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Implicit Beliefs About Anxiety and the Relationship with Competitive Anxiety Intensity and Direction

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IMPLICIT BELIEFS ABOUT ANXIETY AND THE RELATIONSHIP WITH COMPETITIVE

ANXIETY INTENSITY AND DIRECTION

by

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(Under the Direction of Megan Byrd)

ABSTRACT

During the Fall of 2021, 45% of male and 72% of female student-athletes reported overwhelming anxiety at least once a month (NCAA, 2021). In addition to affecting an individual's well-being, anxiety may negatively impact athletic performance (Edwards & Hardy, 1996). To better understand the impact of anxiety on athletic performance and develop effective interventions, both the intensity and direction of symptoms experienced must be considered. Incremental beliefs have been shown to be related to desirable performance outcomes and increased well-being in various populations (Danthony et al., 2020; Dweck, 2008), and may provide an effective intervention to interpret anxiety as more facilitative. This study set the foundation by analyzing the relationship between athletes' implicit beliefs and their competitive trait anxiety. The intensity and direction of competitive trait anxiety symptoms were quantitatively assessed using a modified version of the Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006), and implicit beliefs were measured using the Theories of Anxiety Scale (TOA; Schroder et al., 2015). The sample ($n = 114$) consisted of collegiate student-athletes from both co-active and interactive sports. Results suggest that implicit beliefs are related to the intensity of competitive anxiety symptoms (r (112) = -.485, $p < .001$), meaning higher incremental beliefs are related to lower levels of competitive anxiety. Therefore, this study provides initial support that implicit beliefs may have a considerable impact on managing student-athletes' anxiety levels. However, results demonstrated that how student-athletes interpreted their anxiety symptoms was not affected by their implicit beliefs about anxiety. Further research is required to gain a better understanding of the predictors of a facilitative interpretation of competitive anxiety. The implications of these findings include recognizing the need to gain deeper insights into underlying implicit beliefs that impact student-athletes' experiences and how to assess and utilize those beliefs in applied practice.

INDEX WORDS: Competitive anxiety, Athletes, Growth mindset, Fixed mindset, Implicit beliefs, Student-athletes

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INTRODUCTION

Statement of the Problem

According to the Association for Applied Sport Psychology (AASP), there are two main goals for the field of sport and exercise psychology: (a) increase individual well-being, and (b) elevate performance (2022). For collegiate student-athletes, one factor that can affect both their performance and well-being is anxiety. Among the general student population, around 40% of students report above-normal anxiety levels (Beiter et al., 2015). As part of the student population, student-athletes are likely to have similar experiences while simultaneously dealing with additional stressors related to their athletic obligations such as their direct involvement in training or travel to their competitions (Provencio, 2016). Interventions have been developed to help student-athletes deal more effectively with anxiety prior to and during competition (Hanton & Jones, 1999). Implicit beliefs, which commonly describe how malleable or fixed a person believes a trait to be (Dweck, 2008), have recently sparked the interest of researchers in the field of clinical psychology as a potential intervention technique for coping with anxiety. Additionally, examining competitive anxiety from the perspective of implicit beliefs may provide further insights into student-athletes' interpretation of competitive anxiety as either facilitative or debilitative.

Competitive anxiety

To better understand the challenges student-athletes are facing, the terms associated with anxiety need to be clearly defined. Spielberger (1972a) was one of the first scientists to offer a theory that extends beyond the perception of objective physical threats to focus more on an individual's interpretation of a potentially threatening situation. To differentiate between an individual's general response to a situation and an individual's current response to a situation, Spielberger coined the terms trait and state anxiety. State anxiety is defined as an "emotional reaction that consists of subjective feelings of tension, apprehension, nervousness and worry, and heightened activity of the autonomic nervous systems" (Spielberger, 1979, p. 17). On the other hand, trait anxiety is defined as "individual differences in anxiety proneness" which is further clarified as "the tendency to see the world as dangerous and in the frequency

that state anxiety is experienced over a long period of time" (Spielberger, 1979, p. 60). Spielberger's (1972b) research also highlighted a need for situation-specific trait assessment to predict situation-specific state anxiety more accurately. This means that to predict how student-athletes respond in a competitive situation, their general response in competitive situations is more important than their overall "anxiety proneness" across all types of situations. Therefore, one of the common definitions of competitive trait anxiety is the frequency with which individuals respond to a competitive situation with state anxiety (Lewthwaite & Scanlan, 1989). Further, competitive state anxiety is defined as a situation-specific, negative emotional response to one's involvement in a competitive situation (Martens et al., 1990).

With the understanding of what competitive anxiety is, the question of how it influences athletic performance can subsequently be examined. Early theories proposed either a positive linear relationship (Spence & Spence, 1966) or an inverted-U relationship between anxiety and performance (Yerkes & Dodson, 1908). The inverted-U hypothesis suggested that there is an optimal level of anxiety needed for performance, and either too much or too little anxiety can be debilitative to performance. To adjust the inverted-U hypothesis to each individual athlete, the individual zones of optimal functioning (IZOF; Hanin, 2000) was created. The IZOF theory focused on the observation that some student-athletes perform better at higher levels of perceived anxiety, while others perform at their best at lower levels. Other researchers focused heavily on the idea of further categorizing competitive anxiety through a variety of assessments (Martens et al., 1990; Smith et al., 1990). The three subcategories of competitive state anxiety, cognitive anxiety, somatic anxiety, and self-confidence, influence athletic performance differently and therefore need to be treated independently (Martens et al., 1990). Student-athletes can have varying levels across subscales (e.g. have high cognitive anxiety but low somatic anxiety), and each subscale can have a different impact on athletic performance (Edwards & Hardy, 1996; Hanton et al., 2002). Other theories attempt to combine the multidimensional theories into singular models while allowing for a wide variety of effects on performance. These theories include the Cusp Catastrophe Model (CAT; Hardy & Parfitt, 1991) and the reversal theory (Apter, 1982) which has been applied to the sport psychology literature (Kerr, 1987). Both models incorporate the idea that anxiety's effect on performance

may be dependent on multiple factors such as physiological arousal (Hardy & Parfitt, 1991) or metamotivational states (Apter, 1982). Despite failing to describe the relationship between anxiety and performance with full accuracy, most recent models are supported by scientific data and are beneficial in describing the experiences of many athletes (Baldock et al., 2021). Since most models examine different elements of anxiety, reviewing the various models together may provide the most comprehensive understanding of anxiety and how it impacts performance.

Based on the definition that competitive anxiety is a negative emotional response (Martens et al., 1990), high levels of competitive anxiety are often viewed as undesirable. However, some models (e.g., Hanin, 2000; Hardy & Parfitt, 1991; Martens et al., 1990) suggest that an increase in competitive anxiety may increase athletic performance. Therefore, it is valuable to explore the various facets of competitive anxiety and determine both the debilitative and facilitative aspects and their impact on performance. To differentiate those concepts, the amount of anxiety perceived by student-athletes will be referred to as anxiety intensity, while the interpretation of those anxiety symptoms and the subsequent effect on athletic performance will be considered anxiety direction.

Direction of competitive anxiety. In a sample of female gymnasts, competitive anxiety was measured by a modified version of the Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990), and their performance was rated by judges (Jones et al., 1993). Although there were no significant differences between high and low-performing athletes when it came to the intensity of anxiety they experienced prior to the event, athletes who rated their anxiety symptoms as more facilitative prior to their performance performed significantly better than those gymnasts that rated their anxiety as more debilitative (Jones et al., 1993). Due to the desired effect of a facilitative interpretation of anxiety, researchers have attempted to manipulate athletes' appraisal of competitive anxiety (Hanton & Jones, 1999). Multiple interventions such as goal setting, imagery, and self-talk allowed competitive swimmers a more facilitative interpretation of their anxiety. Similar to Jones and colleagues (1993), swimmers who interpreted their anxiety as more facilitative performed better as measured by their respective times during their events than swimmers who interpreted their anxiety as debilitative (Hanton & Jones, 1999). These

findings further highlight that athletes are not only differing in the intensity of anxiety that is experienced but also in their interpretation of these anxiety symptoms. Furthermore, the interpretation of these anxiety symptoms appears to have a significant effect on an athlete's performance, which seems to be independent of the anxiety intensity.

Differences in competitive anxiety. Student-athletes' anxiety intensity and perception of anxiety symptoms may vary as a function of demographic groups (e.g., gender, race, ethnicity). Studies have found differences in general anxiety (Brown et al., 2019) and competitive anxiety based on athlete gender (Correia & Rosado, 2019), suggesting that females tend to experience slightly more anxiety, while other studies have found no significant differences based on gender (Ntoumanis & Jones, 1998; Turkmen et al., 2013). There may be racial and ethnic differences regarding competitive anxiety (Anagnostopolous et al., 2015), however, these differences are noted to be smaller than other concepts, such as self-confidence, and mainly based on an individual's cultural appraisal of anxiety rather than due to biological differences (Xinyi et al., 2004). Elite-level athletes are suggested to only differ from non-elite athletes on the interpretation but not the intensity of anxiety (Jones et al., 1994), but there may be differences between athletes at the same level based on their sport and role on the team (Smith, 1983; Terry et al., 1996). These potential differences raise questions about what factors allow some athletes to interpret their competitive anxiety as facilitative, and how those athletes whose performances are debilitated by anxiety can achieve a more effective interpretation.

Implicit beliefs

Implicit beliefs are a psychological concept that has received attention in attempting to improve an individual's well-being and performance. The idea of implicit beliefs was significantly impacted by the work of Carol Dweck, who conceptualized two distinct implicit beliefs; incremental and entity beliefs (Dweck, 2008; Dweck & Legget, 1988). Incremental beliefs are perceptions that perceive characteristics as malleable, meaning that through effort, new strategies, and help from others, this characteristic can be improved (Dweck, 2008). Entity beliefs, however, evolve around the idea that characteristics are innate and therefore fixed, which means that they cannot be improved independent of the effort that is put out

(Dweck, 2008). Notably, the characteristics that are referenced above represent a variety of concepts including intelligence (Dweck et al., 1995), athletic ability (Biddle et al., 2003), emotions (Tamir et al., 2007), and anxiety (Schroder et al., 2015).

Incremental beliefs have been associated with desirable outcomes in different performance arenas, such as academics and athletics. Because incremental beliefs encourage an increase in effort, they have most frequently been related to positive performance outcomes. Incremental beliefs in students have been associated with higher levels of self-efficacy, which resulted in better academic performance as measured by grade point average (GPA; Komarraju & Nadler, 2013). In athletes, implicit beliefs are suggested to increase motivation to utilize mental skills, which may result in an increase in athletic performance (Shaffer et al., 2015). This suggests that implicit beliefs could play a crucial part in setting individuals up for success by influencing seemingly small and subtle decisions (e.g., learning new skills) that will lead long-term to more desirable outcomes.

Desirable outcomes of having incremental beliefs have also been found in sports and physical activities. In a sample of students in Australia, implicit beliefs about athletic ability were positively related to the enjoyment of participating in their sport both at the onset of the study as well as after one year (Scanlan et al., 1993). Further research by Gardner et al., (2018) suggests that implicit beliefs function as a protective factor of enjoyment. For athletes that experienced a deterioration in the relationship with their coach, incremental beliefs were related to higher levels of enjoyment than for athletes holding entity beliefs who experienced a similar deterioration.

Fortunately, these implicit beliefs are malleable in that existing beliefs can be substituted for more helpful beliefs through different interventions. By educating middle-school students about emotions and introducing them to emotion regulation strategies, researchers were able to increase incremental beliefs among students (Smith et al., 2018). The increase in those incremental beliefs resulted in an increase in well-being for this intervention group. Similar findings were present in a sample of collegiate athletes who were presented with a small passage about incremental or entity beliefs (Shaffer et al., 2015). Those student-athletes who read empathetic and anecdotal evidence in support of the helpfulness

of mental skills training showed an increase in incremental beliefs, which was related to an increase in motivation and self-efficacy.

Despite the evidence that incremental beliefs are related to desired outcomes such as increased enjoyment or performance, the implementation of such beliefs is not without obstacles. In a study of female high school soccer players, some of the challenges become apparent (Zanin et al., 2020). Participants who embodied incremental beliefs were frequently considered "show-offs" by their peers. Participants with entity beliefs chose to conceal or avoid excellence to achieve higher social acceptance. Without discrediting the challenges that doing so may present in particular to young athletes, the long-term benefits of incremental beliefs suggest that their implementation can be deemed more desirable.

Implicit beliefs and anxiety

The question that remains to be answered is whether these implicit beliefs provide beneficial insights for student-athletes regarding competitive anxiety. In a sample of French high school students, their implicit beliefs about athletic ability were related to their test anxiety in their physical education class (Danthony et al., 2020). Particularly, incremental beliefs were significantly related to lower levels of worry and somatic tension. Similar findings have been replicated in an athletic context, where entity beliefs about athletic ability were related to higher levels of competitive trait anxiety in a sample of competitive soccer players (Gardner et al., 2015).

As mentioned, the concepts of implicit beliefs can be applied to a wide variety of characteristics such as intelligence (Dweck et al., 1995), athletic ability (Biddle et al., 2003), emotions (Tamir et al., 2007), and anxiety (Schroder et al., 2015). Researchers were able to differentiate these various implicit beliefs not just theoretically, but also practically in a wide range of samples (Hughes, 2015; Jowett & Spray, 2013). Doing so showed that individuals hold incremental beliefs about one characteristic, like intelligence, while at the same time holding entity beliefs about a different characteristic, like morality. Besides differentiating multiple implicit beliefs, researchers were also able to identify which implicit beliefs were most relevant in predicting different characteristics such as intelligence, morality, or emotions (Hughes, 2015; Schroder et al., 2015). According to these results, domain-specific symptoms

are best predicted by domain-specific implicit beliefs, meaning that individuals' anxiety was best predicted by their implicit beliefs about anxiety rather than their implicit beliefs about intelligence or emotion (Schroder et al., 2016). Despite implicit beliefs about athletic ability being related to anxiety (Danthony et al., 2020; Gardner et al., 2015), it seems to be more accurate to assess student-athletes' implicit beliefs about anxiety to predict their competitive anxiety.

When further examining implicit beliefs about anxiety, researchers and sport and performance (SPP) practitioners may find various application opportunities for student-athletes. Since there is no research on implicit beliefs about anxiety from a performance lens, it is necessary to look outside the performance framework to gain a better understanding of those specific beliefs. From a more clinical perspective, incremental beliefs about anxiety are related to the preference for individual therapy rather than medication (Schroder et al., 2015), better outcomes in short-term mental health (Schleider et al., 2015), as well as better outcomes of therapy related to anxiety disorders (Reffi et al., 2020). Implicit beliefs have also been shown to function as a buffer for psychological distress following traumatic experiences (Schroder et al., 2017). There also seem to be relevant benefits of incremental beliefs for individuals with sub-clinical levels of anxiety. An analysis suggested that incremental beliefs about anxiety were related to better adjustment to college as indicated by lower levels of distress in college freshmen (Schroder et al., 2019). Based on the finding that implicit beliefs about anxiety are malleable with long-term lasting changes in beliefs (e.g., De Castella et al., 2015; Reffi et al., 2020), some researchers have suggested that implicit beliefs interventions provide a cost-effective solution for individuals struggling with clinical or sub-clinical anxiety (Stickel, 2019).

Purpose of the Study

Applying implicit beliefs to competitive anxiety has yet to be explored. To date, one study (Gardner et al., 2015) has demonstrated the relationship between implicit beliefs about athletic ability and perceived anxiety, however, beliefs about the malleability of competitive anxiety have not been analyzed. Such a relationship may hold valuable information on how to improve student-athletes' well-being and performance. There is a need to further advance the development of cost-effective and long-term anxiety

interventions to address the experienced anxiety of student-athletes. Levels of anxiety are a concern for the well-being and performance of student-athletes. Additionally, research suggests that besides the intensity of anxiety, the interpretation of anxiety as either facilitative or debilitative is a crucial factor in determining whether an increase in arousal negatively affects well-being and performance. Implicit beliefs have been shown to have a significant impact on an individual's goals, motivation, and effort. Even though individuals have predominantly either incremental or entity beliefs, implicit beliefs are suggested to be malleable both in the short term and long term. The purpose of this research project was to examine the relationship between student-athletes' implicit beliefs about anxiety and their competitive trait anxiety intensity and direction. Specifically, this study is answering the following questions: (1) is there a relationship between the direction and intensity of anxiety and an athlete's implicit beliefs about anxiety? and (2), to what degree is the direction of competitive anxiety predicted by anxiety intensity, implicit beliefs, gender, and an athlete's age? It was hypothesized that (1a) There will be a positive relationship between implicit beliefs and the direction of competitive anxiety indicating that stronger incremental beliefs are predicted to be related to a more facilitative interpretation of anxiety symptoms, (1b) there will be a negative relationship between implicit beliefs and the intensity of competitive anxiety. (2a) Somatic anxiety, concentration disruption, worry, implicit beliefs, and student-athletes' transition status will account for a significant amount of the variance in anxiety direction, while age and gender will not significantly predict an athlete's interpretation of competitive anxiety. Additionally, (2b) implicit beliefs will be a stronger predictor of variance in anxiety direction than any of the three subscales of anxiety intensity.

CHAPTER 2

METHODS

Design

The study design was quantitative and correlational in nature and used a convenience sample. All data were collected through Qualtrics and required only one-time participation from student-athletes. Data were analyzed using descriptive and inferential statistics.

Participants

According to a power analysis, 98 participants were needed for this study, based on an expected medium effect size ($f^2 = .15$) and an alpha level of .05, ensuring a power of .80. The final sample consisted of 114 student-athletes from 15 co-active and interactive sports. To allow for participants transitioning in or out of college, individuals were considered student-athletes if they were competing for an intercollegiate, school-sponsored team during the 2022-23 academic year. Additionally, participants were required to be at least 18 years or older to be eligible to participate. To recruit a diverse sample of participants, no other exclusion criteria were used. Participants had a mean age of 19.8 years ($SD = 1.29$) and consisted of predominantly female student-athletes ($n = 84$; 73.7 %). The majority of the sample identified as White ($n = 86$; 75.4 %) or Black/African American ($n = 15$; 13.2 %), while the remaining participants were biracial ($n = 7$; 6.1%) or preferred to not disclose their race ($n = 6$; 5.2 %). Participants were from 15 different sports but included predominantly soccer ($n = 43$; 37.7 %), basketball ($n = 15$; 13.2 %), and volleyball ($n = 14$; 12.3 %). Participants were also categorized as either transitioning (n = 58; 50.9 %) or not transitioning in or out of their current team (n = 56; 49.1 %). Participants were categorized as "transitioning" if this is either their first year on the team or they report that this will be their last year on the team. For a full list of participant demographics, see table 1.

Instruments

Demographic Questionnaire. A total of nine demographic questions assessed descriptive information for the sample. Questions included the participants' age, gender, race, ethnicity, year in school, and sport. Participants were also asked whether this is their first year of competing on this team

(e.g., transfer, freshman) as well as whether they intend to compete on this team again during the next academic year. These questions allowed the researchers to categorize student-athletes as either currently transitioning or not.

Modified Sport Anxiety Scale-2. To measure anxiety, the Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006) was used. The SAS-2 consists of 15 items on a 4-point Likert-type scale (1 = *Not At All*; 4 = *Very Much*) that measures competitive trait anxiety. The questionnaire has three subscales including somatic anxiety (e.g., "My body feels tense."), worry (e.g., "I worry that I will not play well."), and concentration disruption (e.g., "It is hard to concentrate on the game"). Therefore, scores on each of the subscales range from five to 20, while scores for overall competitive trait anxiety can range from 15 to 60. Higher scores indicate higher levels of competitive trait anxiety. Reliability, as measured by Cronbach's alpha coefficient, was assessed for the overall score ($\alpha = .91$), somatic anxiety subscale ($\alpha = .88$), worry subscale ($\alpha = .94$), and concentration disruption subscale ($\alpha = .77$). Thus, the SAS-2 demonstrated strong internal reliability with a collegiate sample for both the total scale as well as the subscales of somatic anxiety and worry in the present study, while the concentration disruption subscale showed acceptable internal reliability.

Additionally, a direction scale (Jones & Swain, 1992) was used to measure the facilitative and debilitative effects of anxiety symptoms. The SAS-2 includes an introductory paragraph that was presented to participants (see Appendix B), which was adjusted to include one sentence introducing the direction scale as well as clarifying the terminology for facilitative (means helpful) and debilitative (means harmful). Therefore, after each item participants were asked to rate how facilitative (+3 = *Very facilitative*) or debilitative (-3 = *Very debilitative*) a particular statement was to their performance (e.g., "My body feels tense" followed by "To what extent was the experience of the previous statement facilitative or debilitative to your subsequent performance?"). Each subscale of the SAS-2 consists of 5 items, so there were a total of 5 direction items per subscale. Therefore, subsequent direction subscales scores can range from - 15 to + 15. Higher scores indicate a more facilitative interpretation, whereas lower scores suggest a more debilitative interpretation of anxiety symptoms. This direction scale has been

used with a wide variety of samples of elite and non-elite athletes (e.g., Edwards & Hardy, 1996; Hanton et al., 2003) including collegiate samples (e.g., Hanton et al., 2002; Ntoumanis & Jones, 1998). Additionally, this direction scale has previously been paired with competitive trait anxiety measurements (e.g., Hanton et al., 2003). When paired with such competitive anxiety measurements, common practice included reporting scores of each subscale (Edwards & Hardy, 1996; Hanton & Jones, 1999; Hanton et al., 2003). Cronbach's alpha revealed acceptable reliability for the direction subscales of somatic anxiety ($\alpha = .78$), concentration disruption ($\alpha = .78$), and worry ($\alpha = .92$) in this study.

Theories of Anxiety Scale. The theories of anxiety scale (TOA; Schroder et al., 2015) consists of four entity statements about anxiety to measure a participant's implicit beliefs. Participants rated their agreement with each statement on a 6-point Likert-type scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (6). All items are reverse coded as higher scores indicate stronger incremental beliefs while lower scores suggest more entity beliefs. Possible scores range from four to 24. This scale demonstrated strong reliability as measured by Cronbach's alpha coefficient ($\alpha = .94$).

Procedure

After receiving Institutional Review Board approval, the questionnaire was administered to a small pilot ($n = 3$) sample to test the feasibility of the questionnaires and procedure. No changes were made to the questionnaires following the pilot study. Participants were recruited using convenience sampling. Two colleges in the southeastern region of the United States were contacted first. Following the participation of those initial schools, 14 additional schools were contacted to recruit additional participants. As a result, one additional school located in the Midwest of the United States agreed to participate in this study, therefore a total of three schools participated. Athletic directors consented to recruit their student-athletes for the purpose of this study. After receiving approval from the university's respective athletic director, collegiate head coaches and their assistant coaches were contacted by the main investigator via e-mail by locating their email addresses online. One athletic director contacted their student-athletes directly by providing information about the study via e-mail. After the initial point of

contact, head coaches and their assistant coaches were contacted once more after 10 days. If head coaches were willing to participate, they were asked to send the information about the study including the link to the questionnaires to their student-athletes. Additionally, information about the study was shared on the main investigator's social media (i.e., Instagram) account.

The access to the questionnaires consisted of a link directing individuals to the informed consent and the questionnaires through Qualtrics Software (Qualtrics, Provo, UT). The informed consent included study goals, information on how participants' data will be used, and researcher institution contact information. After piloting the questionnaires, survey completion was estimated to be 10 minutes, which was shared with the student-athletes prior to their participation. To ensure confidentiality, no identifying information such as name, position, or attending institution were recorded. Additionally, all data were stored on a password-protected file on a password-protected computer.

After providing informed consent, participants were directed to the demographic questionnaire, followed by either the modified SAS-2 (Jones & Swain, 1992; Smith et al., 2006) or the TOA (Schroder et al., 2015) first. Counterbalancing the second and third questionnaires was done to minimize the order effect. Outside of the age requirement, no other questions were mandatory to progress through the survey. However, participants were made aware by the software of a missing response prior to progressing to the next part of the questionnaire.

Data Analysis

The latest version of IBM SPSS was used for data analysis (IBM Corp., 2021). Participants with missing responses were excluded from all analyses. Initial data cleaning was conducted by assessing responses that may show anomalous, incorrectly filled, or otherwise faulty responses. No responses were excluded based on the decision of the main investigator and the major faculty advisor. Skewness and kurtosis were assessed by calculating respective z-scores, using its statistic and standard error. Z-scores above 1.96 were considered significant at the .05 level, and respective variables were considered in violation of normality. Each scale and subscale's internal reliability was assessed, calculating Cronbach's

alpha. Outliers were identified using boxplots. Because the exclusion of any outliers did not improve the normality and internal reliability, it was decided to include all data points.

To answer research question one, correlation coefficients between student-athletes' intensity and direction of anxiety and their implicit beliefs of anxiety were calculated. Correlations were conducted for competitive trait anxiety, measured by the total score of the SAS-2, as well as the three separate subscales, somatic anxiety, worry, and concentration disruption.

To answer research question two, multiple linear regression analyses were conducted to analyze how much of the competitive anxiety interpretation was predicted by the three anxiety intensity subscales, implicit beliefs about anxiety, student-athletes' age, transition status, and gender. A separate regression analysis was conducted for each of the three direction subscales. A model was created using backward regression to test multiple variables and include the ones that show the most significant predictability of anxiety interpretation. This method was chosen based on a lack of known predictors from previous research to justify the use of hierarchical regression analysis and to minimize the suppressor effect (Field, 2009). Specifically, these variables included: three SAS-2 subscales, TOA scores, gender, transition status, and age. By running this statistical analysis, it was possible to identify the variables that most predicted anxiety direction, as well as the extent to which anxiety direction was predicted by the variables assessed in this study. The criterion for inclusion was set at $p < .05$, while the criterion for removal was set at $p > .10$ based on common statistical protocol (Field, 2009). To make inferences about which variables best predict the interpretation of competitive anxiety, R^2 changes were analyzed. Additionally, standardized beta coefficients of each variable and their respective significance were calculated and used to assess predictability.

In order to check whether the assumption of independent error was tenable, Durbin-Watson was calculated, and values between 1 and 3 were considered acceptable (Field, 2009). To determine multicollinearity or singularity between any of the predictor variables the variance inflation factor (VIF) and tolerance were calculated. Factors with a VIF of 10 were considered problematic due to multicollinearity based on common statistical recommendations (Vincent & Weir, 2012). Similarly,

factors with a tolerance of .2 or lower were considered a potential problem, and a tolerance of .1 or lower was considered a serious problem of multicollinearity. In order to assess generalizability of the model, the standardized residuals of each outcome variable were analyzed. Specifically, the normality assumption was checked by assessing for violation of normal skewness and kurtosis by calculating respective z-scores. Scores of 1.96 or higher were considered an indicator of violation of normality at the .05 level. Influential cases that would primarily impact the model were identified, by identifying cases with standard residuals of two or larger. Their influence on the overall model was assessed using Cook's distance and their Centered Leverage Value.

CHAPTER 3

RESULTS

Descriptive Statistics

A total of 157 responses were received from the online survey. Out of the 157 responses, participants with below the minimum age requirement ($n = 2$) or missing/ incomplete responses to one ($n = 13$) or both ($n = 28$) questionnaires were removed from the sample. The remaining participants ($n = 114$) provided a sufficient sample size for the statistical analysis based on the power analysis prior to data collection. Results from the SAS-2 ($M = 30.32$, $SD = 8.51$) indicate that based on visual inspection, student-athletes reported higher scores for the worry subscale ($M = 13.05$, $SD = 4.48$) than they did for both the somatic ($M = 9.73$, $SD = 3.44$) and concentration disruption ($M = 7.54$, $SD = 2.39$) subscales. Similarly, the direction scores for worry ($M = -1.83$, $SD = 6.80$) were visually lower than those of somatic ($M = -1.21$, $SD = 4.17$) and concentration disruption ($M = .42$, $SD = 4.43$), which on average was rated as facilitative to athletic performance. Average implicit beliefs about anxiety as measured by the TOA were 4.11 ($SD = 1.30$). Further descriptive information including each variable's mean and standard deviation are presented in table 2.

Inferential Statistics

Normality assumption was evaluated for all variables. Due to the large sample size, skewness and kurtosis were assessed by calculating respective z-scores rather than using normality tests such as the Kolmogorov-Smirnov test, which may be overly sensitive due to a large number of data points (Field, 2009). For the present sample size, it is recommended to consider all skewness and kurtosis z-scores below 2.58 ($p < .01$) as normal (Field, 2009). Based on this standard skewness and kurtosis the variables of participants' age, TOA scores, worry intensity, total SAS-2, and the direction of worry did not significantly differ from normality. The SAS-2 subscales of concentration disruption and somatic anxiety showed a significant positive skewness, which was expected in a non-clinical sample (Smith et al., 2006). The remaining variables of somatic and concentration disruption direction revealed skewness and kurtosis that significantly differed from normality.

To answer the first research question about whether there is a relationship between the direction and intensity of anxiety and an athlete's implicit beliefs about anxiety, a correlational analysis was conducted. Because only one variable showed no significant deviation from normality, all relationships were assessed using Spearman's rho as a correlation for non-parametric data (Field, 2009). Results suggest a moderate, negative relationship between implicit beliefs about anxiety and total competitive trait anxiety scores, r (112) = -.485, $p < .001$. Additionally, implicit beliefs showed a moderate relationship with the subscales of somatic anxiety intensity ($r = -.301$, $p = .001$), concentration disruption intensity ($r = -.290$, $p = .002$), and a strong negative relationship with worry intensity ($r = -.545$, $p < .001$). Implicit beliefs about anxiety were however not significantly related to any of the three directional subscales: somatic anxiety direction ($r = .111$, $p = .241$), concentration disruption direction ($r = .086$, $p = .362$), or worry direction ($r = .174$, $p = .064$). Therefore, there was only partial support for the first hypothesis that implicit beliefs are significantly related to student-athletes' competitive anxiety intensity but not their interpretation.

To answer the second research question, backward stepwise regressions were conducted for each of the three directional variables. Detailed information for the direction worry regression is presented in table 4, while the direction of concentration disruption and somatic anxiety are reported in tables 5 and 6 respectively. Worry intensity and concentration disruption intensity predicted the direction of worry, $R^2 = .080$, $F(2, 111) = 4.83$, $p = .010$. The direction of concentration disruption was predicted by age and the intensity of worry, $R^2 = .082$, $F(2, 111) = 4.93$, $p = .009$. Lastly, the direction of somatic anxiety was predicted by the intensity of both somatic anxiety and concentration disruption, $R^2 = .125$, $F(2, 111) = 7.96$, $p = .001$. Results suggest that only the intensity scores of the worry subscale were a significant predictor of worry direction ($\beta = -.314$, $p = .003$). Similarly, intensity worry was the only significant predictor of concentration disruption direction ($\beta = -.227$, $p = .014$). To predict the direction of somatic anxiety the regression revealed the intensity of those somatic anxiety symptoms as the only significant predictor ($\beta = -.401$, $p = .001$). Across all models, the highest variance inflation factor was 1.28. Standard residuals were calculated for all models with results across cases ranging from - 3.08 to 4.17. Standard

residuals for all three regressions showed a non-normal distribution at the .05 level. Specifically, results suggest that all three distributions are leptokurtic and positively skewed. In conclusion, there was only minimal support for the second hypothesis.

CHAPTER 4

DISCUSSION

The purpose of this study was to assess the relationship between student-athletes' implicit beliefs about anxiety and their relationship to competitive trait anxiety. Results suggested that more incremental beliefs were related to lower levels of anxiety across all three subscales of the Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006). Additionally, the intensity of anxiety symptoms was a significant predictor of an athlete's interpretation of those symptoms. In general, higher levels of anxiety were related to a more debilitative interpretation of those symptoms for subsequent performance.

According to the findings in this study, and confirming hypothesis 1b, if an athlete believes that their competitive anxiety is fixed (i.e. holding entity beliefs), they are more likely to experience higher levels of anxiety than an athlete who believes those symptoms are malleable (i.e. holding incremental beliefs). Results aligned with previous research that suggest a relationship exists between implicit beliefs and anxiety (e.g., DeCastella et al., 2014; Stickel et al., 2019). Individuals who experienced higher levels of trait anxiety were also more likely to consider their anxiety as fixed (Stickel et al., 2019). Furthermore, implicit beliefs were found to take an important role in affecting one's emotion regulation processes, therefore directly impacting athlete's experience of anxiety (DeCastella et al., 2014). In addition to these well-dcoumented findings, results of the present study expand our understanding of the relationship between implicit beliefs and trait anxiety by focusing on the experiences of student-athletes. Furthermore, the importance of domain-specificity is underlined, in that implicit beliefs about anxiety rather than implicit beliefs about athletic ability, which encompass much broader experiences, were measured in the present study. Findings of the present study highlight that the domain specific implicit beliefs about anxiety may also be more predictive when assessing competitive anxiety. The magnitude of the relationship between beliefs about anxiety and competitive anxiety exceeds those previously found among broader implicit beliefs, such as athletic ability (Gardner et al., 2015), further spotlighting the importance of domain-specific implicit beliefs. Furthermore, this confirms that domain-specific beliefs are most predictable of domain-specific outcomes (Hughes et al., 2015), such as implicit beliefs about anxiety

being a better predictor of anxiety than beliefs about athletic ability because the outcome variable (i.e. competitive anxiety) is explained by the specific beliefs rather than a broader set of beliefs (Hughes et al., 2015). Based on the findings of this study, there is reason to believe that anxiety interventions may benefit from focusing on the domain-specific implicit beliefs about anxiety to directly target beliefs that primarily influence anxiety levels.

As implicit beliefs are suggested to differ across domains (e.g., Schroder et al., 2016), differentiating specific implicit beliefs is crucial as it expands previous research on the role of implicit beliefs within athletic populations. The results of this study found that student-athletes who are experiencing higher levels of competitive anxiety, have higher entity beliefs. While perceived control over one's experiences having an anxiety-reducing effect (Bandura et al., 1988) is not a recent discovery in the broader psychological literature, it shows that beliefs about one's controllability (i.e. incremental beliefs) can influence the intensity of anxiety. Sport and performance psychology (SPP) practitioners and researchers may now be able to target those domain-specific implicit beliefs for more effective interventions. Implicit belief interventions have been found to be effective in increasing incremental beliefs over time in high school and college students (e.g., De Castella et al., 2015; Reffi et al., 2020). Therefore, SPP practitioners can not only target those specific implicit beliefs about anxiety but also improve through interventions. SPP practitioners can assess implicit beliefs quickly and reliably through the 4-item Theories of Anxiety Scale (TOA; Schroder et al., 2015), subsequently benefiting student-athletes by offering a discussion of their current beliefs and their implications for their competitive anxiety. A discussion may increase student-athletes' awareness of their implicit beliefs and highlight how they may be affecting their experience consciously or subconsciously. In addition to bringing awareness to the athlete, administering the TOA (Schroder et al., 2015) and discussing the implications of its results could be an effective intervention to increase the perceived control of student-athletes' anxiety intensity.

As established by previous research (e.g., Hanton & Jones, 1999), athletes tend to interpret anxiety as debilitative, which requires SPP practitioners and researchers to continue developing anxiety interventions that are effective and long-lasting (Baxter et al., 2014; Stickel, 2019). Overall, higher levels

of competitive anxiety were interpreted as more debilitative to athletic performance, highlighting the importance of lowering levels of competitive anxiety for a more facilitative interpretation of competitive anxiety. Additionally, the findings within this study highlight that an athlete's anxiety intensity moderately predicted their anxiety interpretation. SPP practitioners who are using the SAS-2 (Smith et al., 2006), are encouraged to consider the effects of all three subscales on an athlete's interpretation. Including those subscales, such as the intensity of concentration disruption when analyzing an athlete's interpretation of worry, increases the predictability of student-athletes' interpretation of anxiety symptoms. By increasing predictability, interventions can be used to target a more facilitative interpretation of competitive anxiety, ultimately benefiting each individual athlete. A facilitative interpretation can generally be understood to be desirable for student-athletes as it suggests that anxiety symptoms are benefiting their upcoming performance, despite the experience being unpleasant (Lewis, 1970).

Although the relationship between intensity and direction for somatic symptoms (Edwards & Hardy, 1996) has been well established in previous literature, this study further highlights the role that cognitive symptoms have on student-athletes' interpretation of their symptoms. Research has quite frequently compared competitive anxiety intensity and direction across different groups (e.g., Jones et al., 1993; Ntoumanis & Biddle, 2000), but it has failed to extensively describe the relationship between competitive anxiety intensity and direction. Specifically, an athlete's worry may play a crucial role not only in the interpretation of those symptoms but also in the experience of somatic anxiety and concentration disruption. In fact, worry was the only significant predictor of the interpretation of concentration disruption, and therefore more predictive than the intensity of concentration disruption itself. In this study, as well as in previous research, student-athletes consistently scored the highest on the worry subscale (Smith et al., 2006) further noting the importance of attending to student-athletes' experiences of worry. Overall, the relationships found in this study between intensity and interpretation scores can be considered comparable in magnitude to previous findings (Jones & Hanton, 1996).

The current study provided no evidence that implicit beliefs significantly impact an athlete's interpretation of competitive anxiety. Further analyzing the scale used to measure athletes' interpretation of competitive anxiety can provide one explanation of this finding. The directional subscales of concentration disruption and somatic anxiety showed lower levels of internal reliability compared to the TOA (Schroder et al., 2015) or SAS-2 (Smith et al., 2006). There is evidence to suggest that the directional assessment may provide conflicting results (Edwards & Hardy, 1996; Jones et al., 1993), while also showing that the directional assessment may not predict actual performance (Edwards & Hardy, 1996). Therefore, the current one-item assessment of competitive anxiety direction may be a limiting factor in establishing relationships.

Although previous findings of the impact of gender on competitive anxiety have been equivocal, with some suggesting female athletes experiencing higher levels of anxiety, while other studies consider gender to have little predictive value for one's anxiety intensity (Ntoumanis & Jones, 1998). The findings of this study indicate that student-athletes' gender did not predict one's interpretation of competitive trait anxiety. However, most recent research on collegiate athletes suggests that female student-athletes are more likely to experience heightened intensity of both general anxiety (Brown et al., 2021) and competitive anxiety (Chun et al., 2023). While there may be several explanations for this gender difference (McLean & Anderson, 2009), it is important to highlight that based on the findings of this study those differences are not related to a different interpretation of competitive anxiety.

Limitations

There are some limitations to the current findings of this study. For one, the assumption of normal distributions for the residuals in all three regressions was not tenable. Therefore, the findings of this study may not generalize beyond this sample or a sample with similar skewness. When administering the SAS-2 (Smith et al., 2006) to student-athletes, it can be expected to see a tendency for lower scores. Similarly, the positive skewness for the subscales of anxiety interpretation aligns with previous research that athletes tend to interpret anxiety as more debilitative than facilitative (Hanton & Jones, 1999). Therefore, despite the data underlying this research exhibiting a statistical skewness, the data possibly

resemble the underlying population distribution of student-athletes. Researchers and SPP practitioners are encouraged to be cautious when applying those findings to other athlete populations, however, as outlined there is reason to expect that the overall population of collegiate student-athletes show a similar skewed distribution (Smith et al., 2006). Although findings may not be generalizable to the general population, findings can reasonably extend to the collegiate athletic population specifically.

Athletes from co-active sports or individual sports face unique challenges that are unaccounted for in this sample. Recent research suggests that aesthetic sports are more prone to anxiety in athletes (Schaal et al., 2011), due to one's success being highly dependent on the judgment of others. Since there were several participants from aesthetic sports in this study (i.e. acrobatics & tumbling, cheerleading, synchronized skating, etc.), one's sport can impact the relationships outlined in the present study. Furthermore, participants in the current study were likely at different points of their athletic season. Student-athletes completing the survey could have been in various stages of pre-season, competitive season, and post-season. Previous research suggests that competitive anxiety varies across different time points in their season (e.g., Hanton & Jones, 1999). Furthermore, data collection extended over roughly five weeks at the end of the 2022 academic year. Therefore, even student-athletes from the same sport (e.g., soccer) may have completed the questionnaire during different parts of their season dependent on whether their team qualified for post-season tournaments. Researchers attempted to minimize the effect of this limitation by assessing for trait anxiety through the SAS-2 (Smith et al., 2006) rather than state anxiety (e.g., CSAI-2, Martens et al., 1990).

Future Directions

Given that this was one of the first studies that assessed any form of implicit beliefs and their relationship to anxiety within the athletic population, there are several future research opportunities. While the present study was able to demonstrate a relationship between both factors, SPP practitioners likely benefit from having a causal relationship established. Because there is a need for cost-effective trait anxiety interventions (Baxter et al., 2014; Stickel, 2019), it would be beneficial to test whether interventions leading to a change in implicit beliefs can result in lower levels of competitive anxiety.

Cognitive interventions have previously been shown to have a desirable effect on competitive anxiety (Maynard et al., 1995), however, implicit belief interventions have been limited within a sport setting and most frequently encompassed larger topics, such as overall emotions, rather than focusing on student-athletes' anxiety (e.g., Smith et al., 2018).

This study also highlighted the lack of scientific understanding regarding the interpretation of competitive anxiety symptoms. Across all three subscales, student-athletes' implicit beliefs and the intensity of their anxiety accounted for some variance in their anxiety interpretation. While there is some evidence that other aspects (e.g. confidence) play a significant role in the interpretation of anxiety (Edwards & Hardy, 1996), further research is needed on what may allow student-athletes to interpret anxiety symptoms as facilitative to performance. Furthermore, future research can continue differentiating between an athlete's interpretation of anxiety as facilitative or debilitative and the actual impact anxiety symptoms have on subsequent performance (Edwards & Hardy, 1996; Hanton & Jones, 1999). To do so, researchers are encouraged to develop alternative forms of assessments that account for a variety of interpretations of competitive anxiety. Although the current one-item measure of assessing student-athletes' interpretation holds high practical value, there are concerns about the reliability and validity of this method of assessment as highlighted in this study.

Implications and Conclusion

The purpose of this study was to bridge the gap between implicit beliefs and their impact on the intensity and direction of competitive anxiety among student-athletes. This study expands current knowledge by highlighting that student-athletes who believe in the malleability of anxiety tend to experience less anxiety symptoms. The results further show that student-athletes' beliefs about the malleability of anxiety do not significantly impact their interpretation of anxiety symptoms. Furthermore, this study was able to underline previous findings that one's intensity of anxiety symptoms is generally the best predictor of one's interpretation (Edwards & Hardy, 1996). This can be useful information for SPP practitioners to further support the importance of the matching hypothesis when supporting student-athletes in developing a more facilitative interpretation of their experience (Terry et al., 1995). Given that

incremental beliefs have a strong relationship with many desirable outcomes across several different performance domains (Burnette et al., 2013; Vella et al., 2016), SPP practitioners can benefit from exploring an athlete's belief about the malleability of anxiety prior to engaging in any cognitive or somatic interventions. Yet, SPP practitioners are encouraged to focus on the individuality of each athlete when exploring their implicit beliefs and how these beliefs impact the athlete's experience of anxiety. As shown by a few cases with high standardized residuals, a facilitative interpretation may still be possible when holding entity beliefs about anxiety. For such student-athletes, it may not be advantageous to explore alternative belief systems since they seemingly experience little debilitative consequences of their current belief system.

REFERENCES

Anagnostopoulos, V., Carter, M. M., & Weissbrod, C. (2015). Pre-competition anxiety and self-

confidence in collegiate track and field athletes: A comparison between African American and

Non-Hispanic Caucasian men and women. *The Sport Journal*. Retrieved from:

https://thesportjournal.org/article/pre-competition-anxiety-and-self-confidence-in-collegiate-

track-and-field-athletes-a-comparison-between-african-american-and-non-hispanic-caucasian-

men-and-women/

Apter, M. J. (1982). *The experience of motivation: The theory of psychological reversals*. Academic

Press.

Association for Applied Sport Psychology. (2022). *Where members and performers realize their*

potential. Retrieved August 27, 2022, from https://appliedsportpsych.org/about-the-association-

for-applied-sport-psychology/

Baldock, L., Hanton, S., Mellalieu, S. D., & Williams, J. M. (2021). Understanding and managing stress

in sport. In J. M. Williams & V. Krane, *Applied sport psychology: Personal growth to peak*

performance. (pp. 210-243)

Bandura, A. (1988). Self-efficacy conception of anxiety. *Anxiety Research*, *1*(2), 77–98.

https://doi.org/10.1080/10615808808248222

Baxter, A. J., Vos, T., Scott, K. M., Ferrari, A. J., & Whiteford, H. A. (2014). The global burden of

anxiety disorders in 2010. *Psychological Medicine*, *44*(11), 2363–2374.

https://doi.org/10.1017/S0033291713003243

Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S. (2015). The

prevalence and correlates of depression, anxiety, and stress in a sample of college students.

Journal of Affective Disorders, *173*, 90–96. https://doi.org/10.1016/j.jad.2014.10.054

Biddle, S. J., Wang, C. J., Chatzisarantis, N. L., & Spray, C. M. (2003). Motivation for physical activity in young people: Entity and incremental beliefs about athletic ability. *Journal of Sports Sciences*, *21*(12), 973–989. https://doi.org/10.1080/02640410310001641377

Brown, B. J., Aller, T. B., Lyons, L. K., Jensen, J. F., & Hodgson, J. L. (2021). NCAA student-athlete mental health and wellness: A biopsychosocial examination. *Journal of Student Affairs Research and Practice*, *59*(3), 252–267. https://doi.org/10.1080/19496591.2021.1902820

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin*, *139*(3), 655–701. https://doi.org/10.1037/a0029531

Chun, D.-R., Lee, M.-Y., Kim, S.-W., Cho, E.-Y., & Lee, B.-H. (2023). The Mediated Effect of Sports Confidence on Competitive State Anxiety and Perceived Performance of Basketball Game. *International Journal of Environmental Research and Public Health*,*20*(1), 334. https://doi.org/10.3390/ijerph20010334

Correia, M. E., & Rosado, A. (2019). Anxiety in athletes: Gender and type of sport differences. *International Journal of Psychological Research*, *12*(1), 9–17. https://doi.org/10.21500/20112084.3552

Danthony, S., Mascret, N., & Cury, F. (2020). Test anxiety in physical education: The predictive role of gender, age, and implicit theories of athletic ability. *European Physical Education Review*, *26*(1), 128–143. https://doi.org/10.1177/1356336X19839408

De Castella, K., Goldin, P., Jazaieri, H., Heimberg, R. G., Dweck, C. S., & Gross, J. J. (2015). Emotion beliefs and cognitive behavioural therapy for social anxiety disorder. *Cognitive Behaviour Therapy*, *44*(2), 128–141. https://doi.org/10.1080/16506073.2014.974665

De Castella, K., Goldin, P., Jazaieri, H., Ziv, M., Heimberg, R. G., & Gross, J. J. (2014). Emotion beliefs in social anxiety disorder: Associations with stress, anxiety, and well-being. *Australian Journal of Psychology*, *66*(2), 139–148. https://doi.org/10.1111/ajpy.12053

Dweck, C. S. (2008). *Mindset: The new psychology of success* (Ballantine Books trade pbk. ed). Ballantine Books.

Dweck, C. S., & Leggett, E. L. (1988). A social cognitive approach to motivation and personality. *Psychological Review*, *95*(2), 256–273. https://doi.org/10.1037/0033-295X.95.2.256

Dweck, C. S., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgments and reactions: A word from two perspectives. *Psychological Inquiry*, *6*(4), 267–285. https://doi.org/10.1207/s15327965pli0604_1

Edwards, T., & Hardy, L. (1996). The Interactive Effects of Intensity and Direction of Cognitive and Somatic Anxiety and Self-Confidence upon Performance. *Journal of Sport and Exercise Psychology*, *18*(3), 296–312. https://doi.org/10.1123/jsep.18.3.296

Field, A. P. (2009). *Discovering statistics using SPSS: And sex, drugs and rock "n" roll* (3rd ed). SAGE Publications.

Gardner, L. A., Vella, S. A., & Magee, C. A. (2015). The relationship between implicit beliefs, anxiety, and attributional style in high-level soccer players. *Journal of Applied Sport Psychology*, *27*(4), 398–411. https://doi.org/10.1080/10413200.2015.1019681

Gardner, L. A., Vella, S. A., & Magee, C. A. (2018). The role of implicit beliefs and achievement goals as protective factors in youth sport. *Journal of Applied Sport Psychology*, *30*(1), 83–95. https://doi.org/10.1080/10413200.2017.1334160

Hanin, Y. L. (2000). Individual Zones of Optimal Functioning (IZOF) Model: Emotion-performance relationship in sport. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 65–89). Human Kinetics.

Hanton, S., & Jones, G. (1999). The effects of a multimodal intervention program on performers: Training the butterflies to fly in formation. *The Sport Psychologist*, *13*(1), 22–41. https://doi.org/10.1123/tsp.13.1.22

Hanton, S., Mellalieu, S. D., & Hall, R. (2002). Re-examining the competitive anxiety trait-state relationship. *Personality and Individual Differences*, *33*(7), 1125–1136. https://doi.org/10.1016/S0191-8869(02)00003-X

Hanton, S., O'Brien, M., & Mellalieu, S. D. (2003). Individual Differences, Perceived Control and Competitive Trait Anxiety. *Journal of Sport Behavior*, *26*(1), 39–55.

Hardy, L., & Parfitt, G. (1991). A catastrophe model of anxiety and performance. *British Journal of Psychology*, *82*(2), 163–178. https://doi.org/10.1111/j.2044-8295.1991.tb02391.x

Hughes, J. S. (2015). Support for the domain specificity of implicit beliefs about persons, intelligence, and morality. *Personality and Individual Differences*, *86*, 195–203. https://doi.org/10.1016/j.paid.2015.05.042

IBM Corp. Released 2021. IBM SPSS Statistics for Windows, Version 28.0. Armonk, NY: IBM Corp

Jones & Swain, 1992

Jones, G., & Hanton, S. (1996). Interpretation of Competitive Anxiety Symptoms and Goal Attainment Expectancies. *Journal of Sport and Exercise Psychology*, *18*(2), 144–157. https://doi.org/10.1123/jsep.18.2.144

Jones, G., Hanton, S., & Swain, A. (1994). Intensity and interpretation of anxiety symptoms in elite and non-elite sports performers. *Personality and Individual Differences*, *17*(5), 657–663. https://doi.org/10.1016/0191-8869(94)90138-4

Jones, G., Swain, A., & Hardy, L. (1993). Intensity and direction dimensions of competitive state anxiety and relationships with performance. *Journal of Sports Sciences*, *11*(6), 525–532. https://doi.org/10.1080/02640419308730023

Jowett, N., & Spray, C. M. (2013). British Olympic hopefuls: The antecedents and consequences of implicit ability beliefs in elite track and field athletes. *Psychology of Sport and Exercise*, *14*(2), 145–153.https://doi.org/10.1016/j.psychsport.2012.09.003

Kerr, J. H. (1987). Cognitive intervention with elite performers: Reversal theory. *British Journal of Sports Medicine*, *21*(2), 29–33. https://doi.org/10.1136/bjsm.21.2.29

Komarraju, M., & Nadler, D. (2013). Self-efficacy and academic achievement: Why do implicit beliefs, goals, and effort regulation matter? *Learning and Individual Differences*, *25*, 67–72. https://doi.org/10.1016/j.lindif.2013.01.005

Lewthwaite, R., & Scanlan, T. K. (1989). Predictors of competitive trait anxiety in male youth sport participants. *Medicine & Science in Sports & Exercise*, *21*(2), 221–229. https://doi.org/10.1249/00005768-198904000-00016

Martens, R., Burton, D., & Vealey, R. S. (1990). *Competitive anxiety in sport*. Human Kinetics Books.

Maynard, I. W., Smith, M. J., & Warwick-Evans, L. (1995). The Effects of a Cognitive Intervention Strategy on Competitive State Anxiety and Performance in Semiprofessional Soccer Players. *Journal of Sport and Exercise Psychology*, *17*(4), 428–446. https://doi.org/10.1123/jsep.17.4.428

McLean, C. P., & Anderson, E. R. (2009). Brave men and timid women? A review of the gender differences in fear and anxiety. *Clinical Psychology Review*, *29*(6), 496–505. https://doi.org/10.1016/j.cpr.2009.05.003

Ntoumanis, N., & Biddle, S. J. H. (2000). Relationship of Intensity and Direction of Competitive Anxiety with Coping Strategies. *The Sport Psychologist*, *14*(4), 360–371. https://doi.org/10.1123/tsp.14.4.360

Ntoumanis, N., & Jones, G. (1998). Interpretation of competitive trait anxiety symptoms as a function of locus of control beliefs. *International Journal of Sport Psychology*, *29*, 99–114.

Provencio, C. (2016). Student-athlete: A study of student-athlete workload compared with traditional

    student workload. [Master's thesis, South Dakota State University]

Reffi, A. N., Darnell, B. C., Himmerich, S. J., & White, K. J. (2020). Implicit beliefs of emotion and

    anxiety in psychotherapy. *Motivation and Emotion*, *44*(3), 453–463.

    https://doi.org/10.1007/s11031-019-09794-6

Scanlan, T. K., Carpenter, P. J., Simons, J. P., Schmidt, G. W., & Keeler, B. (1993). An introduction to

    the sport commitment model. *Journal of Sport and Exercise Psychology*, *15*(1), 1–15.

    https://doi.org/10.1123/jsep.15.1.1

Schaal, K., Tafflet, M., Nassif, H., Thibault, V., Pichard, C., Alcotte, M., Guillet, T., El Helou, N.,

    Berthelot, G., Simon, S., & Toussaint, J.-F. (2011). Psychological balance in high level athletes:

    Gender-based differences and sport-specific patterns. *PLoS ONE*, *6*(5), e19007.

    https://doi.org/10.1371/journal.pone.0019007

Schleider, J. L., Abel, M. R., & Weisz, J. R. (2015). Implicit theories and youth mental health problems:

    A random-effects meta-analysis. *Clinical Psychology Review*, *35*, 1–9.

    https://doi.org/10.1016/j.cpr.2014.11.001

Schroder, H. S., Callahan, C. P., Gornik, A. E., & Moser, J. S. (2019). The fixed mindset of anxiety

    predicts future distress: A longitudinal study. *Behavior Therapy*, *50*(4), 710–717.

    https://doi.org/10.1016/j.beth.2018.11.001

Schroder, H. S., Dawood, S., Yalch, M. M., Donnellan, M. B., & Moser, J. S. (2015). The role of implicit

    theories in mental health symptoms, emotion regulation, and hypothetical treatment choices in

    college students. *Cognitive Therapy and Research*, *39*(2), 120–139.

    https://doi.org/10.1007/s10608-014-9652-6

Schroder, H. S., Dawood, S., Yalch, M. M., Donnellan, M. B., & Moser, J. S. (2016). Evaluating the

    domain specificity of mental health–related mind-sets. *Social Psychological and Personality*

    Science, *7*(6), 508–520. https://doi.org/10.1177/1948550616644657

Schroder, H. S., Yalch, M. M., Dawood, S., Callahan, C. P., Brent Donnellan, M., & Moser, J. S. (2017).

    Growth mindset of anxiety buffers the link between stressful life events and psychological

    distress and coping strategies. *Personality and Individual Differences*, *110*, 23–26.

    https://doi.org/10.1016/j.paid.2017.01.016

Shaffer, C. T., Tenenbaum, G., & Eklund, R. C. (2015). Implicit theories of mental skills abilities in

    collegiate athletes. *Journal of Applied Sport Psychology*, *27*(4), 464–476.

    https://doi.org/10.1080/10413200.2015.1044136

Shaffer, C. T., Tenenbaum, G., & Eklund, R. C. (2015). Implicit theories of mental skills abilities in

    collegiate athletes. *Journal of Applied Sport Psychology*, *27*(4), 464–476.

    https://doi.org/10.1080/10413200.2015.1044136

Smith, E. N., Romero, C., Donovan, B., Herter, R., Paunesku, D., Cohen, G. L., Dweck, C. S., & Gross, J.

    J. (2018). Emotion theories and adolescent well-being: Results of an online intervention.

    Emotion, *18*(6), 781–788. https://doi.org/10.1037/emo0000379

Smith, R. E., Smoll, F. L., & Schutz, R. W. (1990). Measurement and correlates of sport-specific

    cognitive and somatic trait anxiety: The sport anxiety scale. *Anxiety Research*, *2*(4), 263–280.

    https://doi.org/10.1080/08917779008248733

Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of Multidimensional

    Sport Performance Anxiety in Children and Adults: The Sport Anxiety Scale-2. *Journal of Sport*

    and Exercise Psychology, *28*(4), 479–501. https://doi.org/10.1123/jsep.28.4.479

Smith, T. (1983). Competition trait anxiety in youth sport: Differences according to age, sex, race and

   playing status. *Perceptual and Motor Skills*, *57*(3_suppl), 1235–1238.

   https://doi.org/10.2466/pms.1983.57.3f.1235

Sorensen, C. E. (2016). *The Relationship of Growth Mindset and Goal-setting in a First-year College

   Course*. 33.

Spence, J. T., & Spence, K. W. (1966). The motivational components of manifest anxiety: Drive and

   drive stimuli. In *Anxiety and Behavior* (pp. 291–326). Elsevier. https://doi.org/10.1016/B978-1-

   4832-3131-0.50017-2

Spielberger, C. D. (1972a). Anxiety as an emotional state. In *Anxiety* (pp. 23–49). Elsevier.

   https://doi.org/10.1016/B978-0-12-657401-2.50009-5

Spielberger, C. D. (1972b). Conceptual and methodological issues in anxiety research. In *Anxiety* (pp.

   481–493). Elsevier. https://doi.org/10.1016/B978-0-12-657402-9.50013-2

Spielberger, C. D. (1979). *Understanding stress and anxiety*. Harper & Row.

Stickel, J. (2019). *The relationship between trait anxiety, anxiety mindset and state anxiety*. [Unpublished

   thesis, University of Twente]

Tamir, M., John, O. P., Srivastava, S., & Gross, J. J. (2007). Implicit theories of emotion: Affective and

   social outcomes across a major life transition. *Journal of Personality and Social Psychology*,

   92(4), 731–744. https://doi.org/10.1037/0022-3514.92.4.731

Terry, P. C., Cox, J. A., Lane, A. M., & Karageorghis, C. I. (1996). Measures of Anxiety among Tennis

   Players in Singles and Doubles Matches. *Perceptual and Motor Skills*, *83*(2), 595–603.

   https://doi.org/10.2466/pms.1996.83.2.595

Terry, P., Coakley, L., & Karageorghis, C. (1995). Effects of intervention upon precompetition state

   anxiety in elite junior tennis players: The relevance of the matching hypothesis. *Perceptual and

   Motor Skills*, *81*(1), 287–296. https://doi.org/10.2466/pms.1995.81.1.287

Turkmen, M., Bozkus, T., & Altintas, A. (2013). The relationship between motivation orientations and competitive anxiety in bocce players: does gender make a difference. *Psychology and Behavioral Sciences*, *2*(4), 162. https://doi.org/10.11648/j.pbs.20130204.12

Vella, S. A., Braithewaite, R. E., Gardner, L. A., & Spray, C. M. (2016). A systematic review and meta-analysis of implicit theory research in sport, physical activity, and physical education. *International Review of Sport and Exercise Psychology*, *9*(1), 191–214. https://doi.org/10.1080/1750984X.2016.1160418

Vincent, W. J., & Weir, J. P. (2012). *Statistics in kinesiology* (4th ed). Human Kinetics.

Xinyi, Z., Smith, D., & Adegbola, O. (2004). A cross-cultural comparison of six mental qualities among Singaporean, North American, Chinese, and Nigerian professional athletes. *International Journal of Sport and Exercise Psychology*, *2*(2), 103–118. https://doi.org/10.1080/1612197X.2004.9671735

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology*, *18*(5), 459–482. https://doi.org/10.1002/cne.920180503

Zanin, A. C., Adame, E. A., Niess, L. C., & Martinez, L. V. (2020). Negotiating identity and the development of incremental mindset in a female adolescent sport context. *Journal of Applied Sport Psychology*, 1–25. https://doi.org/10.1080/10413200.2020.17833

Tables

Table 1

Demographic Table

	Total	*N*	Percentage
Gender	114		
Female		84	73.7 %
Male		29	25.4 %
Non-binary		1	0.9 %
Transitioning Status	114		
Yes		58	50.9 %
No		56	49.1 %
Year in School	114		
Freshman		32	28.1 %
Sophomore		22	19.3 %
Junior		38	33.3 %
Senior		20	17.5 %
Graduate Students		2	1.8 %
Hispanic	114		
Yes		93	81.6 %
No		21	18.4 %
Race	114		
Black/African American		15	13.2 %
Mixed-race		7	6.1 %
White		86	75.4 %
Not disclosed		6	5.3 %
Sport	114		
Acrobatics and Tumbling		5	4.4%
Archery		1	0.9%
Baseball		1	0.9%
Basketball		15	13.2%
Cheerleading		3	2.6%
Cross Country/ Track		9	7.9%
Field Hockey		1	0.9%
Golf		1	0.9%
Lacrosse		8	7.0%
Soccer		43	37.7%
Softball		2	1.8%
Swimming and Dive		5	4.4%
Synchronized Skating		3	2.6%
Tennis		3	2.6%
Volleyball		14	12.3%

Table 2

Descriptive Statistics

	M	SD	95% CI		Cronbach's α
			Lower Bound	Upper Bound	
Age	19.79	1.29	19.55	20.03	
Total TOA	4.11	1.30	3.87	4.35	.940
Total SAS-2	30.32	8.51	28.74	31.90	.912
Intensity Worry	13.05	4.48	12.22	13.88	.936
Intensity Concentration Disruption	7.54	2.39	7.10	7.99	.770
Intensity Somatic Anxiety	9.73	3.45	9.09	10.37	.876
Direction Scores					
Direction Worry	-1.83	6.80	-3.09	-.57	.924
Direction Concentration Disruption	.42	4.43	-.40	1.24	.780
Direction Somatic Anxiety	-1.21	4.17	-1.98	-.44	.783

Table 3

Spearman Correlations

	1	2	3	4	5	6	7	8	9	10
1. Age	—									
2. Total TOA	.077	—								
3. Intensity Somatic	.069	-.301[**]	—							
4. Intensity Concentration Disruption	.113	-.290[**]	.470[**]	—						
5. Intensity Worry	-.102	-.545[**]	.528[**]	.509[**]	—					
6. Total SAS-2	-.007	-.485[**]	.781[**]	.718[**]	.900[**]	__				
7. Direction Somatic	-.055	.111	-.311[**]	-.105	-.289[**]	-.302[**]	—			
8. Direction Concentration Disruption	.169	.086	-.101	-.251[**]	-.274[**]	-.249[**]	.430[**]	—		
9. Direction Worry	.002	.174	-.171	-.027	-.264[**]	-.211[*]	.629[**]	.281[**]	—	
10. Gender	.050	.284[**]	-.234[*]	-.065	-.354[**]	-.310[**]	.183	.111	.115	—

*Note: * p < .05. ** p < .01.*

Table 4

Worry Direction Regression Model

	B	SE B	β	t	Sig.	VIF
Model						
Constant	.094	2.283		.041	.967	
Intensity Concentration Disruption	.571	.293	.201	1.949	.054	1.28
Intensity Worry	-.477	.156	-.314	-3.052	.003	1.28

Note: $R^2_{adj.}$ = .063. B = Unstandardized coefficients, SE B = Standard Error B, β = Standardized Beta Coefficients, VIF = Variance inflation factor.

Table 5

Concentration Disruption Direction Regression Model

	B	SE B	β	t	Sig.	VIF
Model						
Constant	-6.920	6.453		-1.075	.285	
Age	.519	.313	.152	1.659	.100	1.01
Intensity Worry	-.225	.090	-.227	-2.486	.014	1.01

Note: $R^2_{adj.}$ = .065. B = Unstandardized coefficients, β = Standardized Beta Coefficients, VIF = Variance inflation factor.

Table 6

Somatic Direction Regression Model

	B	SE B	β	t	Sig.	VIF
Model						
Constant	.978	1.347		.726	.469	
Intensity Somatic	-.484	.121	-.401	-3.991	.000	1.28
Intensity Concentration Disruption	.334	.175	.192	1.912	.058	1.28

Note: $R^2_{adj.}$ = .110. B = Unstandardized coefficients, β = Standardized Beta Coefficients, VIF = Variance inflation factor.

APPENDICES

APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE

How old are you? _____

What gender do you identify with?
- Male
- Female
- Non-binary/ third gender
- Prefer not to say
- Prefer to self-describe. _____

Are you Hispanic/ Latino or from Spanish Origin?
- Yes
- No
- Prefer not to disclose

How would you describe yourself? You may choose multiple options.
- American Indian/ Alaska Native
- Asian
- Black/ African American
- Native Hawaiian/ Other Pacific Islander
- White
- Prefer not to disclose

What team are you competing for?
- Men's Soccer
- Women's Soccer
- Other

What year in school are you?
- Freshman
- Sophomore
- Junior
- Senior/ 5th year
- Graduate Student

Do you plan to play on this team during the next collegiate season (2023/24)?
- Yes
- No
- Unsure

Is this your first year on the team?
- Yes
- No

Would you be considered a …
- Freshman
- Transfer Student
- Other. Please specify: _____

APPENDIX B

MODIFIED SAS-2

Many athletes get tense or nervous before or during games, meets, or matches. This happens even to pro athletes. Please read each question. Then, circle the number that says how you USUALLY feel before or while you compete in sports. The questionnaire will also ask you to share how facilitative (means helpful) or debilitative (means harmful) this experience usually is to your athletic performance. There are no right or wrong answers. Please be as truthful as you can.

Before or while I compete in sports:

1. It is hard to concentrate on the game.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

2. My body feels tense.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

3. I worry that I will not play well.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

4. It is hard for me to focus on what I am supposed to do.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

5. I worry that I will let others down.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

6. I feel tense in my stomach.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

7. I lose focus on the game.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

8. I worry that I will not play my best.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

9. I worry that I will play badly.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

10. My muscles feel shaky.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

11. I worry that I will mess up during the game.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

12. My stomach feels upset.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

13. I cannot think clearly during the game.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

14. My muscles feel tight because I am nervous.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Before or while I compete in sports:

15. I have a hard time focusing on what my coach tells me to do.

Not At All	*A Little Bit*	*Pretty Much*	*Very Much*
1	2	3	4

Each of the 15 SAS-2 Statements will be followed by the following question:

To what extent was the experience of the previous statement facilitative or debilitative to your subsequent performance?

Very debilitative		Neither facilitative nor debilitative				Very facilitative
❑	❑	❑	❑	❑	❑	❑

APPENDIX C

THEORIES OF ANXIETY SCALE

Please indicate the extent to which you agree or disagree with each of the following statements.

1. You have a certain amount of anxiety and you really cannot do much to change it.

Strongly Disagree   Strongly Agree
          1   2   3   4   5   6

2. Your anxiety is something about you that you cannot change very much.

Strongly Disagree   Strongly Agree
          1   2   3   4   5   6

3. To be honest, you cannot really change how anxious you are.

Strongly Disagree   Strongly Agree
          1   2   3   4   5   6

4. No matter how hard you try, you can't really change the level of anxiety that you have.

Strongly Disagree   Strongly Agree
          1   2   3   4   5   6

APPENDIX D

LITERATURE REVIEW

According to the Association for Applied Sport Psychology (AASP), the two main goals when working with athletes are to elevate their performance as well as increase individual well-being (2021). One of the factors that can affect performance as well as impact individual well-being is anxiety. Around 40% of college students reported anxiety levels above what would be considered normal (Beiter et al., 2015). Since student-athletes fall within the broader category of college students, while at the same time being exposed to additional stressors, these athletes may be at particular risk of experiencing heightened anxiety (Provencio, 2016). Interventions have been developed to help athletes deal more effectively with anxiety prior to and during competition (Hanton & Jones, 1999). Implicit beliefs, which commonly describe how malleable or fixed a person believes a trait to be, have recently sparked the interest of researchers in the field of clinical psychology as a potential cost-effective and long-lasting intervention technique for anxiety. Additionally, looking at competitive anxiety from the perspective of implicit beliefs may provide further insights into the help-seeking behavior of student-athletes as well as their interpretation of competitive anxiety as either facilitative or debilitative. So far, no scientific research has been conducted on competitive anxiety and implicit beliefs about anxiety in an athlete sample. The following literature review highlights the current scientific status of anxiety and implicit beliefs and presents gaps in the current scientific literature.

Anxiety in Sport

Defining Anxiety. Interest in fear and anxiety as a human condition can be traced back to the origins of the bible, writings of early philosophers in ancient Greece, as well as ancient Egyptian hieroglyphics (Cohen, 1969). It was however not until Freud, that anxiety has been properly integrated into the understanding of neurotic and psychosomatic conditions (Freud, 1936). Freud's theory of anxiety was largely based around repressed childhood fears as well as repressed sexual energy. Spielberger, however, found that situations involving potential failure or threats to self-esteem may be perceived as

more threatening than situations that involve objective danger to one's physical well-being. Therefore, Spielberger (1972a) offered a theory of anxiety that focused on the individual's interpretation of a situation rather than the objective threat. Nevertheless, Spielberger identified that certain individuals have a higher tendency to interpret a situation as anxiety-provoking than others. This idea laid the groundwork for his concepts of trait and state anxiety. State anxiety is defined as an "emotional reaction that consists of subjective feelings of tension, apprehension, nervousness and worry, and heightened activity of the autonomic nervous systems" (Spielberger, 1979, p. 17). On the other hand, trait anxiety is defined as "individual differences in anxiety proneness" which is further clarified as "the tendency to see the world as dangerous and in the frequency that state anxiety is experienced over a long period of time" (Spielberger, 1979, p. 60). Based on these definitions, trait anxiety has been described as the likelihood of an individual interpreting a non-threatening situation as threatening and, therefore, responding with state anxiety (Spielberger, 1972a).

There continues to be a scientific debate about whether the interpretation of anxiety takes place on a continuum or whether there are qualitative differences (Endler & Kocovski, 2001). Those who consider anxiety lying on a continuum suggest low levels of anxiety show little to no impact on daily life, whereas the higher end of the continuum consists of clinical anxiety disorders. Others argue that there are qualitative differences between groups of lower and higher levels of anxiety (Endler & Kocovski, 2001). Given this discrepancy in scientific opinions, it seems important to pay attention to unique predispositions when analyzing anxiety in participants that fall at a certain level on the continuum or in a specific category. In this literature review, this differentiation will be simplified as clinical or non-clinical anxiety.

Spielberg's research also highlighted that "situation-specific trait anxiety measures are better predictors of elevations in A-State for a particular class of stress situations than are general A-Trait measures" (1972b). This suggests that scales assessing trait anxiety in a competitive situation are expected to be more accurate than general trait anxiety measures in predicting state anxiety during competitive situations. Using the Sport Competition Anxiety Test (SCAT), a competitive trait anxiety

scale, as well as the Test Anxiety Inventory (TAI; Spielberger, 1970), a general trait anxiety scale,

researchers demonstrated that a player's competitive anxiety state was stronger related to the competitive

trait measurement than to the general trait measurement (Martens et al., 1990).

Defining Competitive Anxiety. Despite general anxiety and competitive anxiety being strongly

related, research has shown that they are two separate concepts and therefore need to be defined

separately (Martens et al., 1990). One of the common definitions for competitive anxiety is a situation-

specific, negative emotional response to one's involvement in competition (Martens et al., 1990). Like

general anxiety, competitive anxiety can be differentiated as state and trait anxiety (Martens et al, 1990).

Competitive trait anxiety is defined as the frequency with which individuals respond to competitive

situations with state anxiety (Lewthwaite & Scanlan, 1989). This again highlights the idea that trait

anxiety can be seen as a general tendency to interpret situations as threatening and therefore respond with

state anxiety. However, competitive trait anxiety definition limits these general situations to competitive

situations only. The minimal requirements of a situation to be considered competitive requires "the

comparison of an individual's performance [...] with some standard in the presence of at least one other

person who is aware of the criterion for comparison and can evaluate the comparison process" (Martens,

1976, p.14). This standard can include an individual's previous performance, an ideal performance level,

as well as another individual's performance. Additionally, the individual needs to interpret this objective

competitive situation as competitive to create a subjective competitive situation (Martens et al., 1990).

In order to identify whether an individual has responded with state anxiety in such a subjective

competitive situation, it is integral to clarify what state anxiety in a competitive situation looks like.

Unfortunately, there has been no standard definition of competitive state anxiety beyond describing

general state anxiety (see Spielberger, 1979) or the subcategories of state anxiety. The multidimensional

interpretation of state anxiety allows for two distinct concepts, cognitive anxiety and somatic anxiety, to

be used to describe the response to a competitive situation. Cognitive state anxiety describes "negative

expectations about performance and thus negative self-evaluation, both of which precipitate worry,

disturbing visual images, or both" (Martens et al., 1990, p.120). Somatic anxiety is the "physiological and

affective elements of the anxiety experience that develop directly from autonomic arousal" (Martens et al., 1990, p. 121). Common somatic state anxiety responses include increased heart rate, muscle tension, shallow breath, clammy hands, and butterflies in the stomach (Martens et al., 1990).

Measuring Competitive Trait & State Anxiety. Given the multidimensionality of anxiety regarding state and trait anxiety, both concepts are assessed differently. There may be certain benefits and shortcomings to assessing one concept over the other, which makes it important to highlight which assessment tool has been utilized. Given the vast array of general anxiety scales available, this review will focus particularly on three main scales that are frequently used when assessing competitive anxiety in athletes.

So far there have been only a few trait anxiety measures targeting sport populations. The Sport Competition Anxiety Test (SCAT; Martens et al., 1990), as well as the Sport Anxiety Scale (SAS; Smith et al., 1990), are the two most commonly used scales. The most common scale used to measure competitive state anxiety is the CSAI-2 (Martens et al., 1990).

Sport Competition Anxiety Test (SCAT). The Sport Competition Anxiety Test (SCAT; Martens et al., 1990) was one of the first sport-specific anxiety inventories. Therefore, much of its theoretical groundwork relied on ideas borrowed from general anxiety scales, in particular, Spielberger's State-Trait Anxiety Inventory for Children (STAIC; 1973). After multiple item analyses, 10 items as well as 5 spurious items that are unscored made up the SCAT (Martens et al., 1990). To assess concurrent validity, the adult version of the SCAT as well as the Trait Anxiety Inventory for Adults (TAI; Spielberger et al., 1983) was used. Reliability was established by calculating an ANOVA reliability coefficient ($r = .85$). A moderate correlation ($r = .44$) between the sport-specific and the general trait anxiety scale, provided sufficient support for the concurrent validity of the SCAT. This moderate relationship was desirable and expected by the authors to underline the domain-specificity of the SCAT over a general anxiety measurement. Additionally, SCAT ($r = .64$) was a better predictor of player's pre-competition state anxiety than a general trait anxiety scale ($r = .30$). These findings were limited to competitive situations, which means that the SCAT was not a better predictor in non-competitive situations.

Sport Anxiety Scale-2 (SAS-2). The Sport Anxiety Scale-2 (Smith et al., 2006) is the updated version of the original Sport Anxiety Scale (SAS; Smith et al., 1990). After recognizing that the original SAS failed to reproduce the three-factor structure in child samples as well as demonstrated conflicting factor loadings in adult samples, the SAS-2 was developed. Using both children (n = 1,038) and college students (n = 1,294) as a sample, an exploratory factor analysis revealed three factors. Those three factors were titled somatic anxiety, worry, and cognitive disruption. The confirmatory factor analysis revealed that the 3-factor model with as well as without the higher-order anxiety component showed an appropriate fit. The 15-item final scale assesses each of the 3 factors with 5 questions each on a 4-point Likert scale. The scores on each of the three subscales can range from five to 20, whereas the total anxiety score can range from 15 to 60. Therefore, the scale can be used with its three subscales, as well as its overall competitive trait anxiety score.

Internal consistency, as measured by Cronbach's alpha, was acceptable for all 15 items (α = .91). Subscale reliability coefficients were also acceptable for somatic (.84), worry (.89), and concentration disruption (.84). Predictive validity was established by assessing the relationship between the SAS-2 and state anxiety measurements. The same statements were used for the state anxiety measurement with adjustments to the trait scale to account for participants' feelings at this moment. The correlations between overall scores of the trait and state assessment were moderately strong (r = .64, p < .001). Additionally, the SAS-2 showed a strong positive correlation (r = .90; p < .01) with the original SAS (Smith et. al., 1990) indicating the new scale is an appropriate substitute for the original scale as well as that both scales are measuring the same construct. Social desirability was assessed as well, and results revealed that the SAS-2 is minimally influenced by social desirability.

Because the SAS-2 (Smith et al., 2006) is highly correlated with the original SAS (Smith et al., 1990), we can conclude that the SAS-2 has a medium correlation to general trait anxiety measures similar to the SAS (Smith et al., 1990). A medium correlation between domain-specific anxiety measurements is desirable to further highlight the overlap between both assessments, which indicates they measure similar characteristics. Too much overlap indicates they measure the same characteristics, which would cause the

domain-specific assessment to lose its predictive power (Martens et al., 1990). Too little overlap would indicate that both scales are measuring different concepts and are therefore unrelated.

Competitive Sport Anxiety Inventory-2 (CSAI-2). After multiple factor analyses as well as discriminant analyses the Competitive Sport Anxiety Inventory-2 was developed with 27 items (Martens et al., 1990). It consists of three 9-item subscales for cognitive state anxiety, somatic state anxiety, as well as self-confidence. Each item will be answered on a 4-point Likert scale. Scores can range from 9 to 36 on each of the three subscales, with higher scores indicating greater somatic or cognitive anxiety as well as greater self-confidence. Scores will be analyzed based on these three subscales and no total score will be computed. The CSAI-2 takes less than 5 minutes to complete and is recommended to be completed no more than one hour prior to competition.

The CSAI-2 showed acceptable reliability as indicated by Cronbach's alpha for the subscales of cognitive anxiety (α = .79-.83), somatic anxiety (α = .82-.83), and self-confidence (α = .87-.90). Concurrent validity was established through correlations between the SCAT as well as cognitive (r = .45), somatic (r = .62), and self-confidence (r = -.55) subscales. Additionally, the TAI (Spielberger et al., 1970) was used to establish validity within broader assessments of anxiety. The magnitudes of these relationships were slightly lower for the somatic (r = .37) and self-confidence (r = -.46) subscales as expected, but slightly higher for the cognitive (r = .50) subscale.

Direction Scale. In comparison to the many different ways competitive anxiety has been assessed over the years, the direction of anxiety symptoms has been measured very consistently. Jones and Swain (1992) assessed competitive state anxiety using the CSAI-2 (Martens et al., 1990) while attempting to further explore whether these symptoms are perceived as facilitative or debilitative. For each item of the original CSAI-2 (Martens et al., 1990), they asked participants to rate these symptoms as either facilitative or debilitative for the upcoming performance on a scale from -3 to +3. Lower scores indicate more debilitative interpretation while higher scores represent more facilitative perception. It is important to highlight that participants were asked to rate how they believe these symptoms would affect their performance and not whether they perceived them as pleasant or unpleasant. Compared to the CSAI-2

(Martens et al., 1990) the SAS-2 (Smith et al., 2006) has 15 instead of 27 items, while also having three subscales. This means that directional scores would range from -15 to +15 for each of the three subscales. This scale has been commonly used in the sport psychological literature to establish the direction of anxiety symptoms (e.g., Jones et al., 1993; Edwards & Hardy, 1996; Hanton & Jones, 1999; Hanton et al., 2003).

Competitive Anxiety Theories. Drive theory is considered one of the first theories that attempted to describe the relationship between anxiety and performance (Spence & Spence, 1966). As one of the first theories, the drive theory is also one of the most simplistic theories to describe this relationship. According to the authors, an increase in anxiety will lead to an increase in performance given that the individual feels proficient at the task. Therefore, this model suggests that an increase in arousal will directly and consistently lead to an increase in performance. Despite having some support for this theory, since then many more models have been established that describe the relationship between anxiety and performance much more accurately. However, with the increase in accuracy also comes an increase in complexity. Therefore, it is important to highlight the simplicity and unidimensionality of this model as well as consider it as the starting point that allowed more advanced models to be developed.

Inverted U-hypothesis. As a response to the drive theory, the inverted U-hypothesis was applied to anxiety (Yerkes & Dodson, 1908). Originally developed to describe the timeliness of habit formation, this shape has been applied to many psychological concepts including anxiety. This hypothesis states that as anxiety increases performance increases, until a certain point where peak performance is reached. Further increases in anxiety will lead to a decrease in performance (Baldock et al., 2021). Due to its simplicity, this model has multiple shortcomings, including but not limited to the lack of acknowledgment of individual differences (Baldock et al., 2021).

Individual Zones of Optimal Functioning. Based on the idea that there may be an optimal anxiety level for peak performance, adaptations were made to the inverted U-hypothesis resulting in the creation of individual zones of optimal functioning (IZOF; Hanin, 2000). This model focuses on the intensity of anxiety experienced in order to establish a level that allows for optimal performance for each individual

athlete. Given that it suggests that each athlete has their own zone of perceived anxiety in which they tend to perform at their best. Any deviation from this zone, both higher and lower, is suggested to lead to a performance decrease (Baldock et al., 2021). Despite its strong practicality in working with athletes, this model fails to explain the causality of this relationship in particular why there are different zones for different athletes.

Multidimensional Theory of Anxiety. Another model focuses on differentiating between different subcategories of anxiety. Based on the multidimensional anxiety theory, these three subgroups include cognitive anxiety, somatic anxiety, and self-confidence (Martens et al., 1990). The relationship between cognitive anxiety follows a linear negative relationship with performance, meaning that as cognitive anxiety increases performance decreases accordingly. Somatic anxiety on the other hand is proposed to follow the previously discussed inverted U-shape. This means that an increase in somatic anxiety to a certain point will lead to an increase in performance, after which will cause performance to slowly deteriorate. Self-confidence, according to Baldock and colleagues (2021), is not part of competitive anxiety and is suggested to have a linear positive relationship with performance, indicating that as self-confidence increases so will performance. Unfortunately, there is only partial support for this model and research has highlighted some of its limitations in neglecting potential positive effects of cognitive anxiety and the lack of interaction between the three subcomponents (Baldock et al., 2021; Woodman & Hardy, 1993). The inclusion of an interaction would suggest that an individual high in one subcomponent (e.g., self-confidence) may experience a different performance outcome when another subcomponent increases (e.g., somatic anxiety) than an individual who is low on this subcomponent.

Cusp Catastrophe Model. Another model that is frequently discussed is the cusp catastrophe (CAT) model to describe the relationship between anxiety and performance (Hardy & Parfitt, 1991). Originally this model was developed in response to perceived limitations of the inverted-U hypothesis in explaining the relationship between anxiety and performance (Fazey & Hardy, 1988). This new model includes the subcategory of somatic anxiety similar to previous models, however, it refers to the second variable physiological arousal, instead of somatic anxiety. According to the model, when cognitive

anxiety is low, increases in physiological arousal led to a slight increase in performance until an optimal

level and then slowly leads to a decrease. This trajectory is comparable to the inverted U hypothesis

(Yerkes & Dodson, 1908). When cognitive anxiety is high, however, increases in physiological arousal

will lead to a different performance outcome. Initially increase in physiological arousal will also lead to a

slight increase in performance, however, once arousal goes beyond a critical point, performance will

cause a catastrophic decrease in performance. Additionally, it is important to highlight that return to

optimal performance is possible by decreasing physiological arousal only when cognitive anxiety is low.

Once the catastrophic drop has occurred during a high cognitive anxiety situation, returning to optimal

performance will be extremely challenging due to the discontinuous nature of the relationship between

performance and physiological arousal at such a high cognitive anxious level. In an addition to this

model, self-confidence has been added later on as a moderating variable, which has been referred to as the

butterfly CAT model (Hardy & Parfitt, 1990). Due to the complexity of this model, specifics will not be

discussed but were deemed important enough to be mentioned at this point.

   Reversal Theory. Another theory that may be both highly applicable and relevant to this literature

review is the reversal theory (Apter, 1982). This theory has since been applied to the sport psychological

literature (Kerr, 1987). The foundation of this theory suggests that there are four pairs of

metamotivational states an athlete can experience. These pairs consist of telic-paratelic, negativism-

conformity, autocentric-allocentric, as well as sympathy-mastery. At any given time only one state of the

pair can be active, while the other one will be inactive. Generally, one of the four pairs will be dominant

in any given situation. The name of this theory is a result of the idea that authors suggest an athlete can

reverse from one active state to an inactive state through techniques like cognitive restructuring. This

being said, one of the main ideas of this theory is that the experience of the athlete is dependent on their

interpretation of the objective situation more so than the objective situation itself. In relation to anxiety,

an athlete that is in a telic state may be more goal-oriented and desire a low-arousal state. Whereas an

athlete who is in a paratelic state may prefer higher arousal. Instead of solely focusing on arousal

regulation, Kerr (1987) has also suggested taking reversals between active states into consideration to allow for optimal athletic performance.

In conclusion, researchers are still trying to explain the relationship between anxiety and performance with many new approaches proposed (Baldock et al., 2021). Despite lacking full scientific accuracy, there are helpful points to take away from the review of these models. First, it allows us to understand that there may be an optimal level of anxiety that arguably is different for each individual. Therefore, solely looking at the absolute intensity of anxiety symptoms reported may be misleading. It will be crucial to combine the intensity with the self-reported perception of these symptoms as either facilitative or debilitative. Secondly, through the analysis of these models, it is indicated that there are different components of anxiety, such as concentration disruption or somatic anxiety (Smith et al., 2006). Differentiating among these subgroups may result in a clearer picture of understanding the proposed relationships. Many competitive anxiety assessments allow for such a differentiation such as the CSAI-2 (Martens et al., 1990), SCAT (Martens et al., 1990), and the SAS-2 (Smith et al., 2006). Before connecting these concepts to implicit beliefs, it is important to review some of the current literature that has assessed both the intensity and direction of anxiety and its effect on performance.

Relationship between competitive state & trait anxiety. Initial research on cognitive and somatic anxiety has established different models describing the relationship between these variables (Hanin, 2000; Martens et al., 1990; Yerkes & Dodson, 1908;). Hanton and colleagues examined the multidimensional relationship between trait anxiety and state anxiety in collegiate male soccer players (Hanton et al., 2002). To assess competitive state anxiety, researchers used the Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990), which is presently still used as one of the common scales to assess competitive state anxiety (e.g., Anangnostopolous et al., 2015; Souza et al., 2019). The CSAI-2 includes three subscales of cognitive anxiety, somatic anxiety, and self-confidence (Martens et al., 1990). As quantitative measurement of competitive trait anxiety, the Sport Anxiety Scale (SAS; Smith et al., 1990) was used, which is the original version of the now more commonly used SAS-2 (Smith et al., 2006). Results showed that athletes who were high in competitive trait anxiety also scored significantly

higher in both somatic state anxiety ($\eta2$ = .88-.95) and cognitive state anxiety ($\eta2$ = .71-.83). Researchers were also able to provide evidence that trait anxiety may play a critical role in how state anxiety is perceived. In particular, results showed that individuals who were low in concentration disruption, interpreted both somatic ($\eta2$ = .85) and cognitive state anxiety ($\eta2$ = .96) as more facilitative. These findings further support the idea that not only are both competitive trait and state anxiety influencing each other in terms of the intensity but also that certain subscales may play a critical role in how anxiety is perceived. In critically reviewing this study, it is important to highlight the unidimensional analysis of this relationship within the sport of soccer. Due to the open-skill nature of the sport, there is an inherent unpredictability that may further amplify the effects of concentration disruption on the perception of state anxiety. This means that in such open-skill sports particular attention may be given to concentration disruption since athletes may be unable to predict in which situations concentration is required, forcing them to continuously keep concentration levels high to avoid a negative impact on their performance. Nevertheless, these findings highlight that researchers need to not only assess the intensity of anxiety symptoms but also the direction as either facilitative or debilitative.

Additionally, this research provides evidence that athletes high in trait anxiety may respond with heightened state anxiety in competitive situations (Hanton et al., 2002). Vice versa individuals reporting high competitive state anxiety may be assumed to respond in such a fashion consistently. This assumption is necessary to draw conclusions about the direction and intensity of competitive anxiety from studies that have assessed only state or trait anxiety. Conceptually this assumption can be grounded in the definition of trait anxiety as a predisposition to state anxiety meaning that those individuals respond more frequently with heightened state anxiety. Therefore, competitive trait anxiety can be simplified as an average of multiple state anxiety measurements over time. This is based on the definition that competitive trait anxiety describes how likely individuals are to perceive a competitive situation as threatening and to respond with heightened competitive state anxiety (Martens et al., 1990). Even though trait and state measures can be differentiated from one another it will be important to analyze research articles including both as well as only one of these measurements. Therefore, results indicating certain relationships

between trait anxiety and one variable may be assumed to also exist for state anxiety if no research has looked at the state relationship. The opposite shall be assumed for research focusing on state assessments. Despite these assumptions, it will be important to highlight the specific measurements as either trait or state assessments throughout the literature review, to minimize false generalizations. This will be important considering the interpretation of some of the results and the degree to which some findings may have clinical significance to the athletes. Despite the close relationship between competitive state and trait anxiety, both are distinguishable from one another.

Anxiety relationship with performance. Anxiety is most often defined as a negative emotional state (Lewis, 1970). It is important to highlight however that despite the emotion being unpleasant it does not necessarily have to be debilitative (Jones, 1995). In fact, anxiety may be facilitative to some individuals despite the presence of anxiety being unpleasant in itself. As highlighted by a variety of theories, an increase in arousal may be beneficial to an athlete's performance (e.g., drive theory). Other times an increase in arousal beyond a certain level may be more debilitative to the desired outcome (e.g., inverted U-hypothesis, catastrophe model). The amount or magnitude of experienced anxiety symptoms is referred to as the intensity of anxiety.

The idea of interpreting anxiety as either facilitative or debilitative to the task at hand is referred to as the direction of anxiety, which also may impact an athlete's performance. Researchers have been interested in the relationship between intensity and direction of anxiety.

Direction/interpretation of anxiety symptoms. Edwards and Hardy (1996) assessed the intensity and direction of competitive state anxiety in female netball players using a modified CSAI-2 (Martens et al., 1990) including a direction scale (Jones & Swain, 1992). Players' ages ranged from 18 to 23 and were competing at a competitive level in Wales. Assessments were taken 45 minutes prior to six different games. Participants were also asked to self-rate their performance after the same games in relation to their average performance. Results indicated that cognitive anxiety intensity was not significantly related to performance, however, both somatic intensity and self-confidence intensity were (Edwards & Hardy, 1996). Direction of the three subscales of cognitive ($r = -.11$) and somatic anxiety ($r =$

-.21) as well as self-confidence (r = .15) showed a significant relationship with perceived performance (Edwards & Hardy, 1996). These results suggest that athletes who interpreted their symptoms as more debilitative rated themselves as having performed better than those who interpreted them as more facilitative. An interaction effect between anxiety intensity and direction did not add any value to predicting performance. Additional statistical analysis indicated also that anxiety direction did not account for more variance in performance than intensity. Therefore, these findings provide some results that go against what may have been predicted by theoretical models. This finding also contradicts previous research that showed facilitative interpretations being related to an increase in performance.

In a study of female gymnasts between 14 and 16 years of age, performance was rated by external judges rather than through a self-assessment (Jones et al., 1993). Each athlete's performance was videotaped and rated by two independent judges. Based on the judges' ratings participants were split into two different groups. The completion of the CSAI-2 (Martens et al., 1990) including the direction scale (Jones & Swain, 1992) ten minutes before their beam performance was used as the assessment of competitive anxiety. Results showed that there was no difference among participants from both groups in terms of state anxiety intensity scores. However, those who performed better interpreted the anxiety symptoms as significantly more facilitative than those who performed worse (Jones et al., 1993). This research also highlights the importance of assessing both anxiety intensity and direction. At the same time, these contradictory findings highlight that the relationship between anxiety and performance is not yet fully understood. One potential explanation for these different results is that state anxiety is highly dependent on the specific situation. Looking at trait anxiety may allow for more consistent results and a clearer picture of this relationship.

Male swimmers (n = 4), with an average age of 21.75 years, were selected based on the inclusion criteria of having debilitative interpretations of competitive anxiety (Hanton & Jones, 1999). Participants were asked to complete the CSAI-2 (Martens et al., 1990) over multiple time points of their competitive season while competing in 10 separate competitions of their season. Researchers also used the direction scale (Jones & Swain, 1992) to gather qualitative data about the interpretation of state anxiety symptoms.

After analyzing the results, the effect of a particular competition on perceived anxiety becomes evident. For all participants, reported anxiety intensity varied greatly over the course of the season, with no particular pattern being recognizable outside of the fact that each meet may have caused a different anxiety perception in each participant. This is important to note since it could have been assumed that anxiety intensity increases as the season progresses, which would have further implications when discussing the interpretation of anxiety symptoms. Furthermore, researchers were able to manipulate athletes' perception of their experienced anxiety symptoms, by implementing multiple interventions targeting goal-setting, imagery, positive thinking, and self-talk. These interventions allowed athletes a more facilitative interpretation, which resulted in an improvement in their swim performance, whereas the control participant did not see any performance improvement (Hanton & Jones, 1999). Despite the small sample size and exploratory nature of this study, these results are promising as it shows that the perception of anxiety is malleable and also suggest that a more facilitative interpretation relates to a performance increase. Unfortunately, no information was assessed regarding which of the interventions has contributed the most or least to these facilitative changes. Additionally, this approach to creating changes may require a significant number of resources both from the athlete as well as from the SPP practitioner. Further research may benefit from expanding this study design to a larger population in particular including more than just one control participant.

As mentioned previously limited research has been conducted to explore these concepts on a trait level. In a sample of elite and non-elite open-skill athletes, trait anxiety, as well as the interpretation of anxiety symptoms as either facilitative or debilitative, was assessed (Hanton et al., 2003). Athletes included both male (n = 141) and female (n = 92) ranging from 19 to 34 years old (M = 23.56) competing in the sports of cricket (n = 71), soccer (n = 75), and rugby union (n = 87). Researchers used a modified version of the CSAI-2 to assess competitive trait anxiety, by modifying the instructions. The direction scale (Jones & Swain, 1992) was then assigned to each of the modified prompts to assess the direction of anxiety symptoms. Results showed significant interactions of trait anxiety intensity and interpretation with goal attainment, as measured by the trait goal attainment expectancy scale (GAS; Jones & Hanton,

1996) indicating that how competitive situations are generally perceived in terms of intensity and interpretation may affect other variables in the athlete's environment (Hanton et al., 2003).

This correlational relationship, as seen in the previous study (Hanton et al., 2003) also suggests that concepts such as goal attainment relate to trait anxiety intensity and direction. This can be interpreted as support to analyze other related concepts, like implicit beliefs, that potentially impact anxiety perceptions. Additionally, this review of competitive anxiety intensity and interpretation highlighted the impact of these concepts on performance. Even if some findings did not produce statistically significant results (Edwards & Hardy, 1996), more facilitative perceptions of anxiety symptoms may lead to clinically significant results such as greater enjoyment during competition. Another question that focuses solely on competitive anxiety is whether these results may be generalizable across different groups or whether significant differences exist. In the following sections, differences in competitive anxiety will be discussed based on sex, race and ethnicity, sport type as well as skill level or experience.

Differences in competitive anxiety among different demographics. Sport is full of individuals with diverse backgrounds. While this is part of the power and beauty of sport, it also comes with important considerations. Since cultural diversity is essential to the applied practice of sport, exercise, and performance psychology, researchers may benefit from highlighting cultural limitations and differences in their work (Gill & Kamphoff, 2021). Since individuals can be differentiated based on an endless number of social identities, only a few of them can be highlighted during a research project. Differentiating participants on every social identity would inevitably put participants' anonymity at stake as well as prevent any kind of generalizability beyond the sample. Sport psychological literature has focused on a few characteristics such as sex, gender, race, or ethnicity. Therefore, the ideas of competitive anxiety will be revisited to identify relevant differences among individuals.

Sex and Gender. Sex and gender are often used interchangeably during daily conversations. The scientific literature distinguishes both concepts however drastically. Sex is most often described as the "relatively unchanging biology of being male or female" such as the genetic makeup (Phillips, 2005, p. 11). Gender on the other hand is referred to as the "roles and expectations attributed to [individuals] in a

society" and therefore are likely to change throughout time, life stage, or culture (Phillips, 2005, p. 11). It is important to highlight that both concepts are theoretically different from another, however, these differences do not suggest a hierarchy where one concept is generally more relevant than the other. An individual's sex and gender may suggest certain characteristics about an individual as well as affect their life. Despite the importance of these two concepts only limited research has been analyzed specifically for differences in competitive anxiety concerning participants' sex.

Prior to looking at competitive anxiety levels, it seems important to look at general anxiety differences among male and female student-athletes given that their overall wellness may be primarily influenced by their general anxiety levels. In a study of 540 collegiate student-athletes from all three divisions of the National Collegiate Athletic Association (NCAA), general anxiety levels were measured using the 7-item Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al., 2006) and analyzed for differences based on participant's sex (Brown et al., 2021). Results suggest that female collegiate athletes are experiencing significantly higher levels of anxiety than their male counterparts ($t = - 4.04$; $p < .001$). This suggests that sex has a medium effect on general anxiety levels experienced in collegiate athletes ($d = .40$).

In a male ($n = 45$) and female ($n = 38$) sports sample, competitive trait anxiety intensity and direction were analyzed (Ntoumanis & Jones, 1998). Athletes were competing in the sports of hockey, rugby, cricket, swimming, and athletics, which were not further specified by the authors. Researchers used the CTAI-2 (Albrecht & Feltz, 1987), which is the trait-modified version of the CSAI-2 (Martens et al., 1990). Additionally, researchers used the direction scale (Jones & Swain, 1992) to assess the interpretation of anxiety symptoms. Results showed that there was no statistically significant difference between male and female athletes in the intensity and direction of cognitive anxiety and somatic anxiety. In this study, any potential differences between males and females were neglected in the further statistical analysis according to the researchers (Ntoumanis & Jones, 1998). This provides evidence that anxiety intensity may not differ based on sex, as well as that there may be no differences in regard to the interpretation of anxiety based on sex.

The findings that there may not be a difference between sex were supported in a study by Turkmen et al. (2013). The Sport Competitive Anxiety Scale (SCAT; Martens et al., 1990) was administered to both male and female Bocce players with an average age of 21.15 years (Turkmen et al., 2013). Despite having a slightly higher average in competitive anxiety than men, females were not significantly more anxious in competitive situations.

Sex differences were assessed among different populations. Early research, including original research to validate the SCAT (Martens et al., 1990), suggested that females may report higher trait anxiety than male athletes. The authors concluded after further researching competitive anxiety that sex may be less indicative of competitive anxiety than originally thought. According to Bem, individuals can exhibit both masculine and feminine personality characteristics that are independent of their biological sex (1974). Masculine characteristics, such as being independent or willing to take risks, and feminine characteristics, such as being affectionate and sensitive, can be measured using the Bem Sex Role Inventory (BSRI; Bem, 1974). Individuals can vary on this scale with masculine and feminine being the end of the spectrum rather than distinct categories. Using this scale researchers have found that feminine athletes, as measured by the BSRI (Bem, 1974), scored significantly higher in competitive trait anxiety, as measured by the SCAT (Martens et al., 1990), than masculine athletes did (Wittig et al., 1987). These differences existed independent of an individual's biological sex meaning that for example a feminine male reported on average higher trait anxiety than a masculine female did. Therefore, gender roles seemed to have a bigger impact on reported anxiety. The main finding was that individuals high in masculine characteristics, regardless of their sex, reported lower trait anxiety than feminine individuals (Martens et al., 1990).

Conversely, there is substantial research that suggests there is a difference between male and female athletes in regard to anxiety intensity when considering their gender rather than their sex (e.g., Correia & Rosado, 2019; Martens et al., 1990). Among 601 athletes, both male (n = 429) and female (n = 172) from a wide variety of sports, including individual sports such as surfing and tennis as well as team sports such as basketball and handball. Participants ages ranged from 12 to 47 with an average age of

17.44. Researchers found that female athletes experienced significantly higher levels of competitive trait anxiety as measured by the SAS-2 (Correia & Rosado, 2019; Smith et al., 2006). The effect size of this difference suggests that gender had a medium effect on how a competitive situation may be perceived (d= .59; Correia & Rosado, 2019). When looking at gender differences based on the three subscales, somatic anxiety, worry, and concentration disruption, we can learn even more. There was no significant difference between both genders based on worry (d = .1), but females scored significantly higher on somatic anxiety (d = .57) and concentration disruption (d = .36).

One of the explanations why little research has focused on assessing differences in competitive trait anxiety based on sex may be since few differences can be found. The lack of understanding between anxiety and performance may be an indicator that the relationship between gender and sex is also not fully developed yet. In particular, there seems to be little evidence suggesting differences in competitive anxiety based on sex, with a few studies suggesting potential differences based on what some may consider typical gender characteristics of masculinity and femininity.

Race and Ethnicity. Another more frequently reported descriptive variable focuses on a participant's race or ethnicity. Despite being two distinct concepts, race and ethnicity are sometimes used interchangeably. Generally, race can be defined "as possessing distinctive biological traits" (Ram et al., 2004, p. 254) while ethnicity is understood to consist of "socially distinct [characteristics] because of shared language, religion, cultural customs, or nationality (Ram et al., 2004, p. 254). Due to these cultural differences, it is important to assess differences among participants that may highlight unique experiences for certain groups. A better understanding of different racial and ethnic groups may also allow for better interventions.

Since most of the reported research in this literature review was conducted in the United States or Western Europe, it is crucial to pay close attention to the limitations of these findings when it comes to these factors. This is important to be aware of cultural differences when attempting to generalize results and apply them to samples and populations outside that studied demographic. Fortunately, more competitive anxiety research has been recently published to initiate the exploration of ethnicity and race.

At a collegiate track-and-field meet, 122 participants were asked to self-report their state anxiety using the modified CSAI-2 (Martens et al., 1990) including a directional scale (Jones & Swain, 1992) to test whether differences among different ethnic groups exist (Anagnostopoulos et al., 2015). Participants self-reported as either African American (n = 57) or non-Hispanic Caucasian (NHC; n = 65). Ethnic differences in anxiety were analyzed based on self-reported gender. Results indicated that African American participants interpreted cognitive anxiety symptoms as less facilitative than their NHC competitors ($\eta p2$ = .25 - .41). NHC women reported higher cognitive anxiety intensity and lower self-confidence than African American women. The analysis of the directionality of anxiety symptoms however revealed no significant difference, indicating that despite perceiving more cognitive anxiety, NHC women did not perceive it as more debilitative. Interestingly enough ethnicity did not show any significant differences in somatic anxiety intensity and interpretation between both men and women (Anagnostopoulos et al., 2015). This shows that ethnicity may have an impact on competitive state anxiety, but further research is needed to allow for an understanding of why these differences exist and how they may affect performance. Researchers suggested that potential explanations of these ethnic differences based on athlete's gender may be due to the unique role African American women take in the family system, therefore strongly identifying with images of a "strong Black woman" or even "superwoman". Both of these ideologies encourage women to show strength and suppress emotions, which could explain their lower levels of anxiety while interpreting it similarly to NHC women (Anagnostoploulos et al., 2015). Additionally, it is important to note that this research has reported some differences between male and female athletes in regard to competitive state anxiety, which provides conflicting results to previous research on competitive trait anxiety (Ntoumanis & Jones, 1998; Turkmen et al., 2013). This may indicate that differences in state anxiety suggest differences among ethnic groups that could be more accurately attributed to factors involving the interpretation of a specific event. Therefore, the question at hand may be whether there are differences in anxiety based on ethnicity, or whether ethnicity influences the interpretation of an event which then influences the experience of anxiety.

In a study of 612 professional athletes from four different countries (i.e., North America, Singapore, China, and Nigeria) competitive trait anxiety was assessed using the SCAT (Martens et al., 1990) as well as five additional variables relevant to sport psychological literature (Xinyi et al., 2004). Additional variables that were assessed among the groups were self-confidence, mental preparation, concentration, leadership, and achievement motivation. A significant MANOVA suggested that the athletes from the four countries differed from one another across the six variables (F (3, 611) = 27.08, p = .001), however, trait anxiety contributed the least to these differences according to follow-up analysis (F = 4.48, p = .01). North American athlete's (M = 53) scored higher than Chinese (M = 52.37) and Nigerian (M = 52.25) athletes, while Singaporean athletes scored the lowest (M = 47.67). This finding suggests that despite competitive anxiety being a relevant differentiator among cultures, it may be more universal across cultures than other factors such as mental preparation.

 Sport Type. When assessing psychological constructs in athletes it seems important to assess for potential confounding variables that may influence results. Quite often an athlete's preferred sport cannot be scientifically manipulated, in particular, if a certain level of proficiency has been developed. This means once an athlete has reached a certain level in their respective sport, researchers are unable to conduct a study assessing anxiety perceptions by manipulating their sport type. Despite the challenge of developing causal evidence, athletes' anxiety levels may affect the sport they choose while at the same time, the sport they compete in may affect their anxiety levels. Therefore, it is important to analyze the relationships between sport type and competitive anxiety. In a study of over 600 Portuguese athletes their sport type, as well as their competitive trait anxiety, was measured (Correia & Rosado, 2019). The SAS-2 (Smith et al., 2006) was administered prior to each athlete's training session and used to establish competitive trait anxiety levels. Results revealed that there are significant differences in trait anxiety between athletes who participate in individual or team sports. Based on the effect size an athlete's sport type accounted for a significant difference in the athlete's competitive trait anxiety (d=.73). Athletes from individual sports are suggested to experience significantly more anxiety than those participating in team sports (Correia & Rosado, 2019). It remains important to highlight that causality did not get established

and therefore directionality between these variables can only be assumed. While individual athletes may experience increased levels of anxiety, it also seems plausible to me that individuals with high trait anxiety may choose to participate in individual sports, therefore giving this scientific relationship a different interpretation.

In a study of 100 male (n = 32) and female (n = 68) tennis players, competitive state anxiety was assessed using the CSAI-2 (Martens et al., 1990) including the direction scale (Swain & Jones, 1992). Participants were asked to complete these assessments one hour prior to one single as well as one doubles competition (Terry et al., 1996). Additionally, researchers recorded the outcome of each match and placed participants in groups of winners and losers for further statistical analysis. Results indicated that both cognitive (d = .29) and somatic (d = .69) scores were significantly higher before single matches than in participants' doubles match. Considering these results, differences in anxiety levels based on sport type may be less due to the actual sport and potentially more due to how many other athletes are competing by one's side. This interpretation would still allow for differences among individual and team sport athlete that is congruent with previously discussed findings (Correia & Rosado, 2019)

Skill Level/Experience. Different levels of competition may bring different levels of objective demands, such as increased attendance of competitions or financial demands due to professional contracts. Therefore, significant research has been conducted on assessing differences in competitive anxiety between groups of different skill levels. When assessing for competitive state anxiety among competitive swimmers, participants were split into two groups based on their qualifying times in their representative event (Jones et al., 1994). Using the modified version of the CSAI-2 (Martens et al., 1990) including the direction scale (Jones & Swain, 1992), researchers measured competitive anxiety symptoms prior to competition. Elite swimmers (n = 97) and non-elite (n = 114) did not differ in the intensity of cognitive or somatic anxiety experienced before their event. Elite swimmers only reported being significantly more self-confident than non-elite swimmers (Jones et al., 1994). Additionally, elite swimmers perceived cognitive (d = .43) and somatic (d = .67) anxiety as significantly more facilitative than non-elite athletes. This indicates that despite experiencing the same amount of anxiety before the

event, elite athletes were able to see these symptoms as more beneficial to their upcoming performance. For the elite swimmers (n = 97) there were only eleven participants who perceived both cognitive and somatic anxiety as debilitative, as shown by a negative score on the interpretation scale (Jones & Swain, 1992) showing that at the elite level the vast majority of athletes perceives at least some part of their anxiety as facilitative. The question that cannot yet be answered is whether elite athletes perform better because they are able to perceive their anxiety as facilitative, or whether they perceive anxiety as facilitative because they have outperformed others previously. Either way, these findings highlight the importance of further focusing on an athlete's interpretation of anxiety instead of the intensity by itself.

Playing status was another variable that was analyzed in one study regarding the relationship with competitive anxiety (Smith, 1983). Using the SCAT for children (Martens et al., 1990) participants' competitive trait anxiety was assessed as well as their playing status as either star players, regular starters, or playing substitutes based on coaches' assessment. Male athletes (n = 80) participated in football and baseball, female athletes (n = 79) competed in volleyball and softball. Results showed that athletes who were considered star players by their coaches had significantly lower anxiety than the group considered playing substitutes. Since this study design does not provide causal explanations for this relationship, it is to speculate how anxiety and playing status are related. According to the researchers, potential explanations include that higher status players are more skilled and experienced therefore interpreting competitive situations as less threatening (Smith, 1983).

In a recent meta-analysis, a difference in competitive anxiety based on skill level was assessed (Rice et al., 2019). Across studies in this meta-analysis results suggested that athletes performing at lower competitive levels experienced higher anxiety than those at higher levels. This effect was found across different sports including soccer. It is important to highlight that this meta-analysis included studies that were conducted in an athlete population however used a wide variety of anxiety measures including state/trait anxiety measures or global anxiety measures (Rice et al., 2019).

Implicit Beliefs

Defining implicit beliefs. Implicit beliefs were significantly impacted by the work of Carol Dweck, who conceptualized the two different implicit beliefs of incremental and entity beliefs (Dweck & Legget, 1988). Incremental beliefs, describe a characteristic as malleable, therefore suggesting that through effort, new strategies, and help from others this characteristic can be improved (Dweck, 2008). Entity beliefs suggest that the characteristic is fixed and cannot be changed (Dweck, 2008). Incremental beliefs have been referred to as Growth Mindset, while entity beliefs were titled as Fixed Mindset to further underline the malleability or lack thereof (Dweck, 2008). In order to keep the consistency of existing research, these concepts will be referred to with their original and scientific terms of incremental and entity theory even if some of the following studies chose to adopt the newer terminology.

Measuring implicit beliefs. There is tremendous research interest when it comes to implicit beliefs within the field of psychology. This allows researchers to choose from a wide range of assessments, many of which were originally developed for a clinical or academic setting. Since implicit beliefs have originally targeted the concept of intelligence, some of the first scales have been developed specifically for this concept. Scales targeting specific implicit beliefs can, however, be adjusted by the substitution of a word to account for a different targeted concept (Dweck, 2008).

Theories of Intelligence Scale. Participants' implicit beliefs about intelligence were initially assessed with an untitled 3-item scale (Dweck et al., 1995). Later this scale was expanded to become the Theories of Intelligence Scale (TIS; Dweck, 1999). The TIS is an expansion of the validated 3-item scale consisting of eight items on a 6-point Likert scale from 1 (strongly agree) to 6 (strongly disagree). Four of the items reflect incremental statements while the other four describe entity beliefs. Participants can also be given the four entity statements only, without presenting any incremental statements, which would shorten the scale from eight to four items. Those three items are the same as three of the four entity statements in the TIS. Since the TIS can be used with solely the entity statements, the validation of the short 3-item questionnaire may still be applicable. This is further supported by the recommendation that the variable at hand (i.e., intelligence) may be substituted for a different variable (i.e., anxiety) to assess implicit beliefs about that new variable.

Internal reliability was established using Cronbach's alpha (α = .94 - .98) over multiple studies (Dweck et al., 1995). Over a two-week period, the test-retest reliability for the three items was acceptable (r = .80). Factor loadings highlighted the validity of implicit beliefs of intelligence over other implicit beliefs such as morality or the world itself. Therefore, incremental beliefs about one domain are independent of implicit beliefs about another domain. Additionally, results suggested that implicit beliefs were unrelated to the participant's age as well as sex, political affiliation, and religion. In regard to discriminant validity, the questionnaire was also unpredictive of individuals' cognitive abilities (β = -11.03, p > .05), as measured by the Scholastic Aptitude Test (SAT), as well as their confidence in their intellectual ability (r = .02). Based on these assessments the three-item questionnaire was deemed an appropriate measurement of the implicit beliefs about intelligence.

Frequently results were analyzed and reported based on two distinct groups of entity and incremental theorists. To differentiate these two groups, authors have recommended considering scores below 3.0 as incremental theorists, whereas scores above 4.0 as entity theorists. This means that a small number of participants may be excluded due to the inability to assign clear incremental or entity beliefs to them.

Conceptions of the Nature of Athletic Ability Questionnaire-2. The Conceptions of the Nature of Athletic Ability Questionnaire-2 (CNAAQ-2; Biddle et al., 2003) is an updated version of the original Conceptions of the Nature of Athletic Ability Questionnaire from Sarrazin and colleagues (1996). The updated version was an attempt to increase the psychometric rigorousness of the scale, by deleting the general and specific subscale that was originally proposed as well as adjusting individual items. The development of the second version included three studies of 3478 students, ages ranging from 11 to 19 years, from over 50 English schools. Confirmatory factor analysis revealed that a model of hierarchical structure of two higher-order factors, entity, and incremental beliefs, as well as four first-order factors consisting of stable, gift, improvement, and learning, was best suited. Cronbach's alpha coefficient demonstrated that both the incremental (α = .80) and entity (α = .74) scale had internal consistency. To demonstrate discriminant validity of both incremental and entity beliefs both scales were correlated,

which showed low correlation (r = -.17) indicating that incremental and entity beliefs are unrelated. An additional factor analysis using 2875 answers to test factorial invariance across gender and age was conducted. The fit indices showed acceptable fit for all age groups and both genders, with the subscales showing similar internal consistency. Therefore, the CNAAQ-2 (Biddle et al., 2003) consists of 12 items on a 5-point Likert scale to assess individuals' beliefs about the nature of athletic ability. Items include entity statements, e.g., "You have a certain level of ability in sport and you cannot really do much to change that level" and incremental statements, e.g., "In sport, if you work hard at it, you will always get better" (Biddle et al., 2003).

Theories of Emotion Scale. The theories of emotions scale (TOE; Tamir et al., 2007), is an adjustment to the original TIS (Dweck, 1999). The TOE assesses implicit beliefs about emotion, whereas the original TIS assessed implicit beliefs about intelligence. The adjustment can be summarized as substituting the word "intelligence" with "emotion" (Tamir et al., 2007). Respondents rate the degree to which they agree with two incremental and two entity statements on a 5-point Likert Scale. Entity statements are reverse scored to allow the overall score to reflect an incremental belief system. Therefore, higher scores indicate a more incremental belief system about emotions. Since this scale was adjusted based on an existing scale and used in a larger study no factor analysis was conducted to determine the validity of the scale. Cronbach's alpha for the adjusted 4-item questionnaire in this study was acceptable ($\alpha = .74$). Implicit beliefs about emotion showed a weak but significant relationship with implicit beliefs about intelligence (r = .27), which may indicate that both scales do indeed assess different concepts. Recently, a French version of the TOE scale has been validated (Congard et al., 2022).

Theories of Anxiety Scale. The theories of anxiety scale (TOA; Schroder et al., 2015) is a variation that focuses specifically on implicit beliefs about anxiety rather than intelligence or emotions as a whole. The first three statements of this 4-item questionnaire are identical to the original TOI scale with the only difference being that the word intelligence has been substituted for the word anxiety. The authors of this scale suggest that this mode of "find-and-replace" is a common methodology for creating new implicit belief measurements. The fourth item on this scale was modified from the TOE (Tamir et al.,

2007) to include another entity statement. This means that the TOA consists of four entity statements similar to the TOI by Hong and colleagues (1999), which is suggested to be less compelling and minimizes biases to respond in an incremental manner. An exploratory factor analysis was conducted to establish that the TOA does indeed measure a concept that is different from the TOI (Hong et al., 1999) and the TOE (Tamir et al., 2007), which was found to be the case based on each scales factor loading and eigenvalues in two independent studies with a total of 775 participants (Schroder et al., 2015). Additionally, medium to low correlations between the TOA and the TOI ($r = .30$) as well as the TOE ($r = .28$) show the relatedness but independence of these concepts. Further highlighting its content validity, the TOA was stronger related to trait anxiety ($r = –.40$), as measured by the STAI-T (Spielberger et al., 1983), than the other two implicit belief scales ($r = –.29 - –.16$). Cronbach's alpha showed excellent reliability for the TOA ($\alpha = .96 - .97$).

 Personal Implicit Beliefs Scales. It is important to note that some of the recent literature has adjusted these scales to allow for a differentiation between general beliefs and personal beliefs (De Castella et al., 2014). General beliefs assess whether an individual believes a certain trait is malleable for people in general, whereas personal beliefs assess whether an individual believes they could change this characteristic in themselves. The explanation for differentiating these beliefs is that in order for individuals to initiate an attempt to control their own emotions they first need to believe that emotions can generally be controlled. They then need to believe that they themselves are capable of doing so (Tamir & Mauss, 2011). For collegiate athletes this may look like an athlete generally believing that players are capable of regulating their anxiety prior to a game, however, they themselves feel unable to do so. To adjust for this differentiation, the statements were adjusted from "You…" to "I …" statements (De Castella et al., 2014). This research has found some promising results, including scientific evidence that general and personal beliefs may differ and may be a better predictor of performance (De Castella, 2017; De Castella & Byrne, 2015).

 Despite these findings, there are some limitations that come with this adjusted scale. One of the concerns is a potential ceiling effect that may occur when assessing personal beliefs (De Castella &

Byrne, 2015). The main concern, however, is that by presenting statements that include both incremental and entity perspectives, participants may be more likely to respond in an incremental manner (Schroder et al., 2015). Therefore, assessing implicit beliefs through entity statements only may be less compelling for an incremental theory. Any adjustments, such as the exclusion of items, may further impact the validity of the personal scale. Therefore, this proposed thesis may benefit from utilizing the TOA, which consists of entity statements only (Schroder et al., 2015). Once the relationship between implicit beliefs and the interpretation and intensity of competitive trait anxiety has been established, researchers may take into consideration the application of a more personal scale.

      Implicit beliefs in performance settings. Since the origin of these mindsets occurred when assessing implicit beliefs about intelligence, it seems only appropriate to start by reviewing research conducted in an academic setting. Additionally, the academic setting provides a great opportunity to analyze findings in a non-sport setting that is still performance oriented. Instead of focusing on the actual performance most of the early research has assessed the effect of the belief systems on motivation, attributional factors, and goal setting (see Burnette et al., 2013 for a review of implicit beliefs and self-regulation).

      Undergraduate students (n = 168) from a university in Hong Kong, were asked to fill out a three-item questionnaire assessing their implicit theories about intelligence based on Dweck's work on implicit beliefs (Hong et al., 1999). Additionally, they were asked to report the final grade of their mandatory English class in high school, as well as indicate whether they would be interested in taking a remedial course in English. Results indicate that when individuals are presented with unsatisfactory results those with more incremental beliefs are more likely to exert higher effort (Hong et al., 1999). In this case, students with an incremental belief system who received a grade of "C" or lower in the class were more likely to take a remedial course than those with a fixed mindset who received the same grade. Indicating that an individual's belief system may be a prime predictor of their future effort when confronted with an unpleasant experience. Despite every student being provided with the opportunity to take a remedial course, students with an incremental belief system were more likely to indeed use the opportunity. It

seems to be relevant that despite individuals being presented with opportunities to take control of their life or their performance, implicit beliefs may have a large influence on whether these opportunities are actually taken, in particular, if a choice is offered.

These findings have just recently been applied to more practical opportunities for students and how they can use implicit beliefs and goal setting to achieve their academic goals (Sorensen, 2016). College students (n = 35) enrolled in a chemistry course, were asked to complete a theory of intelligence scale as well as goal choice questionnaire (Dweck, 1999). Groups differed based on whether they were prompted to create a learning goal or a performance goal for the first exam of the semester. On the final exam, students were asked about their study habits leading up to the exam. After receiving their grade, participants were asked to indicate their satisfaction with their score and the opportunity to keep or change their goal uninhibited by any restraints limiting them to choose either a learning or performance goal. This procedure was repeated for the second exam. Results showed that participants who voluntarily set learning goals performed better on the second exam than students who set performance goals. The relationship between implicit beliefs and goal-setting strategies was statistically non-significant. Since no effect sizes were reported it is difficult to say whether the lack of statistical significance in this study is due to a lack of relationship between the variables or due to the small sample size of 35 students. Nevertheless, the study highlights how to practically incorporate implicit beliefs with common sport psychological interventions such as goal setting.

In a sample of 407 undergraduate students (M_{age} = 20.48 years) from a variety of majors including liberal arts (29.2%) and science (11.5%) motivational strategies, as well as implicit beliefs of intelligence, were assessed (Komarraju & Nadler, 2013). Results suggest that incremental beliefs were related to higher self-efficacy beliefs which in turn were related to higher levels of academic performance, as measured by students' GPA. Additionally, researchers in this article suggest that the reason students may perform better is that they are able to control their natural impulses better, which may be relevant when implicit beliefs are applied to experiencing anxiety in athletes. The main takeaway from this study

however is the simpler finding that implicit beliefs are indirectly related to more desirable academic outcomes (Komarraju & Nadler, 2013).

Since most studies described in this literature review were assessing implicit beliefs in a standard academic setting by using cognitive tests, concerns may arise about whether the cognitive dominance of these tasks would impact these findings. The necessity of more somatic variables has recently motivated researchers to use similar study designs to test the effect of implicit beliefs in physical education classes. Instead of having traditional exams that mainly focus on cognitive demands, physical education classes provide an opportunity to test students on their physical ability.

In a study of 512 French students with an average age of 15.82 (SD = 1.19), implicit beliefs about athletic ability and test anxiety were assessed (Danthony et al., 2020). Researchers used a translated version of the Conceptions of the Nature of Athletic Ability Questionnaire -2 (CNAAQ-2; Biddle et al., 2003) to assess implicit beliefs about students' athletic ability. The Revised Test Anxiety + Regulatory - Physical Education scale (RTAR-PE; Danthony et al., 2019) was used to measure participants' test anxiety specifically most accurately regarding physical education tests. This assessment includes the five subcategories of worry, self-focus, bodily symptoms, somatic tension, and perceived control. Results suggested that incremental beliefs were significantly related to lower worry (r = -.17) and somatic tension (r = -.13), as well as higher perceived control (r = .30). Additional analysis also highlighted that gender and incremental beliefs accounted for 26% of the variance in perceived control, supporting that those two variables are significant when interpreting perceived control about anxiety symptoms. Specifically, gender positively predicted perceived control, indicating that males seem to perceive more control than females. Therefore, highlighting further, the importance of assessing gender when describing relationships involving implicit beliefs. Additionally, the presented research provides support that implicit beliefs are relevant for both cognitive and somatic tasks.

Implicit beliefs and sport performance. Despite the abundance of scientific evidence supporting the importance and usefulness of implicit beliefs in non-sport performance settings, it is not self-evident that similar relationships would exist in the field of sport. To bridge the gap between physical

education and sport, a meta-analysis assessed the implicit theory research for both of these domains

(Vella et al., 2016). 39 articles were included for the final analysis, including participants from over 11

countries with the majority of participants ranging from 11-23 years old. All measures about implicit

beliefs were self-reported with the majority of studies using scales to assess beliefs about athletic ability

with the CNAAQ-2 (Biddle et al., 2003). The review highlighted that only a small number of studies have

chosen an experimental design, with the majority being cross-sectional. This suggests that the following

evidence may still be not fully developed, and more studies may be required. Generally, results supported

the findings that were present in non-sport performance settings such as academic performance.

Relationships between implicit beliefs and motivational climate and goal setting were solidified through

this meta-analysis. Since these relationships were found to be present in performance areas outside of

sport there seems to be a significant overlap in the relationships between implicit beliefs and self-

regulation (Burnette et al., 2013; Vella et al., 2016). Therefore, we can assume that the underlying

theoretical framework of implicit beliefs may also apply to a sport setting. Future researchers were

encouraged to assess a wider variety of outcome variables that go beyond motivational climate or goal

setting (Vella et al., 2016).

Since the publication of this meta-analysis, additional studies have been published following this

suggestion. An important variable for athletes, especially at a young age, may be the enjoyment of their

sport. In a longitudinal study of 247 (54 male, 193 female) private high school students in Australia, the

CNAAQ-2 (Biddle et al., 2003) was administered. Additionally, participants were asked to respond to a

variety of other questionnaires including the enjoyment scale from the Sport Commitment Model

(Scanlan et al., 1993). Results suggest that incremental beliefs are significantly correlated with more

enjoyment at the onset of the study ($r = .14$) as well as the enjoyment after one year (r = .13). One of the

explanations by the author on why some relationships between implicit beliefs were lower in this study,

suggests that implicit beliefs are more predictive during times of adversity, and it is likely these

participants were not experiencing adversity. Since athletic participation may originally be voluntary but

may not be perceived as such once the elite level status is reached, the question is whether similar findings can be replicated among more elite athletes.

One study, assessing implicit beliefs in elite athletes, who were attempting to qualify for the British Olympic track and field team, may provide further insights (Jowett & Spray, 2013). The four (two male, two female) participants ranged in age from 21 to 28 and had to compete in at least one major international senior event to be classified as elite athletes. Each participant was interviewed based on a guide that was inspired by both previous research in the field (e.g., Dweck & Legget, 1988) as well as the CNAAQ (Sarrazin et al., 1996). Participants indicated that they held different beliefs about different aspects of their athletic performance. Strong incremental beliefs were held regarding the idea of physical strength. Considering that elite athletes spend most of their time practicing to improve their physical skills like muscle strength, this finding is not surprising. On the other hand, participants generally perceived concepts like competitive instinct to be more fixed, indicating entity beliefs. Therefore, this finding may suggest that athletes are more likely to hold incremental beliefs about physical aspects of their performance and more entity beliefs about cognitive components. This assumption can have great implications for applying implicit beliefs to a concept such as anxiety. In particular, since anxiety is often differentiated as cognitive and somatic anxiety. Furthermore, athletes highlighted that during times of setbacks, such as an injury, and times of transition, such as moving from junior to senior level, implicit beliefs played an important role in their persistence. Based on this analysis implicit beliefs may be of particular interest for individuals who have undergone a recent transition such as 1st-year athletes who are transitioning from high school to collegiate athletes.

The interaction between implicit beliefs and mental skills has been researched in a number of different populations including collegiate athletes. In a sample of predominantly collegiate track and field athletes, perceived competence of mental skills, as well as the actual use of mental skills, were assessed (Shaffer et al., 2015). Participants consisted of 68 student-athletes from a Division 1 university. The sample was made up of males (n = 28) and females (n = 40) with an average age of 20.4 years, who mostly competed in track and field (n = 40) or cross country (n = 13). A 5-point Likert scale was used to

assess their perceived importance of mental skills in achieving peak performance. Additionally, participants' implicit beliefs about mental skills ability were measured using the Theories of Mental Skills Scale (TMS; Hong et al., 1999). Perceived competence in mental skills was measured by presenting participants one mastery statement as well as one social comparison statement about mental skills. Participants then used a 6-point Likert scale to indicate their perceived competence for each of the two items. Experiential manipulation was achieved by presenting participants with either a small passage about incremental or entity beliefs. Since this study included mostly athletes with incremental beliefs statistical analyses were only conducted on athletes with incremental beliefs, and therefore it is unclear whether the following results would also be present in athletes with entity beliefs. Results supported previous findings of incremental beliefs being associated with desirable outcomes such as increased motivation. The experimental design of this study also showed that it is possible to successfully manipulate participants' implicit theories since incremental beliefs in athletes were significantly weakened by being presented with an entity statement.

In contrast to the case study of elite athletes (Jowett & Spray, 2013), this sample predominantly held incremental beliefs about mental skills (Shaffer et al., 2015). A potential explanation of this result may be attributed to the questionnaire used when assessing implicit beliefs. Since both entity statements and incremental statements were used (Shaffer et al., 2015), participants may have answered in a way that portrays them in a more favorable light, in particular since statements tend to describe the extremes of both belief systems. For this reason, it has been recommended to use assessment scales that only include entity belief statements (Schroder et al., 2015).

Despite the evidence of desirable outcomes associated with incremental beliefs, not all athletes are willing and able to develop an incremental belief system. In a sample of female soccer players, some of the challenges of implementing an incremental belief system became evident (Zanin et al., 2020). The homogenous sample consisted of 28 female Caucasian soccer players from a suburban soccer club. With ages between 14 to 15 years, participants were either transitioning or about to transition to high school, which as described before may be a critical time for implicit beliefs in regard to influencing behavior. In

particular, researchers assessed the peer perception of exerting high effort, through two semi-structured interviews and bi-weekly video journals over a 10-week span. To assess athletes' implicit beliefs, researchers used the Implicit Person Theory Scale (Dweck et al., 1995), which allowed them to better understand how participants interpreted negative identity ascriptions. Results suggest that characteristics of a "try hard" were perceived negatively by all participants indifferent of their implicit beliefs. Athletes with incremental beliefs, however, were able to either ignore, reject, or even embrace these ascriptions, while those with entity beliefs concealed their excellence or even avoided excellence. This seems to suggest that implementing an entity belief system may lead to an initial increase in social acceptance which may be particularly important for individuals in that age group. Nevertheless, if individuals are able to implement strategies to successfully deal with negative associations, then desirable long-term effects of incremental beliefs will dominate. This sample also consisted mainly of participants holding predominantly incremental beliefs, however, the Implicit Person Theory Scale includes both incremental and entity statements. As previously mentioned, self-assessments that include statements from both ends of the implicit belief spectrum may be suggestive, since participants may find incremental statements highly compelling and therefore adjust their responses towards this belief system.

Further protective functions of incremental beliefs were highlighted in a study of 327 high school students (Mage = 13.03) from Australia who regularly participated in organized extracurricular sports (Gardner et al., 2018). Participants responded to a variety of questionnaires indicating their implicit beliefs (CNAAQ-2; Biddle et al., 2003), enjoyment, which was measured by the Sport Commitment Model (Scanlan et al., 1993) as well as their achievement goals using the Achievement Goals Questionnaire for Sport (Conroy et al., 2003). Data was collected at the onset of the study as well after 12 months on all of these scales. Results showed that not only did student's incremental beliefs correlate with their enjoyment of their sport ($r = .14$, $p < .05$) but also that incremental beliefs had an indirect effect on enjoyment after 12 months through mastery approach goals ($B = .04$, $p <. 05$; Gardner et al., 2018). Interestingly however was the finding that when accounting for a change in the relationship between coach and the athlete the indirect effect of incremental beliefs on enjoyment was only present when the

relationship deteriorated. This suggests that incremental beliefs can function as a protective factor of enjoyment when facing challenges such as a deterioration in the relationship with the coach.

In summary, there is evidence that indicates desirable outcomes related to incremental belief systems in a sport setting. Researchers may disagree on whether athletes may be prone to more incremental beliefs, as well as whether this dominance translates to only the physical aspect of performance or the cognitive as well. Additionally, experimental studies provided evidence for the ability to manipulate implicit beliefs in the short term. Long-term adoption of incremental beliefs may hold the most value to athletes but does come with some initial challenges such as overcoming negative identity ascriptions.

Gender differences in implicit beliefs. As mentioned earlier, it is important to assess intergroup differences to allow for accurate interventions. Gender is one of the more frequently reported identities of a participant in psychological research, it seems reasonable to analyze whether differences in implicit beliefs exist based on gender. Unfortunately, limited research has assessed differences in implicit beliefs based on participants' gender. One of the main reasons may be that there seems no real theoretical explanation on why there should be a difference between males and females. Since implicit beliefs can be learned and taught (Dweck, 2008), gender may have no impact on these beliefs.

In a study with a sample of 917 participants in Norway between the age of 14 and 77 years the influence of gender on implicit beliefs was further tested (Sigmundsson et al., 2021). Participants were recruited from high schools, sports clubs, and public buildings and reported a wide range of socio-economic status. A Norwegian version of the TIS (Dweck, 1999) was used to assess participants' implicit beliefs about the malleability of intelligence. Results revealed that females tended to score slightly higher, indicating more incremental beliefs, however, the difference was non-significant. The lack of statistical significance despite a large sample (n = 917), suggests that there truly may not be an impact of gender on the beliefs held. Since this study focused on beliefs about intelligence, there is a need to analyze potential differences in a sport setting.

Based on the previously mentioned meta-analysis about implicit beliefs in a sport setting, gender had a moderating effect on incremental beliefs and adaptive outcomes (Vella et al., 2016). Female-only samples ($r_$ = .42) showed a stronger positive relationship between implicit beliefs and adaptive outcome than did male-only ($r_$ = .29) or combined samples ($r_$ = .34) based on uncorrected effect sizes. This finding, however, does not necessarily provide evidence for the idea that females are more likely to hold incremental beliefs. Rather this finding can be seen as support for the idea that the effects of holding an incremental belief may be larger for females than for males. Additionally, this meta-analysis consisted largely of mixed-gender studies ($n = 16$), whereas male-only ($n = 1$) and female-only ($n = 1$) samples were rare.

Implicit beliefs and anxiety in sport

As mentioned in the introduction, one of the goals of the field of sport psychology according to AASP is to increase the well-being of athletes (2021). Implicit beliefs may play an important role when attempting to improve athletes' well-being (Smith et al., 2018). In a large sample of 1,645 middle school students in the United States, implicit beliefs about emotions were assessed using a questionnaire that was adapted from the TOE (Tamir et al., 2007). Emotional well-being during students' time was assessed by one statement addressing positive emotions (i.e., "I tend to feel a lot of positive emotions at school") as well as one statement capturing negative emotions (i.e., "tend to feel a lot of negative emotions at school"). The sample was split into an intervention group and a control group. The intervention included educating students about emotions as well as emotion regulation strategies to install more incremental theories of emotions. Results suggest that the intervention did increase students' incremental beliefs about emotions which in turn did increase students' well-being in school ($\beta = 0.035$, $p < .001$).

This result suggests that both implicit beliefs and competitive anxiety can have a significant impact on the well-being of athletes as well as on their performance. Despite their importance, very few researchers have looked at both concepts together to better understand athletes' experiences. To date, there is only one published study that assessed implicit beliefs and the relationship with anxiety in a sport

environment (Gardner et al., 2015). Implicit beliefs about their athletic ability were assessed in 72 soccer players using the CNAAQ-2 (Biddle et al., 2003). Additionally, participants' competitive trait anxiety was assessed using the SCAT (Martens et al., 1990). Results showed that higher entity beliefs were associated with higher trait anxiety ($r = .31$, $p < .05$), and higher incremental beliefs with lower trait anxiety ($r = -.40$, $p < .01$). Further analysis indicated relationships between perceived control of positive and negative events and implicit beliefs. This may be an indicator of a causal explanation of the relationship between implicit beliefs and anxiety. The reported findings suggest that if an athlete believes their abilities to be fixed, a competition that tests these abilities may be perceived as more threatening and therefore increase anxiety. For athletes with entity beliefs, competitive situations constantly provide a threat to expose that their abilities are insufficient. Due to the belief that their abilities are inherently fixed, there is nothing they could do about it. On the other hand, athletes with incremental beliefs may perceive competitive situations as less threatening due to the learning opportunity they provide. Since learning in itself is not threatening they may respond with lower levels of anxiety. This theoretical explanation has not yet been supported by experimental research designs. Since the present study also only assessed the intensity of anxiety symptoms and not their direction as either facilitative or debilitative, explanations regarding the perception of competitive situations are solely based on anxiety intensity.

In addition to the strong evidence of the reported relationship that has been presented so far, implicit beliefs may potentially have an even stronger impact on anxiety in an athletic setting. Recent research suggests that individuals may have different implicit beliefs about different characteristics (Hughes et al., 2015). Unexpectedly, there was skewness in implicit beliefs about intelligence towards more incremental beliefs, which was not supported by previous research (Hughes et al., 2015). A potential explanation of these results is based on the unique attributes of the sample. The sample consisted of college students, who were asked about their beliefs about intelligence. It seems plausible that holding entity beliefs, while at the same time attending a higher-education institution may create some dissonance. Therefore, it may be less likely to hold entity beliefs about intelligence, while at the same time attempting to improve their cognitive knowledge through coursework. This raises an interesting concern regarding

the study of Gardner and colleagues (2015). Similar to how perceiving intelligence as being fixed may be unattractive to college students (Hughes et al., 2015), seeing athletic ability as fixed may be an unattractive belief to athletes, who spend much of their time attempting to improve their athletic ability and skill through hours of practice.

This study further suggests that individuals may have different implicit beliefs about different characteristics (Hughes et al., 2015). One of the results of this study suggests that implicit beliefs about intelligence and morality may be unrelated to one another. This can be seen as evidence that individuals hold different implicit beliefs about different factors in their lives. In the case of this particular study, results indicated that implicit beliefs about intelligence may not indicate an individual's beliefs about morality (Hughes et al., 2015). Though little surprising that individuals may believe some factors are malleable (i.e., incremental beliefs), while others are relatively fixed (i.e., entity beliefs), this finding is a crucial cornerstone when analyzing sport-specific research about implicit beliefs. Applying this knowledge to the findings of the previously discussed research on implicit beliefs about athletic ability predicting experienced anxiety (Gardner et al., 2015), it is to question whether athletes held this implicit belief about their athletic ability only, or as well about anxiety itself. Findings from Hughes and colleagues may suggest that athletes' implicit beliefs about athletic ability and their implicit beliefs about emotions such as anxiety are unrelated (2015). Since it is established that mindsets may differ, the question arises of which mindsets are better at predicting certain outcome variables.

When looking at different domain-specific implicit beliefs and related symptoms, including social anxiety, depression, somatic anxiety, and problematic worry, Schroder and colleagues were able to provide results indicating an answer to the question of which mindsets are the most predictive (2016). Not only did results support the previous findings that implicit beliefs were distinguishable from another (Hughes et al., 2015), but also that there may be an underlying mindset that influences all domain-specific implicit beliefs (Schroder et al., 2016). More importantly, however, results indicated that the domain-specific implicit beliefs predicted the domain-specific symptoms the best. This means that implicit beliefs about anxiety better predicted somatic and social anxiety than did implicit beliefs about depression or

intelligence (Schroder et al., 2016). This may suggest that even though perceived anxiety symptoms may be predicted by implicit beliefs about athletic ability, implicit beliefs about anxiety itself may be a significantly better predictor. No study to date has assessed implicit beliefs about anxiety and the potential relationship of them with neither the intensity of competitive anxiety symptoms experienced nor the direction of competitive anxiety symptoms. Therefore, this proposed thesis will fill an important gap in sport psychological literature and guide practitioners in their work of consulting athletes who are experiencing high levels of debilitative anxiety symptoms in competitive situations.

Implicit beliefs about anxiety

As just discussed, there is convincing evidence that implicit beliefs about anxiety can be differentiated from other implicit beliefs as well as may be more predictive of anxiety than other implicit beliefs (e.g., Hughes et al., 2015; Schroder et al., 2016). Despite the lack of research in the domain of sport psychology, this concept has been assessed before in other areas. Since anxiety can be differentiated between clinical anxiety as well as subclinical anxiety, literature will be reviewed independently to clearly differentiate both concepts.

Clinical anxiety. In a review of 17 studies about implicit beliefs and the relationship with mental health problems in youth, the majority of those studies assessed psychopathology and a wide variety of implicit beliefs including intelligence as well as personality factors (Schleider et al., 2015). Despite strong evidence that implicit beliefs were related to mental health issues, there was some discrepancy as to which implicit beliefs may have the best predictive outcome. Therefore, the review suggests that certain implicit beliefs, such as ones about intelligence, peer relationships, and personality may be particularly beneficial to achieve the greatest mental health benefits in youth. Since these beliefs have been shown to be particularly malleable for youth this may be a good starting point for practitioners to focus their interventions on (Schleider et al., 2015). Applying this finding to sport, it may mean that implicit beliefs about mental health in sport can be the target of early interventions due to the high malleability. Additionally, some of the experimental studies reviewed in the meta-analysis were able to successfully

manipulate implicit beliefs, which lead to a better outcome in short-term mental health (Schleider et al., 2015). In a different study focusing on anxiety symptoms during psychotherapy, researchers were able to demonstrate that implicit beliefs were related to outcomes of therapy (Reffi et al., 2020). Incremental beliefs were related to fewer psychological symptoms reported at the conclusion of the study.

In a more recent meta-analysis, similar concepts were analyzed for relationships between implicit beliefs and psychopathology (Howell, 2017). On the most basic level, the reviewed literature further suggests that entity beliefs about emotions are related to more negative emotional experiences. Despite the evidence cited within the meta-analysis, that manipulation of implicit beliefs may lead to a decrease in experienced psychological dysfunction, more confirmatory research may be desirable before drawing conclusions. Additionally, potential downfalls of incremental beliefs need to be assessed and clarified. In order to get a better understanding of the role of implicit beliefs about anxiety, one study cited in the review will be discussed in more detail (Howell, 2017). After establishing implicit beliefs about intelligence, emotion, and anxiety, researchers measured additional outcome variables including anxiety (Schroder et al., 2015). Results confirmed the domain-specificity of implicit beliefs by demonstrating that implicit beliefs about anxiety correlated more strongly with reported anxiety symptoms than the measurements about intelligence or emotion. In the second part, researchers offered participants a treatment choice between either individual therapy, medication, or a combination of the two. Individuals with entity beliefs were more likely to choose the medication-only treatment option, compared to those holding incremental beliefs, who rather chose the individual therapy (Schroder et al., 2015). These findings seem to be congruent with what could theoretically be expected. Since entity theorists believe in the rigidness of psychopathology, choosing the medical treatment option may further enhance the belief that changes are outside of their control. On the other hand, incremental theorists sought out a treatment option that was congruent with their belief system that this trait may be malleable through increased effort, new strategies, and the help of others. Additionally, this can be seen as support for the argument that athletes with more incremental belief systems about mental health, may be more likely to seek out treatment from SPP practitioners. Therefore, individuals with entity beliefs are potentially an at-risk

population since they are more likely to suffer from negative consequences when traumatic experiences arise but are also less likely to seek professional help.

    Non-Clinical Anxiety. That these findings may also hold implications for athletes that are presently not experiencing any mental health concerns, as shown in the following study. After assessing implicit theories of anxiety through the theories of anxiety scale (TOA; Schroder et al., 2015), 293 first-year college students were asked to complete weekly mental health measures including a test assessing their adjustment to college (Schroder et al., 2019). The sample consisted of primary females (80.6%) and a marginal group of males (18.5%) with an average age of 18.07 years (SD = .33). Results revealed that incremental beliefs about anxiety related to a better adjustment to college as indicated by lower reported distress. Baseline implicit beliefs were still significantly correlated with distress levels that were reported five weeks later. This suggests that having incremental beliefs about mental health may be related to better mental health in the future. In this sense, it seems to suggest that implicit beliefs may function as a natural resilience builder to future stressors and therefore both athletes with and without any present mental health concerns may benefit. This has been supported by findings from a study where implicit beliefs have been shown to function as a buffer for psychological distress following traumatic experiences (Schroder et al., 2017).

    The research findings are congruent in suggesting that incremental beliefs are connected to more desirable mental health outcomes. As mentioned earlier, these benefits are even measurable in subclinical populations. One of the most often demonstrated findings is that implicit beliefs are malleable in the short term with relatively low resources required to do so. It has been demonstrated that after 16 cognitive-behavioral therapy (CBT) sessions, participants saw a significant decrease in entity beliefs about anxiety (De Castella et al., 2015). In a follow-up with this sample, researchers were able to demonstrate that implicit beliefs continued to predict anxiety symptoms, further underlining the long-term effect of malleability (De Castella et al., 2015; Reffi et al., 2020). Based on some of these findings some researchers have argued that implicit beliefs may provide the basis for cost-effective interventions, which are strongly desired by clients and practitioners (Stickel, 2019).

Implicit beliefs about anxiety in sport

Most of the current scientific evidence for anxiety interventions focuses on state rather than trait anxiety (Maynard et al., 1995; Terry et al., 1995). Since there is evidence that trait anxiety is malleable (Jorm, 1989), practitioners may be wondering how to achieve such a facilitative change for their clients. In particular, there is a need for finding ways to provide quicker and cheaper trait anxiety interventions (Baxter et al., 2014). A better understanding of how implicit beliefs influence the perception and intensity of competitive trait anxiety may provide further insight into how to develop such cost-effective intervention plans for athletes and other performers. In particular, research suggests that changes in trait anxiety through therapeutic interventions, such as rational-emotive or related therapies, are long-lasting (Jorm, 1989). Additionally, a better understanding of the effects of implicit beliefs may explain why some athletes seek out professional help while others do not. If an athlete perceives their anxiety to be generally fixed, then there may be little motivation to learn skills and techniques to manage these symptoms (Howell, 2017). Overall, there seems to be an overwhelming amount of evidence suggesting the need for research regarding competitive trait anxiety, as well as the positive outlook that this study may bring for clients and practitioners.

Conclusion

Different levels of anxiety are a concern for the well-being and performance of student-athletes. Additionally, research suggests that besides the intensity of anxiety, the interpretation of anxiety as either facilitative or debilitative may be a crucial factor in determining whether an increase in arousal is negatively affecting well-being and performance. There is a need for efficient and cost-effective interventions to improve well-being and allow for optimal performance.

Implicit beliefs have been shown to have a significant impact on an individual's goals, motivation, and effort. Clinical research has also highlighted the benefits of incremental beliefs in help-seeking behavior as well as desirable intervention outcomes. Even though individuals have predominantly

either incremental or entity beliefs, implicit beliefs are suggested to be malleable both in the short-term and long-term. This would allow a wide range of individuals benefiting from incremental beliefs.

Applying both concepts to athletes has barely been explored yet. Even though implicit beliefs about athletic ability are related to perceived anxiety in a single study, beliefs about the malleability of competitive anxiety have not been analyzed. Currently, it is unknown to what degree, if at all, implicit beliefs about anxiety are related to competitive anxiety in student-athletes. Since such a relationship may hold valuable information on how to improve athletes' well-being and performance, there is a strong need to establish this relationship. Therefore, the purpose of this research project is to explain the relationship between implicit beliefs about anxiety and the intensity as well as the direction of competitive anxiety in student-athletes.

References

Albrecht, R. R., & Feltz, D.L. (1987). Generality and specificity of attention related to
competitive anxiety and sport performance. *Journal of Sport Psychology*, *9*, 231–246.

Anagnostopoulos, V., Carter, M. M., & Weissbrod, C. (2015). Pre-competition anxiety and self-
confidence in collegiate track and field athletes: A comparison between African
American and Non-Hispanic Caucasian men and women. *The Sport Journal*. Retrieved
from: https://thesportjournal.org/article/pre-competition-anxiety-and-self-confidence-in-
collegiate-track-and-field-athletes-a-comparison-between-african-american-and-non-
hispanic-caucasian-men-and-women/

Apter, M. J. (1982). *The experience of motivation: The theory of psychological reversals*.
Academic Press.

Baldock, L., Hanton, S., Mellalieu, S. D., & Williams, J. M. (2021). Understanding and
managing stress in sport. In J. M. Williams & V. Krane, *Applied sport psychology:
Personal growth to peak performance.* (pp. 210-243)

Baxter, A. J., Vos, T., Scott, K. M., Ferrari, A. J., & Whiteford, H. A. (2014). The global burden
of anxiety disorders in 2010. *Psychological Medicine*, *44*(11), 2363–2374.
https://doi.org/10.1017/S0033291713003243

Beiter, R., Nash, R., McCrady, M., Rhoades, D., Linscomb, M., Clarahan, M., & Sammut, S.
(2015). The prevalence and correlates of depression, anxiety, and stress in a sample of
college students. *Journal of Affective Disorders*, *173*, 90–96.
https://doi.org/10.1016/j.jad.2014.10.054

Bem, S. L. (1974). The measurement of psychological androgyny. *Journal of Consulting and
Clinical Psychology*, *42*(2), 155–162. https://doi.org/10.1037/h0036215

Biddle, S. J., Wang, C. J., Chatzisarantis, N. L., & Spray, C. M. (2003). Motivation for physical activity in young people: Entity and incremental beliefs about athletic ability. *Journal of Sports Sciences*, *21*(12), 973–989. https://doi.org/10.1080/02640410310001641377

Brown, B. J., Aller, T. B., Lyons, L. K., Jensen, J. F., & Hodgson, J. L. (2021). NCAA student-athlete mental health and wellness: A biopsychosocial examination. *Journal of Student Affairs Research and Practice*, *59*(3), 252–267. https://doi.org/10.1080/19496591.2021.1902820

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin*, *139*(3), 655–701. https://doi.org/10.1037/a0029531

Cohen, J. (1969). *Personality Dynamics*. Rand McNally.

Congard, A., Le Vigouroux, S., Antoine, P., Andreotti, E., & Perret, P. (2022). Psychometric properties of a French version of the Implicit Theories of Emotion Scale. *European Review of Applied Psychology*, *72*(1), 1-8. https://doi.org/10.1016/j.erap.2021.100728

Conroy, D. E., Elliot, A. J., & Hofer, S. M. (2003). A 2 × 2 achievement goals questionnaire for sport: Evidence for factorial invariance, temporal stability, and external validity. *Journal of Sport and Exercise Psychology*, *25*(4), 456–476. https://doi.org/10.1123/jsep.25.4.456

Correia, M. E., & Rosado, A. (2019). Anxiety in athletes: Gender and type of sport differences. *International Journal of Psychological Research*, *12*(1), 9–17. https://doi.org/10.21500/20112084.3552

Danthony, S., Mascret, N., & Cury, F. (2019). Development and validation of a scale assessing test anxiety in physical education. *Journal of Teaching in Physical Education*, *38*(4), 357–366. https://doi.org/10.1123/jtpe.2018-0282

Danthony, S., Mascret, N., & Cury, F. (2020). Test anxiety in physical education: The predictive role of gender, age, and implicit theories of athletic ability. *European Physical Education Review*, *26*(1), 128–143. https://doi.org/10.1177/1356336X19839408

De Castella, K. (2017). *Implicit theories and emotion regulation: Beliefs about emotions and their role in psychological health and well-being*. [Unpublished doctoral dissertation, Australian National University]

De Castella, K., & Byrne, D. (2015). My intelligence may be more malleable than yours: The revised implicit theories of intelligence (self-theory) scale is a better predictor of achievement, motivation, and student disengagement. *European Journal of Psychology of Education*, *30*(3), 245–267. https://doi.org/10.1007/s10212-015-0244-y

De Castella, K., Goldin, P., Jazaieri, H., Heimberg, R. G., Dweck, C. S., & Gross, J. J. (2015). Emotion beliefs and cognitive behavioural therapy for social anxiety disorder. *Cognitive Behaviour Therapy*, *44*(2), 128–141. https://doi.org/10.1080/16506073.2014.974665

De Castella, K., Goldin, P., Jazaieri, H., Ziv, M., Heimberg, R. G., & Gross, J. J. (2014). Emotion beliefs in social anxiety disorder: Associations with stress, anxiety, and well-being. *Australian Journal of Psychology*, *66*(2), 139–148. https://doi.org/10.1111/ajpy.12053

Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development*. Psychology Press.

Dweck, C. S. (2008). *Mindset: The new psychology of success* (Ballantine Books trade pbk. ed). Ballantine Books.

Dweck, C. S., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgments and

    reactions: A word from two perspectives. *Psychological Inquiry*, *6*(4), 267–285.

    https://doi.org/10.1207/s15327965pli0604_1

Dweck, C. S., & Leggett, E. L. (1988). A social cognitive approach to motivation and

    personality. *Psychological Review*, *95*(2), 256–273. https://doi.org/10.1037/0033-

    295X.95.2.256

Edwards, T., & Hardy, L. (1996). The interactive effects of intensity and direction of cognitive

    and somatic anxiety and self-confidence upon performance. *Journal of Sport and*

    Exercise Psychology, *18*(3), 296–312. https://doi.org/10.1123/jsep.18.3.296

Endler, N. S., & Kocovski, N. L. (2001). State and trait anxiety revisited. *Journal of Anxiety*

    Disorders, *15*(3), 231–245. https://doi.org/10.1016/S0887-6185(01)00060-3

Fazey, J., & Hardy, L. (1988). *The inverted-U hypothesis: A catastrophe for sport psychology?*

    British Ass. of Sports Sciences.

Gardner, L. A., Vella, S. A., & Magee, C. A. (2015). The relationship between implicit beliefs,

    anxiety, and attributional style in high-level soccer players. *Journal of Applied Sport*

    Psychology, *27*(4), 398–411. https://doi.org/10.1080/10413200.2015.1019681

Gardner, L. A., Vella, S. A., & Magee, C. A. (2018). The role of implicit beliefs and

    achievement goals as protective factors in youth sport. *Journal of Applied Sport*

    Psychology, *30*(1), 83–95. https://doi.org/10.1080/10413200.2017.1334160

Gill, D., & Kamphoff, C. (2021). Gender, diversity, and cultural competence. In J. M. Williams

    & V. Krane, *Applied sport psychology: Personal growth to peak performance*.

    https://search.ebscohost.com/login.aspx?direct=true&scope=site&db=nlebk&db=nlabk&

    AN=2947703

Hanin, Y. L. (2000). Individual Zones of Optimal Functioning (IZOF) Model: Emotion-performance relationship in sport. In Y. L. Hanin (Ed.), *Emotions in sport* (pp. 65–89). Human Kinetics.

Hanton, S., & Jones, G. (1999). The effects of a multimodal intervention program on performers: Training the butterflies to fly in formation. *The Sport Psychologist*, *13*(1), 22–41. https://doi.org/10.1123/tsp.13.1.22

Hanton, S., Mellalieu, S. D., & Hall, R. (2002). Re-examining the competitive anxiety trait-state relationship. *Personality and Individual Differences*, *33*(7), 1125–1136. https://doi.org/10.1016/S0191-8869(02)00003-X

Hanton, S., O'Brien, M., & Mellalieu, S. D. (2003). Individual differences, perceived control and competitive trait anxiety. *Journal of Sport Behavior*, *26*(1), 39–55.

Hardy, L., & Parfitt, G. (1991). A catastrophe model of anxiety and performance. *British Journal of Psychology*, *82*(2), 163–178. https://doi.org/10.1111/j.2044-8295.1991.tb02391.x

Hong, Y., Chiu, C., Dweck, C. S., Lin, D. M.-S., & Wan, W. (1999). Implicit theories, attributions, and coping: A meaning system approach. *Journal of Personality and Social Psychology*, *77*(3), 588–599. https://doi.org/10.1037/0022-3514.77.3.588

Howell, A. J. (2017). Believing in change: Reviewing the role of implicit theories in psychological dysfunction. *Journal of Social and Clinical Psychology*, *36*(6), 437–460. https://doi.org/10.1521/jscp.2017.36.6.437

Hughes, J. S. (2015). Support for the domain specificity of implicit beliefs about persons, intelligence, and morality. *Personality and Individual Differences*, *86*, 195–203. https://doi.org/10.1016/j.paid.2015.05.042

Jones, G. (1995). More than just a game: Research developments and issues in competitive

    anxiety in sport. *British Journal of Psychology*, *86*(4), 449–478.

    https://doi.org/10.1111/j.2044-8295.1995.tb02565.x

Jones, G., & Hanton, S. (1996). Interpretation of competitive anxiety symptoms and goal

    attainment expectancies. *Journal of Sport and Exercise Psychology*, *18*(2), 144–157.

    https://doi.org/10.1123/jsep.18.2.144

Jones, G., Hanton, S., & Swain, A. (1994). Intensity and interpretation of anxiety symptoms in

    elite and non-elite sports performers. *Personality and Individual Differences*, *17*(5), 657–

    663. https://doi.org/10.1016/0191-8869(94)90138-4

Jones, G., & Swain, A. (1992). Intensity and direction as dimensions of competitive state anxiety

    and relationships with competitiveness. *Perceptual and Motor Skills*, *74*(2), 467–472.

    https://doi.org/10.2466/pms.1992.74.2.467

Jones, G., Swain, A., & Hardy, L. (1993). Intensity and direction dimensions of competitive state

    anxiety and relationships with performance. *Journal of Sports Sciences*, *11*(6), 525–532.

    https://doi.org/10.1080/02640419308730023

Jorm, A. F. (1989). Modifiability of trait anxiety and neuroticism: A meta-analysis of the

    literature. *Australian & New Zealand Journal of Psychiatry*, *23*(1), 21–29.

    https://doi.org/10.3109/00048678909062588

Jowett, N., & Spray, C. M. (2013). British Olympic hopefuls: The antecedents and consequences

    of implicit ability beliefs in elite track and field athletes. *Psychology of Sport and*

    Exercise, *14*(2), 145–153. https://doi.org/10.1016/j.psychsport.2012.09.003

Kerr, J. H. (1987). Cognitive intervention with elite performers: Reversal theory. *British Journal*

    of Sports Medicine, *21*(2), 29–33. https://doi.org/10.1136/bjsm.21.2.29

Komarraju, M., & Nadler, D. (2013). Self-efficacy and academic achievement: Why do implicit beliefs, goals, and effort regulation matter? *Learning and Individual Differences*, *25*, 67–72. https://doi.org/10.1016/j.lindif.2013.01.005

Lewis, A. (1970). The ambiguous word "anxiety." *International Journal of Psychiatry*, *9*, 62–79.

Lewthwaite, R., & Scanlan, T. K. (1989). Predictors of competitive trait anxiety in male youth sport participants. *Medicine & Science in Sports & Exercise*, *21*(2), 221–229. https://doi.org/10.1249/00005768-198904000-00016

Martens, R., Burton, D., & Vealey, R. S. (1990). *Competitive anxiety in sport*. Human Kinetics Books.

Martens, R., & Simon, J. A. (1976). *Competitive trait anxiety as a predictor of precompetitive state anxiety.* [Unpublished manuscript, Univeristy of Illinois]

Maynard, I. W., Smith, M. J., & Warwick-Evans, L. (1995). The effects of a cognitive intervention strategy on competitive state anxiety and performance in semiprofessional soccer players. *Journal of Sport and Exercise Psychology*, *17*(4), 428–446. https://doi.org/10.1123/jsep.17.4.428

Ntoumanis, N., & Jones, G. (1998). Interpretation of competitive trait anxiety symptoms as a function of locus of control beliefs. *International Journal of Sport Psychology*, *29*, 99–114.

Phillips, S. P. (2005). Defining and measuring gender: A social determinant of health whose time has come. *International Journal for Equity in Health*, *4*(1), 11. https://doi.org/10.1186/1475-9276-4-11

Provencio, C. (2016). Student-athlete: A study of student-athlete workload compared with traditional student workload. [Master's thesis, South Dakota State University]

Ram, N., Starek, J., & Johnson, J. (2004). Race, ethnicity, and sexual orientation: Still a void in sport and exercise psychology? *Journal of Sport and Exercise Psychology*, *26*(2), 250–268. https://doi.org/10.1123/jsep.26.2.250

Reffi, A. N., Darnell, B. C., Himmerich, S. J., & White, K. J. (2020). Implicit beliefs of emotion and anxiety in psychotherapy. *Motivation and Emotion*, *44*(3), 453–463. https://doi.org/10.1007/s11031-019-09794-6

Rice, S. M., Gwyther, K., Santesteban-Echarri, O., Baron, D., Gorczynski, P., Gouttebarge, V., Reardon, C. L., Hitchcock, M. E., Hainline, B., & Purcell, R. (2019). Determinants of anxiety in elite athletes: A systematic review and meta-analysis. *British Journal of Sports Medicine*, *53*(11), 722–730. https://doi.org/10.1136/bjsports-2019-100620

Sarrazin, P., Biddle, S., Famose, J. P., Cury, F., Fox, K., & Durand, M. (1996). Goal orientations and conceptions of the nature of sport ability in children: A social cognitive approach. *British Journal of Social Psychology*, *35*(3), 399–414. https://doi.org/10.1111/j.2044-8309.1996.tb01104.x

Scanlan, T. K., Carpenter, P. J., Simons, J. P., Schmidt, G. W., & Keeler, B. (1993). An introduction to the sport commitment model. *Journal of Sport and Exercise Psychology*, *15*(1), 1–15. https://doi.org/10.1123/jsep.15.1.1

Schleider, J. L., Abel, M. R., & Weisz, J. R. (2015). Implicit theories and youth mental health problems: A random-effects meta-analysis. *Clinical Psychology Review*, *35*, 1–9. https://doi.org/10.1016/j.cpr.2014.11.001

Schroder, H. S., Callahan, C. P., Gornik, A. E., & Moser, J. S. (2019). The fixed mindset of anxiety predicts future distress: A longitudinal study. *Behavior Therapy*, *50*(4), 710–717. https://doi.org/10.1016/j.beth.2018.11.001

Schroder, H. S., Dawood, S., Yalch, M. M., Donnellan, M. B., & Moser, J. S. (2015). The role of implicit theories in mental health symptoms, emotion regulation, and hypothetical treatment choices in college students. *Cognitive Therapy and Research*, *39*(2), 120–139. https://doi.org/10.1007/s10608-014-9652-6

Schroder, H. S., Dawood, S., Yalch, M. M., Donnellan, M. B., & Moser, J. S. (2016). Evaluating the domain specificity of mental health–related mind-sets. *Social Psychological and Personality Science*, *7*(6), 508–520. https://doi.org/10.1177/1948550616644657

Schroder, H. S., Yalch, M. M., Dawood, S., Callahan, C. P., Brent Donnellan, M., & Moser, J. S. (2017). Growth mindset of anxiety buffers the link between stressful life events and psychological distress and coping strategies. *Personality and Individual Differences*, *110*, 23–26. https://doi.org/10.1016/j.paid.2017.01.016

Shaffer, C. T., Tenenbaum, G., & Eklund, R. C. (2015). Implicit theories of mental skills abilities in collegiate athletes. *Journal of Applied Sport Psychology*, *27*(4), 464–476. https://doi.org/10.1080/10413200.2015.1044136

Sigmundsson, H., Guðnason, S., & Jóhannsdóttir, S. (2021). Passion, grit and mindset: Exploring gender differences. *New Ideas in Psychology*, *63*, 100878. https://doi.org/10.1016/j.newideapsych.2021.100878

Smith, E. N., Romero, C., Donovan, B., Herter, R., Paunesku, D., Cohen, G. L., Dweck, C. S., & Gross, J. J. (2018). Emotion theories and adolescent well-being: Results of an online intervention. *Emotion*, *18*(6), 781–788. https://doi.org/10.1037/emo0000379

Smith, R. E., Smoll, F. L., Cumming, S. P., & Grossbard, J. R. (2006). Measurement of multidimensional sport performance anxiety in children and adults: The sport anxiety

scale-2. *Journal of Sport and Exercise Psychology*, *28*(4), 479–501.

https://doi.org/10.1123/jsep.28.4.479

Smith, R. E., Smoll, F. L., & Schutz, R. W. (1990). Measurement and correlates of sport-specific

cognitive and somatic trait anxiety: The sport anxiety scale. *Anxiety Research*, *2*(4), 263–

280. https://doi.org/10.1080/08917779008248733

Smith, T. (1983). Competition trait anxiety in youth sport: Differences according to age, sex,

race and playing status. *Perceptual and Motor Skills*, *57*(3_suppl), 1235–1238.

https://doi.org/10.2466/pms.1983.57.3f.1235

Sorensen, C. E. (2016). *The Relationship of Growth Mindset and Goal-setting in a First-year

College Course*. [Master thesis, South Dakota State University]. Retrieved from

https://openprairie.sdstate.edu/etd/687/

Souza, R. A., Beltran, O. A. B., Zapata, D. M., Silva, E., Freitas, W. Z., Junior, R. V., da Silva,

F. F., & Higino, W. P. (2019). Heart rate variability, salivary cortisol and competitive

state anxiety responses during pre-competition and pre-training moments. *Biology of

Sport*, *36*(1), 39–46. https://doi.org/10.5114/biolsport.2018.78905

Spence, J. T., & Spence, K. W. (1966). The motivational components of manifest anxiety: Drive

and drive stimuli. In *Anxiety and Behavior* (pp. 291–326). Elsevier.

https://doi.org/10.1016/B978-1-4832-3131-0.50017-2

Spielberger, C. D. (1972a). Anxiety as an emotional state. In *Anxiety* (pp. 23–49). Elsevier.

https://doi.org/10.1016/B978-0-12-657401-2.50009-5

Spielberger, C. D. (1972b). Conceptual and methodological issues in anxiety research. In *Anxiety*

(pp. 481–493). Elsevier. https://doi.org/10.1016/B978-0-12-657402-9.50013-2

Spielberger, C. D. (1973). *STAIC preliminary manual for the state-trait anxiety inventory for children ("how i feel questionnaire")*. Consulting Psychologists Press.

Spielberger, C. D. (1979). *Understanding stress and anxiety*. Harper & Row.

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the state-trait anxiety inventory.* Consulting Psychologists Press.

Spitzer, R. L., Kroenke, K., Williams, J. B. W., & Löwe, B. (2006). A brief measure for assessing generalized anxiety disorder: The GAD-7. *Archives of Internal Medicine*, *166*(10), 1092. https://doi.org/10.1001/archinte.166.10.1092

Stickel, J. (2019). *The relationship between trait anxiety, anxiety mindset and state anxiety*. [Unpublished thesis, University of Twente]

Tamir, M., & Mauss, I. B. (2011). Social cognitive factors in emotion regulation: Implications for well-being. In I. Nyklíček, A. Vingerhoets, & M. Zeelenberg (Eds.), *Emotion Regulation and Well-Being* (pp. 31–47). Springer New York. https://doi.org/10.1007/978-1-4419-6953-8_3

Tamir, M., John, O. P., Srivastava, S., & Gross, J. J. (2007). Implicit theories of emotion: Affective and social outcomes across a major life transition. *Journal of Personality and Social Psychology*, *92*(4), 731–744. https://doi.org/10.1037/0022-3514.92.4.731

Terry, P. C., Cox, J. A., Lane, A. M., & Karageorghis, C. I. (1996). Measures of anxiety among tennis players in singles and doubles matches. *Perceptual and Motor Skills*, *83*(2), 595–603. https://doi.org/10.2466/pms.1996.83.2.595

Terry, P., Coakley, L., & Karageorghis, C. (1995). Effects of intervention upon precompetition state anxiety in elite junior tennis players: The relevance of the matching hypothesis. *Perceptual and Motor Skills*, *81*(1), 287–296. https://doi.org/10.2466/pms.1995.81.1.287

Turkmen, M., Bozkus, T., & Altintas, A. (2013). The relationship between motivation orientations and competitive anxiety in bocce players: does gender make a difference. *Psychology and Behavioral Sciences*, *2*(4), 162. https://doi.org/10.11648/j.pbs.20130204.12

Vella, S. A., Braithewaite, R. E., Gardner, L. A., & Spray, C. M. (2016). A systematic review and meta-analysis of implicit theory research in sport, physical activity, and physical education. *International Review of Sport and Exercise Psychology*, *9*(1), 191–214. https://doi.org/10.1080/1750984X.2016.1160418

Vincent, W. J., & Weir, J. P. (2012). Statistics in kinesiology (4th ed). Human Kinetics.

Wittig, A. F., Duncan, S. L., & Schurr, K. T. (1987). The relationship of gender, gender-role endorsement and perceived physical self-efficacy to sport competition anxiety. *Journal of Sport Behavior*, *11*, 192–199.

Woodman, T., & Hardy, L. (1993). Stress and anxiety. In R. N. Singer, M. Murphey, L. K. Tennant, & International Society of Sports Psychology (Eds.), *Handbook of research on sport psychology* (pp. 290–318). Macmillan ; Collier Macmillan Canada ; Maxwell Macmillan International.

Xinyi, Z., Smith, D., & Adegbola, O. (2004). A cross-cultural comparison of six mental qualities among Singaporean, North American, Chinese, and Nigerian professional athletes. *International Journal of Sport and Exercise Psychology*, *2*(2), 103–118. https://doi.org/10.1080/1612197X.2004.9671735

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit-formation. *Journal of Comparative Neurology and Psychology*, *18*(5), 459–482. https://doi.org/10.1002/cne.920180503

Zanin, A. C., Adame, E. A., Niess, L. C., & Martinez, L. V. (2020). Negotiating identity and the

    development of incremental mindset in a female adolescent sport context. *Journal of*

    Applied Sport Psychology, 1–25. https://doi.org/10.1080/10413200.2020.1783389