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Factor Analysis of the Sport Interference Checklist with Collegiate Athletes

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ABSTRACT

FACTOR ANALYSIS OF THE SPORT INTERFERENCE CHECKLIST WITH COLLEGIATE ATHLETES

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There are a variety of cognitive and behavioral factors that have been indicated to have a negative impact on sport performance. College student-athletes may be at particular risk to evidence problems that interfere with optimal sport performance due to high physical, social, and emotional demands. To fully understand what factors influence student-athlete sport performance, appropriate, psychometrically validated assessment measures are needed. The Sport Interference Checklist (SIC) is an assessment tool that was developed to assess sport performance in both training and competitive situations for student-athletes. The SIC includes two scales, the Problems in Sport Training Scale (PSTS) and the Problems in Sport Competition Scale (PSCS). However, this scale has yet to be examined across multiple settings. Therefore, the aim of the current study was to rigorously examine the factor structure of the SIC PSTS and PSCS scales using confirmatory factor analysis (CFA). Participants were 320 NCAA student-athletes recruited via email. Based upon previous research, it was hypothesized that the data from

this sample would conform to the four-factor model of the PSTS and the six-factor model of the PSCS, originally determined by Donohue, Silver, Dickens, Covassin, and Lancer (2007).

Results indicated that data from the current sample did not fit the hypothesized factor structures for the PSTS and PSCS. Therefore, exploratory factor analysis (EFA) using principal components analysis was conducted for each scale. The EFA for the PSTS revealed a four-factor solution (Dysfunctional Thoughts and Stress, Relationship and Motivation Problems, Injury Concerns, Environmental Stressors). The EFA for the PSCS also revealed a four-factor solution (Dysfunctional Thoughts and Stress, Sport Relationship Difficulties, Injury Concerns, Environmental Stressors).

The convergent validity of the PSTS and PSCS factors was examined based on relationships with the use of psychological skills and mental strategies in sport, depression, and anxiety. The PSTS Dysfunctional Thoughts and Stress, Relationship and Motivation Problems, and Environmental Stressors factors had strong convergent validity, while the PSTS Injury Concerns factor had moderate convergent validity. The PSCS Dysfunctional Thoughts and Stress and Sport Relationship Difficulties factors had strong convergent validity, while the PSCS Injury Concerns and Environmental Stressors factors had moderate convergent validity.

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CHAPTER 1

INTRODUCTION

Striving for optimum performance is a consistent goal amongst elite athletes, and there are consistent factors that have been shown to contribute to optimum sport performance. The most prevalent of these factors include performing without fear, being focused on the task at hand, having the feeling of being in control, feeling confident, being in contact with the present, total immersion in the activity, and enhanced self-awareness (Anderson, Hanrahan, & Mallet, 2014; Cohn, 1991; Privette & Bundrick, 1997; Ravizza, 1977). These models of peak performance provide insight to the cognitive and behavioral factors that help facilitate optimum performance and the factors that interfere with peak performance. For example, Anderson et al. (2014) found that the barriers to optimum performance include lack of flexibility to the environment, outside distractions, high anxiety, lack of focus, self-doubt, low confidence, the presence of fear, feeling things are out of your control, and lack of self-awareness.

College student-athletes may be at particular risk to evidence cognitive and behavioral problems that can interfere with sport performance. Collegiate student-athletes require effective balancing of course-work, high-level athletic training and competition, and the management of a variety of social and intra-personal stressors (Martens, Dams-O'Connor, & Beck, 2006), including pressure to perform, travel demands, and physical injury (Humphrey, Yow, & Bowden, 2000; Selby, Weinstein, & Stewart, 1990). Compared to non-athletes, student-athletes are more likely to experience stress in relationships (Wilson & Pritchard, 2005), are more likely to engage in binge-drinking behavior (Ford, 2007), are more likely to experience negative consequences from drinking (Doumas, Turrisi, Coll, & Harralson, 2007), and are at a greater risk

for developing eating disorders (Huang, Jacobs, Derevensky, Gupta, & Paskus, 2007). Student-athletes experience these stressors, while simultaneously working towards peak performance.

To fully understand the factors that influence student-athlete sport performance, appropriate, psychometrically validated assessment measures are needed. While performance measures are available, very few comprehensively assess a wide array of cognitive and behavioral factors that interfere with sport performance in student-athletes. The Sport Interference Checklist (SIC; Donohue, Silver, Dickens, Covassin, & Lancer, 2007) is an assessment tool that was psychometrically developed to assess sport performance in both training and competitive situations. However, this scale has yet to be cross-validated. Therefore, the purpose of this study is to examine the factor structure and clinical utility of the SIC in a sample of National Collegiate Athletic Association (NCAA) Division I (DI), Division II (DII), and Division III (DIII) student-athletes utilizing confirmatory factor analysis.

CHAPTER 2

LITERATURE REVIEW

Confidence in Sport

Confidence has been conceptualized as a stable, trait-like experience and as a dynamic, state-like experience (Vealey, 1986). This conceptualization of sport confidence is heavily influenced by Bandura's self-efficacy theory (Bandura, 1977). Martin and Gil (1991) found that in high-school track athletes, finishing times were significantly lower in athletes who reported higher sport-confidence. In a study of 14 elite-level athletes, results from semi-structured interviews found that higher levels of sport confidence were associated with more positive thoughts and behaviors, as well as better performance outcomes (Hayes, Thomas, Maynard, & Bawden, 2009). In a broad sample of university and club level athletes, confidence was significantly and positively related with the self-report of sport-performance satisfaction (Levy, Nicholls, & Polman, 2011). Confidence is also linked to other factors that strongly predict sport performance, such as perceived mastery of athletic abilities (Otten, 2009). Additionally, confidence appears to be significantly and positively related to dispositional flow in sport (Koehn, Pearce, & Morris, 2013).

Measurement tools for confidence include the State Sport Confidence Inventory (SSCI: Vealey, 1986) and the Trait Sport Confidence Inventory (TSCI: Vealey, 1986). The original evaluation of the SSCI and TSCI both produced scores that are reliable (Cronbach's alpha of SSCI = .95; Cronbach's alpha of TSCI = .93). While these measures are rather brief (13 items each), they are limited in scope in that they exclusively assess for either state or trait sport confidence, without consideration of other psychological or behavioral factors that might be impacting athletes' sport experience. As a result, supplemental measurement tools are required to

gain a holistic understanding of the athlete's experience, which may be time consuming for both the athlete to complete and the clinician to interpret.

Anxiety in Sport

Anxiety has long been established as "a negative emotional state in which feelings of nervousness, worry, and apprehension are associated with activation or arousal of the body" (Weinberg & Gould, 2007, p. 78). Like confidence, anxiety is conceptualized to have trait- and state-like components (Weinberg & Gould, 2007). The influence that anxiety has on sport performance is commonly conceptualized using paradigms explaining the influence of physiological arousal on performance. A widely accepted theory is the inverted U-hypothesis, which posits that peak performance occurs under conditions of moderate arousal, with either excessively low or excessively high arousal levels being consistent with sub-optimal performance (Balague, 2005). Over-arousal leads to tension and negative thoughts while under-arousal can lead to low motivation and focus (Balague, 2005).

A second conceptualization of anxiety is based around the Individual Zones of Optimal Functioning (IZOF) theory, which posits that there is no universal level of optimal anxiety, but rather each individual has a personal optimal level (Hanin, 1997). Optimal functioning is not a singular point, but rather a small spectrum (or "zone) that is linked with optimum performance. Empirical evidence supports the IZOF theory. Jokela and Hanin (1999) conducted a meta-analysis that included 19 studies, specific to examination of the relationship between performance and athlete anxiety. The investigators found that athletes who performed while out of their optimal zone of anxiety were significantly less successful than athletes who were within their optimal zone of anxiety. Indeed, a significant moderate effect size was found. In a study of 80 Finnish athletes, athletes within their optimal zone of anxiety performed significantly better

than athletes outside of their optimal zone while participating in competitions they identified as being very important (Salminen, Liukkonen, Hanin, & Hyvönen, 1995).

In a meta-analysis examining 29 studies that were aimed at exploring anxiety and sport performance, Craft, Magyar, Becker, and Feltz (2003) found no significant relationship between anxiety and performance. Craft et al. (2003) suggests the lack of significance between cognitive anxiety and performance may be due to examining the relationship from a purely linear perspective and not accounting for the potential of a curvilinear relationship. Woodman and Hardy (2003) found in their meta-analysis of 42 studies that 60% of the studies included showed a negative relationship between cognitive anxiety and performance, 16% of studies showed a near zero correlation, and 23% showed a positive relationship. These results suggest the possibility of a curvilinear relationship between cognitive anxiety and performance. However, Woodman and Hardy (2003) acknowledge that the assessments used to measure cognitive anxiety do not adequately assess whether anxiety is interpreted as facilitative or debilitative, preventing a definitive conclusion on the existence of a curvilinear relationship between these variables. Furthermore, the overall analysis showed a significant negative effect between cognitive anxiety and performance, supporting a linear relationship.

As anxiety is not a sport-specific phenomenon, there are many available assessment tools for measuring this construct. Some research utilizes non-sport specific anxiety measures, such as the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970), while other researchers have utilized measures specific to anxiety in sport. The Competitive State Anxiety Inventory (CSAI; Martens, Burton, Rivkin, & Simon, 1980) is probably the most widely used state anxiety assessment measure for both sport research (Craft et al., 2003; Woodman & Hardy, 2003) and practice (Balague, 2005). The CSAI was originally developed to evaluate sport-

specific state anxiety, and since its inception it has undergone frequent re-evaluation of its psychometric properties, including the development of the CSAI-2 (Martens, Burton, Vealey, Bump, & Smith; 1990) and the CSAI-2R (Cox, Martens, & Russell, 2003). In their meta-analysis examining the relationship between state cognitive anxiety and sport performance, Woodman and Hardy (2003) found that 88% (N=38) of the studies utilized the CSAI-2 as the primary measure of cognitive anxiety.

The CSAI-2R yields a three-factor structure, including a cognitive anxiety factor, a somatic anxiety factor, and a self-confidence factor, which have Cronbach's alpha coefficients of .83, .88, and .91, respectively (Cox et al., 2003). The development of the self-confidence factor has made this a popular measure for assessing confidence, as well as anxiety. Despite its frequent use in both research and applied settings, there are questions about the psychometric validity of the CSAI family of assessments, as well as questions about the applicability of the CSAI in sport performance. Additionally, questions have been raised regarding the theoretical rationale for inclusion of a self-confidence scale in an anxiety assessment measure (Lane, Sewell, Terry, Bartram, & Nesti, 1999).

In examining trait anxiety in sport, the two most prominent assessments used are the Sport Competition Anxiety Test (SCAT; Martens, Vealey, & Burton, 1990) and the Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz, 1990). The SCAT is a uni-dimensional measure of trait anxiety that was developed in samples of both children and adults, with both versions showing acceptable reliability and validity estimates (Martens et al., 1990). The SCAT consists of 15 items that focus exclusively on anxiety in competition scenarios. However, it does not address anxiety in training situations and provides limited information about the other factors that influence sport performance. As a result, comprehensive assessment using the SCAT would

require supplemental assessment measures to examine other psychological and behavioral processes.

The original SAS has been refined through exploratory and confirmatory factor analysis yielding a multidimensional factor structure, including a somatic anxiety factor, a worry factor, and a concentration disruption factor (SAS-2; Smith, Smoll, Cumming & Greenspan, 2006). The SAS-2 consists of 15 items. Similar to the SCAT, the items of the SAS-2 exclusively focus on anxiety, without addressing other psychological or behavioral factors. While the SAS-2 assesses anxiety concerns before or during sport competition, it does not specifically target anxiety concerns in training scenarios. Again, similar to the SCAT, examining other constructs outside of anxiety would require additional measurement tools, suggesting the need for a parsimonious assessment tool for the wide variety of psychological and behavioral factors that influence sport performance.

Injury Concerns in Sport

NCAA student-athletes experience approximately 11,300 injuries per year (Hootman, Dick & Agel, 2007). While injuries occur both in competition and training, injuries are almost twice as likely to occur in competitive scenarios (Hootman et al., 2007). There is evidence that the psychological impact of injury can be debilitating on a variety of levels. In a sample of 343 NCAA DI athletes, those who experienced physical injuries had higher levels of depression and anxiety symptoms than non-injured or recovered athletes (Leddy, Lambert, & Ogles, 1994). The psychological impact of injury is supported in a review of the literature on injury rehabilitation. For instance, Podlog, Dimmock, and Miller (2011) outlined five major psychological themes associated with sport injuries, including anxiety associated with re-injury, uncertainty in ability to return to pre-injury performance levels, isolation from teammates, coaches, and other social

supports coupled with the loss of identity as an athlete, pressures to quickly return to sport, and impression management concerns. Extending the work of Podlog et al. (2011), Ardern, Taylor, Feller, and Webster (2013) completed a systematic review of the literature supporting the impact that psychological factors have on the injury rehabilitation process. Arden et al. (2013) found that a positive psychological response (i.e., confidence, positive emotionality, and lower fear of re-injury) improved outcomes related to the likelihood of returning to sport post-injury and the speed of recovery.

It is important to understand the psychological impact that injury has on athletes and how psychological health impacts risk of injury. The major contributors for risk of injury include the athlete's history of stressors, athlete's personality, and coping resources available to athletes (Williams & Anderson, 1998). Consistent with this conceptualization, Johnson and Ivarson (2011) found that negative life stress was a strong predictor for future injury in sport. This relationship is reciprocal, as physical injuries are one of the most common sources of stress amongst student-athletes (Selby et al., 1990).

The complex psychological processes associated with sport injury warrant appropriate assessment to measure how athletes respond psychologically to sport injury. The Psychological Response to Sports Injury Inventory-II (PRSII; Evans, Hardy, Mitchell, & Rees, 2008) is an example of such a measure. The PRSII consists of 19 items that are focused on how an athlete feels after injury and includes six-factors (Devastation, Dispirited, Reorganization, Feeling Cheated, Restlessness, Isolation). The initial development of this measure provided some evidence for the factorial and construct validity. However, reliability of the PRSII was not examined in this study (Evans et al., 2008).

Assessment of injury can be extended to pain tolerance and how athletes cope with sport-related pain. The Sports Inventory for Pain (SIP; Meyers, Bourgeois, & LeUnes, 1992) consists of 25 items and yields a five-factor structure (Coping, Cognitive, Catastrophizing, Avoidance, Body Awareness), as well as an overall score. Further examination of the SIP using confirmatory and exploratory factor analysis resulted in the development of the SIP15 (Bourgeois, Meyers, & LeUnes, 2009). The SIP15 consists of 15 items with a 3-factor structure (Coping by Direct Action, 7 items; Catastrophizing, 5 items; Somatic Awareness; 3 items), as well as an overall index that examines the ability to cope with pain from injury (Personal Coping Resources). Statistical analysis supports the SIP15 as a reliable and valid instrument (Bourgeois et al., 2009).

While it is important to thoroughly assess the specific nuances of sport injury, the breadth of the available measures makes it difficult to accurately examine what psychological factors influence the performance of an athlete in respect to injury without sacrificing assessment in other areas. This suggests the need for a more comprehensive measure that not only incorporates an appropriate assessment of the injury-related factors that interfere with sport performance, but also the other unique factors that athletes experience in both training and competition settings.

Relationships in Sport

The interpersonal relationships of athletes play an important role in the experience of athletes. There are a variety of relationship types, including but not limited to, parent-athlete, coach-athlete, teammate-athlete, and peer-athlete relationships. Each relationship type has its own unique influence on the athlete and the athlete's sport performance (Gould, Greenleaf, Chung, & Guinan, 2002). For example, higher instances of negative relationships amongst athletic teams are associated with lower overall team performance, a relationship that is mediated by team cohesion (de Jong, Curşeu, & Leenders, 2014). Choi, Cho, and Huh (2013) found that

athletes with more positive relationships with their coaches had a greater satisfaction of their basic psychological needs (autonomy, competence, and relatedness). Interpersonal conflict with coaches has been linked to negative affect (Davis & Jowett, 2014) and poorer performance outcomes in athletes (Jowett, 2003).

Positive relationships between athletes and coaches and between athletes and their parents are significantly related to healthy eating, while lower quality relationships that are devoid of support and rife with conflict are significantly related to negative eating pathology (Shanmugam, Jowett, & Meyer, 2013). Criticism from family members, coaches, and peers is linked with higher experiences of anxiety and shame and more intense experiencing of disordered eating in athletes (Muscat & Long, 2008).

In a systematic review, Campo, Mellalieu, Ferrand, Martinent, and Rosnet (2012) found that the relationships that athletes have with teammates and coaches impact the emotional states of athletes. For example, criticisms from coaches or teammates have negative impacts on the emotional state of athletes through perceived stress. Athletes' romantic relationships also impact emotional well-being. In a study of 87 elite-level athletes, it was found that relationship concerns that involved sports were related to lower satisfaction with sport participation and more depression (Jowett & Cramer, 2009).

Certain measures have been developed to examine the dynamics of specific relationship types, such as the 11-item Coach-Athlete Relationship Questionnaire (CART-Q; Jowett & Ntoumanis, 2004). The initial development of the CART-Q yielded a three-factor structure including Commitment, Closeness, and Complementarity that was both reliable and valid. The Cronbach's α coefficients for the three factors were .82, .87, and .88, respectively and were all above the recommended level of .70 (Jowett & Ntoumanis, 2004). While the CART-Q has

shown promising psychometric properties, its restricted focus to just the coach-athlete relationship offers limited utility in clinical settings, where a holistic understanding of the roles of all the relationships in an athlete's life is needed.

While the CART-Q focuses solely on the coach-athlete relationship, other measures aim to examine a broader spectrum of relationship dynamics that athletes face. One such measure is the Student-Athlete Relationship Instrument (SARI; Donohue, Miller, Crammer, Cross, & Covassin, 2007). The SARI examines how student-athlete relationships influence sport performance in four domains (Family, Coaches, Teammates, Peers). Initial psychometric evaluation of the SARI displayed criterion-related validity and internal consistency of items (high Cronbach's α coefficients for Teammates = .93, Coaches = .96, Family Members = .92, and Peers = .87; Donohue, Miller et al., 2007). Although the SARI is capable of assessing relationships comprehensively, it does not permit a comprehensive examination of sport performance.

Motivation in Sport

Motivation plays a key role in athletic training and competition. Bandura (1977) conceptualized motivation for behavior, such as sport participation/performance from a cognitively focused perspective. First, motivation for behavior is guided by the cognitive expectation that behavior will result in an anticipated, desired outcome. The desired result may come in the form of either a positive or negative reinforcement. Second, motivation is derived from self-evaluative goals, for which a cognitive standard is determined that subsequent performance is to be compared. An example would be a long-distance runner setting a goal for a specific race-time they desire. This goal becomes the internal standard against which all the runner's performances will be evaluated. Therefore, the runner will be motivated by his or her

own internal cognitive contingencies. In addition, motivation to participate in behavior is influenced by a belief that the desired outcome is achievable (Bandura, 1977).

An alternative conceptualization of motivation is Self-Determination Theory (SDT), which postulates that humans have a natural inclination to actively engage in activities that are of interest to them, that breed social connectedness, and lead to personal improvement. These inclinations tend to be either intrinsic (motivated without external consequence or reward) or extrinsic (motivated by an external consequence or reward applied, as a result of the action, Deci & Ryan, 2000). SDT differentiates itself from other theories of motivation in its assumption that the type of motivation (intrinsic or extrinsic) is more important to performance outcomes than the amount of motivation (Deci & Ryan, 2008).

Regardless of which theoretical background is used in operationalizing the construct of motivation, it is an essential aspect of the athlete experience and warrants proper assessment. A theoretically sound evaluation of motivation will be especially helpful in setting and monitoring goals, as knowing the right motivating factors for an athlete to reach a goal will help them act out goal-consistent behavior.

Contemporary assessment of motivation has focused on evaluating the construct from a SDT perspective. The Sport Motivation Scale (SMS-II; Pelletier, Rocchi, Vallerand, Deci, & Ryan, 2013) and the Behavioral Regulation in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008) are two of the most popular measures used to explore motivation from an SDT perspective. The format of the SMS-II includes a stem question that queries why the athlete participates in sport and a total of 18 items, each of which the athlete will rate how closely the item corresponds to his or her own personal reasons for participating in the sport. Factor analysis of the SMS-II yields six subscales consistent with the different types of motivation as outlined by

SDT. Similarly, the BRSQ is a 36-item questionnaire where each item consists of a conditional statement of why the athlete participates in his or her sport, which is then rated on how true it is in describing the athlete's motivational sets. Supporting evidence for the reliability and validity of both the SMS-II and the BRSQ has been found. However, concerns regarding the ability of these measures to evaluate the universal sport experience (i.e., training and competition) and relevance of item content to motivation have been reported (Lonsdale, Hodge, Hargreaves, & Ng, 2014).

Furthermore, the information gathered from measures like the SMS-II and the BRSQ may help to inform what motivating factors are at play with athletes. Empirical research examining the causal link between individual motivational factors and sport performance will increase the utility of these measures in a clinical setting. Additionally, it is essential for the continued development and refinement of assessment tools, so as to gain a more accurate understanding of how motivation influences sport performance.

Academic Achievement and Sport

Student-athletes inherently face a dual role in which they must balance academic achievement with athletic performance. Research has shown that student athletes struggle with this balance, spending on average more time in practice and competition than NCAA regulations allow for (Chen, Mason, Middelton, & Salazar, 2013), and athletes have lower achievement and lower graduation rates compared to their non-athlete peers (Purdy, Eitzen, & Hufnagel, 1982). The academic struggles of student-athletes may be attributed to the institutional pressures they face. In a study examining data from the National Study of Intercollegiate Athletes, it was found that student-athletes who spent more time involved in sport-related activities were more likely to have lower grade point averages (GPA) (Upthegrove, Roscigno, & Charles, 1999). In the same

study, GPA decreases systematically for student-athletes who have greater difficulty in time management.

Athletes on scholarship, particularly athletes in revenue-generating sports, such as football and basketball, tend to have the lowest levels of academic achievement (Purdy et al., 1982). Scholarship athletes have been found to have lower GPAs than non-scholarship athletes (Rubin & Rosser, 2014), and athletes in revenue-generating sports have lower GPAs than non-revenue generating athletes (Upthegrove, Roscigno, & Charles, 1999). Football and basketball players also have been found to have significantly lower performance in measures of writing skills, reading ability, critical thinking (Pascarella, Truckenmiller, Nora, Terenzini, Edison, & Serra Hagedorn, 1999), reading comprehension, and mathematics (Pascarella, Bohr, Nora, & Terenzini, 1995) when compared to both non-athletes and non-revenue-generating athletes. Furthermore, there is a seasonal component to student-athlete academic performance. During competition season, the academic performance of student-athletes has been shown to be lower than when athletes are not competing in their sport (Scott, Paskus, Miranda, Petr, & McArdle, 2008). Not surprisingly, this effect is exacerbated in student-athletes involved in high profile sports. Scott et al. (2008) posited that decreased academic performance in-season is moderated by the increased time demands placed on student-athletes during competition.

There is a dearth of research examining how academic stress impacts athlete sport performance. The available assessment measures examining athletes and academics reflect the limited research focus on how academic performance influences sport performance. These measures tend to not be specific and not in relation to athletes as students, a dual role they fill. Many assessment techniques for academic performance include self-reports (Aries, 2004), grade point averages (Aries, 2004), standardized tests (Aries, 2004), non-validated questionnaires

(Simons, Rheenan & Covington, 1999), and behavioral data (Chen et al., 2013). A major flaw with these assessment measures is that they fail to explore the specific relationship between academic performance and sport performance.

Some measures, such as the Academic and Athletic Identity Scale (AAIS; Yukhymenko-Lesroart, 2014), acknowledge the dual role of the student-athlete, however, are not aimed at exploring sport performance and/or the influence that academic struggles may have on it. Others examine the effect that sport participation has on academic performance, but not vice versa (Pascarella et al., 1995). There is a lack of standardized measures examining how stress is associated with academic demands of student-athletes and how stress influences sport performance. Therefore, the further development and validation of assessment tools examining academic stress in athletes is warranted. Moreover, empirical research examining the relationship between academic stressors and sport performance will help to improve the usefulness of these measures in clinical and performance enhancement settings.

CHAPTER 3

AIMS OF THE STUDY

Privette (1981) conceptualizes optimum performance as behavioral action that goes above and beyond the normal limits of a person's ability. In sport, it could be said optimum performance occurs when an athlete reaches the peak of physical and mental ability. From this perspective, there is a constellation of factors that can both contribute to sport performance, as well as interfere with sport performance in both training and competition scenarios. These factors include both cognitive representations and behavioral actions. From the research that has been reviewed above, there are two issues salient to the assessment of the factors that interfere with sport performance: (1) need for parsimonious assessment of the broad spectrum of factors that interfere with sport performance and (2) need for separate examination of the cognitive and behavioral experiences of athletes in training and competition scenarios.

To better understand optimum performance and to alleviate the aforementioned concerns with the assessment of the barriers to sport performance, Donohue, Silver et al. (2007) developed the Sport Interference Checklist (SIC). Utilizing a seven-point scale (1= Never, 7 = Always), athletes are prompted to indicate the extent to which various factors interfere with their sport performance in training on the Problems in Sport Training Scale (PSTS) and in competition on the Problems in Sport Competition Scale (PSCS). In the Donohue, Silver et al. (2007) model, the PSTS has four factors (Dysfunctional Thoughts and Stress, Academic Problems, Injury Concerns, and Poor Team Relationships) and the PSCS has six factors (Dysfunctional Thoughts and Stress, Academic and Adjustment Problems, Lack of Motivation, Overly Confident/Critical, Injury Concerns, and Pain Intolerance).

There were no significant differences in response patterns for the PSTS and PSCS scales between males and females or between recreational and NCAA athletes (Donohue, Silver et al, 2007). The differing factor structure between the training and competition scales is important to note, as it suggests differing experiences of athletes in training scenarios compared to competition. The original psychometric development of the SIC addresses a gap in the current assessment literature regarding sport performance, most notably the lack of comprehensive measures that evaluate both the cognitive and behavioral aspects of the sport experience. However, the empirical factor structure found in the SIC's original development has yet to be re-examined with a student-athlete population. The specific aim of the current study is to rigorously evaluate the reliability and validity of the factor structure of the SIC PSTS and PSCS scales using confirmatory factor analysis (CFA). Consistent with previous research (Donohue, Silver et al., 2007), it was hypothesized that responses to the SIC in a large sample of student-athletes would conform to the four-factor model for the PSTS and the six-factor model for the PSCS. Additionally, it was predicted that higher endorsement of items on the SIC would be positively correlated with measures of clinical depression and generalized anxiety, and negatively correlated with measures assessing psychological skills and strategies that have been found to enhance sport performance.

CHAPTER 4

METHODS

Participants

Participants were 320 student-athletes from across North America participating in NCAA sports. Sixty-five (20%) participated at the DI level, 138 (43%) participated at the DII level, and 117 (37%) participated at the DIII level. Participants were from various sport backgrounds, including football, baseball, track & field, cross-country, volleyball, basketball, softball, golf, soccer, swimming & diving, tennis, bowling, gymnastics, ice hockey, and lacrosse. One hundred ninety-seven (62%) were female and 123 (38%) were male. The mean age of the participants was 19.89 years (SD=1.39). Two hundred thirty-seven (74%) identified as Caucasian, 22 identified as Hispanic (7%), 15 identified as African-American (5%), 15 identified as Asian (5%), three (1%) identified as Pacific Islander, one (<1%) identified as American Indian, one (<1%) identified as Middle Eastern, 14 (4.4%) identified as Multiethnic, nine (3%) identified as ethnicity outside of the response options, and three (1%) did not report their ethnicity.

Procedure

Recruitment was initiated by emailing NCAA coaches to obtain permission to contact the student-athletes on their teams about participating in the study (see Figure 1 for recruitment flow chart). In the recruitment email, it was reported that it would probably take participating students 30 minutes to complete various questionnaires that were developed to assess factors that interfere with their sport performance, their use of psychological skills and mental strategies evidenced during their sport participation, and their general mental health. It was reported that coaches who agreed to participate would be provided an aggregated summary of their team's results. One hundred and one coaches (5% of all coaches emailed) expressed interest in having their athletes

participate in the study. Of these 101 coaches, 51 (51%) agreed to provide the necessary contact information to approach athletes on their team. Of the 51 coaches agreeing to participate, 33 (65 %) provided a roster of student-athlete email addresses (permitting recruitment emails with study information to be sent directly to athletes using the Qualtrics survey tool), and 18 (35%) agreed to forward the study description and an anonymous link to their teams. Overall 2.3% of all coaches solicited agreed to have their athletes participate, and approximately 27% of athletes who were solicited participated.

Upon opening the survey link, the athletes were provided a brief description of the study, which included the same information that was provided to the coaches. Consenting athletes then completed an anonymous survey, which included a brief demographic questionnaire, the SIC (Donohue, Silver et al., 2007), the Test of Performance Strategies (TOPS; Thomas, Murphy, & Hardy, 1999), the Patient Health Questionnaire-9 (PHQ-9; Kroenke, Spitzer, & Williams, 2001), and the Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006).

Measures

Demographic questionnaire. Each participant completed a brief demographic questionnaire to determine the participant's age, gender, sport, level in school, etc. (see Appendix for full questionnaire).

Sport Interference Checklist. (SIC; Donohue, Silver et al., 2007)

The SIC measures cognitive and behavioral problems that have been identified to interfere with sport performance in both training and competition scenarios. The SIC consists of 26 problem statement items (i.e., negative thoughts about personal performance, feeling stressed out, problems with my teammates). The 26 items were derived systematically from focus groups consisting of individuals with personal experience participating in competitive sports. For each

item, participants are asked to report how frequently the stated problem interferes with their sport performance in sport training (The Problems in Sports Training Scale or PSTS) and sport competition (The Problems in Competition Training Scale or PSCS) utilizing a 7-point Likert scale (1 = Never, 7 = Always). For each problem, participants are also asked to report if they would visit a sport psychologist to assist with the respective problem (Desire for Sport Psychology Scale, or DSPS). Only the PSTS and the PSCS scales were relevant to the present study. The factor structure for both the training and competition scales of the SIC was established by Donohue, Silver et al. (2007) in a sample of 141 student-athletes participating in either NCAA or club sports. Principal components analysis was used with varimax rotation. For both the PSTS and PSCS, the number of factors was determined based on the Kaiser-Guttman rule and the scree test (Donohue, Silver et al., 2007). Items with factor loadings greater than .55 were considered salient.

The PSTS includes four factors (Dysfunctional Thoughts and Stress, six items; Academic Problems, three items; Injury Concerns, three items; Poor Team Relationships, two items). Overall, the PSTS scale has high internal consistency, as evidenced by Cronbach's α of .91 (see Table 1 for Cronbach's α of each factor). All of the derived factors of the PSTS were significantly correlated with a global measure of psychiatric functioning, indicating the convergent validity of the PSTS. All of the factors were unrelated to measures examining the benefits of sport psychology intervention, demonstrating its divergent validity (Donohue, Silver et al., 2007).

The PSCS includes six factors (Dysfunctional Thoughts and Stress, eight items; Academic and Adjustment Problems, three items; Lack of Motivation, four items; Overly Confident/Critical, two items; Injury Concerns, two items; Pain Intolerance, two items). Overall,

the PSCS has high internal consistency, as evidenced by a Cronbach's α of .92 (see table 1 for Cronbach's α of each factor). Five of the six derived factors of the PSCS were significantly related with a global measure of psychiatric functioning, indicating its convergent validity, while four of the six derived factors showed no relationship with a measure examining the benefits of sport psychology intervention, supporting its divergent validity (Donohue, Silver et al., 2007).

Test of Performance Strategies. (TOPS; Thomas, Murphy, & Hardy, 1999).

The TOPS is a 64-item self-report questionnaire that assesses for the use of psychological skills and mental strategies in sport practice and sport competition. There are eight practice factors and eight competition factors. The TOPS practice factors are Goal Setting, Emotional Control, Automaticity, Relaxation, Self-Talk, Imagery, and Attentional Control. The TOPS competition factors are Goal Setting, Emotional Control, Automaticity, Relaxation, Self-Talk, Imagery, and Negative Thinking.

Patient Health Questionnaire-9. (PHQ-9; Kroenke, Spitzer, & Williams, 2001)

The PHQ-9 is a brief measure of depression that can be used independently, or as part of the larger Patient Health Questionnaire assessment tool (Spitzer, Kroenke, & Williams, 1999). The PHQ-9 is based off of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM–IV–TR*; American Psychiatric Association, 2000) criteria for depression and assesses the extent to which depression was reported to occur during the past two weeks. Each item is scored utilizing a 0 (not at all) to 3 (nearly every day) frequency scale. The PHQ-9 also assesses how difficult the presented symptoms have made it to function in the domains of work, home life, and relationships. The total score of the PHQ-9 ranges from 0 to 27, with scores of 0 to 4 indicating minimal depression, 5 to 9 indicating mild depression, 10 to 14 indicating moderate depression, 15 to 19 indicating moderately severe depression, and 20 to 27 indicating

severe depression. The PHQ-9 has evidenced excellent test-retest reliability (Cronbach's α of .89; Kroenke et al., 2001).

Generalized Anxiety Disorder-7. (GAD-7; Spitzer, Kroenke, Williams, & Löwe, 2006)

The GAD-7 is a brief measure of anxiety developed as a screening tool for generalized anxiety for use in research and clinical practice. The seven items of the GAD-7 are designed to assess symptoms of generalized anxiety as defined by *DSM-IV-TR* criteria over a two-week period. The frequency of each item is scored on a range from 0 (not at all) to 3 (nearly every day). The GAD-7 also assesses how difficult the presented symptoms have made it to function in the domains of work, home life, and relationships. The total score of the GAD-7 ranges from 0 to 21, with scores of 0 to 4 indicating minimal anxiety, 5 to 9 indicating mild anxiety, 10 to 14 indicating moderate anxiety, and 15 to 21 indicating severe anxiety. The GAD-7 has a Cronbach's α of .92, with an inter-class correlation of .83, indicating good test-retest reliability (Spitzer et al., 2006).

Statistical Plan

Confirmatory factor analysis (CFA) using EQS 6.1 software (Bentler & Wu, 2002) was used to test the four-factor structure of the PSTS and the six-factor structure of the PSCS with the collected data (see original study by Donohue, Silver et al., 2007). Two hundred and fifty two participants agreed to the study and completed the assessment measures. The Mahalanobis distance statistic was calculated for each of these participants to examine the data for multivariate outliers. Mahalanobis distance is distributed as a chi-square statistic and a critical value was determined with the number of predictors (i.e., items) functioning as the degrees of freedom. As recommended by Kline (2005), any case with a Mahalanobis distance greater than the chi-square critical value at $p < .001$ was considered an outlier and deleted for the respective

analysis. The critical value for both the PSTS and the PSCS was 54.05 (due to both scales having 26 items). Therefore, if a case had a Mahalanobis distance greater than the critical value of 54.05, it was deleted.

Mardia's (1974) coefficient was used to examine the normality of the sample. If the Mardia's (1974) coefficient indicated the sample to be normal, then the Maximum Likelihood method was used to estimate the parameters of these models. If the sample was non-normal, as evidenced by a coefficient greater than 5.00 (Bentler, 2005), the Robust Maximum Likelihood method was used to estimate the parameters of these models (Byrne, 2006).

Consistent with the recommendations of Boomsma (2000), multiple measures of goodness of fit were used to evaluate the model fit. The measures include the model chi-square, the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990), and the Comparative Fit Index (CFI; Bentler, 1990). If the data were non-normal, the Satorra-Bentler scaled chi-square was used in lieu of the model chi-square. The model chi-square, Satorra-Bentler scaled chi-square, and RMSEA are considered "badness of fit" statistics, meaning that higher values indicate worse model fit (Kline, 2005). In this study, a non-significant model chi-square or Satorra-Bentler scaled chi-square ($p > .05$) and a RMSEA value below .08 were the criteria used to assess model fit. The CFI is a true goodness of fit statistic, where scores greater than .90 indicate a good fit (Hu & Bentler, 1999). If the data did not fit the previously identified empirical factor structure of the PSTS and the PSCS, then exploratory factor analysis (EFA) was conducted to examine the quantity and quality of the components of the SIC subscales.

Convergent validity was examined by correlating the resulting PSTS and PSCS factors with the TOPS, the PHQ-9, and the GAD-7. It was expected that greater endorsement of psychological skills and mental strategies would be negatively related to interferences in sport

performance in both training and competition. Furthermore, it was expected that greater endorsement of generalized anxiety symptoms and depression symptoms would be positively related to interferences in sport performance in both training and competition.

In order to determine the similarity between the resulting factors of the PSTS and the PSCS, congruence coefficients were calculated. Based upon the recommendations by Lorenzo-Seva and ten Berge (2006), a congruence coefficient between .85 and .94 were considered indicative of a fair amount of similarity between the factors. A congruence coefficient above .95 will be considered indicative of factors that are ostensibly equal. Furthermore, factor scores and scaled scores of the resulting PSTS and the PSCS were correlated to determine the relationship between problems in sport training and problems in sport competition.

CHAPTER 5

RESULTS

PSTS Confirmatory Factor Analysis

Twelve cases had a Mahalanobis distance greater than 54.05 on the PSTS and were deleted from the analysis (N=240). The PSTS Mardia's (1974) coefficient was 11.34, indicating that the data were positively kurtotic. Equality constraints were imposed making the estimates for the two items of the Injury Concerns factor equal to help reduce estimation problems that can occur when factors have less than three items (Kline, 2005). Additionally, all factor variances for the PSTS analysis were constrained to one. The four-factor model of the PSTS fit the data poorly with a significant Satorra-Bentler chi-square statistic ($\chi^2(78, N=240) = 281.18$, $p < .001$), an RMSEA value above .08 (RMSEA = .10), and a CFI score below .90 (CFI = .81). Due to the lack of fit between the data and the empirical four-factor structure of the PSTS, an EFA was conducted on the PSTS.

PSTS Exploratory Factor Analysis

The Bartlett-Box procedure (Box, 1949) was conducted to determine if male and female participants should be analyzed together. There was a significant difference between the variance-covariance matrices of male and female participants (Box's M (351, 118439.637) = 451.12, $p = .049$). The significant difference in variance-covariance matrices suggests that separate gender-specific analyses be conducted. However, both the female sample (N = 147) and the male sample (N = 93) have well below the recommended 300 participants to conduct factor analysis (Tabachnick & Fidel, 2007). Therefore, despite the presence of homogenous subgroups, the subgroups were combined. There was no significant difference between the average scores of the male and female participants on items ($F(1, 238) = .14$, $p = .713$).

The Bartlett-Box procedure (Box, 1949) was also conducted for participants in different levels of NCAA competition. The variance-covariance matrices were significantly different between the different levels of NCAA participation (Box's M (702, 68263.977) = 1063.63, p = .000). Similar to the gender subgroups, participants in DI (N = 48), DII (N = 113) and DIII (N = 79) levels of competition all have sample sizes below the recommended level for separate analyses. Therefore, the subgroups were combined, despite the presence of homogenous subgroups. There was no significant difference between the average scores of DI, DII, and DIII participants on the items of the PSTS ($F(2, 237) = .53$, $p = .591$).

To assess whether all items of the PSTS measure the same construct, the first principle component was calculated. For this study, .40 was used as the criterion for salience, meaning that coefficients that are greater than .40 or less than -.40 are salient. Table 3 contains the pattern matrix coefficients for the first principal component. Based on a Cronbach's α of .91, the first principle component of the PSTS has excellent internal consistency. Twenty-three of the 26 items of the PSTS had salient pattern matrix coefficients on the first principal component. The three items that had non-salient coefficients were item 9 (Overly optimistic (cocky) thoughts), item 14 (Others have commented that I am not motivated in my sport), and item 25 (Maintaining an acceptable grade point average). All items had positive pattern matrix coefficients.

To determine the number and nature of the factors underlying the PSTS, principal components analysis was conducted with multiple factors. Two criteria were used to determine the number of factors. The first criterion was Parallel Analysis (Horn, 1965: Cota, Longman, Holden, & Rekken, 1993) and the second was the Minimum Average Partial test (MAP test; Velicer, 1976). Based on Parallel Analysis, there was one factor. According to the MAP test, there were four factors. Due to the lack of agreement between the MAP and Parallel Analyses,

multiple factor solutions of the PSTS were extracted, rotated, and interpreted to determine which factor solution was most meaningful. The MAP test and Parallel Analysis are usually accurate within one factor, so solutions consisting of two, three, and four factors were examined. After examining multiple solutions, it was determined that a four factor structure for the SIC PSTS was most consistent with the cognitive-behavioral underpinnings upon which the SIC was developed; hence, four factors were extracted.

Several different rotations were examined to determine which rotation came closest to the ideal of simple structure, using the criteria of number of complex items, hyperplanar count, and extent of correlation among the factors. Oblique rotation with a Delta value of -1 was selected, as this rotation provided the highest hyperplanar count and no complex items, while maintaining a moderately low correlation among factors (see Table 4).

For factor 1, items 1, 2, 4, 5, 6, 7, 8, 10, and 11 had salient positive coefficients. All the items with salient coefficients on factor 1 related to difficulties associated with maladaptive thought processes or cognitive stress. As a result, factor 1 was named Dysfunctional Thoughts and Stress. For factor 2, items 9, 12, 13, 14, 15, 16, and 19 had salient positive coefficients. There were two underlying concepts within the salient item loadings on factor 2. Items 15, 16, and 19 are related to difficulties interacting with others involved in sport (i.e., coaches and teammates). Items 12 and 13 are related to athlete difficulties with motivation. Item 14 appears to tap into both difficulties in interactions with others and difficulties in motivation. Item 9 may also be representative of both concepts, as cockiness may represent a problem with motivation and also is likely to strain relationships within the sport environment. Despite not having a salient loading for any factor, item 3 is intuitively related to difficulties with sport relationships and had a loading (.36) that was approaching salience on factor 2. The loadings of both items

that represent difficulties in sport relationships and items that represent difficulties with motivation on factor 2 suggest that these two seemingly independent concepts are related in some way. It is possible that problems that arise with coaches and teammates are fueled by difficulties with motivation. It is also possible that problems with coaches and teammates are the cause of a lack of motivation. Due to the dual nature of factor 2, it was named Relationship and Motivation Problems.

For factor 3, items 21, 22, 23, and 24 had salient positive coefficients. All the items with salient coefficients on factor 3 relate to difficulties associated with injuries or injury management. Therefore, factor 3 was named Injury Concerns. For Factor 4, items 17, 18, 20, 25, and 26 had salient positive coefficients. All the items with salient coefficients on factor 4 related to external stressors not directly related to sport. Therefore, factor 4 was named Environmental Stressors.

PSTS Reliability

Coefficient alpha of the PSTS was .91. The confidence interval for coefficient alpha was calculated using the method developed by Feldt (1965). The 95% confidence interval for coefficient alpha was .89 to .92. This displays that the PSTS has excellent internal consistency. Coefficient alpha was also calculated to estimate the internal consistency in sub-populations of the sample, specifically males and females. Coefficient alpha for males was .91 and for females was .90. This analysis displays that the PSTS has excellent internal consistency across genders.

PSTS Validity

Convergent validity was assessed by correlating the mean scores of the PSTS with the total score of the TOPS Practice Scale. The correlation was small and negative (r (217) = -.24, p < .001). The correlation between the PSTS and the TOPS Practice Scale indicates these two

scales were related. These results provide evidence for the convergent validity of the PSTS. Convergent validity of the PSTS was also assessed in sub-populations of the sample. Mean scores of the PSTS were correlated with the total score of the TOPS Practice Scale across gender. The correlation between the PSTS and the TOPS Practice Scale in males was small and negative (r (84) = -.24, p = .030 and in females was small and negative (r (133) = -.24, p = .006).

Factor scores were calculated for the Dysfunctional Thoughts and Stress, Relationship and Motivation Problems, Injury Concerns, and Environmental Stressors factors using the regression method. The factor scores were then correlated with TOPS Practice Subscale total scores, the PHQ-9 total score, and the GAD-7 total score (see Table 5).

Higher scores on the PSTS Dysfunctional Thoughts and Stress factor indicate more interference with sport performance due to cognitive concerns, which would be consistent with symptoms of anxiety and depression measured by the PHQ-9 and GAD-7, and inconsistent with the relaxation, self-talk, emotional control, automaticity, and attentional control strategies measured by the TOPS Practice Scale. However, the items of the PSTS Dysfunctional Thoughts and Stress factor appear to have little conceptual relationship with the items of the TOPS practice scale measuring goal-setting, imagery, and activation. Therefore, it would be expected that this factor would have a moderate negative correlation with the TOPS Practice Scale, and moderate to strong negative correlations with the PHQ-9 and GAD-7. The results show the relationships between the PSTS Dysfunctional Thoughts and Stress factor and the TOPS Practice Scale, the PHQ-9 and the GAD-7 were as was expected, suggesting this factor had strong convergent validity.

The PSTS Relationship and Motivation Problems factor is measuring two underlying concepts. Very high scores on this factor indicate more interference with sport performance due

to relationship difficulties with others involved in the athlete's sport and due to difficulties with sport motivation. Moderately high scores could be indicative of a combination of problems in one or both domains. Problems with sport relationships are consistent with the experience of depression and anxiety, as measured by the PHQ-9 and GAD-7. However, problems in relationships appear to have little direct relationship with the use of mental skills and strategies specific to sports as measured by the TOPS Practice Scale. Difficulties with sport motivation would be expected to have a strong positive relationship with depression symptoms, as measured by the PHQ-9. Sport motivation difficulties appear to be inconsistent with items of the TOPS Practice Scale measuring goal-setting, self-talk, attentional control, and activation strategies. On the other hand, sport motivation difficulties appear to have little relationship with the items of the TOPS Practice Scale measuring imagery, emotional control, automaticity, and relaxation. Sport relationship difficulties also appear to have little direct relationship to anxiety, as measured by the GAD-7.

Due to the differing relationships between the two constructs measured by the PSTS Relationship and Motivation Difficulties factor, it would be expected that this factor would have a weak negative correlation with the TOPS, a weak positive correlation with the GAD-7, and a weak to moderate positive correlation with the PHQ-9. The results suggest that the PSTS Relationship and Motivation Problems factor has strong convergent validity, as evidenced by a weak negative correlation with the TOPS Practice Scale, and weak positive correlations with the PHQ-9 and GAD-7.

The relationship between the PSTS Injury Concerns factor and the validity measures suggests moderate convergent validity. Athletes that are dealing with injuries are likely not actively practicing, so their use of psychological skills in practice would appear to be less related

to their injury concerns. Therefore, it would be expected that the Injury Concerns factor would have a near zero correlation with the TOPS Practice Scale. However, experiencing injury and coping with recovery appears intuitively tied to the experience of depression symptoms, meaning a moderate positive correlation between the Injury Concerns factor and the PHQ-9 total score would be expected. It would also be expected that worrying about past injury and fearing future injury or sickness would be strongly related to general anxiety. Thus, a moderate positive correlation would be expected between this factor and the GAD-7. The results suggest the Injury Concerns factor has moderate convergent validity due to a slightly larger negative correlation than expected with the TOPS Practice Scale, and slightly weaker than expected positive relationships with the PHQ-9 and the GAD-7.

Lastly, the results suggest PSTS Environmental Stressors factor had strong convergent validity. Near zero correlations between the Environmental Stressors factor and the TOPS Practice Scale can be expected, as the Environmental Stressors factor specifically measures outside of sport experiences. Outside of sport stressors, such as difficulties with finances, school, and the social landscape are likely factors that contribute to depression and anxiety.

PSTS Item Analysis

To examine how each item contributes to internal consistency of the PSTS, as well as how internal consistency could be improved, alpha-if-item-deleted and corrected-item total correlations were calculated (see Table 6). Alpha-if-item-deleted values greater than the value of coefficient alpha indicate that an item reduces internal consistency. All items on the PSTS had equal or lower alpha-if-item-deleted values compared to the value of coefficient alpha for the PSTS (.91). Based on the alpha-if-item-deleted analysis, no items adversely affect internal consistency. For corrected item-total correlations, all items of the PSTS had positive correlations

with the TOPS Practice Scale, indicating that what each item measures is consistent with what the other items measure.

Alpha-if-item-deleted and corrected-item correlations were also calculated to examine how each item contributes to internal consistency of the PSTS, as well as how internal consistency could be improved in male and female samples separately. All items had alpha-if-item deleted values equal to or less than coefficient alpha for the male sample. Additionally, in the male sample all items had positive corrected item-total correlations.

All items had an alpha-if-item-deleted value equal to coefficient alpha for the female sample except for item 15, which had an alpha-if-item deleted value of .91. This value is greater than the coefficient alpha for the female sample (.90), indicating that item 15 reduces the internal consistency of the SIC PSTS in the female sample. Furthermore, all items had moderate to high positive corrected item-total correlations in the female sample, except for item 9, which had a corrected item-total correlation of .26.

Item-level correlations with the TOPS Practice Scale were conducted to examine which items contributed to the convergent validity of the PSTS (see Table 7). The results of the item-level correlation indicate that the SIC PSTS items contribute to overall convergent validity of the PSTS. Items 3, 9, 16, 17, 18, 19, 21, 23, 24, and 25 had low correlations with the TOPS Practice Scale. However, it was expected that these items would have near zero correlations with the TOPS Practice Scale, as these items represent concepts such as difficulties in sport relationships (3, 16, 17, 19), cockiness (9), injury concerns (21, 22,23, 24), or outside of sport stressors (18, 20, 25, 26) that conceptually are not related to the use of sport-specific mental skills and strategies as measured by the TOPS Practice Scale.

The convergent validity of the PSTS was also examined in sub-populations of the sample by conducting item-level correlations with the TOPS Practice Scale total score for male and female subgroups separately (see Table 7). Similar to the larger sample, the majority of items on the PSTS items had small to moderate negative correlations with the TOPS Practice Scale in the gender-specific samples. However, in the male sample, items 2, 3, 9, 18, 20, 21, 22, 24, and 25 all had low correlations with the TOPS Practice Scale and in the female sample items 3, 7, 9, 16, 17, 18, 19, 21, 23, 25, and 26 all had low correlations. Similar to the larger sample, it was expected that these items would have a near zero relationship with the TOPS Practice Scale in the gender-specific samples, with the exception of item 2 (Being too critical of myself) and item 7 (Difficulty relaxing). Both of the latter items tap into cognitive interferences with sport performance, which are likely to have an inverse relationship with the use of psychological skills and mental strategies to improve sport performance. Therefore, it would be expected that both of these items would have weak to moderate negative correlations with the TOPS Practice Scale. However, the results suggest that item 2 does not contribute to the convergent validity of the male sample and item 7 does not contribute to the convergent validity of the female sample.

PSCS Confirmatory Factor Analysis

Thirteen cases had a Mahalanobis distance greater than 54.05 for the PSCS (N=239) and Mardia's (1974) coefficient was 22.35. All factor variances were constrained to one and equality constraints were imposed for the Overly Confident/Critical factor, the Injury Concerns factor, and the Pain Intolerance factor. The six-factor model of the PSCS fit the data poorly, as indicated by a significant Satorra-Bentler chi-square statistic ($\chi^2(192, N = 239) = 642.09, p < .001$), an RMSEA value above .08 (RMSEA = .10), and a CFI score below .90 (CFI = .71). Therefore, an EFA was conducted on the PSCS.

PSCS Exploratory Factor Analysis

The variance-covariance matrices of the PSCS were significantly different between male (n = 93) and female (n=146) participants (Box's M(351, 118591.003) = 498.78, $p < .001$), and between participants at different levels of NCAA competition (DI (n = 48), DII (n = 111), and DIII (n = 80)). These groups were analyzed together due to small sample sizes. There was no significant difference between the average scores of males and females on the items of the SIC PSCS (F(1, 237) = 1.34, p =.248) or between the average scores of the participants in different levels of NCAA competition (F(2, 236) = 1.04, p =.356).

Table 8 contains the pattern matrix coefficients for the first principal component of the PSCS. The first principal component of the PSCS has excellent internal consistency (Cronbach's α = .92). Item 15 (Problems with my coach(es)) and item 25 (Maintaining an acceptable grade point average) had non-salient pattern matrix coefficients, while all other items had salient pattern matrix coefficients. The procedures used to determine the number and nature of the factors underlying the PSCS were identical to those used for the PSTS. The Parallel Analysis indicated two factors, while the MAP test indicated four factors. Factor solutions consisting of two, three, and four factors were extracted and rotated and the four-factor structure for the PSCS was determined to be most meaningful; hence, four factors were extracted and an oblique rotation with Delta value of -2 was used (see Table 9).

For factor 1, items 1, 2, 4, 5, 6, 7, 8, 10, 11, and 12 had salient positive coefficients. Almost all of these items related to difficulties associated with maladaptive thought processes or cognitive stress, with the exception of item 12, which related to difficulty motivating oneself. Factor 1 was named Dysfunctional Thoughts and Stress due to the majority of items explicitly measuring cognitive dysfunction or stress. For factor 2, items 3, 14, 15, 16, and 19 had salient

positive coefficients. Most of the items on factor 2 are clearly related to difficulties interacting with others within the sport domain. Item 14 ("Others have commented that I am not motivated in my sport") could be interpreted both as a measure of problems interacting with others, as well as a measure of problems with motivation. While Item 9 ("Overly optimistic (cocky) thoughts") did not have a salient loading, it approached salience on factor 2 (.39). This item may also be representative of both relationship and motivational difficulties, but its role as a measure of these constructs is less clear. Seeing that all but item 14 are clearly measuring sport relationship difficulties, and the items that are measuring sport relationship difficulties had the highest coefficients, factor 2 was named Sport Relationship Difficulties. For factor 3, items 13, 17, 18, 20, 25, and 26 had salient positive coefficients. Items 17, 18, 20, 25, and 26 are related to external stressors not directly related to sport. Item 13 ("Lack of desire and will to win") relates to motivational difficulties within sport and had the lowest loading of all items with salient coefficients. Due to the majority of items on factor 3 addressing outside of sport pressures, factor 3 was named Environmental Stressors. For factor 4, items 21, 22, 23, and 24 had salient positive coefficients. All the items with salient coefficients on factor 4 related to injury or injury management. As a result, factor 4 was named Injury Concerns.

PSCS Reliability

The PSCS has excellent internal consistency, with a coefficient alpha of .92 with a 95% confidence interval of .90 to .93. The PSCS also has excellent internal consistency across genders, as evidenced by a coefficient alpha of .93 for males of .93 and .91 for females.

PSCS Validity

The overall correlation between the SIC PSCS and the TOPS Competition Scale was moderate and negative (r (216) = -.42, $p < .001$), as were the correlations for males (r (84) = -.48,

$p < .001$) and females (r (132) = -.36, $p < .001$). Factor scores for the PSCS factors were correlated with TOPS Competition Subscale total scores, the PHQ-9 total scores, and the GAD-7 total scores (see Table 10).

Similar to the PSTS, factor scores on the PSCS Dysfunctional Thoughts and Stress factor would be expected to have a moderate to strong positive correlation with the PHQ-9 and GAD-7. Higher scores on the Dysfunctional Thoughts and Stress factor signify more interference with sport performance due to cognitive concerns specific to sport competition, which would be inconsistent with the self-talk, emotional control, goal-setting, activation, and relaxation strategies measured by the TOPS Competition Scale. However, the items of this factor don't have a clear conceptual relationship with the items of the TOPS Competition Scale measuring automaticity and imagery. Therefore, it is expected that the Dysfunctional Thoughts and Stress factor should have a moderate to strong negative correlation with the TOPS Competition Scale. The results are consistent with the expected relationships, which suggests the strong convergent validity of this factor.

Unlike the PSTS, the factor 2 of the PSCS (Sport Relationship Difficulties) is primarily measuring the concept of problems with sport relationships. Problems with sport relationships were expected to have moderate positive relationships with depression (PHQ-9) and anxiety (GAD-7) and have weak negative relationships with the use of mental skills and strategies specific to sports as measured by the TOPS Competition Scale. The results were consistent with the expected relationships, suggesting the strong convergent validity of the PSCS Sport Relationship Difficulties factor.

Higher scores on the PSCS Injury Concerns factor indicate more interference with sport performance due to the cognitive and behavioral management of injury. Athletes that are

managing injuries are likely not actively involved in competition, so their use of psychological skills in competition would appear to be less related to their injury concerns. Therefore, it would be expected that the Injury Concerns factor would have a near zero correlation with the TOPS Competition Scale. Experiencing injury and coping with recovery appears intuitively tied to the experience of depression symptoms, meaning a moderate positive correlation between the Injury Concerns factor and the PHQ-9 total score would be expected. It would also be expected that worrying about past injury and fearing future injury or sickness be strongly related to general anxiety. Thus, a moderate positive correlation would be expected between this factor and the GAD-7. Consistent with the expected relationships, the direction of the correlations between the Injury Concerns factor and the PHQ-9 and GAD-7 were both positive. However, the strength of these correlations were both weak. Additionally, the correlation between the Injury Concerns factor and the TOPS Competition Scale was weak and negative, which was unexpected. The weak negative correlation with the TOPS Competition Scale and the weak positive correlations with the PHQ-9 and GAD-7 suggest the PSCS Injury Concerns factor has moderate convergent validity.

The PSCS Environmental Stressors factor specifically measures outside of sport experiences and how they interfere with sport performance. Therefore, a near zero correlation between this factor and the TOPS Competition Scale would be expected. On the other hand, outside of sport stressors, such as difficulties with finances, school, and the social landscape are likely factors that contribute to depression and anxiety. Hence, moderate positive relationships would be expected between this factor and the PHQ-9 and GAD-7. The results suggest that the Environmental Stressors factor has moderate convergent validity due to a slightly larger than

expected negative correlation with the TOPS Competition score and slightly weaker positive correlations with the PHQ-9 and GAD-7.

PSCS Item Analysis

All items on the PSCS had alpha-if-item-deleted values equal to or lower than the value of coefficient alpha and moderate to high positive corrected item-total correlations (see table 11). For males, all items except for item 25 had alpha-if-item-deleted values equal to coefficient alpha and had moderate to high positive corrected item-total correlations. Item 25 had an alpha-if-item-deleted value of .94 and a corrected item-total correlation of .24. For females, no items adversely affected internal consistency and all items had moderate to high positive corrected item-total correlations, except for item 15, which had a corrected item-total correlation of .28.

Item-level correlations between each item on the PSCS and the TOPS Competition Scale indicated that all items except item 15 ($r(216) = -.05$) and item 9 ($r(216) = .00$) had small to moderate negative correlations with TOPS Competition Scale total score (see Table 12). For the male sample, all items except item 15 ($r(84) = -.09$) and item 25 ($r(84) = -.05$) had small to moderate negative correlations with the TOPS Competition Scale. For the female sample, all items except item 15 ($r(132) = -.03$), item 16 ($r(132) = .01$), item 17 ($r(132) = -.03$), and item 19 ($r(132) = -.03$) had small to moderate negative correlations with the TOPS Competition Scale.

Congruence Coefficient between Factors of PSTS and PSCS

Coefficients of congruence were calculated to determine the degree of factorial similarity between the factors of the PSTS and the PSCS (see Table 13). Per the guidelines set by Lorenzo-Seva and ten Berge (2006), the coefficients of congruence between the PSTS Dysfunctional Thoughts and Stress and the PSCS Dysfunctional Thoughts and Stress and the PSTS Relationship and Motivation Problems and the PSCS Sport Relationship Difficulties have

a good degree of factorial similarity, while the PSTS Injury Concerns and PSCS Injury Concerns have a fair degree of similarity. The coefficient of congruence between the PSTS Environmental Stressors and the PSCS Environmental Stressors was below .85, which suggests that these factors should not be interpreted as equal.

Correlation between PSTS and PSCS

The PSTS factor scores were correlated with the theoretically equivalent factor scores of the PSCS to determine the relationship between athletes' experiences in training and athletes' experiences in competition (see Table 14). The factor scores of the Dysfunctional Thoughts and Stress factors, as well as the factor scores of the Injury Concerns factors had large and significant positive correlations between them. However, the correlation between the factor scores of the Relationship and Motivation Problems and Sport Relationship Difficulties factors has a small significant positive correlation, and the Environmental Stressors factors had an insignificant, weak positive correlation between them. The strong correlation of the factor scores for the factors of the PSTS and the PSCS Dysfunctional Thoughts and Stress, Injury Concerns, and to a lesser extent, Relationship and Motivation Problems and Sport Relationship Difficulties factors supports that the PSTS and PSCS are assessing similar constructs. The weak and non-significant correlation between the Environmental Stressors factors suggests that outside of sport stressors that negatively impact sport performance in training scenarios differ from the factors that negatively impact sport performance in competition. In addition to factor scores, scaled scores were calculated for each factor. The scaled scores of the PSTS factors were then correlated with the corresponding PSCS factors (see Table 15). The results of the scaled score correlations between the PSTS and PSCS factors were all large, significant, and positive. These results provide further evidence for the convergent validity of both the PSTS factors and the PSCS

factors, as it is expected that factors that interfere with sport training would be have a strong positive relationship with the factors that interfere with sport competition.

CHAPTER 6

DISCUSSION

While many assessment tools exist that evaluate specific barriers to sport performance, few measures explore the broad spectrum of cognitive and behavioral barriers to sport performance in training and competition scenarios, independently. The purpose of the current study was to investigate the reliability and validity of the factor structure of the Problems in Sport Training Scale (PSTS) and Problems in Sport Competition Scale (PSCS) of the Sport Interference Checklist (SIC; Donohue, Silver et al., 2007). It was hypothesized that the previously established four-factor model of the PSTS and six-factor model of the PSCS from the Donohue, Silver et al. (2007) study would be replicated in a sample of NCAA student-athletes using confirmatory factor analysis (CFA) techniques. Results indicated a poor fit between the examined data and hypothesized model for both the PSTS and PSCS. Therefore, separate exploratory factor analyses (EFA) were conducted on each SIC subscale to examine their underlying factor structure. The resulting EFAs yielded four-factor models for the PSTS and the PSCS. The practical implications, limitations of the study, and directions for future research are discussed further, including recommendations to add, subtract, and modify items of the SIC are made with the goal of improving the factor structure.

The results of CFA did not support the four-factor model of the PSTS or the six-factor structure of the PSCS as determined Donohue, Silver et al. (2007). Both the PSTS and PSCS had a significant Satorra-Bentler χ^2 statistics, RMSEA values above .08, and CFI values below .90. Due to the current data not fitting either hypothesized model, EFAs were conducted using principal components analysis to explore other possible models for each scale of the SIC.

Results of the exploratory analysis showed the PSTS to have excellent internal consistency in the overall sample and across genders, as well as moderate convergent validity. The Cronbach's alpha for the current model (.91) was identical to that of Donohue, Silver et al. (2007). Four factors were extracted from the PSTS (Dysfunctional Thoughts and Stress, Relationship and Sport Problems, Environmental Stressors, Injury Concerns).

In the current model, all items of the PSTS loaded onto one of the four factors, except for item 3. While item 3 did not have a salient loading, it approached salience for the Relationship and Sport Problems factor. In the Donohue et al. (2007) model, only 14 of the 26 items had salient loadings on a PSTS factor. This difference is likely due to a difference in the criteria used for salience. In the current study, a factor loading of .40 or above was considered salient, while Donohue, Silver et al. (2007) considered a factor loading of .55 or above to be salient. Despite the differences in the number of items included in each factor, the themes of the four factors of the current model and the four factors of the model proposed by Donohue, Silver et al. (2007) are similar. Both models have a factor that measures problems associated with negative cognitions and anxiety, a factor that measures environmental stressors outside of sport, a factor that measures problems associated with injuries, and a factor that measures problems in sport relationships. However, the items assessing motivation are not accounted for in Donohue's model, as these items do not load on any factor. This again may be due to the higher salience criteria used in the Donohue, Silver et al. (2007) study.

The items of the PSTS Dysfunctional Thoughts and Stress factor had strong convergent validity, as evidenced by moderate positive relationships with the PHQ-9 and the GAD-7 and a weak negative relationship with the TOPS Practice Scale. The correlations with the PHQ-9 and GAD-7 were consistent with the expected direction and strength of the relationships. While it

was expected that the correlation with the TOPS Practice Scale would be moderate to strong, the correlation was approaching moderate (.27), indicating that this factor is a good measure of the cognitive experiences that interfere with performance in sport training.

The items of the PSTS Relationship and Motivation Problems factor had strong convergent validity. Strong relationships with the validity measures were not expected, and results supported this as the Relationship and Motivation Problems factor had a weak negative correlation with the TOPS Practice Scale and weak positive correlations with the PHQ-9 and the GAD-7.

The items of the PSTS Environmental Stressors factor had strong convergent validity. There were significant positive correlations between the factor scores and the PHQ-9 and GAD-7, and a near zero positive correlation between the factor scores and the TOPS Practice Scale. The correlations with the PHQ-9 and GAD-7 were consistent with the expected direction and strength of the relationships. Additionally, the near zero correlation with the TOPS Practice Scale was consistent with the expected relationship between environmental stressors and mental skills and strategies that are used during sport training.

The items of the PSTS Injury Concerns factor had moderate convergent validity, as evidenced by weak positive correlations with the PHQ-9 and GAD-7, and a weak negative correlation with the TOPS Practice Scale. The correlation with the TOPS Practice Scale was consistent with the expected direction and strength of the relationship. However, the correlations with the PHQ-9 and GAD-7 were weaker than expected.

These results suggest that the quality of an athlete's cognitive experience (i.e., negative self-talk, anxiety), motivational disposition, and sport relationships have the strongest associations with an athlete's ability to implement skills and strategies that may facilitate

performance. Conversely, stress outside of sport appears to have little association with athletes' use of mental skills and strategies. This may be due to athletes not generalizing effective psychological skills to areas of their life outside of sports. Sport-specific psychological skills may have low ecological validity in non-sport domains, or athletes have minimal training or awareness of the possible benefit of generalizing these skills. In the current sample, the majority of student-athletes had never met with a sport psychologist (82%) or a mental health professional (77%). This suggests that student-athletes have not had formal training in the development and use of psychological skills. These findings support the need for a more holistic outlook when providing clinical services to student-athletes. Donohue and colleagues' (2015) family behavior model and Gardner and Moore's (2007) mindfulness-acceptance and commitment approach are two examples of treatment modalities that integrate both in sport and outside of sport concerns into the conceptualization of the athlete, allowing for the concurrent treatment of sport-performance and mental health. Currently, the SIC is being used as an outcome measure in a large, randomized controlled trial, exploring the efficacy of the Donohue et al. (2015) model in student-athletes with substance abuse concerns, which will help to elucidate the efficacy of an integrated approach to student-athlete psychological treatment.

The PSCS has excellent internal consistency in the overall sample and within genders, has moderate convergent validity, and all but two items (15, 25) are measuring the same construct. Four factors were extracted from the PSCS (Dysfunctional Thoughts and Stress, Sport Relationship Difficulties, Injury Concerns, Environmental Stressors). All items of the PSCS loaded on one of the four factors, except for item 9, which did not load on any factor. However, item 9 approached salience on the Sport Relationship Difficulties factor. In the Donohue, Silver et al. (2007) model, 21 of the 26 items loaded on a factor. As was the case with the PSTS, the

difference in criteria for what is considered a salient loading is likely responsible for the fewer item loadings in the Donohue, Silver et al. (2007) model. In comparing the four-factor structure of the current model to the six-factor structure of Donohue's model, there are some common themes among the factors and some noticeable differences. The Dysfunctional Thoughts and Stress factor for both models are well defined and primarily measure negative cognitions and anxiety, with all eight items that load on the Donohue model being represented in the current model. The current model includes one factor inclusive of all items that explore sport injury, while the Donohue model had the four items focusing on injuries split into two factors with two items each; one focusing on fears and worries about getting injured and the other focusing on pain management. Both models also have a factor that primarily measures environmental stressors. The principal difference between the current model of the PSCS and the Donohue model is the representation of the sport relationships and motivation themes. The current model has one central factor that examines experiences associated with relationship difficulties in sport, while the Donohue model has the relationship themed items represented across multiple factors or not represented on a factor at all. Conversely, in the current model, the motivation items were not represented on any one factor and were dispersed across the Dysfunctional Thoughts and Stress, Sport Relationship Difficulties, and Environmental Stressors factors; while Donohue's model had a specific factor that included most of the motivation items. Lastly, the Donohue model had a sixth factor (Overly Confident/Critical) that included only two items (Overly optimistic (cocky) thoughts; Being too critical of teammates) that do not appear to have a direct relationship with each other.

Items of the PSCS Dysfunctional Thoughts and Stress factor had strong convergent validity, as evidenced by moderate positive relationships with the PHQ-9 and the GAD-7 and a

moderate negative relationship with the TOPS Competition Scale. The correlations with the PHQ-9, GAD-7, and TOPS competition scale were consistent with the expected direction and strength of the relationships. The items of the PSCS Sport Relationship Difficulties factor had strong convergent validity, as evidenced by moderate positive correlations with the PHQ-9 and GAD-7 and a weak negative correlation with the TOPS Competition Scale. The correlations with the PHQ-9, GAD-7, and TOPS Competition Scale were consistent with the expected direction and strength of the relationships.

The items of the PSCS Injury Concerns factor had moderate convergent validity, as evidenced by weak positive correlations with the PHQ-9 and GAD-7 and a weak negative correlation with the TOPS Competition Scale. The correlations with the PHQ-9 and GAD-7 were both positive, as expected. However, the strength of these relationships was weaker than expected. The correlation with the TOPS Competition Scale was small and negative, and so was slightly larger than expected.

It was expected that the PSCS Environmental Stressors factor would have a near zero correlation with the TOPS Competition Scale and moderate positive correlations with the PHQ-9 and GAD-7. The results show a weak negative relationship with the TOPS Competition Scale and weak positive relationships with the PHQ-9 and GAD-7. Consequently, the stronger than expected relationship with the TOPS Competition Scale and weaker relationships with the PHQ-9 and GAD-7 suggest moderate convergent validity of the Environmental stressors factor.

This study provides evidence for a high degree of factorial similarity between the PSTS Dysfunctional Thoughts and Stress and the PSCS Dysfunctional Thoughts and Stress factors, the PSTS Relationship and Motivation Problems and the PSCS Sport Relationship Difficulties factors, and the PSTS Injury Concerns and the PSCS Injury Concerns factors, as evidenced by

the congruence coefficients between each dyad. However, the congruence coefficient between the PSTS Environmental Stressors factor and the PSCS Environmental Stressors factor was below the threshold to consider the factors congruent (Lorenzo-Seva & ten Berge, 2006). A similar pattern was found when factor scores of the PSTS factors were correlated with the factor scores of the corresponding PSCS factors. All correlations were significant and positive with the exception of the relationship between the Environmental Stressors factors, which had a weak and non-significant positive correlation. This pattern was not reflected when scaled scores were correlated, as all correlations between factors of the PSTS and PSCS were strong, significant, and positive.

Two conclusions can be drawn from these findings. First, the lack of factorial similarity and the non-significant correlation of the factor scores for the Environmental Stressors factors suggest that the outside of sport stressors, such as academic demands, financial concerns, and social difficulties that student-athletes experience have distinctive impacts on their performance in sport training, and separately in sport competition. This supports the conclusions of Donohue et al. (2007) that student-athlete experiences in training and competition are unique. Together, the factorial similarity, the strong correlations between the factor scores of the Dysfunctional Thoughts and Stress, Relationship and Motivation Problems/Sport Relationship Difficulties, and Injury Concerns factors intimate that there is considerable overlap amongst the factors that interfere with sport performance in training and competition.

Second, the strong correlations between scale scores of the PSTS and PSCS factors must be interpreted with caution. While the strong correlations between the factors could be interpreted as support for a generalized model of barriers to sport performance (i.e., no difference between training and competition), it is important to note that items on scaled scores are un-

weighted and do not account for how representative an item is of the particular factor. In other words, higher endorsement of an item with a loading of .80 on a factor is accounted for just the same as higher endorsement of an item with a loading of .40. Compared to scaled scores, factor scores are inconvenient to calculate and are unlikely to be used in clinical practice. Therefore, it is recommended that scaled scores for both the PSTS and PSCS factors be used in clinical settings and are interpreted using the procedures developed by Donohue et al. (2015). The Donohue et al. (2015) model not only utilizes SIC scaled scores for both the training and competition scales, but also provides individual interpretation of the SIC items to aid in clinical decisions.

Limitations

A limitation of this study is the sample size used for analyses. Many SIC items had factor loadings that were not particularly high and Tabachnick and Fidell (2007) recommend that when factor loadings are not high, a sample of 300 or more participants is best for yielding replicable results. In the current study 320 participants consented for participation, but only 252 agreed to the study and completed the assessment measures. Furthermore, the removal of outliers detected further reduced the sample in both the PSTS (N=240) and the PSTS (239). The small sample size of this study may have contributed to the dissimilarities of the current EFA and the previous factor structure found by Donohue, Silver et al. (2007). The small sample size also impacts the replicability of the factor structure extracted from the data in the EFA analyses in future samples.

Analyses indicated that differences existed in the patterns of responses based on gender in the PSCS scale. The data for the PSCS has excellent internal consistency and moderate convergent validity for both the male and female subgroups. However, Bartlett-Box procedures

found differences in how males and females responded to the PSCS. Differences in responses to the PSTS and PSCS were also found across the three levels of NCAA competition. Unfortunately, due to the small sample size, doing separate analyses for these homogenous subgroups was not feasible. It is also possible other subgroups existed in the sample that were not accounted for. Examples include athlete sport (i.e., ice hockey vs. swimming), the type of sport (team vs. individual), and funding type (scholarship vs. non-scholarship). However, the small number of participants in each of these subgroups prevented further analysis.

A third limitation of this study is the nature of the online recruitment and survey administration. The use of online surveys is commonplace due to the low financial and time cost, design flexibility, increased anonymity of respondents, and increased access to large samples (Umbach, 2004), and have been used to sample similar populations to the current study, including student-athletes (Hutching, Lac, Hummer, & LaBrie, 2011) and coaches (Knight, Reade, Selzler, & Rodgers, 2013; Kroshus, Sherman, Thompson, Sossin, & Austin, 2014). However, low response rates lead to the risk of response bias due to fundamental differences between respondents and non-respondents (Porter, 2004). The response rates for coaches (2.3%) who were solicited for participation in the current study and the athletes who were provided access to the survey link (approximately 27%) were considerably lower than other research using online recruitment of coaches (43%, Knight et al., 2013; 19%, Kroshus et al., 2014) and student athletes (88.8%, Hutchings et al., 2011). Consequently, the low response rates may not account for systematic biases in the coaches who agreed to have their athletes participate, and for biases in which athletes agreed to complete the survey. It should be noted that a review of the literature found no other instances where the online solicitation of coaches was used as an intermediary for recruitment of athletes, making comparisons of the current coach response rates to previous

research preliminary at best. The intermediary role of coaches in the current methodology also does not account for the level of influence a coach has on the athlete completing the survey. Some coaches were comfortable providing emails to athletes directly, while others agreed only to forward an anonymous link to the team. Whether or not all coaches actually forwarded the emails is unknown. It is also unknown how the coaches presented the study to athletes if they did forward the email. Some coaches may have colored involvement as a voluntary opportunity, while others may have made it appear more as a mandatory task. The power differential between coach and athlete may have had unintentional effects on if and how the athlete responded. Even though it was clearly stated in the study description that coaches would not have access to individual responses, it is still possible that athletes were wary of providing information that they felt could be used against them.

Despite these limitations, the current study has several strengths. Rigorous factor analytic techniques were used for both the confirmatory and exploratory analyses. Multiple criteria were used to determine model fit in the CFA for both the PSTS and PSCS. Using multiple criteria is highly recommended in CFA and helps to accommodate for the specific inadequacies inherent to each individual criterion (Boomsma, 2000). For the EFA, detailed analyses were conducted exploring the reliability and validity of each scale. This included multiple item analyses. The rich information provided from these analyses allows for more appropriate and meaningful recommendations to be made for future modification. Furthermore, multiple factor structures and factor rotations were examined to determine the best solution for each scale. This detailed analysis of factor structure and rotation is considered best practice in EFA and provides a level of detail that is often overlooked in test development (Costello & Osborne, 2005).

Multiple validity measures were used to examine the convergent validity of the SIC, including measures examining thoughts and behaviors in sport-specific contexts and in the general mental health domain. The breadth of validity measures provides a stronger understanding of the SIC's contribution to the sport performance nomological network. The results of validity analyses solidify the SIC's purpose as a measure of cognitive and behavioral factors that interfere with sport performance. The validity of this study is further supported by the wide variety of athletes who participated. By recruiting across multiple NCAA divisions, conferences, sports, and teams, a diverse sample of athletes participated from all across North America. This broad sample strengthens the conclusions and increases the generalizability of the findings to the greater student-athlete population. Moreover, the wide representation of student-athletes protects against the dangers that are present from using convenience samples.

RECOMMENDED MODIFICATIONS

The following recommendations are offered with the goal to improve the factor structure of the SIC PSTS and PSCS to include clear factors of dysfunctional thoughts and stress, motivation problems, sport relationship difficulties, environmental stressors, and injury concerns.

The first recommendation is to remove item 9 ("Overly optimistic (cocky) thoughts") from the measure. In Donohue's model, this item did not load on any factor of the PSTS and was part of a doublet factor on the PSCS. In the current model item 9 had a non-salient loading on the first principal component of the PSTS and did not load on any factor as part of the PSCS. It also reduced the reliability and validity of both the PSCS and the PSTS. This item appears to cluster with other items that measure difficulties in sport relationships. While cockiness and overconfidence are likely to have impacts on sport performance, its association with stress and

strain in relationships is less clear. Thus, item 9 does not appear to theoretically or empirically contribute to the SIC's main purpose of assessing for barriers to sport performance.

Second, it is recommend that modifications be made to the items (12, 13,14) associated with motivation with the goal of developing a unique motivation factor. Item 12 is a compound item (i.e., one item that asks multiple questions). Compound items contribute to ambiguity about what the item truly assesses. The "motivate" verbiage is clearly addressing motivation. However, the "push myself" verbiage could be interpreted as a problem of thinking. This could be responsible for the inconsistency in factor loadings in the PSTS and PSCS. It is recommended that this item be split into two "inability to motivate myself" and "inability to push myself." This eliminates the compound nature of the item and increases the overall number of items that are measuring motivation. Item 13 is also a compound item, measuring both the athletes' desire and will to win. It is recommended that this item be split into two questions. This would yield one question targeting the lack of desire to win ("Lack of desire to win"), and the other targeting the lack of will to win ("Lack of will to win"). Item 14 is a first person declarative sentence, which differs from most other SIC items that are noun phrases. Additionally, there is some ambiguity in the nature of item 14 ("Others have commented that I am not motivated in my sport"). The reference to "Others" states that this item is on some level measuring how the athlete relates to other people. However, there is a clear reference to motivation, as well. It is recommend that references to "others" be deleted and the phrasing be modified to directly assess how motivation level interferes with sport performance ("Problems with motivation in my sport").

In addition to the compound items that assess motivation, there are also compound items that assess for the other target constructs of the SIC. Items 4, 5, and 8 are compound and target dysfunctional thoughts and stress. It is recommended that item 4 be split into two questions; one

that assesses how frequently athletes are distracted by people who watch them perform and one that assesses for how upsetting it is for people to watch them perform. It is recommended that reference to "concentration" be removed from item 5 to improve clarity and concision, making the item "difficulty maintaining focus to the task at hand." Similarly, it is recommended "overconcerned" be removed from item 8. The rationale is that "overconcerned" and "worry" targets the same experience for the athlete and that "worry" is a more understandable term than "overconcerned."

Items 18 and 20 are compound items targeting outside of sport stressors. It is recommended that item 18 be reworded as "Problems due to lack of money," eliminating any reference to stress. It is expected that problems with money inherently involve stress, so an overt reference to stress is not necessary. Additionally, this rewording will keep the format consistent with other SIC items (i.e., "Problems with Family"). Item 20 appears to be exploring two unique (and possibly interdependent) constructs. It is recommended that item 20 be split into two individual questions; one of which examines the impact of a lack of close supports ("Lacking close supports") and the other the impact of feeling home sick ("Being home sick").

Item 21 is a compound item and targets problems with injuries. It is recommended that this item be split into two distinct items. For instance, one item could specifically assess fears associated with sport injuries ("Fear of getting injured in sport") and one item could specifically assess fears associated with getting sick ("Fear of getting sick"). The rationale behind this is that a fear of sickness is independent to the fear of injury.

Based upon the proposed modifications, the SIC would have a total of 30 items. Ten items would target dysfunctional thoughts and stress, six items would target environmental

stressors outside of sport, five items would target problems in sport relationships, five items would target motivational concerns, and four items would target injury concerns.

FUTURE DIRECTIONS

There are many future directions to be taken regarding research for the SIC. As the current study extracted a novel factor structure for both the PSTS and PSCS, future research would benefit from conducting confirmatory factor analysis on the new structure. Determining if the model fits the four-factor structure will provide evidence either supporting or refuting this model. Future results showing that the four-factor structure holds up in new samples will improve the confidence level of the SIC's utility and interpretability, as it currently stands.

As multiple recommendations for future modifications of the SIC have been made, future exploratory procedures are warranted to examine the usefulness and functionality of the suggested modifications. The modifications include the deletion of items, re-phrasing of items, and the creation of new items. These modifications will naturally impact the factor structure of the SIC, requiring new validation studies to be conducted. It is also important to determine if the newly written questions embody the constructs they are targeted to assess.

As mentioned before, the number of participants in the current sample prevented individual analyses for homogenous subgroups that may be present. Future research should focus on gaining very large samples so that appropriate statistical analyses can be conducted on subgroups of males, females, DI athletes, DII athletes, DIII athletes, and other possible influential subgroups. Of particular interest would be examining the presence of possible differences in the pattern of responding for sport-specific samples. Each sport has its own nuances that may contribute to unique cognitive and behavioral concerns.

The significant relationships found between the SIC factors and measures of anxiety and depression warrant further investigation of how the factors that interfere with sport performance relate to psychopathology. While assessment measures used in the current study are valid screening tools for depression and generalized anxiety that have been found to serve as strong predictors of clinical disorders (Kroenke et al. 2001; Spitzer et al. 2006), the use of more detailed assessments of student athlete mental health may allow for stronger conclusions about the relationship between sport performance barriers and clinical concerns. Examples of possible measurement tools to be used are the Structured Clinical Interview for DSM-5-Research Version (SCID-5-RV; First, Williams, Karg, & Spitzer, 2015), the Minnesota Multiphasic Personality Inventory-2-RF (MMPI-2-RF; Ben-Porath & Tellegen, 2008), and the Symptom Checklist 90-Revised (SCL90-R; Derogatis, 1994). This SCL90-R was used as a validity measure in the original SIC development study, which found that the Global Severity Index of the SCL90-R was positively correlated with most of the original SIC factors (Donohue, Silver et al., 2007).

In conclusion, this investigation provides support for the SIC as a reliable and valid measure for the assessment of the factors that interfere with sport performance in training and competition. While confirmatory factor analysis found that the current data did not fit the original factor structure of the SIC found by Donohue, Silver et al. (2007), exploratory factor analysis determined new four-factor structures in both training and competition. However, there may be five underlying constructs measured by the SIC (i.e., Dysfunctional Thoughts and Stress, Problems in Sport Relationships, Problems with Motivations, Injury Concerns, Outside of Sport Stressors). On the PSTS, the problems with motivation and problems in sport relationships constructs loaded together on one factor, while on the PSCS the motivation items did not load together, but rather independently on other factors. Hence, suggestions for modifications were

made in an attempt to improve the factor structure of the SIC. These results are to be interpreted in the context of a relatively small sample size, suggesting the need for continued psychometric exploration of the SIC.

APPENDIX A

DEMOGRAPHIC QUESTIONNAIRE ITEMS AND RESPONSE OPTIONS

- College attending: [Please write-out full name]
- Gender: [Male; Female]
- Age: [18; 19; 20; 21; 22; 23; 24; >24]
- What is your primary sport: [NCAA Football; NCAA Baseball; NCAA Track & Field (Outdoor); NCAA Cross-Country, NCAA Volleyball; NCAA Basketball; NCAA Softball; NCAA Golf; NCAA Soccer; NCAA Swimming & Diving; NCAA Tennis; NCAA Water Polo; NCAA Field Hockey; NCAA Bowling; NCAA Fencing; NCAA Gymnastics; NCAA Ice Hockey; NCAA Rifle; NCAA Skiing; NCAA Wrestling; NCAA Rowing; NCAA Lacrosse; NCAA Track & Field (Indoor)]
- Ethnicity: [Caucasian; African American; Asian; Hispanic; American Indian; Pacific Islander; Middle Eastern, Other; Multiethnic/Mixed]
- Class Status: [Freshman; Sophomore; Junior; Senior; 5th year; Graduate Student]
- NCAA Division: [I; II; III]
- Total number of years playing your primary sport: [1; 2; 3; 4; 5; 6; 7; 8; 9; 10; 11; 12; 13; 14; 15; 16; 17; 18; 19; 20; >20]
- Are you Red-shirting this year? [Yes; No]
- This year, are you typically a: [Starter; Non-Starter; N/A]
- Number of years playing your primary sport at this college (including this year): [1; 2; 3; 4; 5]
- Are you a team captain this year? [Yes; No]
- Do you consider yourself to be a leader on this team? [Yes; No]

- Are you considered an in-state or out of state student? [In-state; Out-of-State]
- What was your GPA last semester? (If a freshman, provide last high school GPA): [Write in]
- How many credits are you enrolled in this semester? [Write in]
- On average, how many hours per week do you spend in team related activities (i.e., practice, competitions, weight training, team meetings)? [Write in]
- Have you ever met with a sport psychologist before? [Yes; No]
- Have you ever seen a mental health professional before? [Yes; No]

APPENDIX B

RECRUITMENT FLOW CHART

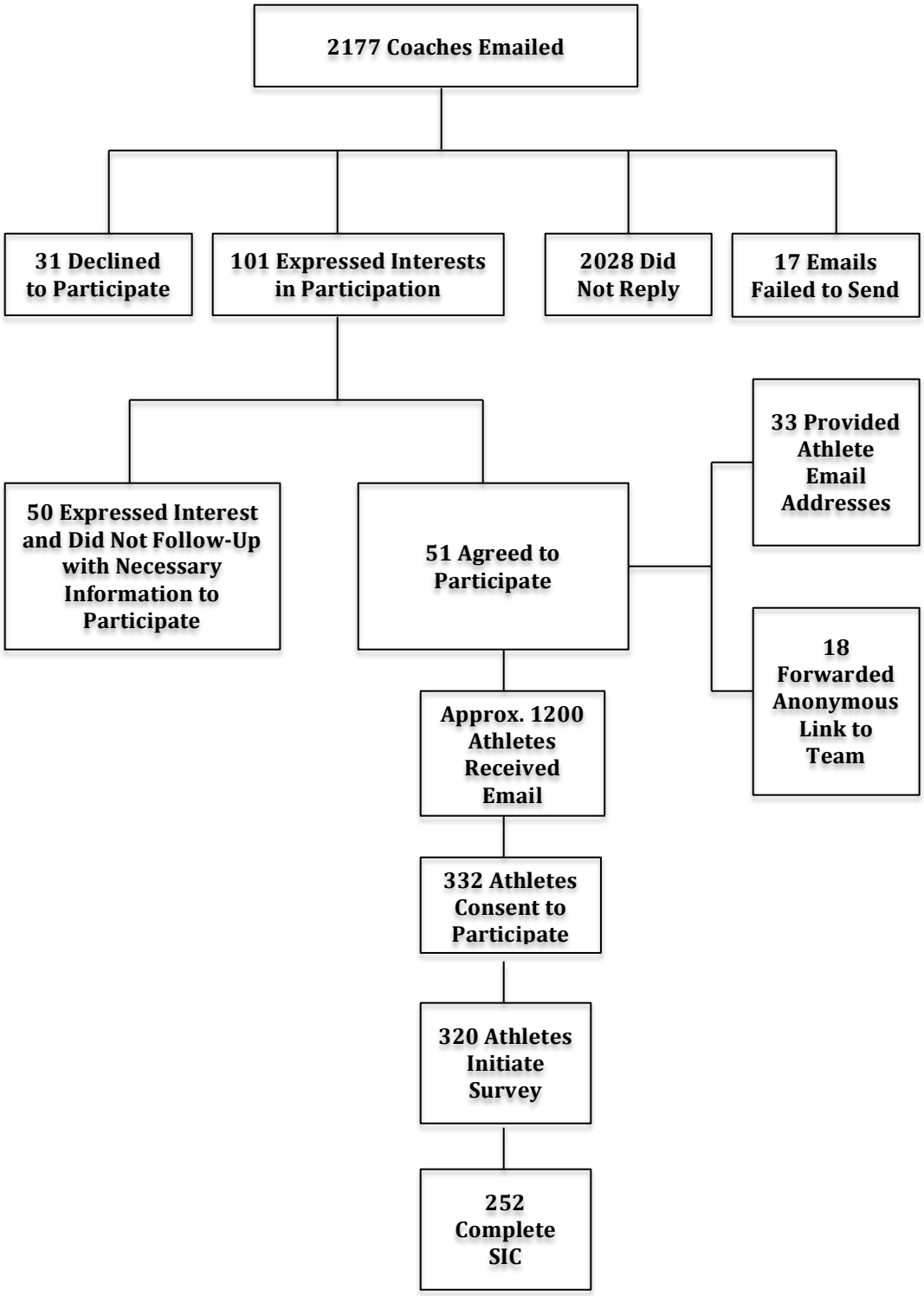

Figure 1. Recruitment Flow-Chart. This figure illustrates how study participants where recruited into the study.

APPENDIX C

TABLES

Table 1

Cronbach's Alpha for Sport Interference Checklist Factors

Problems in Sport Training Scale Factors	Cronbach's Alpha
Dysfunctional Thoughts and Stress	.88
Academic Problems	.77
Injury Concerns	.50
Poor Team Relationships	.66
Problems in Sport Competition Scale Factors	
Dysfunctional Thoughts and Stress	.90
Academic and Adjustment Problems	.73
Lack of Motivation	.79
Overly Confident/Critical	.67
Injury Concerns	.70
Pain Intolerance	.63

Note. These values are taken from Donohue, Silver, et al., 2007.

Table 2

Model-Data Fit Statistics for Sport Interference Checklist (SIC) Subscales

Model	Mardia's Coefficient	Satorra-Bentler χ^2	RMSEA	CFI
SIC Problem in Sport Training Scale	11.34	281.18***	.10	.81
SIC Problem in Sport Competition Scale	22.35	642.09***	.10	.71

*** $p < .001$

Table 3

First Principle Component of the Sport Interference Checklist Problem in Sport Training Scale

Item	Pattern Matrix Coefficient
1. Negative thoughts about personal performance	.69
2. Being too critical of myself	.63
3. Being too critical of teammates	.44
4. Distracted (or upset) by people who observe me	.60
5. Difficulty concentrating or maintaining focus to the task at hand	.60
6. Difficulty thinking positively once negative thoughts have occurred	.73
7. Difficulty relaxing	.67
8. Overconcerned or worry too much about what others think about my performance	.69
9. Overly optimistic (cocky) thoughts	.29
10. Feeling stressed out	.72
11. Hard to recover mentally once errors are made	.79
12. Inability to motivate or push myself	.63
13. Lack of desire and will to win	.54
14. Others have commented that I am not motivated in my sport	.39
15. Problems with my coach(es)	.40
16. Problems with my teammates	.47
17. Problems with my family	.52
18. Problems with or stress due to a lack of money	.46
19. Problems with others who are too involved in telling you what to do in your sport	.58
20. Being home sick or lacking close social supports	.52
21. Fear of getting injured or sick	.47
22. Difficulties dealing with physical pain	.56
23. Using prescribed medication to assist in the management of an injury	.45
24. Worrisome thoughts about past injuries	.41
25. Maintaining an acceptable grade point average (GPA)	.34
26. Difficulty with time management (how to fit everything in)	.56

Note. Coefficient alpha for the first principle component is .91.

Table 4

Factor Analysis of Problem in Sport Training Scale Items

Item	Factor 1	Factor 2	Factor 3	Factor 4	h^2
1. Negative thoughts about personal performance	**.76**	-.02	.00	.11	.63
8. Overconcerned or worry too much about what others think about my performance	**.76**	.06	.01	.01	.61
6. Difficulty thinking positively once negative thoughts have occurred	**.76**	.07	.13	-.06	.67
11. Hard to recover mentally once errors are made	**.75**	.11	.08	.09	.71
2. Being too critical of myself	**.71**	-.09	-.02	.16	.56
10. Feeling stressed out	**.68**	-.08	.07	.30	.66
7. Difficulty relaxing	**.62**	-.02	.14	.15	.52
4. Distracted (or upset) by people who observe me	**.54**	.28	.13	-.18	.48
5. Difficulty concentrating or maintaining focus to the task at hand	**.52**	.15	.05	.09	.39
15. Problems with my coach(es)	-.02	**.74**	-.04	.03	.53
16. Problems with my teammates	-.19	**.71**	.09	.33	.64
19. Problems with others who are too involved in telling you what to do in your sport	.10	**.59**	.02	.28	.53
14. Others have commented that I am not motivated in my sport	.05	**.58**	.16	-.16	.41
9. Overly optimistic (cocky) thoughts	.06	**.47**	-.09	.02	.23
12. Inability to motivate or push myself	.37	**.46**	.23	-.17	.55
13. Lack of desire and will to win	.25	**.46**	.17	-.07	.40
3. Being too critical of teammates	.23	.36	.07	-.01	.25
24. Worrisome thoughts about past injuries	.02	-.13	**.89**	-.08	.75
21. Fear of getting injured or sick	-.02	-.10	**.83**	.12	.70
22. Difficulties dealing with physical pain	.12	.08	**.65**	.07	.54
23. Using prescribed medication to assist in the management of an injury	.00	.11	**.61**	.07	.43
25. Maintaining an acceptable grade point average (GPA)	.10	-.13	-.02	**.68**	.49
18. Problems with or stress due to a lack of money	.02	.04	.15	**.66**	.52
26. Difficulty with time management (how to fit everything in)	.34	-.04	.03	**.56**	.51
17. Problems with my family	-.04	.27	.21	**.54**	.50
20. Being home sick or lacking close social supports	.13	.25	.05	**.47**	.40

Factor Intercorrelations	1	2	3	4
Factor 1	1.00			
Factor 2	.28	1.00		
Factor 3	.27	.23	1.00	
Factor 4	.25	.13	.19	1.00

Note. h^2 = communality. Salient factor pattern matrix coefficients are in boldface. Factor 1= Dysfunctional Thoughts and Stress, Factor 2= Relationship and Motivation Problems, Factor 3= Injury Concerns, and Factor 4=Environmental Stressors.

Table 5

Correlations between Sport Interference Checklist (SIC) Problems in Sport Training Scale (PSTS) Factor Scores and Validity measures

SIC PSTS Factor	TOPS Practice Total Score	PHQ-9 Total Score	GAD-7 Total Score
Dysfunctional Thoughts and Stress	-.27**	.42**	.36**
Relationship and Motivation Problems	-.20**	.17*	.11
Injury Concerns	-.11	.24**	.13
Environmental Stressors	.02	.29**	.37**

*$p < .05$ ** $p < .01$.

Table 6

Item Analysis to Improve Internal Consistency of the Sport Interference Checklist (SIC) Problems in Sport Training Scale

Item		Alpha if Item Deleted	Corrected Item-Total Correlation
1.	Negative thoughts about personal performance	.90	.63
2.	Being too critical of myself	.90	.57
3.	Being too critical of teammates	.90	.39
4.	Distracted (or upset) by people who observe me	.90	.53
5.	Difficulty concentrating or maintaining focus to the task at hand	.90	.53
6.	Difficulty thinking positively once negative thoughts have occurred	.90	.67
7.	Difficulty relaxing	.90	.61
8.	Overconcerned or worry too much about what others think about my performance	.90	.61
9.	Overly optimistic (cocky) thoughts	.91	.25
10.	Feeling stressed out	.90	.67
11.	Hard to recover mentally once errors are made	.90	.74
12.	Inability to motivate or push myself	.90	.57
13.	Lack of desire and will to win	.90	.48
14.	Others have commented that I am not motivated in my sport	.91	.34
15.	Problems with my coach(es)	.91	.35
16.	Problems with my teammates	.90	.44
17.	Problems with my family	.90	.48
18.	Problems with or stress due to a lack of money	.90	.42
19.	Problems with others who are too involved in telling you what to do in your sport	.90	.54
20.	Being home sick or lacking close social supports	.90	.47
21.	Fear of getting injured or sick	.90	.44
22.	Difficulties dealing with physical pain	.90	.52
23.	Using prescribed medication to assist in the management of an injury	.90	.41
24.	Worrisome thoughts about past injuries	.91	.38
25.	Maintaining an acceptable grade point average (GPA)	.91	.31
26.	Difficulty with time management (how to fit everything in)	.90	.51

Note. Coefficient alpha for the 26-item test is .91.

Table 7

Item Analysis to Examine Validity of the Sport Interference Checklist Problems in Sport Training Scale by Correlating with Test of Performance Strategies Practice Scale

Item		All Participants (n=217)	Males Only (n=84)	Females Only (n=133)
1.	Negative thoughts about personal performance	-.20***	-.13	-.22*
2.	Being too critical of myself	-.12	-.08	-.13
3.	Being too critical of teammates	-.03	.00	-.09
4.	Distracted (or upset) by people who observe me	-.21***	-.23*	-.19*
5.	Difficulty concentrating or maintaining focus to the task at hand	-.22***	-.28**	-.21*
6.	Difficulty thinking positively once negative thoughts have occurred	-.25***	-.16	-.29***
7.	Difficulty relaxing	-.14*	-.21	-.09
8.	Overconcerned or worry too much about what others think about my performance	-.20***	-.19	-.19*
9.	Overly optimistic (cocky) thoughts	.02	-.07	.03
10.	Feeling stressed out	-.23***	-.17	-.24***
11.	Hard to recover mentally once errors are made	-.18***	-.18	-.17
12.	Inability to motivate or push myself	-.28***	-.29***	-.31***
13.	Lack of desire and will to win	-.30***	-.45***	-.26***
14.	Others have commented that I am not motivated in my sport	-.19***	-.22*	-.18*
15.	Problems with my coach(es)	-.14*	-.17	-.15
16.	Problems with my teammates	-.07	-.18	-.01
17.	Problems with my family	-.07	-.19	.00
18.	Problems with or stress due to a lack of money	-.03	-.05	-.03
19.	Problems with others who are too involved in telling you what to do in your sport	-.08	-.15	-.04
20.	Being home sick or lacking close social supports	-.16*	-.08	-.15
21.	Fear of getting injured or sick	.00	.12	-.05
22.	Difficulties dealing with physical pain	-.13	.00	-.15
23.	Using prescribed medication to assist in the management of an injury	-.09	-.10	-.09
24.	Worrisome thoughts about past injuries	-.07	.00	-.11
25.	Maintaining an acceptable grade point average (GPA)	.05	-.02	.07
26.	Difficulty with time management (how to fit everything in)	-.14*	-.18	-.09

*$p < .05$. *** $p < .001$.

Table 8

First Principle Component for Sport Interference Checklist Problems in Sport Competition Scale

Item		Pattern Matrix Coefficient
1.	Negative thoughts about personal performance	.70
2.	Being too critical of myself	.68
3.	Being too critical of teammates	.53
4.	Distracted (or upset) by people who observe me	.60
5.	Difficulty concentrating or maintaining focus to the task at hand	.64
6.	Difficulty thinking positively once negative thoughts have occurred	.69
7.	Difficulty relaxing	.70
8.	Overconcerned or worry too much about what others think about my performance	.69
9.	Overly optimistic (cocky) thoughts	.45
10.	Feeling stressed out	.75
11.	Hard to recover mentally once errors are made	.78
12.	Inability to motivate or push myself	.65
13.	Lack of desire and will to win	.50
14.	Others have commented that I am not motivated in my sport	.43
15.	Problems with my coach(es)	.39
16.	Problems with my teammates	.51
17.	Problems with my family	.54
18.	Problems with or stress due to a lack of money	.53
19.	Problems with others who are too involved in telling you what to do in your sport	.56
20.	Being home sick or lacking close social supports	.52
21.	Fear of getting injured or sick	.54
22.	Difficulties dealing with physical pain	.58
23.	Using prescribed medication to assist in the management of an injury	.45
24.	Worrisome thoughts about past injuries	.49
25.	Maintaining an acceptable grade point average (GPA)	.35
26.	Difficulty with time management (how to fit everything in)	.59

Note. Coefficient alpha for the first principle component is .92.

Table 9

Factor Analysis of Sport Interference Checklist Problem in Sport Competition Scale Items

Item	Factor 1	2	3	4	h^2
6. Difficulty thinking positively once negative thoughts have occurred	**.80**	.01	.06	.00	.66
8. Overconcerned or worry too much about what others think about my performance	**.79**	-.01	-.07	.15	.68
1. Negative thoughts about personal performance	**.78**	.05	.07	-.03	.66
7. Difficulty relaxing	**.77**	-.01	.03	.09	.65
11. Hard to recover mentally once errors are made	**.77**	.06	.12	.08	.72
2. Being too critical of myself	**.75**	-.02	.06	.07	.61
10. Feeling stressed out	**.69**	-.08	.27	.14	.69
4. Distracted (or upset) by people who observe me	**.50**	.32	-.22	.20	.50
5. Difficulty concentrating or maintaining focus to the task at hand	**.47**	.14	.27	.05	.44
12. Inability to motivate or push myself	**.45**	.23	.30	-.02	.48
16. Problems with my teammates	.01	**.81**	-.05	.11	.70
15. Problems with my coach(es)	-.04	**.74**	.07	-.05	.54
19. Problems with others who are too involved in telling you what to do in your sport	.16	**.57**	.01	.16	.49
14. Others have commented that I am not motivated in my sport	-.02	**.50**	.37	-.06	.44
3. Being too critical of teammates	.27	**.43**	-.25	.31	.49
9. Overly optimistic (cocky) thoughts	.17	.39	-.19	.30	.37
26. Difficulty with time management (how to fit everything in)	.26	-.03	**.64**	.09	.59
25. Maintaining an acceptable grade point average (GPA)	.08	-.18	**.59**	.12	.40
18. Problems with or stress due to a lack of money	.01	.12	**.56**	.25	.49
20. Being home sick or lacking close social supports	.05	.27	**.50**	.10	.44
17. Problems with my family	-.07	.37	**.45**	.24	.52
13. Lack of desire and will to win	.15	.31	**.44**	-.06	.40
24. Worrisome thoughts about past injuries	.05	-.12	.01	**.84**	.69
21. Fear of getting injured or sick	-.01	-.07	.13	**.84**	.74
22. Difficulties dealing with physical pain	.13	.01	.16	**.63**	.54
23. Using prescribed medication to assist in the management of an injury	-.06	.20	.04	**.60**	.46

Factor Intercorrelations	1	2	3	4
Factor 1	1.00	.28	.27	.25
Factor 2	.28	1.00	.23	.13
Factor 3	.27	.23	1.00	.19
Factor 4	.25	.13	.19	1.00

Note. h^2 = communality. No items were reversed-scored for this analysis. Salient factor pattern matrix coefficients are in boldface. Factor 1= Dysfunctional Thoughts and Stress, Factor 2= Sport Relationship Difficulties, Factor 3= Environmental Stressors, Factor 4= Injury Concerns.

Table 10

Correlations between Sport Interference Checklist Problems in Sport Competition Scale (SIC PSCS) Factor Scores and Validity Measures

SIC PSCS Factor	TOPS Competition total score	PHQ-9 total score	GAD-7 total score
Dysfunctional Thoughts and Stress	-.45**	.44**	.33**
Sport Relationship Difficulties	-.26**	.33**	.37**
Environmental Stressors	-.11	.20**	.20**
Injury Concerns	-.15*	.25**	.21**

*$p < .05$. ** $p < .01$.

Table 11

Item Analysis to Improve Internal Consistency of Sport Interference Checklist Problems in Sport Competition Scale

Item		Alpha if Item Deleted	Corrected Item-Total Correlation
1.	Negative thoughts about personal performance	.91	.64
2.	Being too critical of myself	.91	.62
3.	Being too critical of teammates	.92	.48
4.	Distracted (or upset) by people who observe me	.91	.54
5.	Difficulty concentrating or maintaining focus to the task at hand	.91	.59
6.	Difficulty thinking positively once negative thoughts have occurred	.91	.63
7.	Difficulty relaxing	.91	.65
8.	Overconcerned or worry too much about what others think about my performance	.91	.64
9.	Overly optimistic (cocky) thoughts	.92	.41
10.	Feeling stressed out	.91	.70
11.	Hard to recover mentally once errors are made	.91	.73
12.	Inability to motivate or push myself	.91	.60
13.	Lack of desire and will to win	.92	.45
14.	Others have commented that I am not motivated in my sport	.92	.39
15.	Problems with my coach(es)	.92	.35
16.	Problems with my teammates	.92	.47
17.	Problems with my family	.92	.50
18.	Problems with or stress due to a lack of money	.92	.49
19.	Problems with others who are too involved in telling you what to do in your sport	.92	.52
20.	Being home sick or lacking close social supports	.92	.48
21.	Fear of getting injured or sick	.92	.50
22.	Difficulties dealing with physical pain	.91	.54
23.	Using prescribed medication to assist in the management of an injury	.92	.42
24.	Worrisome thoughts about past injuries	.92	.44
25.	Maintaining an acceptable grade point average (GPA)	.92	.32
26.	Difficulty with time management (how to fit everything in)	.91	.55

Note. Coefficient alpha for the 26-item test is .92.

Table 12

Item Analysis to Examine Validity of Sport Interference Checklist Problems in Sport Competition Scale by Correlating with Test of Performance Strategies Competition Scale

Item		All participants (N=216)	Males only (N=84)	Females only (N=132)
1.	Negative thoughts about personal performance	-.38***	-.35***	-.38***
2.	Being too critical of myself	-.30***	-.36***	-.24***
3.	Being too critical of teammates	-.21***	-.28***	-.16
4.	Distracted (or upset) by people who observe me	-.29***	-.39***	-.23***
5.	Difficulty concentrating or maintaining focus to the task at hand	-.39***	-.46***	-.34***
6.	Difficulty thinking positively once negative thoughts have occurred	-.38***	-.39***	-.37***
7.	Difficulty relaxing	-.36***	-.39***	-.33***
8.	Overconcerned or worry too much about what others think about my performance	-.38***	-.42***	-.35***
9.	Overly optimistic (cocky) thoughts	.00	-.18	.11
10.	Feeling stressed out	-.29***	-.38***	-.21*
11.	Hard to recover mentally once errors are made	-.41***	-.47***	-.36***
12.	Inability to motivate or push myself	-.40***	-.49***	-.34***
13.	Lack of desire and will to win	-.28***	-.44***	-.17
14.	Others have commented that I am not motivated in my sport	-.19***	-.25*	-.14
15.	Problems with my coach(es)	-.05	-.09	-.03
16.	Problems with my teammates	-.10	-.25*	.01
17.	Problems with my family	-.12	-.26*	-.02
18.	Problems with or stress due to a lack of money	-.21***	-.27*	-.17*
19.	Problems with others who are too involved in telling you what to do in your sport	-.14*	-.33*	-.03
20.	Being home sick or lacking close social supports	-.23***	-.18	-.24***
21.	Fear of getting injured or sick	-.16*	-.17	-.15
22.	Difficulties dealing with physical pain	-.23***	-.25*	-.22*
23.	Using prescribed medication to assist in the management of an injury	-.11	-.14	-.10
24.	Worrisome thoughts about past injuries	-.18***	-.23*	-.15
25.	Maintaining an acceptable grade point average (GPA)	-.10	-.05	-.17
26.	Difficulty with time management (how to fit everything in)	-.23***	-.23*	-.23***

* $p < .05$. *** $p < .001$

Table 13

Coefficients of Congruence between Sport Interference Checklist (SIC) Problems in Sport Training Scale (PSTS) and Problems in Sport Competition Scale (PSCS) Factors

	PSCS Factors			
SIC PSTS Factors	Dysfunctional Thoughts and Stress	Sport Relationship Difficulties	Environmental Stressors	Injury Concerns
Dysfunctional Thoughts and Stress	.99	-	-	-
Relationship and Motivation Problems	-	.97	-	-
Environmental Stressors	-	-	.73	-
Injury Concerns	-	-	-	.91

Table 14

Correlation Matrix for Sport Interference Checklist (SIC) Problems in Sport Training Scale (PSTS) and Problems in Sport Competition Scale (PSCS) Factor Scores

	PSCS Factors			
SIC PSTS Factors	Dysfunctional Thoughts and Stress	Sport Relationship Difficulties	Environmental Stressors	Injury Concerns
Dysfunctional Thoughts and Stress	.78***	-	-	-
Relationship and Motivation Problems	-	.29***	-	-
Environmental Stressors	-	-	.08	-
Injury Concerns	-	-	-	.84***

*** $p < .001$

Table 15

Correlation Matrix for Sport Interference Checklist (SIC) Problems in Sport Training Scale (PSTS) and Problems in Sport Competition Scale (PSCS) Scaled Scores

	PSCS Factors			
SIC PSTS Factors	Dysfunctional Thoughts and Stress	Sport Relationship Difficulties	Environmental Stressors	Injury Concerns
Dysfunctional Thoughts and Stress	.79***	-	-	-
Relationship and Motivation Problems	-	.76***	-	-
Environmental Stressors	-	-	.83***	-
Injury Concerns	-	-	-	.89***

*** $p < .001$

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CURRICULUM VITAE

Travis Loughran

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Las Vegas, Nevada 89183

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EDUCATION

University of Nevada, Las Vegas

Clinical Psychology Doctoral Student **2012-present**

Thesis: "Factor Analysis of the Sport Interference Checklist with Collegiate Athletes"

Expected Graduation Date: 2017

Medaille College, Buffalo, NY

M.A. in Psychology **2009**

Thesis: "An Investigation into the Extant Literature Regarding Self-Handicapping Behavior"

Clemson University, Clemson, SC

B.A. in Psychology **2007**

Minor: Biological Science

RESEARCH EXPERIENCE

Family Research & Services (FRS), University of Nevada, Las Vegas

Research Coordinator **2014-2015**

Responsibilities include immediate oversight of all research projects at FRS, including the coordination of research assessments, management of urn randomization procedures, development and review of research procedures, and the supervision of graduate and undergraduate research team members.

Data Management Coordinator/Performance Coach **2012-2014**

Responsibilities included immediate oversight of all data management, including development and initiation of data spreadsheets, training research assistants to collect, enter and record data, establishing and maintaining quality assurance checks of data records and databases, and assuring data security.

University at Buffalo, Buffalo, NY

Project Aide **2010-2011**

Worked in the Department of Counseling, School and Educational Psychology on the various projects providing Motivational Interviewing interventions to adolescents diagnosed with ADHD. In addition, responsibilities included collecting and coding data and conducting data entry using SPSS software.

TEACHING EXPERIENCE

University of Nevada, Las Vegas

Introductory Psychology Instructor **2015-Present**

Instructor for multiple sections of bachelor-level introductory psychology courses where responsibilities include the development and implementation of in-class lectures, as well as, the development and implementation of appropriate assessments based on the course materials.

Bryant and Stratton College, Buffalo, NY

Adjunct Instructor **2012**

Acted as the instructor for a baccalaureate-level Industrial/Organizational psychology class, where responsibilities included developing and implementing lesson plans, as well as, developing appropriate assessments based on the course material.

CLINICAL EXPERIENCE

VA Southern Nevada Healthcare System Addictive Disorders Treatment Program, Las Vegas, NV

Doctoral Practicum Student **2015-Present**

Provide individual counseling, group therapy, and psychological assessment services for United States Veterans who are experiencing a wide range of psychological concerns. Interventions occur in an outpatient setting. Current groups include Acceptance and Commitment Therapy for substance use, Seeking Safety for dually diagnosed PTSD and substance use disorders, Anger Management, and substance use education. Work under the supervision of a licensed clinical psychologist.

A Better Today Recovery Services, Las Vegas, NV

Doctoral Practicum Student **2014-2015**

Provide individual counseling, group therapy, and psychological assessment services for male clients diagnosed with substance-use disorders. Intervention occurs in a partial hospitalization setting and is rooted in a Cognitive-Behavioral theoretical orientation. Work under the supervision of a licensed clinical psychologist.

The Optimum Performance Program in Sports (TOPPS), University of Nevada, Las Vegas

Performance Coach **2012-2015**

Provide evidenced-based interventions and psychological assessment aimed at reducing alcohol/drug use, reducing risk of HIV/STI, improving interpersonal relationships, improving mental health, and improving sport performance with student-athletes. Work under the supervision of a licensed clinical psychologist.

The PRACTICE: A UNLV Community Mental Health Clinic, Las Vegas, NV

Doctoral Practicum Student **2013-2014**

Provide counseling, psychotherapy and assessment services for clients struggling with anxiety, trauma, depression, anger, stress, grief and loss, learning disabilities, and developmental disorders. Work under the supervision of licensed clinical psychologists.

Horizon Health Services, Buffalo, NY

Drug Court Liaison **2011-2012**

Acted as intermediary between Horizon Health Services and local court programs, organizing progress reports, providing in-court substance use screens, and working with court officials to coordinate appropriate treatment interventions.

Substance Abuse Counselor **2009-2012**

Assessed adults and adolescents for DSM IV-TR substance related diagnoses and provided individual and group counseling while actively maintaining a full caseload.

WORK AND VOLUNTEER EXPERIENCE

APAGS Advocacy Coordinating Team (ACT)

Regional Advocacy Coordinator (Southwest Region) **2015-Present**

Responsibilities include managing a team of State Advocacy Coordinators from eight states and territories in helping educate students, developing advocacy skills, and accomplishing advocacy projects. Disseminates information on advocacy issues related to psychology, and assist in the recruitment of new members for the APAGS ACT network.

Campus Representative **2014-2015**

Responsibilities include informing students about issues relevant to the field of psychology and APAGS/APA, acting as a resource for information about legislative issues affecting the field of psychology, and acting as a liaison between graduate students at UNLV and the Nevada Psychological Association.

Association for Applied Sport Psychology

Student Delegate **2015-Present**

Responsibilities include disseminating information about AASP to students and schools in the Las Vegas area and actively participating in AASP Internship & Practicum Database Initiative.

Toronto Marathon Psyching Team, Toronto, Ontario Canada

Volunteer **2011**

Provided brief interventions using mental imagery, reframing, and anchoring techniques to help marathon runners prepare and perform during the Toronto Goodlife Marathon. Interventions were provided during the pre-race expo, as well as, on the course and post-race.

UNLV Outreach Undergraduate Mentoring Program

Mentor to Undergraduate Students **2013-Present**

Provided individualized mentorship and support to UNLV undergraduate students from under-represented backgrounds. The mentorship model is focused on helping students prepare for graduate studies in the field of psychology.

Electronic Gaming Therapy, Williamsville, NY

Volunteer **2009**

Assisted in providing group skills training to children ages 5-17. In addition, performed administrative duties including client check-in, organization and preparation of therapeutic equipment, and completion of group progress notes.

Horizon Health Services, Buffalo, NY

Resource Advocate **2007-2009**

Assisted clients in obtaining and maintaining New York State Medicaid benefits and managed financial balances at three separate locations.

BOOK CHAPTERS

Marzell, M., Donohue, B. & **Loughran, T**. (2015). Assessing Substance-Related Disorders in African American Clients. In Benuto, L.T. & Leany, B.D. (Eds.), *Guide to Psychological Assessment with African Americans*. New York: Springer. In press.

PUBLICATIONS

Chow, G. M., Donohue, B., Pitts, M., **Loughran, T**., Schubert, K. N., Gavrilova, Y., &

Diaz, E. (2014). Results of a Single Case Controlled Study of The Optimum Performance Program in Sports in a Collegiate Athlete. *Clinical Case Studies*, 1534650114548313.

Donohue, B., Chow, G. M., Pitts, M., **Loughran, T**., Schubert, K. N., Gavrilova, Y., & Allen, D. N. (2014). Piloting A Family-Supported Approach to Concurrently Optimize Mental Health and Sport Performance in Athletes. *Clinical Case Studies*, 1534650114548311.

Pitts, M., Donohue, B., Schubert, K. N., Chow, G. M., **Loughran, T**., & Gavrilova, Y. (2014). A systematic case examination of The Optimum Performance Program in Sports in a combat sport athlete. *Clinical Case Studies*, 1534650114548312.

NEWSLETTERS

Loughran, T. (2014). Stress in student-athletes: A review of assessment and intervention strategies. *Performance Excellence Magazine,* 11-15.

POSTERS AND PRESENTATIONS

Loughran, T., Soto-Nevarez, A., Pitts, M., Schubert, K., Gavrilova, Y., Chow,G., & Donohue, B. (November, 2015). *Evaluation of a goal-oriented alcohol prevention program in student-athletes.* Poster presented at the Association for Behavioral and Cognitive Therapies annual convention, Chicago, IL.

Loughran, T., & Donohue, B. (October, 2015). *Psychological skills as a predictor of thoughts and stress in sport training.* Poster presented at the annual Association for Applied Sport Psychology conference, Indianapolis, IN.

Gavrilova, Y., Dowd, A., **Loughran, T**., Mitchell, R., & Donohue, B. (May, 2015). *Effect of engagement strategy on client's disclosure.* Poster presented at the Western Psychological Association annual convention, Las Vegas, NV.

Loughran, T., Lee, B., Zink, D., & Barchard, K. A. (May, 2015). *A psychometric evaluation of the emotion-based decision making scale*. Poster presented at the Western Psychological Association annual convention, Las Vegas, NV.

Phillips, C.R., Dowd, A., **Loughran, T**., & Donohue, B. (May, 2015). *A cognitive behavioral theory to assist in mental health rehabilitation following sport injury.*

Poster presented at the Western Psychological Association annual convention, Las Vegas, NV.

Chow, G. M., Donohue, B., Diaz, E., Pitts, M., **Loughran, T**., Schubert, K., & Gavrilova, Y. (October, 2014). A Sport-Specific Family Behavior Therapy for Athletes: A Multiple- Baseline Case Study of a Collegiate Dancer. Poster presented at the annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Donohue, B., Chow, G., Pitts, M., **Loughran, T**., Schubert, K., Gavrilova, Y. (2014, October). Development and Initial Examination of The Optimum Performance Program in Sports (TOPPS): Bridging the Gap between Mental Health and Sport Performance. In K. Wilson (Discussant). Symposium presented at the annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Donohue, B., Chow, G., Pitts, M., **Loughran, T**., & Schubert, K., & Gavrilova, Y. (October, 2014). Preliminary Pilot Examination of The Optimum Performance Program in Sports in Club and NCAA Athletes. Presentation presented at the annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Gavrilova, Y., Donohue, B., Chow, G., Pitts, M., **Loughran, T**., & Schubert, K. (October, 2014). The Optimum Performance Program in Sports (TOPPS) Overview. Presentation presented at the annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Loughran, T., Chow, G., Pitts, M., Schubert, K., Gavrilova, Y., & Donohue, B. (October, 2014). Frequency of Alcohol Use as a Predictor of Mental Health Symptoms in Collegiate Athletes. Poster presented at the annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Pitts, M., Donohue, B., Chow, G., **Loughran, T**., Schubert, K., & Gavrilova, Y. (October, 2014). Case Study Examination of The Optimum Performance Program in Sports (TOPPS) in a Collegiate Athlete. Presentation presented at the annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Schubert, K., Donohue, B., Pitts, M., Chow, G., **Loughran, T.**, & Gavrilova, Y. (October, 2014). Case Examination of The Optimum Performance Program in Sports (TOPPS) in an NCAA Division I Athlete. Presentation presented at the

annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Swarzman E., **Loughran, T**., Dowd, A., Tran, T., Torres, A., Gonzalez-Bueno, A., Gavrilova, Y., Chow, G., & Donohue, B. (October, 2014). Development and initial evaluation of a dynamic performance goal intervention. Poster presented at the annual Association for Applied Sport Psychology conference. Las Vegas, NV.

Diaz, E., **Loughran, T**., Chow, G., Kelleher, L., Kong, P., Dunn, R., Murrieta, V., & Donohue, B. (2014, April). *The effect of prevention programs on freshman athletes' alcohol consumption.* Poster session presented at the 94th annual meeting of The Western Psychological Association, Portland, Oregon.

Loughran, T. (2014, April). TOPPS: Methods to reduce stigma in performance-based interventions in collegiate athletes. In B. Donohue (Chair), *Process of developing a non-stigmatizing, positive environmental context for the optimum performance program in sports*. Symposium conducted at the 94th annual meeting of The Western Psychological Association, Portland, Oregon.

Loughran, T., Swarzman, E., Armenta, S., Dowd, A., Pak, K., Chow, G., & Donohue, B. (2014, April). *FBT adherence and outcomes in substance using mothers.* Poster session presented at the 94th annual meeting of The Western Psychological Association, Portland, Oregon.

Diaz, E., Kong, P., Swarzman, E., Holler, A., Gonzalez-Bueno, A., Gavrilova, Y., **Loughran, T**., Wrzeciona, K., Pitts, M., Murrieta, V., Dunn, R., Chow, G., Kelleher, L., & Donohue, B. *Factors that interfere with sport performance and alcohol use among college athletes.* (2013, October) Poster session presented at the 28th Association for Applied Sport Psychology Conference, New Orleans, Louisiana.

Bigler, L., Gonzalez-Buena, A., **Loughran, T**., Swarzman, E., Gavrilova, Y., Chow, G., & Donohue, B. (2013, July) *Family Behavioral Therapy's influence on alcohol use in collegiate athlete's performance.* Poster session presented the 2nd OMICS International Conference and Exhibition on Addiction Research and Therapy, Las Vegas, Nevada.

Gonzalez-Bueno, A., Bigler, L., **Loughran, T**., Swarzman, E., Chow, G., & Donohue, B. (2013, July) *Relationship between the training scales of the SIC and alcohol*

consumption scores of the AUDIT across gender. Poster session presented the 2nd OMICS International Conference and Exhibition on Addiction Research and Therapy, Las Vegas, Nevada.

Loughran, T., Swarzman, E., Gonzalez-Bueno, A., Bigler, L., & Donohue, B. (2013, July) *Case study for the treatment of high-risk alcohol use in a collegiate athlete using Family Behavior Therapy.* Poster session presented the 2nd OMICS International Conference and Exhibition on Addiction Research and Therapy, Las Vegas, Nevada.

Swarzman, E., **Loughran, T**., Bigler, L., Gonzalez-Bueno, A., & Donohue, B. (2013, July) *Case study for the treatment of alcohol use in a collegiate athlete using Family Behavior Therapy.* Poster session presented the 2nd OMICS International Conference and Exhibition on Addiction Research and Therapy, Las Vegas, Nevada.

CLINICAL TRAININGS

Comprehensive Training In Dialectical Behavior Therapy (DBT)

Part 1: Theory, Structure, Targets And Treatment Strategies **Feb. 2015**

TRAINED BY ALAN FRUZZETTI, PH.D.

Part 1 of the DBT training focused on theory and conceptualization of the DBT model and the structure of treatment in diverse populations. It included didactic training, demonstration, and supervised practice.

Advanced Motivational Interviewing (MI) Workshop **Aug. 2014**

TRAINED BY: KAMILLA L. VENNER, PH.D.

The Advanced MI Workshop focused on increasing MI skills and practice. Exercises centered on using complex therapeutic reflections to increase empathy and deepen the therapeutic alliance and collaboration. Emphasis was placed on honing skills in identifying change talk and practicing ways to elicit change talk.

Motivational Interviewing (MI) Introductory Workshop **May 2014**

TRAINED BY: KAMILLA L. VENNER, PH.D.

MI is a form of collaborative conversation for strengthening a person's own motivations and commitment to change. It is a person-

centered counseling style for addressing the common problem of ambivalence about change by paying particular attention to the language of change. This workshop focused on orientation to the fundamental processes of MI and the exposure to, and practice of basic MI skills.

Substance of Withdrawal and Overdose: Recognizing the Signs and Symptoms **Oct. 2013**

TRAINED BY: JIM JOBIN, MFT

Examined the signs and symptoms of dependence, overdose, and withdrawal from various substances. Discussed treatment methods to effectively assist individuals who are dependent on substances, as well as ensure that those who are withdrawing are effectively assisted through this process.

Substance Dependence And Withdrawal: Focus On Anabolic Androgenic Steroids **Nov. 2012**

TRAINED BY: LAUREL PRICHARD, PH.D.

Examined the characteristics of general substance abuse and dependence, specific to anabolic androgenic steroid (AAS) use. Discussed several studies on the effects of steroid use with human and animal participants, including the how to treat steroid AAS dependence

Structural Clinical Interview For DSM-IV-TR Axis I Disorders-Patient Edition **Sept. to Dec. 2012**

TRAINED BY: DANIEL ALLEN, PH.D.

The Structured Clinical Interview for DSM-IV-TR Axis I Disorders-Patient Edition (SCID-I /P) is a semi-structured interview for making the major DSM-IV-TR Axis I diagnoses. The SCID-I /P has been found to have excellent reliability and validity in numerous studies. This training focused on effective and reliable implementation of the SCID-I/P assessment.

Family Behavior Therapy (FBT) For Adults **Aug. 2012**

TRAINED BY: BRADLEY DONOHUE, PH.D.

FBT is a cost-effective, evidence-based, behavioral, treatment for adults and their families. FBT utilizes the importance of having a significant other present throughout therapy. This workshop focused on implementation of the various FBT interventions including Behavioral Goals, Treatment Planning, Stimulus Control, Urge/Self Control, I've Got a Great Family (i.e., positive exchange of reinforcers within the family), and Communication Skills Training.

AWARDS AND HONORS

- APAGS Advocacy Coordinating Team Excellence In Campus Leadership Award **2015**
- First Place: Nevada Psychological Association Student Poster Award **2015**
- UNLV Summer Session Scholarship Recipient **2015**
- Selected As A Delegate For 2015 American Psychological Association State Leadership Conference **2015**
- Regents Service Program Award **2014**
- Family Research And Services Outstanding Graduate Student **Spring 2013**

PROFESSIONAL ORGANIZATIONS

- American Psychological Association
  - Division 2 (Society for the Teaching of Psychology)
  - Division 31 (State, Provincial, and Territorial Psychological Association Affairs) **2009-Present**
- Association for Applied Sports Psychology **2012-Present**
- Western Psychological Association **2013-Present**
- Nevada Psychological Association **2014-Present**
- Association for Behavioral and Cognitive Therapies **2015-Present**