

## THE RELIABILITY OF THE CSAI-2 AMONG PREADOLESCENT FEMALE GYMNASTS: PILOT STUDY SHORT REPORT

**CORRINA REID, MARK DEBELISO\***

Department of Kinesiology and Outdoor Education, Southern Utah University, Cedar City, UT, USA.

\*Email: markdebeliso@suu.edu

**How to cite this article:** Reid, C. & DeBeliso, M. (September, 2019). The reliability of the CSAI-2 among preadolescent female gymnasts: pilot study short report. Journal of Physical Education Research, Volume 6, Issue III, 09-17.

**Received:** May 02, 2019

**Accepted:** September 15, 2019

### ABSTRACT

*Athletes and coaches are constantly seeking for ways to improve performance. Sport psychology is one mechanism that can be employed in order to implement strategies to improve performance. Anxiety is a construct that is related to worry, stress, and arousal. Anxiety depends on the situation and the athlete's perception of how stressful the situation is and whether or not he or she has the coping abilities to deal with the situation. This can be referred to as state anxiety, or anxiety that is present in certain situations. Reliable assessment of an athlete's state anxiety under varying conditions can better prepare coaches to help manage their athlete's anxiety levels. The purpose of this study was to examine the reliability of the Competitive State Anxiety Inventory-2 (CSAI-2) among preadolescent competitive female gymnasts. The CSAI-2 assesses cognitive anxiety, somatic anxiety, and self-confidence. The CSAI-2 questionnaire was administered to ten preadolescent competitive female gymnasts prior to gymnastics practice on two separate occasions separated by one-two weeks (or two trials). The results of the two trials of the CSAI-2 questionnaire were then examined between trials via:  $\Delta$  Mean between trials, interclass reliability coefficients ( $r$ ), intraclass reliability coefficients (ICCs), typical error expressed as a CV%, standard error of measurement (SEM), and Bland-Altman plots. The results of the two pre-practice CSAI-2 administrations (mean $\pm$ SD) were 17.8 $\pm$ 5.7 and 16.5 $\pm$ 5.8 for cognitive anxiety, 17.6 $\pm$ 5.2 and 17.7 $\pm$ 5.6 for somatic anxiety, and 23.9 $\pm$ 3.7 and 24.6 $\pm$ 6.2 for self-confidence for trial one and trial two, respectively. The  $\Delta$ Means between trials with 90% confidence limits were -1.3 $\pm$ 2.2 (UL: 0.0, LL: -2.7) for cognitive, 0.1 $\pm$ 3.1 (UL: 1.9, LL: -1.7) for somatic, and 0.7 $\pm$ 3.6 (UL: 2.8, LL: -1.4) for self-confidence. The interclass reliability coefficients with 90% confidence limits were:  $r=0.94$  (UL: 0.98, LL: 0.79) for cognitive,  $r=0.85$  (UL: 0.95, LL: 0.56) for somatic, and  $r=0.86$  (UL: 0.96, LL: 0.59) for self-confidence. The ICCs with 90% confidence limits were: ICC=0.94 (UL: 0.98, LL: 0.83) for cognitive, ICC=0.87 (UL: 0.96, LL: 0.63) for somatic, and ICC=0.79 (UL: 0.93, LL: 0.47) for self-confidence. The typical error with 90% confidence limits were: CV%=12.7 (UL: 21.7, LL: 9.1) for cognitive, CV%=12.1 (UL: 20.7, LL: 8.7) for somatic, and CV%=13.6 (UL: 23.3, LL: 9.7) for self-confidence. The SEM with 90% confidence limits were: SEM=1.6 (UL: 2.6, LL: 1.1) for cognitive, SEM=2.2 (UL: 3.7, LL: 1.6) for somatic, and SEM=2.6 (UL: 4.2, LL: 1.9) for self-confidence. The Bland-Altman plots indicated agreement between the two CSAI-2 administrations for each of the subscales. Within the parameters of this study it appears that the CSAI-2 is a reliable instrument among preadolescent competitive female gymnasts.*

**Keywords:** Reliability, gymnasts, anxiety.

### 1. INTRODUCTION

Anxiety is an important construct in the sporting community and is one of the most studied concepts (Besharat & Pourbohloul, 2011; Cox, 2012; Cox, Martens, & Russell, 2003). Anxiety is a psychological factor related to stress, worry, or arousal (Chase, Magyar, & Drake, 2005; Cottyn, de Clercq, Pannier, Crombez, & Lenoir, 2006; Cox, 2012; Ford, Ildefonso, Jones, & Arvinen-Barrow, 2017; Hanton, Mellalieu, & Hall, 2004; de Pero, Minganti, Pesce, Capranica, & Piacentini, 2013). Anxiety is an emotion, and is a result of when an athlete's doubts on his or her ability are greater than their ability to cope with the situation that is causing the perceived stress (Chase, Magyar, & Drake, 2005; Cottyn, de Clercq, Pannier, Crombez, & Lenoir, 2006; Cox, 2012; Ford, Ildefonso, Jones, & Arvinen-Barrow, 2017; Hanton, Mellalieu, & Hall, 2004; de Pero, Minganti, Pesce, Capranica, & Piacentini, 2013). Anxiety is correlated with decreased performance and increased risk of injury (Allie et al., 2018; Basler et al., 1976; Cagle, Overcash, Rowe, & Needle, 2017; Caine & Nassar, 2005; Cartoni, Minganti, & Zelli, 2005; Cerin, 2003; Chase et al., 2005; Cottyn et al., 2006, 2008; Craft, Magyar, Beckre, & Feltz, 2003; Ford et al., 2017; Hanton et al., 2004; Harringe, Lindblad, & Werner, 2004; Kolt & Kirby, 1994; León-Prados, García, & Lluch, 2011; Magyar & Chase, 1996; McCarthy, Allen, & Jones, 2013; Tsopani et al., 2011).

At some point in an athlete's experience it is highly likely that he or she will experience anxiety or become anxious to some degree. Some athletes may have a higher trait anxiety, or have a higher

predisposition to become anxious in certain situations if the athlete feels unable to deal with the stress or pressure (Cagle et al., 2017; Donti, Thodorakou, Kambiotis, & Donti, 2011; Donti et al., 2012; Ford et al., 2017; Hanton et al., 2004; Horikawa & Yagi, 2012; Woodman & Hardy, 2003). If an athlete has a higher trait anxiety, their predisposition for anxiety can increase the likelihood that they will experience state anxiety, or anxiety in certain situations, such as in an important game or competition. Anxiety as related to competition includes cognitive or somatic anxiety, which are two constructs assessed by the Competitive State Anxiety Inventory-2 (CSAI-2). Cognitive anxiety can refer to thoughts such as feeling incompetent, unable to perform up to expectations, or pressure of performing in front of a crowd expecting a win (Ariza-Vargas-2011; Barreto et al., 2016; Cerin, 2003; Cox, 2012; Molina et al., 2018; Pineda-Espejel, 2013; Schmidt & Lee, 2014). Somatic anxiety refers to physiological symptoms such as an increased heart rate, sweating, or muscle tension (Allie et al., 2018; Besharat & Pourbohloul, 2011; Burton & Raedeke, 2008; Cottyn et al., 2006, 2008; Craft et al., 2003; Ford et al., 2017; Grossbard et al., 2009; Hanton et al., 2004; Jones & Hanton, 2001; Marshall & Gibson, 2017; Martens et al., 1990; Tsopani et al., 2011; Woodman & Hardy, 2003).

There is documented evidence suggesting a relationship between somatic anxiety, cognitive anxiety, self-confidence and performance (Bozkus & Kul, 2013; Englert & Bertrams, 2012; Zeng, 2003; Koehn, 2013; Humara, 1999). Hence, developing effective strategies to manage an athlete's anxiety levels (and self-confidence) are imperative with regards to maximizing an athlete's performance (Bozkus & Kul, 2013; Zeng, 2003). With that said, the instrument implemented to assess an athlete's anxiety levels (and self-confidence) must be reliable.

Some of the apparatuses used for gymnastics, such as the balance beam and the uneven bars are high off the ground and may tend to incite more anxiety than other sports (Cartoni et al., 2005; Caine & Nassar, 2005; Chase et al., 2005; Cottyn et al., 2006, 2008; Martin et al., 2008). Being able to reliably assess somatic anxiety, cognitive anxiety, self-confidence among competitive young gymnasts may provide valuable with regards to developing effective strategies for managing their anxiety levels. As such, the purpose of this study was to determine the reliability of the CSAI-2 among preadolescent competitive female gymnasts.

## **2. METHODS AND MATERIALS**

### **2.1 Participants**

Participants included volunteer competitive female gymnasts from local gymnastics teams in Utah County (Utah, US). Because of the specific nature of this study, only those who were at a competitive level in gymnastics (at least a level 3) were permitted to participate. The participants had an age range of 11-13 years old. Each gymnast participated in typical practices for their gymnastics team as well as other normal day to day activities of youth in this age group. All participants were in in-season training shape.

All volunteer participants were given a written consent form that was read and signed by both the participant and her parent before conducting the study. The study was approved by a University Institutional Review Board before any testing procedures began regarding this study. Each participant was given the option to withdraw at any time for whatever reason, and were provided the proper protocol for completion of the CSAI-2 questionnaires.

### **2.2 Instrument**

The CSAI-2 is one of the most widely used anxiety assessments (Cox et al., 2003). The CSAI-2 and its derivatives (CSAI-2C, CSAI-2R, etc.) assesses cognitive anxiety, somatic anxiety, and self-confidence (Craft et al., 2003; Cottyn et al., 2006, 2008; Cox et al., 2003; Craft et al., 2003; Fernandes et al., 2013; Hanton et al., 2004; Humara, 1999; Jones & Hanton, 2001; Jones & Swain, 1992; Jones et al., 1993; Kais & Raudsepp, 2004; Koehn, 2013; Marshall & Gibson, 2017; Martens et al., 1990; Pineda-Espejel et al., 2013; Tsopani et al., 2011; Woodman & Hardy, 2003; Zeng, 2003). The CSAI-2 was developed by Martens, Vealey, and Burton in 1990 as a revision to the CSAI with 27 items that are answered on a Likert scale (ranging from 1 not at all to 4 very much so) and is widely used in a sport context. Prior research has reported reliability of the CSAI-2 as:  $r=0.79-0.90$  for somatic anxiety,  $r=0.80-0.90$  for cognitive anxiety,  $r=0.90$  or higher for both somatic and cognitive anxiety,  $r=0.86-0.94$  for self-confidence, and Cronbach alpha levels ranging from 0.79 to 0.94 (Cerin, 2003; Craft et al., 2003; Fernandes et al., 2013; Hall & Kerr, 1997; Jones & Hanton, 2001; Koehn, 2013; Martens et al., 1990; Pineda-Espejel, 2013; Tsopani et al., 2011; Zeng, 2003). Noting the aforementioned, the CSAI-2 has yet to be examined for reliability among competitive gymnasts in this age group.

The CSAI-2 is considered a valid instrument for assessing cognitive anxiety, somatic anxiety, and self-confidence for 13-16 year olds (Martens, Vealey, & Burton, 1990). The CSAI-2C has been validated among children 8-12 years of age (Stadulis, MacCracken, Eidson, & Severance, 2002). The CSAI-2R has been validated among college age intramural and collegiate athletes (Cox, Martens, & Russell, 2003). The ages of the participants in this study were: 13 (40%), 12 (40%) and 11 (20%) years of age. Hence the participants did not fit ideally into using either the CSAI-2C or the CSAI-2R. Given that the CSAI-2C and the CSAI-2R are derivatives of the CSAI-2, it was determined that the most appropriate instrument for this study was the CSAI-2.

## 2.3 Procedures

The participants were administered the CSAI-2 prior to two separate practice sessions on two different days (two trials). Each participant completed both CSAI-2 trials within a two week period of time. The same administrator was present during both assessment days and provided clarification for any words that the participants were not familiar with. Once the CSAI-2 trials were completed data was recorded into a Microsoft Excel spreadsheet for statistical analysis.

## 2.4 Statistical Analysis

The CSAI-2 questionnaire is comprised of three subscales: cognitive anxiety, somatic anxiety, and self-confidence. The subscales as assessed on the two trials of the CSAI-2 administration were then examined between trials via:  $\Delta$  Mean between trials, interclass reliability coefficients ( $r$ ), intraclass reliability coefficients (ICCs), typical error expressed as a CV%, and standard error of measurement (SE<sub>m</sub>). Scatter plots were constructed to examine linearity between the subscale trial scores. Bland-Altman plots were used to determine error uniformity and limits of agreement (LOA) between the subscale trial scores. The reliability statistics were calculated in an MS Excel spreadsheet provided by Hopkins (2013). The Excel spreadsheet was peer reviewed for accuracy as suggested by Altarawneh and Thorne (2017).

## 3. RESULTS

A total of 11 preadolescent competitive gymnasts volunteered to complete the questionnaires. One participant was unable to complete one of the pre-practice CSAI-2 trials and her data was discarded. The analysis of the data was based on ten gymnasts ( $n=10$ ).

The mean and standard deviation for the CSAI-2 questionnaires and subscale scores are presented in table 1. Tables 2-4 show the reliability statistics for each of the subscales: cognitive (Table 2), somatic (Table 3), and self-confidence (Table 4) with 90% confidence limits (UL, LL) for the CSAI-2 trials. Figures 1-3 are scatter plots of the CSAI-2 trial scores, suggesting a linear relationship between the test-retest scores, for each of the three subcategories: cognitive (Figure 1), somatic (Figure 2), and self-confidence (Figure 3).

**Table 1: CSAI-2 trial scores**

	N	Cognitive Score	Somatic Score	Self-Confidence Score
Trial 1	10	17.8±5.7	17.6±5.2	23.9±3.7
Trial 2	10	16.5±5.8	17.7±5.6	24.6±6.2

CSAI-2 subscale scores (mean±SD). No significant difference between trials ( $p>0.05$ ).

**Table 2: CSAI-2 cognitive scale reliability statistics**

Statistic		Upper Limit	Lower Limit
$\Delta$ Means (trials)	-1.3±2.2	-0.0	-2.7
$r$	0.94	0.98	0.79
ICC	0.94	0.98	0.83
Typical Error (CV%)*	12.7	21.7	9.1
SE <sub>m</sub>	1.6	2.6	1.1

90% Confidence limits for selected reliability statistics. \*Typical error expressed as a CV% based on Log-transformed data. SE<sub>m</sub>- standard error of the measure.  $r$ - Pearson correlation coefficient. ICC- Intraclass correlation coefficient.

**Table 3: CSAI-2 somatic scale reliability statistics**

Statistic		Upper Limit	Lower Limit
$\Delta$ Means (trials)	$0.1 \pm 3.1$	1.9	-1.7
R	0.85	0.95	0.56
ICC	0.87	0.96	0.63
Typical Error (CV%)*	12.1	20.7	8.7
SE <sub>m</sub>	2.2	3.7	1.6

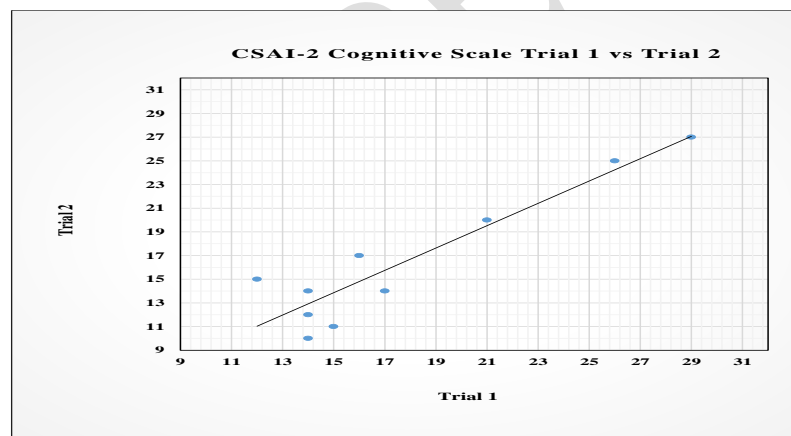
90% Confidence limits for selected reliability statistics. \*Typical error expressed as a CV% based on Log-transformed data. SEM- standard error of the measure. r- Pearson correlation coefficient. ICC- Intraclass correlation coefficient.

**Table 4: CSAI-2 self-confidence scale reliability statistics**

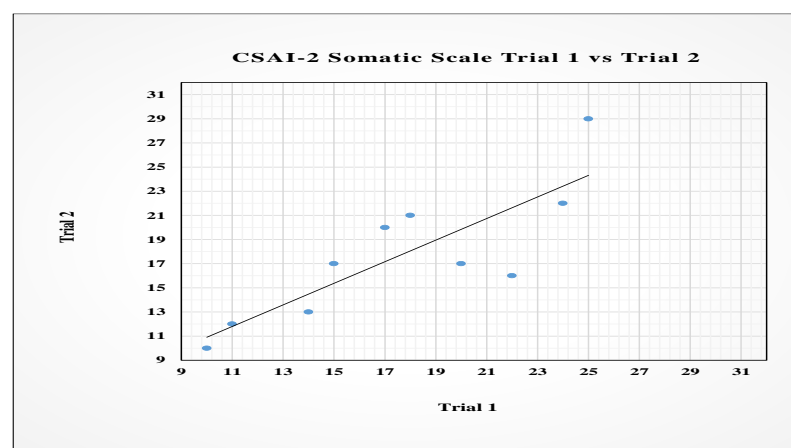
Statistic		Upper Limit	Lower Limit
$\Delta$ Means (trials)	$0.7 \pm 3.6$	2.8	-1.4
R	0.86	0.96	0.59
ICC	0.79	0.93	0.47
Typical Error (CV%)*	13.6	23.3	9.7
SE <sub>m</sub>	2.6	4.2	1.9

90% Confidence limits for selected reliability statistics. \*Typical error expressed as a CV% based on Log-transformed data. SEM- standard error of the measure. r- Pearson correlation coefficient. ICC- Intraclass correlation coefficient.

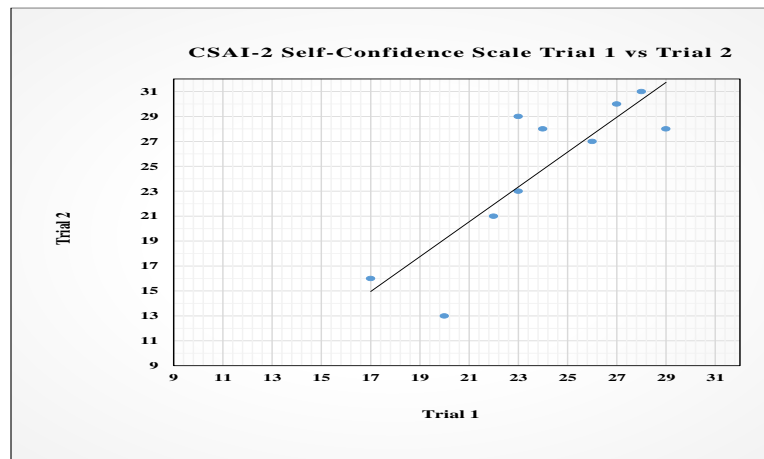
**Figure 1: Scatter plot of trial 1 and 2 CSAI-2 cognitive scale**



**Figure 2: Scatter plot of trial 1 and 2 CSAI-2 Somatic Scale**

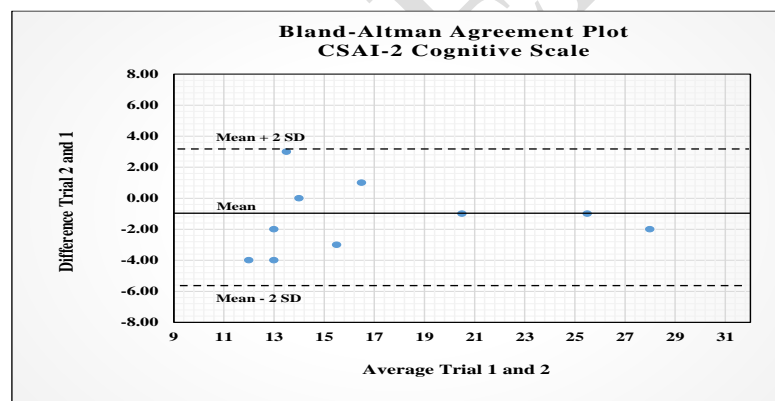


**Figure 3: Scatter plot of trial 1 and 2 CSAI-2 Self-Confidence Scale**

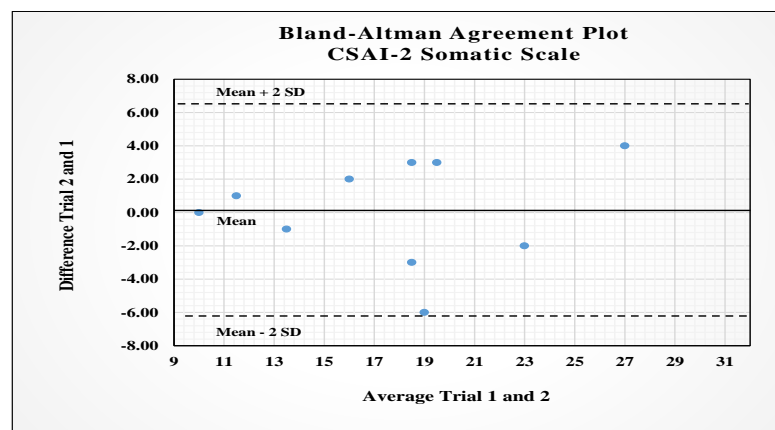


Figures 4-6 are Bland-Altman plots comparing the average trial scores from the CSAI-2 versus the difference in the trial scores as well as the limits of agreement (LOA) for each of the subscales: cognitive (Figure 4), somatic (Figure 5), and self-confidence (Figure 6). Of the presented paired sets of data, each stayed within the 95% LOA except for one score on the self-confidence scale. The Bland-Altman plots did not exhibit evidence of non-uniform error or bias.

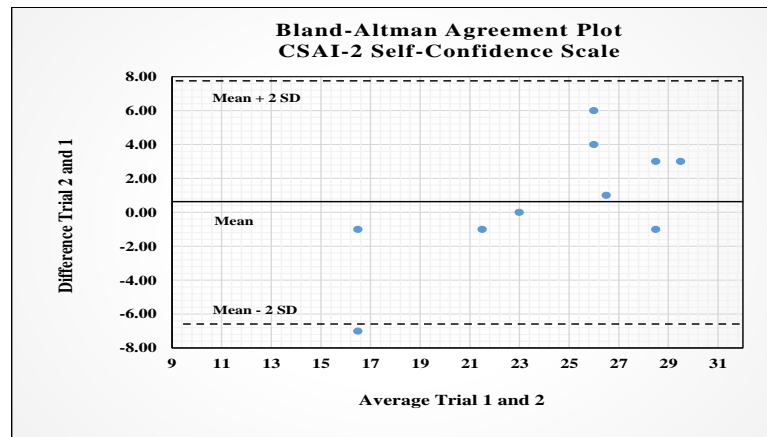
**Figure 4: Bland-Altman plot of trial 1 and 2 CSAI-2 Cognitive Scale scores. Limits of agreement are the mean $\pm$ 2 SD in the differences in trial scores.**



**Figure 5: Bland-Altman plot of trial 1 and 2 CSAI-2 Somatic Scale scores. Limits of agreement are the mean $\pm$ 2 SD in the differences in trial scores**



**Figure 6. Bland-Altman plot of trial 1 and 2 CSAI-2 Self-Confidence Scale. Limits of agreement are the mean $\pm$ 2 SD in the differences in trial scores**



#### 4. DISCUSSION

The purpose of this study was to determine the reliability of the CSAI-2 among preadolescent female competitive gymnasts. The various reliability statistics indicated high reliability between the two pre-practice trials of the CSAI-2 scores for cognitive anxiety, somatic anxiety and self-confidence.

Tables 2-4 tabulate the reliability statistics with 90% confidence limits (UL, LL) for the CSAI-2 trial scores for the cognitive (Table 2), somatic (Table 3), and self-confidence (Table 4) subscales. Interclass reliability coefficients ( $r$  or PCC) ranged from 0.85-0.94, which are consider high (Safrit & Wood, 1995). The intraclass reliability coefficients (ICC) ranged from 0.79-0.94, which are considered good to excellent (Koo & Li, 2016). The standard error of measurement (SEm) ranged from 1.6-2.6 across the subscales. As recommended by Hopkins (2013), data was log-transformed to identify typical error and no bias or non-uniform error was detected.

The results of the current study are consistent with prior investigations which have reported the CSAI-2 and its derivatives to be reliable among other populations (Cerin, 2003; Craft et al., 2003; Fernandes et al., 2013; Hall & Kerr, 1997; Jones & Hanton, 2001; Koehn, 2013; Martens et al., 1990; Pineda-Espejel, 2013; Tsopani et al., 2011; Zeng, 2003). As mentioned earlier the participants in the current study did not fit ideally into the parameters of usage of either the CSAI-2C or CSAI-2R. The CSAI-2C was modified with language age appropriate for children 8-12 years of age (Stadulis, MacCracken, Eidson, & Severance, 2002). The CSAI-2R was modified with specificity towards college intramural and intercollegiate athletes (Cox, Martens, & Russell, 2003). The participants in the current study were essentially too young to use the CSAI-2R and many were too old to for the usage of the CSAI-2C. Future research might focus on the development of an age appropriate version of the CSAI-2 that is suited for youth competitive athletes: possibly termed the CSAI-2CR?

#### 5. CONCLUSION

Within the parameters of this study the CSAI-2 has exhibited satisfactory test-retest reliability among preadolescent female competitive gymnasts. Coaches can use the CSAI-2 to reliably monitor cognitive anxiety, somatic anxiety, and self-confidence among this population.

#### 6. REFERENCES

- Allie, J., Larson, A., & DeBeliso, M. (2018). Levels of anxiety: Practice vs. competition in NCAA division I North American football players. *International Journal of Sports Science*, 8(4), 118-123.
- AlTarawneh, G., & Thorne, S. (2017). A pilot study exploring spreadsheet risk in scientific research. arXiv [cs.CY]. Retrieved from <http://arxiv.org/abs/1703.09785>. March 2017.
- Ariza-Vargas, L., Domínguez-Escribano, M., López-Bedoya, J., & Vernetta-Santana, M. (2011). The effect of anxiety on the ability to learn gymnastic skills: A study based on the schema theory. *Sport Psychologist*, 25(2), 127-143.



- Barreto, P. M., De Moraes, M. G., De Souza Zanini, G., Neiva, C. M., Vilela Terra, G. D. S., Filho, D. M. P., & Lopes Veradi, C. E. (2016). Associated factors between the state of anxiety and a specific gymnastics skill with environmental variations. *Journal of Physical Education & Sport*, 16(1), 187-191.
- Basler, M. L., Fisher, A. C., & Mumford, N. L. (1976). Arousal and anxiety correlates of gymnastics performance. *Research Quarterly*, 47(4), 586-589.
- Besharat, M. A. & Pourbohloul, S. (2011). Moderating effects of self-confidence and sport self-efficacy on the relationship between competitive anxiety and sport performance. *Psychology*, 2(7), 760-765.
- Bozkus, T. M., & Kul, M. (2013). The effects of age, sports experience and physical self-perception on competition anxiety levels of female football players. *International Journal of Academic Research* 5 (4), 509-513.
- Burton, D. & Raedeke, T. (2008). *Sports psychology for coaches*. Champaign, IL: Human Kinetics.
- Cagle, A., Overcash, K., Rowe, D., & Needle, A. (2017). Trait anxiety as a risk factor for musculoskeletal injury in athletes: A critically appraised topic. *International Journal of Athletic Training Therapy*, 22(3), 26-31.
- Caine, D. J. & Nassar, L. (2005). Gymnastics injuries. *Medicine and Sport Science*, 48(1), 18-58.
- Cartoni, A. C., Minganti, C., & Zelli, A. (2005). Gender, age and professional-level differences in the psychological correlates of fear of injury in Italian gymnasts. *Journal of Sport Behaviour*, 28(1), 465-475.
- Cerin, E. (2003). Anxiety versus fundamental emotions as predictors of perceived functionality of pre-competitive emotional states, threat, and challenge in individual sports. *Journal of Applied Sport Psychology*, 15(3), 223-238.
- Chase, M. A., Magyar, T. M., & Drake, B. M. (2005). Fear of injury in gymnastics: Self-efficacy and psychological strategies to keep on tumbling. *Journal of Sports Sciences*, 23(5), 465-475.
- Cottyn, J., de Clercq, D., Combez, G., & Lenoir, M. (2008). The role of preparatory heart rate deceleration on balance beam performance. *Journal of Sport & Exercise Psychology*, 30(2), 159-170.
- Cottyn, J., de Clercq, D., Pannier, J. L., Crombez, G., & Lenoir, M. (2006). The measurement of competitive anxiety during balance beam performance in gymnasts. *Journal of Sports Science*, 24(2), 157-164.
- Cox, R. H. (2012). Anxiety, stress, and mood relationships. In *Sport Psychology: Concepts and Applications* (7<sup>th</sup> ed., pp. 154-182). New York, NY: McGraw-Hill.
- Cox, R. H., Martens, M. P., & Russell, W. D. (2003). Measuring anxiety in athletics: The revised competitive state anxiety inventory-2. *Journal of Sport & Exercise Psychology*, 25, 519-533.
- Craft, L. L., Magyar, T. M., Becker, B. J., & Feltz, D. L. (2003). The relationship between the competitive anxiety inventory-2 and sport performance: A meta-analysis. *Journal of Sport & Exercise Psychology*, 25(1), 44-65.
- de Pero, R., Minganti, C., Pesce, C., Capranica, L., & Piacentini, M. F. (2013). The relationships between pre-competition anxiety, self-efficacy, and fear of injury in elite team gym athletes. *Kinesiology*, 45(1), 63-72.
- Donti, O., Theodorakou, K., Kambiotis, S., & Donti, A. (2011). Self-esteem, trait anxiety and parental educational level of children practicing noncompetitive gymnastics sports. *Science of Gymnastics Journal*, 3(2), 27-37.
- Donti, O., Theodorakou, K., Kambiotis, S., & Donti, A. (2012). Self-esteem and trait anxiety in girls practicing competitive and recreational gymnastics. *Science of Gymnastics Journal*, 4(1), 33-43.
- Englert, C., & Bertrams, A. (2012). Anxiety, ego depletion, and sports performance. *Journal of Sport & Exercise Psychology*, 34(5), 580-599.
- Fernandes, M. G., Nunes, S. A., Raposo, J. V., Fernandes, H. M., & Brustad, R. (2013). The CSAI-2: An examination of the instrument's factorial validity and reliability of the intensity, direction, and frequency dimensions with Brazilian athletes. *Journal of Applied Sport Psychology*, 25(1), 377-391.
- Ford, J. L., Ildefonso, K., Jones, M. L., & Arvinen-Barrow, M. (2017). Sport-related anxiety: Current insights. *Open Access Journal of Sports Medicine*, 8, 205-212.
- Gillham, E., & Gillham, A.D. (2014). Identifying athletes' sources of competitive state anxiety. *Journal of Sport Behavior*, 37(1), 37-55.
- Grossbard, J. R., Smith, R. E., Smoll, F. L., & Cumming, S. P. (2009). Competitive anxiety in young athletes: Differentiating somatic anxiety, worry, and concentration disruption. *Anxiety, Stress & Coping*, 22(2), 153-166.
- Hall, H. K., & Kerr, W. A. (1997). Motivational antecedents of precompetitive anxiety in youth sport. *The Sport Psychologist*, 11, 24-42.

- Hanin, Y. L. (2000). Individual zones of optimal functioning (IZOF) model: Emotion- performance relationships in sport. In Y.L. Hanin (Ed.), *Emotions in sport* (pp. 65-89). Champaign, IL: Human Kinetics.
- Hanin, Y. L. (2010). Coping with anxiety in sport. In A. Nicholls (Ed.), *Coping in sport: Theory, methods, and related constructs* (pp. 159-175). New York, NY: Nova Science Publishers.
- Hanton, S., Mellalieu, S. D., & Hall, R. (2004). Self-confidence and anxiety interpretation: A qualitative investigation. *Psychology of Sport & Exercise*, 5(4), 466-495.
- Hardy, L. (1996). A test of catastrophe models of anxiety and sports performance against multidimensional anxiety theory models using the method of dynamic differences. *Anxiety, Stress, and Coping: An International Journal*, 9(1), 69-86.
- Harringe, M. L., Lindblad, S., & Werner, S. (2004). Do team gymnasts compete in spite of symptoms from an injury? *British Journal of Sports Medicine*, 38(4), 398-401.
- Hopkins, W.G., (2013). A new view of statistics. Internet Society for Sport Science, <http://www.sportsci.org/resource/stats/>.
- Horikawa, M., & Yagi, A. (2012). The relationships among trait anxiety, state anxiety, and the goal performance of penalty shoot-out by university soccer players. *PlosONE*, 7(4), 1-5.
- Humara, M. (1999). The relationship between anxiety and performance: A cognitive-behavioral perspective. *The Online Journal of Sport Psychology*, 1(2), 1-15.
- Jones, G., & Hanton, S. (2001). Pre-competitive feeling states and directional anxiety interpretations. *Journal of Sport Sciences*, 19(6), 385-395.
- Jones, J. G., & Swain, A. B. J. (1992). Intensity and direction dimensions of competitive anxiety and relationships of competitiveness. *Perceptual and Motor Skills*, 74(2), 467-472.
- Jones, J. G., & Swain, A. B. J., & Hardy, L. (1993). Intensity and direction dimensions of competitive state anxiety relationships with performance. *Journal of Sports Sciences*, 11(6), 525-532.
- Kais, K. & Raudsepp, L. (2005). Intensity and direction of competitive state anxiety, self-confidence and athletic performance. *Kinesiology*, 37(1), 13-20.
- Koehn, S. (2013). Effects of confidence and anxiety on flow state in competition. *European Journal of Sport Science*, 13(5), 543-550.
- Kolt, G. S., & Kirby, R. J. (1994). Injury, anxiety, and mood in competitive gymnasts. *Perceptual and Motor Skills*, 78, 955-962.
- Koo, T. K., & Li, M. Y. (2016). A guideline of selecting and reporting intraclass correlation coefficients for reliability research. *Journal of Chiropractic Medicine*, 15(2), 155-163.
- León-Prados, J. A., García, I. F., & Lluch, Á. C. (2011). Precompetitive anxiety state and self-confidence in gymnasts. *Revista Internacional de Ciencias Del Deporte*, 7(23), 76-91.
- Magyar, T. M., & Chase, M. A. (1996). Psychological strategies used by competitive gymnasts to overcome the fear of injury. *Technique*, 16(10), 1-5.
- Marshall, E. A., & Gibson, A.-M. (2017). The effect of an imagery training intervention on self-confidence, anxiety and performance in acrobatic gymnastics - A pilot study. *Journal of Imagery Research in Sport & Physical Activity*, 12(1), 13-22.
- Martens, R., Vealey, R. S., & Burton, D. (1990). *Competitive Anxiety in Sport*. Human Kinetics: Champaign, IL.
- Martin, S. B., Polster, C. M., Jackson, A. W., Greenleaf, C. A., & Jones, G. M. (2008). Worries and fears associated with competitive gymnastics. *Journal of Clinical Sport Psychology*, 2(4), 299-316.
- McCarthy, P. J., Allen, M. S., & Jones, M. V. (2013). Emotions, cognitive interference, and concentration disruption in youth sport. *Journal of Sports Sciences*, 31(5), 505-515.
- Molina, V. M., Oriol, X., & Mendoza, M. C. (2018). Emotional regulation and physical recovery in young athletes of individual and collective sport modalities. *Revista Internacional de Ciencias Del Deporte*, 14(53), 191-204.
- Pineda-Espejel, A., López-Walle, J., Rodríguez, J. T., Villanueva, M. M., & Gurrola, O. C. (2013). Pre-competitive anxiety and self-confidence in Pan American gymnasts. *Science of Gymnastics Journal*, 5(1), 39-48.
- Safrit, M.J., & Wood, T.M. (1995). Introduction to measurement in physical education and exercise (3<sup>rd</sup> Ed.). St. Louis, MO: Mosby.
- Schmidt, R. A., & Lee, T. D. (2014). *Motor learning and performance from principles to application* (4<sup>th</sup> ed.). Champaign, IL: Human Kinetics.
- Stadulis, R. E., MacCracken, M. J., Eidson, T. A., & Severance, C. (2002). A children's form of the competitive state anxiety inventory: The CSAI-2C. *Measurement in Physical Education and Exercise Science*, 6(3), 147-165.



- Tsopani, D., Dallas, G., & Skordilis, E. K. (2011). Competitive state anxiety and performance in young female rhythmic gymnasts. *Perceptual and Motor Skills*, 112(2), 549-560.
- Woodman, T., & Hardy, L. (2003). The relative impact of cognitive anxiety and self-confidence upon sport performance: A meta-analysis. *Journal of Sports Sciences*, 21(6), 443-457.
- Zeng, H. Z. (2003). The differences between anxiety and self-confidence between team and individual sports college varsity athletes. *International Sports Journal*, 7(1), 28.

JOPER