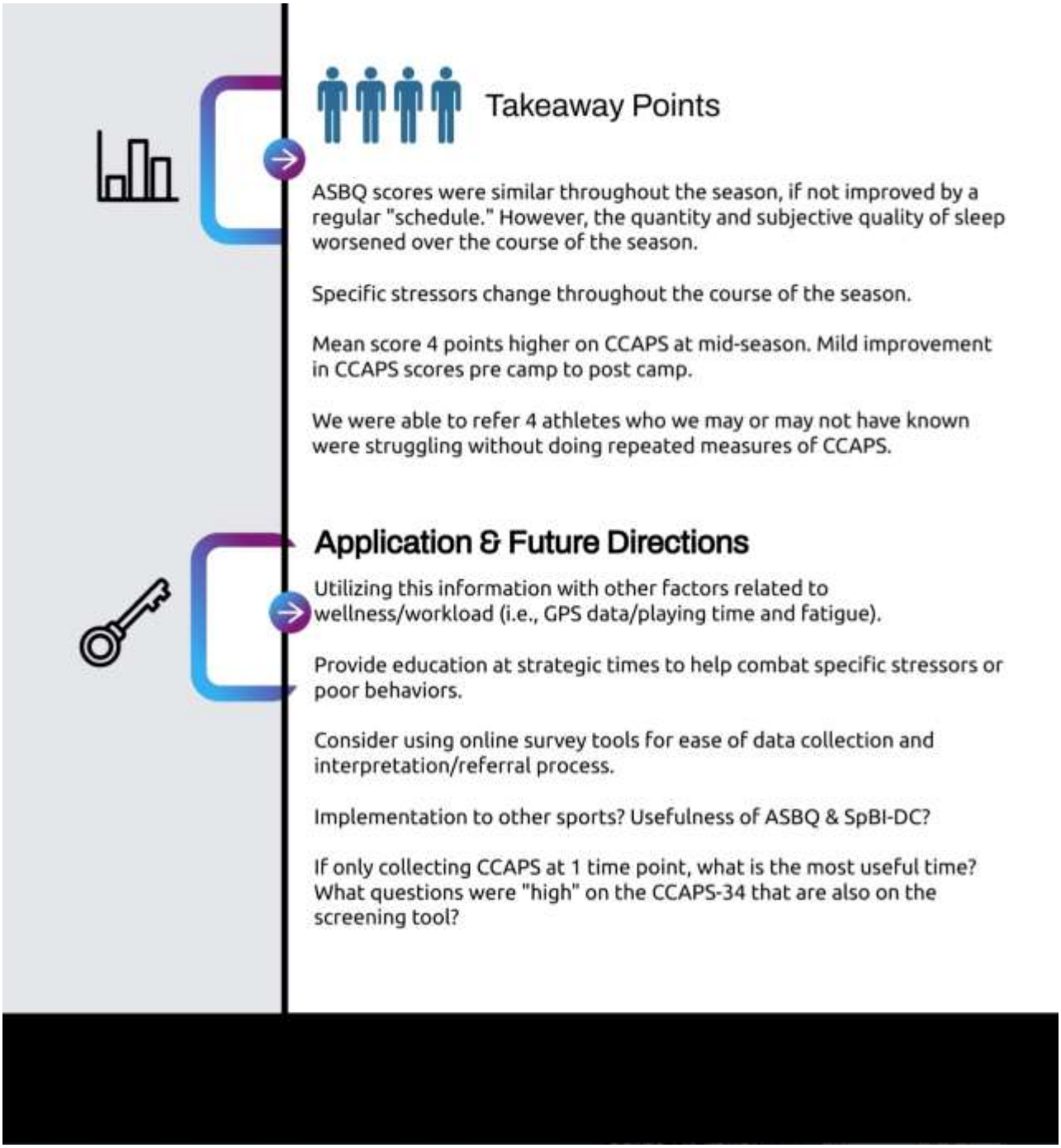
Note. Categories based on responses from the ASBQ on behaviors in the preceding two weeks. Q2 is "I use stimulants when I train / compete," Q5 is "I go to bed at different times each night (> 1 hour variation)," Q8 is "I use light-emitting technology in the hour leading up to bedtime," and Q9 is "I think, plan and worry about my sporting performance when I am in bed."

APPENDIX K: DIFFERENCES BY EXPERIENCE, POSITION & ACADEMIC LOAD

Table K21. Differences in Responses by Experience, Position Group, and Academic Credits

		SpBI-DC			ASBQ			CCAPS-34		
	Time Point	*n*	*F*	*p-value*	*n*	*H*	*p-value*	*n*	*H*	*p-value*
Years of Collegiate Football Experience	Preseason	105	0.958	0.448	106	2.262	0.812	100	8.775	0.118
	Post-camp	69	0.932	0.466	69	4.335	0.502	73	3.921	0.561
	Midseason	76	0.959	0.449	76	5.672	0.339	62	6.704	0.244
	Post-season	104	0.431	0.826	104	1.816	0.874	97	6.713	0.243
Football Position Type	Preseason	105	1.313	0.270	106	5.994	0.200	100	3.023	0.554
	Post-camp	69	0.594	0.668	69	1.891	0.756	73	5.265	0.261
	Midseason	76	1.675	0.165	76	1.832	0.767	62	3.380	0.496
	Post-season	104	1.375	0.248	104	5.412	0.248	97	2.824	0.588
Academic Credit Load	Midseason	74	2.575	0.113	74	4.384	0.223	52	3.561	0.313
	Post-season	69	0.008	0.930	69	3.842	0.279	60	0.704	0.872

APPENDIX L: INFOGRAPHIC


Takeaway Points
ASBQ scores were similar throughout the season, if not improved by a regular "schedule." However, the quantity and subjective quality of sleep worsened over the course of the season.
Specific stressors change throughout the course of the season.
Mean score 4 points higher on CCAPS at mid-season. Mild improvement in CCAPS scores pre camp to post camp.
We were able to refer 4 athletes who we may or may not have known were struggling without doing repeated measures of CCAPS.
Application & Future Directions
Utilizing this information with other factors related to wellness/workload (i.e., GPS data/playing time and fatigue).
Provide education at strategic times to help combat specific stressors or poor behaviors.
Consider using online survey tools for ease of data collection and interpretation/referral process.
Implementation to other sports? Usefulness of ASBQ & SpBI-DC?
If only collecting CCAPS at 1 time point, what is the most useful time? What questions were "high" on the CCAPS-34 that are also on the screening tool?

APPENDIX M: CUSTOM WELLNESS SURVEY

What semester and year did you first begin college?

What is your primary football position?

a. Offensive Line
b. Wide Receiver
c. Tight End
d. Running Back
e. Quarterback
f. Defensive Line
g. Cornerback
h. Safety
i. Inside Linebacker
j. Outside Linebacker
k. Specialist (Kicker, Punter, Long Snapper)

How many academic credits / load are you taking right now?

In the past 2 weeks, how many hours of actual sleep did you get at night?
(This may be different than the number of hours you spent in bed.)

How satisfied/dissatisfied are you with the quality of your sleep?

a. Very satisfied
b. Somewhat satisfied
c. Neither satisfied or dissatisfied
d. Somewhat dissatisfied
e. Very dissatisfied

During the recent past, how long has it usually taken you to fall asleep each night?

a. 15 minutes or less
b. 16-30 minutes
c. 31-60 minutes
d. Longer than 60 minutes

How alert do you feel during the first half-hour after having awakened?

a. Not at all alert
b. Slightly alert
c. Fairly alert
d. Very alert

In the past two weeks how frequently do you take naps?

a. Daily
b. 5-6x/week
c. 3-4x/week
d. 1-2x/week
e. I don't take naps

If you do take naps, how long do they typically last (in minutes)?

If you do take naps, what time of the day do you usually take your nap?

If you do take naps, how close to practice or competition do you nap?

If you do take naps, how close to your class time do you nap?

In the past two weeks what time have you woken up during the weekday?

In the past two weeks what time have you gone to bed during the weekday?

In the past two weeks what time have you woken up during the weekend?

In the past two weeks what time have you gone to bed during the weekend?

I use stimulants when I train / compete (i.e., caffeine).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

I go to bed at different times each night (more than 1 hour variation).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

I go to bed feeling thirsty.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

I go to bed with sore muscles.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

I use light-emitting technology in the hour leading up to bedtime (i.e., laptop, phone, TV, video game).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

I think, plan and worry about my sporting performance when I am in bed.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

I get up at different times each morning (more than 1 hour variation).

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

Travel gets in the way of building a consistent sleep-wake routine.

a. Never
b. Rarely
c. Sometimes
d. Frequently
e. Always

I feel overwhelmed with my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

Sport doesn't interest me anymore.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

I often have feelings that I am not doing well in my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

I often sleep poorly because of matters related to my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

I often feel like I'm not doing my best in my sport.

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

The pressure of my sport is affecting other parts of my life

a. Strongly Disagree
b. Disagree
c. Neutral
d. Agree
e. Strongly Agree

What is the biggest cause of stress in your life now?

a. Football
b. Academics
c. Personal life
d. Other
e. I do not have any stress

If you feel comfortable providing more information to your response in the previous question, please explain further what is causing you the most stress?

Are you dealing with an injury or illness preventing you from participating fully in football?

a. Yes
b. No

How much fatigue do you have right now (scale of 1-5)?

1. Always tired
2. More tired than normal
3. Normal
4. Fresh
5. Very Fresh

What is your stress level like at this moment (scale of 1-5)?

1. Very stressed
2. Feeling stressed
3. Normal
4. Relaxed
5. Very Relaxed

How ready do you feel to participate in the demands of your sport this week (scale of 1-4)?

1. Not ready
2. Undecided
3. Normal
4. Very ready

Is there anything else the Athletic Training staff should know now?