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An Investigation of the Competitive Anxiety Experiences of Adolescent Figure Skaters

Diane Benish

AN INVESTIGATION OF THE COMPETITIVE ANXIETY EXPERIENCES OF ADOLESCENT FIGURE SKATERS

by

DIANE BENISH

(Under the direction of Jody Langdon)

ABSTRACT

Based on the three-factor hierarchical model of competitive anxiety (Jones, Mullen, & Hardy, 2019), the present study explored the relationship between competitive anxiety and performance among a sample of adolescent figure skaters. Participants included 47 figure skating athletes between the ages of 13 – 17 who were participating in a United States Figure Skating Association (USFSA) sanctioned test session. Analyses revealed that the three higher order factors of the Three Factor Anxiety Inventory (TFAI; Jones et al., 2019) along with years of testing experience, test attempt number and months training for a test were not related and therefore were unable to predict figure skaters' objective performance scores. Recommendations are provided for the future use of the TFAI with adolescent and child populations.

INDEX WORDS: Athlete, Sport performance, Perceived control, Three factor hierarchical model, Regulatory dimension

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by

DIANE BENISH

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DIANE BENISH

Major Professor:	Jody Langdon
Committee:	Brandonn Harris
	Megan Byrd

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DEDICATION

I would like to dedicate this thesis to my parents, Jonathan and Michelle. Even when my path has seemed uncertain, you have always reminded me of the goodness of God and to always stand firm in my faith.

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I would like to acknowledge my committee members, Dr. Megan Byrd and Dr. Brandonn Harris who have shown unwavering support and guidance throughout my two years at Georgia Southern. Special thanks goes to my chair, Dr. Langdon who has been a continual source of encouragement while challenging me to remain resilient. I would also like to thank the figure skaters who participated in my study and the parents and coaches who found value in this work. Finally, I would like to thank my husband for being the best travel companion, listening ear and thoughtful confidant.

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CHAPTER 1

INTRODUCTION

The United States Figure Skating Association (USFSA) reported 192,110 members during the 2017-18 season, its second highest membership count since the 2005-06 season ("Membership," n.d.). Most members are athletes under the age of 18, accounting for 74 percent of the total membership. Membership numbers show figure skating is popular among female youth athletes, as 52% of members are female and 22% are male ("2018-2019 Factsheet," 2018). These percentages equate to just under 100,000 female youth skaters and approximately 42,300 male youth skaters who hold memberships within the United States.

Figure skaters develop and progress their skating skills by participating in sanctioned skill tests held at USFSA affiliated clubs. These skills tests mark the progression of skaters through nationally recognized levels in figure skating and determine the highest level the skater may enter to compete at regional, sectional, and national events. Over seven hundred skating clubs are registered with USFSA across the country with the USFSA headquarters processing 5,300 figure skating skills tests on average each month ("U.S. Figure Skating at a Glance," n.d.). Totaled together, this would amount to approximately 63,600 skating skills tests processed in a year. U.S. Figure Skating (n.d.) reported 30,000 tests passed on average by USFSA members in a year marking the overall passing rate for skating skills tests slightly below half. This indicates that more than half of the tests taken by skaters are performing below the standard and will have to retry at a future session.

According to unpublished survey data collected by U.S. Figure Skating (see Table 1), figure skaters taking skating skills tests between 2016-19 were, on average, between the ages of 11 and 17. Passing rates were also reported in this data suggesting an overall passing rate of 79%

Table 1

*Unpublished USFS Test Data**

		Age	Months Training	# Passed per season					# Passed on First Attempt					% First Attempt
Test	**Type**	**Mean**	**Mean**	**2016**	**2017**	**2018**	**2019**	**Total**	**2016**	**2017**	**2018**	**2019**	**Total**	**Total**
Pre-Preliminary	Moves in the Field	11.3	6.6	558	656	661	590	2465	540	544	534	567	2185	89%
	Free Skate	12.1	7.0	194	199	185	193	771	188	197	184	191	760	99%
Preliminary	Moves in the Field	11.7	7.9	351	376	340	348	1415	318	350	302	316	1286	91%
	Free Skate	12.8	8.0	139	122	131	125	517	136	119	125	120	500	97%
Pre-Juvenile	Moves in the Field	12.4	9.3	301	317	331	285	1234	208	225	241	194	868	70%
	Free Skate	13.8	9.2	110	120	118	91	439	101	113	109	80	403	92%
Juvenile	Moves in the Field	13.1	8.2	225	264	252	224	965	167	205	196	186	754	78%
	Free Skate	13.7	8.3	102	122	102	110	436	94	110	95	100	399	92%
Intermediate	Moves in the Field	14.6	9.3	231	234	224	219	908	148	149	150	154	601	66%
	Free Skate	14.4	10.3	89	83	104	79	355	72	68	88	73	301	85%
Novice	Moves in the Field	14.9	11.9	193	220	193	187	793	99	115	104	96	414	52%
	Free Skate	15.5	11.6	62	70	62	64	258	50	56	44	51	201	78%
Junior	Moves in the Field	15.7	11.5	169	172	169	164	674	87	97	88	91	363	54%
	Free Skate	16.7	9.6	57	55	49	34	195	47	44	37	26	154	79%
Senior	Moves in the Field	15.7	8.9	440	529	502	570	2041	315	358	331	391	1395	68%
	Free Skate	17.4	9.0	68	83	107	91	349	54	60	81	72	267	77%
All Levels	Moves in the Field							10495					7866	75%
	Free Skate							3320					2985	90%
	Combined							13815					10851	79%

*(K. Woienski, personal communication, November 15, 2019)

for all levels of Moves in the Field and Free Skate tests. Passing rates are lowest for the four upper level Moves in the Field tests with passing rates between 52 - 68% (K. Woienski, personal communication, November 15, 2019). Testing is extremely important for the competitive figure skater as it is a way for skaters to establish an exceptional demonstration of skill and ability. Tests serve as a reinforcement in achieving a level of proficiency in the sport and helps skaters move up the competitive "ladder" in hopes of representing the United States in international competitions (U.S. Figure Skating, 2019).

To date, research has not explored the specific correlates of passed and unpassed figure skating tests. However, psychological correlates have been considered to help interpret youth athletes' performance results (Gould, Eklund, Petlichkoff, Peterson, & Bump, 1991; McCarthy, Allen, & Jones, 2012). Similar investigations with youth figure skaters have chosen to focus on the influence of competitive anxiety on performance because of the unique challenges and demands of the sport (Colgan, 2006; Vealey & Campbell, 1988). In fact, youth figure skaters have been previously reported experiencing a range of emotions leading up to skating performances to include physiological arousal, fear, and nervousness (Colgan, 2006). A case study has also provided preliminary evidence to support that performance anxiety can have a detrimental effect on test performance (Colgan, Smith, Hartman, & Detling, 2000). Given research has not explored performance anxiety responses in the testing environment, a closer exploration is of interest.

More broadly, research also suggests that athletes of individual sports and athletes with fewer levels of competitive experience have higher anxiety levels than athletes participating in team sport and athletes with more competitive experience (Rocha & de Osório, 2018). As tests serve as a pre-requisite to future competitive participation, adolescent figure skaters are in the process of developing competitive, or in this case, “performance” experience as well as learning to cope with pressure situations. Failure to cope under pressure in this environment could result in multiple unsuccessful attempts to complete skating tests and likely progress to dropout. In considering these factors together, the anxiety-performance relationship was chosen to be further explored in the context of figure skating skill tests given its salience to the testing environment and population in question.

Historically, the anxiety-performance relationship has been far from straightforward as indicated by the numerous theories proposed to explain the relationship (Woodman & Hardy, 2001) as well as the inconsistent empirical results that have attempted to explain the relationship (Burton, 1988; Polman, Rowcliffe, Borkoles, & Levy, 2007). Thus, theoretical frameworks within anxiety literature have sought to address these inconsistencies to better understand the complex nature of the anxiety-performance relationship (Cheng, Hardy, & Markland, 2009).

Competitive Anxiety

Competitive anxiety has received considerable attention when investigating athlete performance as athletes are well known to either thrive or deteriorate when performing under pressure. Competitive anxiety has been succinctly defined as “a specific negative emotional response to competitive stressors” (Mellalieu, Hanton, & Fletcher, 2006, p. 3). This response is specific to sport participation and is often preceded by athletes’ high expectations of self, fear of being evaluated by others and fear of the unknowns associated with performance. Additional contributors to competitive anxiety include the importance of the competition, previous performance, the athlete’s personality, and the current situation of the athlete (Patel, Omar, & Terry, 2010).

Multidimensional conceptualizations of competitive anxiety characterize the subsequent emotional responses into somatic and cognitive anxiety symptoms. Somatic responses manifest physiologically and can include symptoms of perspiration, increased heart rate, dry mouth, and butterflies in the stomach. Cognitive symptoms reveal a mental response to a perceived stressor often characterized by feelings of worry and thoughts of failure (Hanton, Mellalieu, & Williams, 2015; Patel et al., 2010). These potentially unpleasant emotional responses are a result of the athlete appraising competition related stressors as threatening (Martens, Vealey, & Burton, 1990) and thus have the potential to influence athletes' ability to perform at their optimal level. Although research has been equivocal (Polman, Rowcliffe, Borkoles, & Levy, 2007), many studies have suggested both somatic and cognitive forms of anxiety have the potential to have a debilitating effect on performance (Burton, 1988; Mabweazara, Leach, & Andrews, 2017). Less frequently acknowledged, however, is the potential for competitive stressors to have positive consequences on athletes' performance and psychological state (Mellalieu, Hanton, & Fletcher, 2006). In fact, competitive anxiety can benefit performance pending an athlete's facilitative interpretation of their competitive anxiety symptoms. This positive interpretation is a result of an athlete's appraisal of their ability to control the stressor, effectively cope with the demands, and achieve the goals associated with the task (Cheng, Hardy, & Woodman, 2011; Jones, 1995).

Context and group characteristics are important when examining athletes' competitive anxiety responses. Differences have been uncovered in comparing the competitive anxiety experiences of females versus males, athletes participating within team versus individual sport programs, and more experienced athletes versus less experienced athletes (Mellalieu, Hanton, & Fletcher, 2006; Rocha & de Osório, 2018). Rocha and de Osório's (2018) recent meta-analysis of 27 studies revealed females displayed higher levels of anxiety than male athletes as well as noting increased anxiety levels for athletes of individualized sports in comparison with team sport athletes. Similarly, higher levels of somatic and cognitive anxiety have been reported in a sample of tennis players competing in singles matches compared to players competing in doubles. The emphasis on the individual in achieving favorable performance outcomes is thought to contribute to individual athletes' higher perceived competitive anxiety (Terry, Cox, Lane, & Karageorghis, 1996). Athletes' perceived anxiety levels have also been shown to decrease as competitive experience increases (Rocha & de Osório, 2018) suggesting athletes may learn to cope with their competitive anxiety as they gain experience competing in high pressure situations. With this additional knowledge, adolescent figure skaters appear to be a likely population to experience competitive anxiety given the individual nature of the sport, and the lack of competitive experience.

Antecedents of competitive anxiety and subsequent reductions in performance can be examined to provide further insight to figure skaters' response to the testing environment. Athletes' performance has the potential to be adversely affected by fear of failure and fear of evaluation of parents, friends, and others (Passer, 1983) and could potentially be a source of competitive anxiety and stress. Evaluative concerns appear to be especially salient to the adolescent athlete in a structured demonstration of skill competence. Specifically, the emphasis on peer approval and successful demonstration of sport ability has previously been found to be positively correlated with pre-performance anxiety in a population of figure skaters (Vealey & Campbell, 1988). Research conducted with youth skiers revealed their evaluative concerns specific to their performance was related to levels of cognitive anxiety while their levels of somatic anxiety were related to more general evaluative concerns. An examination of descriptive data within this study revealed that youth skiers' greatest concerns were related to the performance-specific evaluations of parents and friends. Therefore, the skier's finish placement was the primary basis for social evaluation (Bray, Martin, & Widmeyer, 2000).

Youth figure skaters have reported cognitive and physiological symptoms of competitive anxiety leading up to a competition. Skaters attributed these symptoms to a fear of falling, making mistakes, being alone on the ice, and performing in front of judges (Bernier, Thienot, Pelosse, & Fournier, 2014). Similar feelings could also be present in the testing environment as a result of the evaluative nature of the test, potential for skaters who do not pass must wait a period of 27 days before they are permitted to re-test after receiving a retry score (U.S. Figure Skating, Rule 4003, 2019). With each test attempt, a fee is required, and coaches are monetarily compensated for training the athlete and for being present the day of the test. Therefore, a failed test means more time on the specific skill set and more money to attempt the test again which could induce subsequent feelings of anxiety.

Only one study was identified as having investigated the performance-anxiety relationship in a population of adolescent figure skaters (Vealey & Campbell, 1988). Self-confidence and anxiety were found to be related with the goal orientations of figure skaters competing in regional competitions. Figure skaters aged 13 to 18 years old with high levels of self-confidence and intrinsic motivation were shown to have lower levels of pre-competition anxiety. Notable was the inability of skating performance to be significantly predicted by pre-competitive self-confidence or pre-competitive anxiety. However, general confidence levels in ability did predict performance (Vealey & Campbell, 1988) which is consistent with other works (Terry, Cox, Lane, & Karageorghis, 1996).

Gould, Finch and Jackson (1993) interviewed elite level figure skaters to identify perceived sources of stress and coping strategies during their national championship experience.

Sources of stress included those of physical, psychological, and environmental demands on skater resources, in addition to expectations and pressure to perform. Precompetitive mental preparation and anxiety management proved to be an important strategy utilized by a majority (65%) of the skaters in managing these sources of stress. Specifically, skaters reported the use of relaxation techniques, mental rehearsal, visualization, imagery, precompetitive ritual, narrow focus, physical release of stress, reflections on past performances, and acknowledging and dealing with nervousness (Gould et al., 1993).

Although performance was not directly addressed in this study, insights can be garnered from how the elite figure skaters responded to the stress of competition. In acknowledging and coping with nervousness, the elite figure skaters appraised their cognitive and somatic anxiety in relation to the competitive stressors and their capacity to cope. Psychological skills were then deployed by the figure skaters as a coping mechanism to protect against more debilitative effects of stress and anxiety. It is therefore acknowledged that perceived control is likely to be an important component to the athletes' appraisal of the testing environment and their psychological and physiological reactions to the stressor. However, this needs to be further explored with an adolescent population who have fewer years of testing experience and may not have established coping mechanisms as well as the elite population.

Somatic and cognitive anxiety symptoms have been measured using various inventories (Jones et al., 2019; Grossbard et al., 2009; Martens et al., 1990; Smith, Smoll, Cumming, & Grossbard, 2006; Spielberger, Gorsuch & Luschene, 1970). Researchers utilizing the Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990) have assessed the relationships between its three subcomponents (somatic anxiety, cognitive anxiety, self-confidence) and performance (for a review see Craft, Magyar, Becker, & Feltz, 2003). Further, a directional scale (Jones & Swain, 1992) has been added to the measure to account for athletes' perceptions of their somatic and cognitive anxiety responses. However, this system of measurement has been challenged for its potential flaws as athletes' coping style may involve ignoring or denying anxiety symptoms or athletes may simply be unaware that their physiological responses are attributed to anxiety (Cheng, Hardy, & Markland, 2009). Similarly, the CSAI-2 has received scrutiny regarding its validity in predicting performance (Craft, Magyar, Backer, & Feltz, 2003). Therefore, the development of a new model has been proposed to more accurately explain the complexity of the anxiety-performance relationship.

Three Factor Hierarchical Model of Competitive Anxiety

A recent development in the anxiety-performance literature established a three-factor hierarchical model of competitive anxiety (Jones et al., 2019) based on the initial conceptualization of a three-dimensional model by Cheng and colleagues (2009). The three factors include cognitive, physiological, and regulatory dimensions. In Jones and colleagues' (2019) refined model, the cognitive dimension includes thoughts of worry, private self-focus (concern attending to inner feelings and thoughts), and public self-focus (awareness of one's effect on others in the social context). The physiological dimension includes autonomous hyperactivity and somatic tension producing physical symptoms related to involuntary (internal organs) and voluntary (motor) muscle groups, respectively. Finally, the regulatory dimension represents the underlying regulatory process in response to a perceived threat. This regulatory process, referred to as perceived control, includes an individual's perception of whether he or she has the capacity to cope with the stressor. Therefore, during the competitive anxiety response, athletes evaluate the internal and external threats to their goal as well as their potential to meet the demands of the task. This regulatory dimension effectively illustrates the adaptive nature of anxiety considering participants' performance expectations (Cheng et al., 2009).

The regulatory dimension of perceived control demonstrated predictive validity in a population of tae-kwon-do athletes. Athletes' performance was assessed using a tae-kwon-do sport performance self-report measure. This measure was comprised of six items rated on a 10-point Likert scale which assessed the following components: attacking, fighting back, personal effort, competitive strategies, physical energy and strength, and reacting appropriately. Here, sport performance was better under high levels of perceived control and lower with low levels of perceived control (Cheng et al., 2011) with similar findings replicated in a follow-up study with a sample of athletes competing in a running race or triathlon (Jones et al., 2019). Conversely, athletes who displayed high levels of physiological anxiety did not exhibit a significant increase in performance when perceived control was increased. However, results indicated performance was maintained and not impaired as perceived control increased (Cheng et al., 2011). Additionally, no significant effects were found for the first order effects of cognitive or physiological dimensions of anxiety (Jones et al., 2019).

Cheng and Hardy (2016) further validated the adaptive potential of perceived control as it was shown to be associated with adaptive dimensions of approach coping, self-talk, and perfectionism, thereby allowing investigators to conclude the ability of the regulatory dimension to reflect "the potential for mobilizing mental and/or physical resources in order to deal with perceived threat in the dynamics of the anxiety response" (Cheng & Hardy, 2016, p. 261). The most recent improvement of the hierarchical model has potential for a more refined diagnosis of anxiety which can then allow for the development and implementation of effective interventions to improve athlete performance. However, the researchers recommended further exploration of the measure’s predictive power with different sport samples (Cheng et al., 2009).

Within the three-factor hierarchical model of competitive anxiety, the three dimensions of cognitive, physiological anxiety, and perceived control may appear to similarly correspond with the three factors of the CSAI-2, namely, cognitive anxiety, somatic anxiety, and self-confidence. However, Cheng et al., (2009) clarified the distinctions between the two stating that the CSAI-2 does not account for the coping capacity of anxiety in its measurement of self-confidence. While perceived control and self-confidence bear resemblance in their measurement of positive performance expectations, perceived control does not relate to the notion of “emotional calmness” also captured by self-confidence. Therefore, the benefit of measuring perceived control instead of self-confidence is due to its ability to explicitly measure the coping capacity of athletes experiencing competitive anxiety. This points directly toward an adaptive potential for anxiety, further reinforcing it as a multidimensional construct (Cheng et al., 2009).

The present study seeks to extend preliminary research indicating the presence of performance anxiety in the context of skating skill tests (Colgan et al., 2000) and its’ effect on skating performance. Research in this area is important given the growing interest in the sport with youth participants and in providing recommendations for coaches and parents to address figure skaters’ anxiety responses. The three-factor hierarchical model of competitive anxiety (Jones et al., 2019) was chosen for this investigation as it accounts for previously inconsistent conceptualizations of the anxiety-performance relationship in capturing the potential for anxiety to have an adaptive capacity and has previously shown promise in predicting performance (Cheng, Hardy, & Woodman, 2011; Jones et al, 2019).

Therefore, the purpose of this study is to determine whether the subscales of the refined three-factor hierarchical model of competitive anxiety (Jones et al., 2019) can predict figure skaters’ test performance score. A secondary purpose is to determine relationships between the cognitive, physiological, and regulatory dimensions of anxiety with the number of attempts for the given test, years of testing experience, and months spent training for a given skating test. Given these aims it is hypothesized that figure skaters’ performance scores would significantly correlate with levels of cognitive anxiety, physiological anxiety, and perceived control. It is also hypothesized that figure skaters’ cognitive and physiological levels would significantly correlate with the number of attempts for the given test. Finally, it is hypothesized that figure skaters’ levels of cognitive anxiety, physiological anxiety, and perceived control would significantly correlate with testing experience and months spent training for a given skating test.

CHAPTER 2

METHODS

Participants

A total of 47 figure skaters (male = 3, female = 44) participating in United States Figure Skating Association (USFSA) sanctioned testing sessions completed survey measures for their Moves in the Field (n = 45) and Free Skate (n = 2) tests. A total of 14 testers (29.8%) indicated they were taking more than one test at the test session and completed survey measures based on their pre-competitive anxiety levels for one of their tests. The majority of the participants were White or Caucasian (n = 33) with others identifying as Asian (n = 6), Black or African American (n = 2), Hispanic or Latino (n = 1), Native American or Alaska Native (n = 1), or multiple races/biracial (n = 4). Participants were recruited at six test sessions which were hosted by five skating clubs located in Northern and Southeastern regions of the United States, including Pennsylvania, Delaware, Michigan, and South Carolina.

On average, figure skaters were 14.8 years old (SD = 1.34) with ages ranging from 13 – 17. The number of months figure skaters trained for their test ranged from one month to 14 months (M = 7.28, SD = 3.671). Figure skaters also reported varying amounts of testing experience ranging from one year to 12 years (M = 4.74, SD = 2.42). The passing rate for the current sample was 91.5% (pass = 43, retry = 4) with figure skaters indicating a range of one to four attempts for the test they took at the time of data collection. Most skaters (76.6%) were attempting the test level for the first time (n = 36) with 19% attempting for the second time (n = 9), 2% attempting a third time (n = 1), and 2% attempting a fourth time (n = 1). For competitive level, figure skaters reported competing at the Pre-Preliminary (n = 8), Preliminary (n = 13), Pre-Juvenile (n = 7), Juvenile (n = 5), Intermediate (n = 10), Novice (n = 1), and Junior (n = 1) levels. Two participants did not compete at any level. Tests that were taken by participants included Preliminary (*n* = 3), Pre-Juvenile (*n* = 7), Juvenile (*n* = 14), Intermediate (*n* = 10), Novice (*n* = 7), Junior (*n* = 4), and Senior (*n* = 2) levels (See Appendix D for test structure and level descriptions). Most of the figure skaters (51.1%) were completing the fourth or fifth level test (Juvenile and Intermediate, respectively). Responses from testers who were completing the Pre-Preliminary (first) test were not collected as this test is not assigned a numerical score for test performance.

Instrumentation

Demographic form. Demographics were collected from the participants with the help of a parent or guardian to include gender, age, ethnicity, highest level competed (Pre-Preliminary, Preliminary, Pre-Juvenile, Juvenile, Intermediate, Novice, Junior, Senior), years of experience testing, approximate number of months training for given test, number of attempts for given test, and name/level of test taken (see Appendix E).

Competitive anxiety. Competitive anxiety was measured with the refined Three Factor Anxiety Inventory (TFAI; Jones, Mullen, & Hardy, 2019) initially developed by Cheng, Hardy, and Markland (2009). The TFAI measures a hierarchical model of competitive anxiety comprised of six reflective (lower-order) constructs that feed into three higher-order constructs. Worry (5 items), private self-focus (3 items), and public self-focus (3 items) make up the cognitive dimension, autonomic hyperactivity (5 items), and somatic tension (5 items) make up the physiological dimension, and perceived control (4 items) make up the regulatory dimension. In total, the measure contains 25-items. A 5-point Likert scale allows participants to indicate their agreement with statements on a scale of 1 (totally disagree) to 5 (totally agree) to describe their precompetitive state. An example for each lower-order construct is provided in Table 2.

Table 2

Item Examples for Constructs of the TFAI and CSAI-2C

TFAI	**Example Item**
Worry	I am worried that I may make mistakes.
Private Self-focus	I tend to dwell on shortcomings in my performance
Public Self-focus	I am conscious about the way I will look to others
Somatic Tension	I feel physically nervous
Autonomic Hyperactivity	My chest feels tight
Perceived Control	I believe in my ability to perform
CSAI-2C	
Cognitive Anxiety	I'm concerned that I will play poorly today
Somatic Anxiety	My body feels tense
Self-confidence	I feel self-confident

Jones et al., (2019) created the first fully differentiated hierarchical model in anxiety literature to date comprised of first order reflective constructs and second order formative constructs, with factor loadings all significantly and positively related in the model. Convergent validity was reported satisfactory as lower-order constructs showed composite reliability (CR) values greater than 0.70 and lower order constructs' average variance extracted (AVE) values greater than 0.50. A Partial Least Squares (PLS) analysis confirmed the model (Jones et al., 2019). Cronbach's alpha demonstrated adequate reliability in the current study for each of the higher-order factors with cognitive dimension ($\alpha = 0.88$), physiological dimension ($\alpha = 0.87$), and regulatory dimension ($\alpha = 0.72$). Five of the six lower-order dimensions also demonstrated adequate reliability with worry (α = 0.86), public self-focus (α = 0.75), somatic tension (α = 0.80), autonomic hyperactivity (α = 0.74), and perceived control (α = 0.72). Private self-focus fell below the standard (α = 0.50).

To date, the TFAI had not been used with a youth population. Therefore, the Competitive State Anxiety Inventory-2 Children's Form (CSAI-2C; Stadulis, MacCracken, Eidson, & Severance, 2002) was also administered to the figure skaters and used to provide preliminary evidence of convergent validity. This inventory has been confirmed with youth ages 8-12 and tests similar constructs as the TFAI. The CSAI-2C measures a three-dimensional model of competitive anxiety via a 15-item questionnaire comprised of three constructs: cognitive anxiety (5 items), somatic (physical) anxiety (5 items), and self-confidence (5 items). These constructs were anticipated to be correlated with the following TFAI higher order constructs respectively: cognitive dimension, physiological dimension, and regulatory dimension.

In the CSAI-2C, a 4-point Likert scale allows participants to indicate their agreement with statements on a scale of 1 (not at all) to 4 (very much so). Example items for each of the CSAI-2C constructs are included in Table 2. Internal consistency for the CSAI-2C was reported using Carmines' θ with a value of 0.96. Cronbach's alphas were also satisfactory with reported values of 0.78 for somatic anxiety, 0.73 for confidence, and 0.75 for cognitive anxiety. Confirmatory analyses revealed a goodness-of-fit index higher than 0.90 and RMSR value of .042. In the present study, Cronbach’s alphas were deemed adequate with cognitive anxiety (α = 0.75), somatic anxiety (α = 0.87) and confidence (α = 0.87).

Skating test performance score. Following the survey measures, skaters reported the final scores that each of the three judges had awarded their skating test. The Moves in the Field tests are scored by evaluating each pattern individually according to the standards of execution outlined in the test book, while Free Skate tests are evaluated against the three categories (elements, skating, and program). According to the U.S. Figure Skating Rulebook (2019), "...each element will be marked on a scale ranging from -3 to +3, in whole number increments, with "0" equal to passing average for test level expectation" (p. 168). The highest potential score range for a test is -18 to +18. A final score of 0 or greater (e.g. +6) indicate the skater has passed the test. A score with a negative value indicates the skater has not met the minimum requirements to pass the test and must retry (e.g. -3). The three final scores assigned by the judges are compared to determine the skater's final test result. Agreement between two of the three judges is the minimum requirement for a pass or retry test result to be assigned. For example, a skater who is awarded scores of -3, 0, and +1 would receive a "pass" result. While a skater who is awarded scores of 0, -1, and -2 would receive a "retry" result. For the purpose of this study, all three scores were converted into z-scores to account for the varying number of skills required for each test and allow for comparisons across tests. Z-scores were averaged and entered as the performance score in the correlational analyses.

Procedures

A pilot study was conducted to assess the comprehension and understanding of the TFAI items with five adolescent athletes between the ages of 13 – 17, as this measure is not currently valid with this demographic group. Data collected during this pilot testing were not used for further analyses. Adolescent athletes were asked to circle words or entire items that were difficult to understand so that clarification could be provided by the researchers. From these notations, the researcher prepared synonymous words or phrases for difficult words identified in seven of the twenty-five items to be used throughout the data collection process. These synonyms allowed for consistent clarification throughout data collection when and if participants indicated they did not understand the meaning of an item. Notations for items that required further clarification are provided in Appendix H.

A letter of cooperation was obtained from a representative (Test Chair or Skating Director) from each individual ice rink or skating club in which data were collected. The initial recruitment of rinks was purposeful to represent multiple clubs and figure skaters across Northeastern and Southeastern regions of the US. A total of 24 skating clubs located across nine states were recruited via email and phone communication. Five skating clubs granted permission to collect data. Upon receiving IRB approval, specific testing dates were obtained, and data collection was scheduled. The week of the test session, the skating director or a club representative notified all parents or guardians of figure skaters registered for a test session of the opportunity to participate in the study via email. This email included an opportunity to complete parental informed consent via Qualtrics. The researcher was provided with a test schedule for each rink in advance and noted which figure skaters had pre-registered to participate in the study.

At each test session, the researcher appeared in person and approached every parent and skater pair listed on the testing schedule taking a Moves in the Field and/or Free Skate test to complete survey measures following the completion of the skater's test. Participants were informed that their involvement in the study was voluntary and that their responses would remain anonymous. Further, participants were informed that they could terminate participation at any time without penalty. Parental consent was obtained for all participants as they were under the age of 18. Youth assent was also obtained. Figure skaters 12 years of age and under were not invited to participate in the study as developmental literature suggests research involving retrospective questions may be difficult for children of this age range as their memory is still developing (de Leeuw, 2011). Delimiters for competitive level and age of participants has similarly been reported in research with competitive figure skaters (Vealey & Campbell, 1988).

Both the TFAI and CSAI-2C were designed and intended to be administered before the athlete participates in their event. However, previous studies have reported successfully administrating surveys post-performance (Cheng, Hardy, & Markland, 2009; Harger & Raglin, 1994; Stanger, Chettle, & Whittle, 2018) as to preserve athletes’ precompetitive routines. In considering the accuracy of recalled pre-competitive anxiety, Harger and Raglin (1994) observed significant correlations between actual pre-competition anxiety values with two-day recalls of precompetitive anxiety values in a population of collegiate track and field athletes. Authors utilized a similar competitive anxiety measure (STAI). It is important to note that self-evaluation of performance did not interfere with athlete’s recall accuracy. In a population of adolescent gymnasts, accuracy correlations were lower when comparing reported competitive anxiety values one hour prior to competition with values reported two-days following competition using the CSAI-2 (Annesi, 1997). Recall accuracy was not explicitly assessed in this study, so the potential for recall bias must be acknowledged.

As the researchers did not want to interfere with athletes' pre-competitive routines and potentially add to the precompetitive anxiety response, participants completed survey measures and a short demographic questionnaire within 10-20 minutes of completing their skating test. Skaters were instructed to recall and report pre-competitive anxiety levels and pre-competitive anxiety symptoms. Figure skaters were also instructed to complete measures before receiving their results for their test; however, this aspect could not be consistently controlled by the researcher as some results were delivered by coaches to the athlete before the survey had been completed. The number of athletes who knew their scores in advance of the survey was not recorded.

Data Analysis

Based on recommendations from previous literature, a minimum sample size was calculated to account for 15 participants per predictor variable entered into the stepwise regression (Tabachnick & Fidell, 1996). Three predictor variables and one criterion variable were entered into the regression (cognitive dimension, physiological dimension, regulatory dimension, and performance) requiring a minimum participant requirement of n = 45. Once this minimum number was reached, data were analyzed using IBM SPSS Statistics for Windows, version 25 (IBM Corp., Armonk, N.Y., USA).

Data were checked for data entry errors and analyzed for normality by examining values for skewness and kurtosis. There were 11 missing values which represented 0.6% of the data. Missing values were assumed to be random and attributed to participant error. Using the multiple imputation function in SPSS, five data sets were generated which calculated mean values for each item with a missing value. The fifth data set was chosen as imputation convergence was achieved. This process was implemented due to the percentage of missing values was low (Manly & Wells, 2013). After completing this procedure, normality was not achieved for all items of the TFAI, specifically the construct of perceived control (skewness range: -1.172 to .347; kurtosis range: 1.95 to .681). Normality for the somatic anxiety construct of the CSAI-2C was also not achieved as it displayed significant kurtosis (kurtosis range: -1.372 to .681). Additionally, performance scores were significantly kurtotic (range: 2.10 to .681). No adjustments or transformation were made to the data as data transformation is not always necessary when calculating Pearson's Product Moment correlations and Cronbach's alpha

(Norris & Aroian, 2004). Descriptive statistics and frequencies were calculated for the demographic information, construct scores, and performance scores including means and standard deviations. Participants' three performance scores were each converted into a z-score and then averaged to allow for the comparison of scores across tests. Cronbach's alpha was calculated for the physiological, cognitive, and regulatory subscales of the refined TFAI as well as the lower order factors of worry, private self-focus, public self-focus, somatic tension, autonomic hyperactivity, and perceived control. Acceptable Cronbach's alpha was set at 0.70 to assess each subscale's level of reliability as this value has been deemed satisfactory in previous literature (Nunnally & Bernstein, 1994). Reliability was achieved for all higher-order subscales of TFAI and CSAI-2C.

Pearson's Product Moment correlations were calculated to provide preliminary evidence of the use of the TFAI with adolescents against an anxiety measure that has been previously validated with youth athletes, the Competitive State Anxiety Inventory-2 Children's Form (CSAI-2C; Stadulis, MacCracken, Eidson, & Severance, 2002). Pearson's Product Moment correlations were also calculated to investigate the relationships between the athletes' number of attempts for the given test, years of testing experience and months spent training for a given skating test, as well as higher order factors of the refined TFAI and performance. Only significant relationships ($\alpha < .05$) between the predictor variables and performance were entered into a stepwise regression. In the current study, no relationships were significant and therefore the stepwise regression analysis was not conducted. Tests for multicollinearity between the constructs of the TFAI were conducted and reported as well as a test for homoscedasticity.

CHAPTER 3

RESULTS

Descriptive statistics for the subscales of the TFAI and CSAI-2C are presented in Tables 3 and 4.

Table 3

Descriptive Statistics for TFAI Subscales

Higher Order Constructs	**Mean**	**SD**	**Lower Order Constructs**	**Mean**	**SD**
Cognitive Dimension	3.77	0.80	Worry	4.00	0.92
			Private Self-focus	3.66	0.74
			Public Self-focus	3.50	1.10
Physiological Dimension	2.84	0.89	Autonomic Hyperactivity	2.80	0.95
			Somatic Tension	2.87	0.93
Regulatory Dimension	3.6	0.74	Perceived Control	3.60	0.74

Table 4

Descriptive Statistics for CSAI-2C Subscales

CSAI-2C Subscales	**Mean**	**SD**
Cognitive Anxiety	2.80	0.75
Somatic Anxiety	2.65	0.86
Self-confidence	2.56	0.66

The correlations revealed no significant associations between the predictor variables and skating performance (see Table 5).

Table 5

Intercorrelations Among TFAI Anxiety Dimensions, Performance, and Additional Variables

		1	2	3	4	5	6	7
1	Cognitive Dimension							
2	Physiological Dimension	.72**						
3	Regulatory Dimension	-.41**	-.23					
4	Months training	.03	-.09	-.10				
5	Years testing experience	-.18	-.08	.07	.31*			
6	Attempt number	.04	-.02	-.07	.38**	.30*		
7	Performance	-.02	.04	.23	-.20	.04	.13	

Note. *p < .05; **p < .01

Thus, a stepwise multiple regression could not be conducted to address the primary research question. Significant correlations were present between the TFAI predictor variables of cognitive and physiological anxiety (r = .72, p < .001) and cognitive anxiety and perceived control (r = -.41, p < .001). Additionally, no significant relationships were observed between the three factors of the TFAI, years of testing experience, and months training for test. Finally, no significant relationships were observed between the cognitive and physiological dimension of anxiety and test attempt number (Table 5).

A Pearson's Product Moment correlation was used to provide preliminary evidence of the use of the TFAI with an adolescent population. The three higher order factors of the TFAI (cognitive dimension, physiological dimension, and regulatory dimension) were correlated against similar constructs represented within the CSAI-2C, including cognitive anxiety, somatic anxiety, and self-confidence, respectively. Analyses revealed significant positive correlations between the cognitive dimension and cognitive anxiety ($r = .88$, $p < .001$), the physiological dimension and somatic anxiety ($r = .82$, $p < .001$), and the regulatory dimension and self-confidence ($r = .71$, $p = .001$). Additional correlations are presented in Table 6.

Table 6

Intercorrelations Among TFAI and CSAI-2C Subscales

		1	2	3	4	5	6
1	Cognitive Dimension						
2	Physiological Dimension	.72**					
3	Regulatory Dimension	-.41**	-.23				
4	Cognitive Anxiety	.88**	.75**	-.56**			
5	Somatic Anxiety	.53**	.82**	-.25	.60**		
6	Self-confidence	-.59**	-.46**	.71**	-.70**	-.40**	

Note. *p < .05; **p < .01

As expected, perceived control exhibited a significant negative correlation with the cognitive dimension ($r = -.41$, $p < .001$), while self-confidence also displayed a significant negative correlation with cognitive anxiety ($r = -.70$, $p < .001$) and somatic anxiety ($r = -.40$, $p = .005$).

CHAPTER 4

DISCUSSION

The purpose of the present study was to determine whether the subscales of the refined three factor hierarchical model of competitive anxiety (Jones, Mullen, & Hardy, 2019) could predict figure skaters' test performance. A secondary purpose was to determine relationships between the cognitive, physiological, and regulatory dimensions of anxiety with the number of attempts for the given test, years of competitive experience and months spent training for a given skating test. It was hypothesized that the higher order dimensions of the TFAI would predict performance scores. This hypothesis could not be tested due to a lack of significant correlations between the predictor variables and performance. Additionally, it was hypothesized that years of testing experience and months training would correlate with the cognitive, physiological, and regulatory dimensions of anxiety, while test attempt number was expected to correlate with the cognitive and physiological dimensions. Relationships between these variables were not significant. Therefore, the second and third hypotheses were not supported. In summary, competitive anxiety and other pertinent training variables were not related to performance.

The intercorrelations between predictor variables of the TFAI indicated multicollinearity was present. The high correlation ($r = .72$, $p < .001$) between the cognitive and physiological dimensions indicated they share a common variance. Had the cognitive and physiological dimensions been significant with performance, only one would have been loaded into the regression. A moderate correlation (r = .56, p < .001) has been reported between these two variables in a previous study (Cheng et al., 2011).

Although it was predicted that perceived control, cognitive anxiety and physiological anxiety would significantly predict figure skater's performance, only perceived control has significantly predicted performance in previous studies using this model (Cheng et al., 2011; Jones, Mullen, & Hardy, 2019). The finding that perceived control was not significantly related to figure skater's performance was somewhat surprising as perceived control is proposed to have a strong theoretical basis for predicting the anxiety-performance relationship (Cheng, Hardy, & Markland, 2009). Given that a high percentage of figure skaters performed well during their test, it is possible that skater's reported levels of perceived control did not hold much significance in distinguishing performance. In a sample of competitive runners, perceived control was shown to be significantly higher for athletes achieving higher levels of performance than those who performed poorly (Jones et al., 2019). In this study, athletes were divided into three performance groups (high, moderate, and low) according to answers on a self-reported measure of performance. Acknowledging the difference in how Jones and colleagues (2019) measured performance in comparison to the measure utilized in the present study may provide further insight as to the differences in results.

It has been suggested that differences in how performance is measured across studies exploring the anxiety-performance relationship may result in different correlations with anxiety (Craft et al., 2003). The current study collected subjective measures of performance given by a panel of judges while previous studies using the TFAI have implemented self-reported measures of performance (Cheng et al., 2011; Jones et al., 2019). The standard in which these two evaluation systems are grounded in are different which can potentially lead to different relationships with anxiety. Self-report measures are answered based on the individuals' perception of their own ability and performance capabilities while test judges are evaluating performance against standardized criteria. Thus, a judge's evaluation considers whether the skater has successfully met the minimum requirements to pass the test while a self-report measure may take into account whether the minimum performance was met and whether the performance was better or worse than how the skater usually performs.

In further examining the present findings, athletes exhibited a relatively high passing rate overall, moderate levels of perceived control and moderately high levels of cognitive anxiety. Also, significant relationships were observed between figure skaters' reported levels of cognitive and physiological anxiety as well as cognitive anxiety and perceived control. Thus, as figure skater's levels of cognitive anxiety increased so did physiological anxiety levels while increases in cognitive anxiety corresponded with decreases in levels of perceived control. Given perceived control is an indicator of an athlete's perception of their ability to cope with the stressor (Cheng et al,, 2009), its' negative relationship with cognitive anxiety is in-line with the theoretical basis for the regulatory dimension of anxiety. In interpreting these findings, it can be suggested that figure skaters with higher levels of worry had weaker perceptions of their ability to perform well. This finding is noteworthy given the high number of figure skaters who successfully passed their test overall. Further, it can also be concluded that the figure skaters in the current study perceived the testing environment as a performance stressor as indicated by their moderate to high levels of pre-performance cognitive and physiological anxiety. However, these perceptions of cognitive and physiological anxiety did not impact test performance.

In the current study, figure skater's responses to cognitive and physiological anxiety measures indicated that their initial appraisal of the testing environment contributed to frequent thoughts of worry and moderate physiological symptoms of anxiety on average. Previous research can help further explain how figure skaters appraised the testing environment and interpreted their emotional responses. An athletes' experience of stress is theorized to be a continual transaction between the demands of the environment and the resources of the individual in which an imbalance results in more negative emotions and behavioral responses (Lazarus, 2000). In the presence of a performance stressor such as a skating skill test, the athletes have initial cognitions or appraisals relating to the event. These appraisals initiate emotional responses such as anxiety, anger, happiness, sadness, pride and nervousness, and can vary in intensity and valence (Uphill & Jones, 2007). Further appraisals of the thoughts and emotions induced by the performance stressor can be interpreted as facilitative or debilitative to performance. This interpretation is contingent upon the athlete's belief of their ability to cope with their emotions and will ultimately influence future behavior of the performer (Neil, Hanton, Mellalieu, & Fletcher, 2011).

Previous studies have indicated that level of experience can have a significant impact on athletes' perceived anxiety levels (Rocha & de Osório, 2018). Specifically, more experienced competitors have reported lower levels of trait somatic and cognitive anxiety while also reporting more facilitative interpretations of anxiety symptoms than athletes with less competitive experience (Mellalieu, Hanton, & O'Brien, 2004). This shift is thought to be attributed to the learning of mental skills and coping mechanisms as athletes become more familiar with the competitive environment (Hanton & Jones, 1999). Within the current study, relationships were predicted between perceived control, years of testing experience and time training for tests in referencing similar information. Athletes who have more experience within the performance or competitive environment likely have experienced symptoms of anxiety before and have learned a variety of skills to cope with these symptoms. Elite figure skaters' reported experience of performance anxiety and use of mental skills in response to cognitive and physiological symptoms of anxiety provides preliminary evidence for this notion (Gould et al., 1993).

Finally, no significant relationships were identified between the cognitive and physiological dimensions of anxiety and test attempt number. Given athletes' performance has been shown to be adversely affected by fear of failure and fear of evaluation of parents, friends, and others (Passer, 1983) it was predicted that figure skaters attempting a test for a second, third, or fourth try would exhibit higher levels of pre-performance anxiety. It may be that small sample size contributed to a lack of findings in this area. To better understand if a relationship does exist here, future work could examine fluctuations in pre-performance anxiety on an individual basis and across multiple test attempts to explore potential fluctuations in state anxiety.

Limitations

A few limitations were present in the current study. First, the timing of survey administration could have potentially been subject to recall bias. Athletes did not take the measure for competitive anxiety up to an hour before they took their test as in previous studies (Cheng, Hardy, & Woodman, 2011; Jones et al., 2019). As competitive anxiety measures are designed to be taken before performance, it can be argued that this is the preferred method of delivery. However, coaches, parents, and board members of skating clubs expressed concern over survey instruments being administered before test performance during the recruitment phase and may have further hindered access to participants had the methodology been adopted. It should be noted that Vealey and Campbell (1988) successfully administered surveys before a competitive event with a population of adolescent figure skaters; however, it was apparent that the use of such methodology would not be feasible for the present study. Social desirability and/or lack of awareness of performance anxiety symptoms can influence the accuracy of self-reported measures of anxiety with figure skaters as well (Cheng et al., 2009; Colgan, 2006).

It has also been reported that poor performance does not interfere with an individuals' ability to recall pre-performance anxiety levels (Harger & Raglin, 1994). While the current study attempted to control for skaters' knowledge of performance score, the variances in testing environments and coaches' knowledge of the study occasionally interfered with these procedures. To that end, some participants knew their score before completing survey measures which could have potentially interfered with survey responses. Future studies should explore whether knowledge of performance score could influence adolescents' recall of pre-performance anxiety levels.

As the TFAI has not been validated with an adolescent population, this factor must be posed as a limitation. Although the current study maintained reliable coefficients for the three higher order subscales of the TFAI, it is recommended that the TFAI be validated for future use with youth athletes. Figure skaters intermittently requested clarification for words in seven of the items, with "lethargic" being the most frequently misunderstood term. Recommendations have been provided for item rewording in Appendix H. Future development and modification of the TFAI should consider the synonyms given for the seven items that often proved challenging for adolescents to comprehend. Consideration could also be given in adapting the measure to include athletes ages 8 – 12 as figure skaters tend to participate in the sport competitively at very early ages.

The differences in competitive and recreational athletes' testing intentions may have explained why significant relationships were not discovered between years of testing experience, time spent training for tests and the three factors of the anxiety measure. For recreational figure skaters, the number of years spent training for skills tests may be higher than competitive athletes as recreational figure skaters typically move through the levels at their own pace. Whereas competitive athletes who train multiple days a week may progress through the levels faster while also spending fewer months preparing for test sessions. To attempt to account for this difference, the number of hours spent training for a test may have been a more reliable marker for gauging how prepared athletes were for their skill tests instead of months. Future work should consider this more specific form of measuring athletic preparation and experience.

Additional limitations include the small sample size and exceptionally high passing rate compared to national data cited by U.S. Figure Skating. The lack of significant findings in the performance to pre-competitive anxiety relationship could potentially be explained by these factors in addition to the performance scores reflecting significant levels of kurtosis. Future research should seek a more diverse sample in terms of test result (pass/retry) along with a higher number of participants. More localized explorations of test performance could also be assessed to include the four higher levels of tests as these tests have lower passing rates overall (K. Woienski, personal communication, November 15, 2019).

Access to participants contributed to the small sample size. Although the researcher initially sought a diverse group of skating clubs to participate in the study (24 skating clubs across 9 states) only five rinks granted access to participants. Along with this, 45% of the participants were surveyed at one location on two different test dates. Future research could continue to sample from rinks across a geographical area utilizing a stratified sampling method. Different skating clubs could vary in respect to the number of qualified coaches and even how frequently test sessions are held. Broadening the sampling area and collecting similar sample sizes at each location could aid in balancing out these inconsistencies.

Implications and Future Directions

In conclusion, the present investigation did not find significant relationships between predictor variables of the TFAI and test performance scores. However, figure skaters were found to exhibit symptoms of cognitive and physiological anxiety within the testing environment leading the researchers to conclude that adolescent figure skaters perceive the testing environment as a performance stressor. Additionally, cognitive anxiety symptoms appeared to be more intense for adolescent skaters than physiological symptoms and were significantly related to their perceptions of their ability to cope with the testing environment.

From the results of this work, practitioners working with adolescent figure skaters can be recommended to explore figure skaters' thoughts of worry, private and public self-focus, and their appraisal of subsequent anxiety symptoms in the performance environment. This is recommended based on high averages for cognitive anxiety intensity levels in the present sample which were significantly associated with an athlete's perception of their ability to cope with the performance. Cognitive strategies such as thought stopping, restructuring, mental rehearsal and self-talk are suggested as methods to reframe initial negative appraisals as facilitative to performance (Hanton, Mellalieu, & Hall, 2004). Psychological interventions with youth figure skaters have shown promise in enhancing competitive and/or test performance as skaters reported using self-talk skills one year after an intervention as they believed it helped them perform better (Ming & Martin, 1992).

Jones and colleagues (2019) recommend practitioners use the TFAI with individual clients as a more detailed approach to understanding individual's pre-performance anxiety response than previously employed measures. The six lower-order factors of the measure can provide more detailed information related to individuals' tendencies toward evaluative concerns (public vs. private), the source of physiological anxiety symptoms (involuntary vs. voluntary muscle groups) and the degree to which athletes feel they can cope with the demands of performing under pressure. Individual responses from the survey could be used by practitioners in designing mental skill training to specifically address more debilitative interpretations of anxiety or effectively reduce high physiological symptoms. The current study is the first to have tested the subscales of the TFAI with an adolescent population and found the scales to be reliable. However, a formal validation of the measure is necessary before future work is recommended with adolescents.

The TFAI could also be paired with the Test of Performance Strategies-2 (TOPS-2) to measure athletes' psychological skill use (Hardy, Roberts, Thomas, & Murphy, 2010) as replication of a previous study that measures anxiety with the CSAI-2 (Fletcher & Hanton, 2001). This information could reveal which psychological skills figure skaters are using to actively cope with their symptoms of pre-competitive anxiety. Mental skills training has been suggested as a method to increase the regulatory dimension of anxiety (perceived control) as well as decrease the intensity levels of anxiety (Cheng & Hardy, 2016). As the current study found relatively high reported levels of cognitive anxiety and moderate levels of perceived control on average, it is of interest whether adolescent skaters are currently utilizing psychological skills and which skills are more frequently employed.

Qualitative methodologies could also be beneficial in future studies with adolescent figure skaters to explore sources of worry and appraisals of the testing environment. Similar research has utilized qualitative methods to explore antecedents of emotions in elite athletes (Uphill & Jones, 2007), to examine appraisals, emotions, further appraisals and behavior of athletes in response to performance stressors (Neil et al., 2011), and to investigate relationships between self-confidence and perceived effects of pre-performance anxiety (Hanton et al., 2004). Jokela and Hanin (1999) suggested that qualitative work could also provide insight into potential idiosyncrasies of the anxiety-performance relationship. As current research with figure skaters is limited, a qualitative design could reveal unique experiences of this population in relation to athletes' motivation to participate in test sessions, how they interpret their symptoms of anxiety, and how they cope with anxiety before performance and during performance.

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APPENDIX A

HYPOTHESES, DELIMITATIONS, ASSUMPTIONS

Hypotheses

The purpose of this study was to determine whether the subscales of the refined three factor hierarchical model of competitive anxiety (Jones, Mullen, & Hardy, 2019) can predict figure skaters' test performance. A secondary purpose was to determine relationships between the cognitive, physiological, and regulatory dimensions of anxiety with the number of attempts for the given test, years of competitive experience and months spent training for a given skating test.

1. Figure skaters' performance scores will be significantly correlated with levels of cognitive anxiety, physiological anxiety, and perceived control.
2. Figure skaters' cognitive and physiological levels will be significantly correlated with the number of attempts for the given test. No predictions for perceived control will be made for this factor.
3. Figure skaters' levels of cognitive anxiety, physiological anxiety, and perceived control will be significantly correlated with testing experience and months spent training for a given skating test.

Delimitations

This study was delimited to only include skaters who were taking a Moves in the Field or Free Skate test to allow for the ease of comparison and statistical analyses. Data from Pre-Preliminary skaters was excluded as this test is not scored numerically and did not allow for statistical comparison. Future research should take other tests into consideration (Pairs and

Dance) to add to the current literature base. Also, the age of skaters taking survey measures was limited to athletes ages 13 and older due to recommendations from the literature regarding the administration of a retrospective questionnaire (de Leeuw, 2011). Delimitations for age and competitive level have similarly been established in previous figure skating research (Vealey & Campbell, 1988). Future studies could benefit from surveying younger participants as skaters can begin testing as soon as skills are mastered for the level. Anecdotally speaking, several skaters could not participate in the current study due to being between ages of 8 – 12.

Assumptions

The current study assumed figure skaters would provide honest and accurate self-reported competitive anxiety experiences. Also, the current study assumed that the testing environment will be perceived as a potential threat and therefore will initiate a stress response in the skater. A final assumption is that skaters would provide accurate reports of test performance.

APPENDIX B

LITERATURE REVIEW

A plethora of research is available to illustrate a predictive relationship between some psychological variable and athletic performance. Noteworthy of these variables include personality (Morgan, 1980; Piedmont, Hill, & Blanco, 1999), preperformance mood state and anxiety levels (Covassin & Pero, 2004; Terry & Slade, 1995), psychological skill usage (Taylor, Gould, & Rolo, 2008), perfectionism (Stoeber, 2011; Stoeber, Uphill, & Hotham, 2009; Stoll, Lau, & Stoeber, 2008), goal-orientation (Isik, 2018), perceived control (Cheng, Hardy, & Woodman, 2011; Jones, Mullen, & Hardy, 2019), and self-confidence (Cox, Shannon, McGuire, & McBride, 2010). Researchers continue to explore these correlates in hopes of establishing consistent patterns in athlete behavior that can be utilized to mentally prepare athletes for optimal performance.

Likewise, the current study will distinguish selective psychological predictors of athlete performance in a population of youth figure skaters. Namely, the predictors of competitive anxiety and perceived control will be investigated. The following review of literature will document the United States Figure Skating skills tests as they pertain to the developing figure skater, highlight the problem of the current investigation, discuss previous research within the chosen correlates of athlete performance, explain the importance of the chosen correlates in predicting figure skaters' test performance, and outline the validated measures that have been used to capture each construct.

United States Figure Skating

The United States Figure Skating Association (USFSA) reported 192,110 members during the 2017-18 season, its second highest membership count since the 2005-06 season.

Membership is comprised of athletes, judges, coaches, board members, boosters, and "Friends of Figure Skating" which is a group of donors committed to supporting U.S. Figure Skating athletes ("Membership," n.d.). A majority of members are male and female athletes under the age of 18, accounting for 74 percent of the total membership count. A closer look at membership numbers shows figure skating is more popular among female youth athletes as 52 percent of members are female and 22 percent are male ("2018-2019 Factsheet," 2018). These percentages equate to just under 100,000 female youth skaters and approximately 42,300 male youth skaters who hold memberships within the United States.

The development of youth athletes in ice skating often begins with a basic skills program such as the Learn to Skate USA (established in 2016) which is endorsed by U.S. Figure Skating, US Speedskating, and USA Hockey and supported by Special Olympics and the Professional Skaters Association. Currently, more than 1,000 Learn to Skate USA programs are introducing skaters to the fundamentals of skating across 49 states ("2018-2019 Factsheet," 2018). Skaters are encouraged to progress in their skill development with various levels and skills tests which are standardized by the Learn to Skate USA curriculum and facilitated by qualified instructors. Additionally, skaters are provided opportunities to showcase their skills at recreational competitions which reinforces a demonstration of skill mastery.

From the basic skills program, skaters who wish to continue their skill progression and competitive career can begin participating in sanctioned test sessions held at USFSA affiliated clubs. These skills tests mark the progression of skaters through nationally recognized levels in figure skating and determine the highest level the skater may enter to compete at regional, sectional, and national events. Over seven hundred skating clubs are registered with USFSA across the country with the USFSA headquarters processing 5,300 figure skating skills tests on average each month (“U.S. Figure Skating at a Glance,” n.d.). Totaled together, this would amount to approximately 63,600 skating skills tests processed in a year. U.S. Figure Skating (n.d.) reported 30,000 tests passed on average by USFSA members in a year marking the overall passing rate for skating skills tests slightly below half. This indicates that more than half of the tests taken by skaters are performing below the standard and will have to retry at a future session.

Testing is a way for skaters to establish an exceptional demonstration of skill and ability and are extremely important for the competitive figure skater. Tests serve as a reinforcement in achieving a level of proficiency in the sport and helps skaters move up the competitive “ladder” in hopes of representing the United States in international competitions (U.S. Figure Skating, 2019). For figure skaters, achieving the “Senior” or “Gold” level in a discipline signifies mastery and is a significant achievement (“U.S. Figure Skating tests,” n.d.) for both recreational and competitive athletes.

There are five U.S. Figure Skating testing tracks that are each comprised of six or eight levels designed to progress skaters through the singles, pairs, and ice dancing disciplines. The five test tracks are as follows: Moves in the Field, Free Skate, Pattern Dance or Solo Pattern Dance, Free Dance or Solo Free Dance, and Pairs. The Moves in the Field track is often considered the baseline or prerequisite test series as singles, pairs, and dance skaters must first successfully pass the equivalent Moves in the Field test before taking a discipline specific test (“U.S. Figure Skating Tests,” n.d.). For example, a singles skater must pass the Juvenile Moves in the Field test before they may take the Juvenile Free Skate test. Passing both of these tests will allow this skater to compete at the Juvenile level in singles at USFSA sanctioned competitions. The test tracks are therefore extremely important for the competitive figure skater as they indicate figure skaters’ achievement and progression through the sport. Tests serve as a reinforcement in achieving a level of proficiency in the sport and helps skaters move up the competitive “ladder” in hopes of representing the United States in international competitions (U.S. Figure Skating, 2019).

USFSA sanctioned test sessions are held at affiliated skating clubs and judged based on the requirements of each skill level test documented by the U.S. Figure Skating Rulebook. The Moves in the Field tests consist of four to six set patterns for each of the eight levels (Appendix D). The levels from start to finish are as follows: Pre-Preliminary, Preliminary, Pre-Juvenile, Juvenile, Intermediate, Novice, Junior, and Senior. Free Skate tests follow the same level progression and are evaluated in across three categories: required program elements, overall skating quality, and program interpretation. Athletes typically move at their own pace when preparing the elements for each test and an increasing number of practice hours become necessary as athletes progress to higher test levels. Tests are evaluated by a panel of one to three judges who are appointed by U.S. Figure Skating after meeting the necessary requirements to become a judge which includes the completion of an exam to certify the appropriate knowledge of the tests they wish to judge.

The Moves in the Field tests are scored by evaluating each pattern individually according to the standards of execution outlined in the test book while Free Skate tests are evaluated against the three categories (elements, skating, and program). According to the U.S. Figure Skating Rulebook (2019), “...each element will be marked on a scale ranging from -3 to +3, in whole number increments, with “0” equal to passing average for test level expectation” (p. 168). In order for a skater to pass the test, the combined score for all elements must be equal to 0 or higher to obtain a “pass” from a judge. The skater must also receive a “pass” from a majority of the judges. A combined test score with a negative value indicate the skater must retry the test again at a later test session. The Pre-Preliminary test is the only test that is scored as “pass” or “retry,” as there are no point values assigned to this test. Unlike competitive events, skaters are scored individually during their test and are not ranked against other skaters testing at the same level.

Unpublished survey data has been collected by US Figure Skating to gauge the average ages of figure skaters taking skating skills tests as well as the training time to complete each level (Table 1). These surveys are completed voluntarily online after participating in a test session and therefore do not represent all figure skaters participating in test sessions. Data collected across four seasons (2016-19) reported the average age for skaters passing the Preliminary tests was age 12 and 16 years of age for the Senior test. The shortest average training time to complete a test was approximately six and a half months for Pre-Preliminary Moves in the Field while the longest training period was one year for the Novice Movies in the Field test. Passing rates were also reported in this data suggesting an overall passing rate of 79% for all levels of Moves in the Field and Free Skate tests. Passing rates are lowest for the four upper level Moves in the Field tests with passing rates between 52 - 68% (K. Woienski, personal communication, November 15, 2019). Passing tests for skaters is important as it qualifies them to compete at the next level. Figure skaters must wait a period of twenty-seven days before they are permitted to re-test test after receiving a retry score (U.S. Figure Skating, Rule 4003, 2019). Although skaters can move through tests at their own pace to coincide with their competitive level, the amount of time that must be invested to complete all levels is significant.

The current passing rate for all disciplines of skills tests (Moves in the Field, Dance, Pairs, and Free Skate) indicates that more than half of the tests are taken by skaters who perform below the standard and will have to retry at a future session. To date, research has not explored the specific correlates of unpassed tests. Membership data and the average age of skaters taking Moves in the Field and Free Skate tests would suggest that youth skaters are the primary subject of evaluation. Therefore, skaters must learn early in their skating participation how to perform under pressure in preparation for future competitive events.

Long-term athlete involvement is important to U.S. Figure Skating as their mission is to "create and cultivate opportunities for participation and achievement in figure skating" (U.S. Figure Skating, 2019, p. 19). Coaches and skaters would benefit from understanding the characteristics of athletes who pass tests versus those who don't pass as they both seek to successfully progress through the levels. The current study aims to consider multiple correlates that have been previously reported as antecedents to performance to include competitive anxiety, perceived control, years of testing experience, number of attempts for the test, and months training for a given test. Each of these correlates will be detailed to justify their inclusion in the analyses.

Anxiety to Performance Relationship

Several theories have been developed to explain an athlete's psychological and physiological response to anxiety and its subsequent effects on performance. The performance to anxiety relationship was at first thought to be linear (Spence & Spence, 1966) and was referred to as drive theory. Psychologists theorized that as arousal levels increased within an individual, so did their performance. Little evidence supported drive theory as researchers found individuals performing worse under high levels of anxiety. Thus, attention shifted to the inverted-U hypothesis (Yerkes & Dodson, 1908) where the anxiety-performance relationship was believed to be optimal when a moderate level of arousal is experienced. Likewise, performance was said to be poor at the lowest level of arousal and at the highest level of arousal. Graphically, this would take the shape of an inverted-U with the peak of the curve indicating optimal performance and arousal levels. As arousal levels recede or surpass the optimal level, performance is predicted to gradually decline. The simplicity of this model has received criticism for its inability to explain the interaction of cognitive anxiety and arousal (somatic anxiety) (Hanton, Mellalieu, & Williams, 2015) or account for the steep drop in performance after athletes' have passed the optimal level of arousal (Hardy & Parfitt, 1991). Despite this, inverted-U has drawn attention to the potential for anxiety to have a positive impact on performance if an optimal level is reached and maintained.

The catastrophe model (Hardy & Parfitt, 1991) was conceptualized to account for the potential interaction of cognitive anxiety and arousal or somatic anxiety. In this model, the inverted-U hypothesis is used to predict the somatic anxiety to performance relationship when an individual is experiencing low cognitive anxiety. However, a drastic deterioration in performance is predicted when an individual is experiencing high levels of cognitive anxiety and reaches the threshold for optimal somatic anxiety. This 'catastrophic' drop in performance can be difficult to recover from and is unlike the steady decline in performance illustrated by the inverted-U hypothesis. Interestingly, this theory postulated the potential benefits of experiencing moderate levels of cognitive and somatic anxiety by indicating better performance in conditions where there is some worry and an optimal level of arousal than when no cognitive anxiety is present at all (Weinberg & Gould, 2011).

The Individualized Zones of Optimal Functioning model (IZOF) illustrates that individuals' optimal arousal level can vary from person to person (Hanin, 1980, 1986). In contrast to the inverted-U hypothesis, IZOF states that an individuals' optimal arousal is not confined to the apex within a supposed curvilinear relationship. Some athletes' will perform best when their arousal levels are very high, in the midrange, or relatively low. IZOF also acknowledges that the optimal level of arousal is better conceptualized as a range or zone rather than a single point. A potential limitation to this model is its lack of emphasis on distinguishing somatic and cognitive anxiety’s effect on performance.

A more cognitive approach to explaining the anxiety to performance relationship is the Attentional Control Theory (Eysenck, Derakshan, Santos, & Calvo, 2007) which was developed as an extension to the Processing Efficiency Theory (Eysenck & Calvo, 1992). The Processing Efficiency Theory established the negative effects of anxiety on the cognitive processing efficiency of those working to achieve a level of performance. Essentially the theory postulates that more resources are required when an athlete is anxious if they wish to maintain the same level of effectiveness in their performance. The theory specifies that worry is the culprit of performance efficiency as it occupies space in working memory and contributes to cognitive interference. Therefore, less resources are available to process relevant tasks unless the individual can successfully minimize their anxiety responses.

The Attentional Control Theory (Eysenck et al., 2007) added that the reduced attentional focus on the relevant task is related to a shift in attention to the threat-related stimuli that can be internal (worry) or external (environmental stimuli or distractions). This shift is also described as an imbalance between the stimulus- and goal-directed attentional systems by which the stimulus-driven attentional system has an increased influence. Stimulus-driven attention refers to bottom-up cognitive processing that takes in behaviorally relevant sensory information while goal-directed attention involves top-down cognitive processing which is influenced by current goals, knowledge, and expectations. Overall, this shift results in a reduction in attentional control or focus and reduced processing efficiency of the inhibition and shifting functions of the central executive which are what aid in the filtration of distractions and identification of task-relevant information, respectively (Eysenck et al., 2007). In essence, an anxious athlete may find themselves attending to internal thoughts of worry or external distractions that relate to the potential threat of the impending task instead of elements more directly related to the task. This shift in an athlete's cognitive process can reduce the efficiency of that athlete's performance as they are more prone to becoming distracted and have filled a portion of working memory with worry as opposed to more task-relevant information.

One of the most prevalent approaches to explaining anxiety is the Multidimensional anxiety theory (Martens, Vealey, & Burton, 1990) which distinguishes the somatic (physiological) and cognitive (mental) components of the anxiety response. These potentially unpleasant emotional and physical responses are a result of the athlete appraising and interpreting competition related stressors as threatening. In describing the performance to anxiety relationship, the theory predicts a negative relationship between cognitive anxiety and performance while predicting an inverted-U relationship between somatic anxiety and performance. Here, cognitive anxiety is always associated with a decrease in performance while somatic anxiety is predicted to be facilitative to performance up to an optimal level. The intensity of somatic and cognitive symptoms is also crucial in explaining the anxiety to performance relationship with high intensity levels generally being the most detrimental to performance. Finally, this perspective identifies self-confidence as a potential buffer against the debilitative effects of cognitive and somatic anxiety (Martens, et al., 1990).

A directional interpretation of competitive anxiety symptoms has been discussed as an extension to the Multidimensional anxiety theory. Direction is related to whether the athlete appraises the intensity of their anxiety as facilitating or debilitating to performance (Jones, 1995;

Jones & Hanton, 2001; Mellalieu, Hanton, & O'Brien, 2004). A precursor to facilitative or debilitative interpretation is whether athletes perceive that they possess the ability to control the stressor, including control over self and the environment. Athletes who perceive high control are likely to interpret anxiety symptoms as more facilitative than those who perceive low control. This may be explained by athletes' inability to cope with the stressor (Jones, 1995).

As anxiety research has progressed, scholars have included the influence of interpretation of somatic and cognitive anxiety symptoms to explore the repercussions of more debilitative appraisals of competitive stressors on performance. Although research has been equivocal (Polman, Rowcliffe, Borkoles, & Levy, 2007), many studies have identified both somatic and cognitive forms of anxiety have the potential to hurt performance (Burton, 1988; Mabweazara, Leach, & Andrews, 2017). Less commonly acknowledged however, is the potential for competitive stressors to have positive consequences on athletes' performance and psychological state (Mellalieu, Hanton, & Fletcher, 2006). In fact, competitive anxiety can benefit performance given an athlete's facilitative interpretation of their competitive anxiety symptoms. This positive interpretation is a result of an athlete's appraisal of their ability to control the stressor, effectively cope with the demands, and achieve the goals associated with the task (Cheng, Hardy, & Woodman, 2011; Jones, 1995). This finding has spurred additional research to explore the use of psychological skills and athletes' anxiety. Wadey and Hanton (2008) found that athletes used skills of imagery, goal setting, and self-talk to interpret their anxiety as facilitative and maintain the intensity of that anxiety leading up to performance.

Much research has added a directional scale (Jones & Swain, 1992) to the frequently used Competitive State Anxiety Inventory-2 (CSAI-2; Martens, et al., 1990) to account for athletes' perceptions of their somatic and cognitive anxiety responses. However, this system of measurement has been challenged for its potential flaws as athletes' coping style may involve ignoring or denying anxiety symptoms or athletes' may simply be unaware that their physiological responses are attributed to anxiety (Cheng, Hardy, & Markland, 2009). Similarly, CSAI-2 has received scrutiny regarding its validity in predicting performance (Craft, Magyar, Backer, & Feltz, 2003). Therefore, the development of a new model has been proposed to more accurately explain the complexity of the anxiety-performance relationship.

Three-Factor Hierarchical Model of Competitive Anxiety

A recent development in the anxiety to performance literature has established a three factor hierarchical model of competitive anxiety (Jones, Mullen, & Hardy, 2019) based on the initial conceptualization of a three-dimensional modal by Cheng and colleagues (2009). In Jones' (2019) refined model, the cognitive dimension includes thoughts of worry, private self-focus (concern attending to inner feelings and thoughts), and public self-focus (awareness of one's effect on others in the social context). The physiological dimension includes autonomous hyperactivity and somatic tension producing physical symptoms related to involuntary (internal organs) and voluntary (motor) muscle groups. Finally, the third dimension is termed the regulatory dimension to represent the underlying regulatory process in response to a perceived threat. This regulatory process, referred to as perceived control, includes an individual's perception of whether he or she has the capacity to cope with the stressor. Therefore, during the competitive anxiety response, athletes evaluate the internal and external threats to their goal as well as their potential to meet the demands of the task. The regulatory dimension effectively illustrates the adaptive nature of anxiety in light of participants' performance expectations (Cheng et al., 2009).

The regulatory dimension of perceived control was shown to have predictive validity in a population of tae-kwon-do athletes. Athletes' performance was better under high levels of perceived control and lower with low levels of perceived control (Cheng, Hardy, & Woodman, 2011) with similar findings replicated in a follow-up study (Jones, Mullen, & Hardy, 2019). Conversely, tae-kwon-do athletes who displayed high levels of physiological anxiety did not exhibit a significant increase in performance when perceived control was increased. However, results indicated performance was maintained and not impaired as perceived control increased (Cheng et al., 2011). Additionally, no significant effects were found for the first order effects of cognitive or physiological dimensions of anxiety (Jones et al., 2019).

The adaptive potential of perceived control has been further validated as it was shown to be associated with adaptive dimensions of approach coping, self-talk, and perfectionism. Allowing investigators to conclude the ability of the regulatory dimension to reflect "the potential for mobilizing mental and/or physical resources in order to deal with perceived threat in the dynamics of the anxiety response" (Cheng & Hardy, 2016, p. 261). The most recent improvement of the hierarchical model has potential for a more refined diagnosis of anxiety which can then allow for the development and implementation of effective interventions to improve athlete performance. However, continued research with this model is recommended to look for effects between performance and lower order factors of the model (Jones et al., 2019).

Within the three-factor hierarchical model of competitive anxiety, the three dimensions of cognitive, physiological anxiety and perceived control may appear to similarly correspond with the three factors of the CSAI-2, namely, cognitive, somatic and self-confidence. However, Cheng et al., (2009) clarified the distinctions between the two stating that the CSAI-2 does not account for the coping capacity of anxiety in its measurement of self-confidence. Namely because self-confidence and worry are conceptualized as being on opposite ends of a bipolar scale and as a potential buffer for the detrimental effects of anxiety (Martens et al., 1990) which has likewise been scrutinized (Woodman & Hardy, 2003). Positive performance expectations are a consistent theme across the constructs of perceived control and self-confidence; however, perceived control does not relate to the notion of "emotional calmness" also captured by self-confidence. The benefit of measuring perceived control instead of self-confidence is due to its ability to explicitly measure the coping capacity of athletes experiencing competitive anxiety. This points directly toward an adaptive potential for anxiety, further reinforcing it as a multidimensional construct (Cheng et al., 2009).

Anxiety has proven to be a daunting phenomenon to explain by any one theory. Indeed, the experience of anxiety is multifaceted and is agreed to consist of the individual's interpretation of the experience and their physiological activation (Weinberg & Gould, 2011).

Athlete Experience of Competitive Anxiety

Research highlighting the psychological characteristics of figure skaters have been limited in the literature thus far, especially in relation to performance. However, a few studies with individual athletes, youth athletes, and elite and adolescent figure skaters have provided insight and reinforced the relevancy of examining the performance correlates of competitive anxiety and perceived control.

Context and group characteristics are important when examining athletes' competitive anxiety responses. Differences have been uncovered in comparing the competitive anxiety experiences of females versus males, athletes of team sports versus individuals and more experienced athletes versus less experienced athletes (Mellalieu, Hanton, & Fletcher, 2006; Rocha & de Osório, 2018). Rocha and de Osório's (2018) recent meta-analysis of 27 studies revealed females displayed higher levels of anxiety than male athletes as well as noting increased anxiety levels for athletes of individualized sports in comparison with team sport athletes. Higher levels of somatic and cognitive anxiety have been similarly been reported in a sample of tennis players competing in singles matches compared to players competing in doubles. The emphasis on the individual in achieving favorable performance outcomes is thought to contribute to individual athletes' higher perceived competitive anxiety (Terry, Cox, Lane, & Karageorghis, 1996). Athletes' perceived anxiety levels have also been shown to decrease as competitive experience increases (Rocha & de Osório, 2018) suggesting athletes may learn to cope with their competitive anxiety as they gain experience performing in high pressure situations (Mellalieu, Hanton, & Fletcher, 2006). With this additional knowledge, adolescent figure skaters appear to be a likely population to experience competitive anxiety given the individual nature of the sport, and the lack of experience performing under pressure.

Adolescents and Competitive anxiety

Vealey and Campbell (1988) examined the goal orientations of adolescent figure skaters competing in regional competitions in addition to levels of self-confidence and anxiety. The authors discovered two main goal orientations, extrinsic (outcome-oriented) and task orientations. Adolescents in highly structured competitive environments such as regional competitions were shown to gain social approval through demonstrations of competence compared to recreational athletes who focus on personal achievement. An emphasis on peer approval and successful demonstration of sport ability was defined as an outcome-oriented perspective and found to be positively correlated with figure skaters' pre-performance anxiety (Vealey & Campbell, 1988). In essence, skaters who are thinking about proving their skills to gain approval from peers, coaches, and parents (outcome-oriented) are more likely to feel anxious than those who are more performance oriented. Developmentally speaking, figure skaters have been shown to become more performance-oriented with age; however, evaluative concerns appear to be especially salient to the adolescent athlete (Vealey & Campbell, 1988). Although the current study will not explore skaters' goal orientations, this information does identify evaluative concerns as an antecedent to adolescent figure skaters' competitive anxiety.

Similar research conducted with youth skiers revealed their evaluative concerns specific to their performance was related to levels of cognitive anxiety while their levels of somatic anxiety was related to more general evaluative concerns. A look at descriptive data within this study showed youth skiers' greatest concerns were related to the performance-specific evaluations of parents and friends. Therefore, the skier's performance outcome was the primary basis for social evaluation (Bray, Martin, & Widmeyer, 2000). Athletes' performance has the potential to be adversely affected by fear of failure and fear of evaluation of parents, friends, and others and is known to be a source of competitive anxiety and stress. Evaluative concerns do not feel unwarranted as highly anxious players in youth soccer were shown to anticipate more frequent criticism from coaches and parents as a consequence for poor performance (Passer, 1983).

Youth figure skaters have reported cognitive and physiological symptoms of competitive anxiety leading up to a competition. Skaters attributed these symptoms to a fear of falling, making mistakes, being alone on the ice, and performing in front of judges (Bernier, Thienot, Pelosse, & Fournier, 2014). Similar feelings could also be present in the testing environment as a result of the evaluative nature of the test, potential for Skaters who do not pass must wait a period of 27 days before they are permitted to re-test after receiving a retry score (U.S. Figure Skating, Rule 4003, 2019). With each test attempt, a fee is required, and coaches are monetarily compensated for training the athlete and for being present the day of the test. Therefore, a failed test means more time on the specific skill set and more money to attempt the test again which could induce subsequent feelings of anxiety. It is with this research we begin to establish the pertinence of examining competitive anxiety under the most recent theoretical model with the current population of adolescent figure skaters in our study.

Performance to anxiety relationship

Only one study was identified as having investigated the performance to anxiety relationship in a population of adolescent figure skaters (Vealey & Campbell, 1988). In fact, self-confidence and anxiety were found to be related with the goal orientations of figure skaters competing in regional competitions. Here, figure skaters ages 13 to 18 with high levels of self-confidence and intrinsic motivation were shown to have lower levels of pre-competition anxiety. Notable was the inability of skating performance to be significantly predicted by pre-competitive self-confidence or pre-competitive anxiety. However, general confidence levels in ability did predict performance (Vealey & Campbell, 1988) which is consistent with other works (Terry, Cox, Lane, & Karageorghis, 1996).

Perceived Control

Gould and colleagues (1993) interviewed figure skaters at the elite level to identify perceived sources of stress and coping strategies during their national championship experience. Sources of stress included those of physical, psychological and environmental demands on skater resources, in addition to expectations and pressure to perform. Precompetitive mental preparation and anxiety management proved to be an important strategy utilized by a majority (65%) of the skaters in managing these sources of stress. Specifically, skaters reported the use of relaxation techniques, mental rehearsal, visualization, imagery, precompetitive ritual, narrow focus, physical release of stress, reflections on past performances, and acknowledging and dealing with nervousness (Gould, Finch, & Jackson, 1993). Although performance was not directly addressed in this study, insights can be garnered from how the elite figure skaters responded to the stress of competition. In acknowledging and dealing with nervousness, the elite figure skaters appraised their cognitive and somatic anxiety in relation to the competitive stressors and their capacity to cope (perceived control). Psychological skills were then deployed by the figure skaters as a coping mechanism to protect against more debilitative effects of stress and anxiety. It is therefore acknowledged that perceived control is likely to be an important component to the athletes' appraisal of the testing environment and their psychological and physiological reactions to the stressor. However, this needs to be further explored with an adolescent population who have fewer years of competitive and testing experience and may not have established coping mechanisms.

Gender

Interesting differences have been uncovered in comparing the competitive anxiety experiences of females versus males. Rocha and de Osório's (2018) recent meta-analysis of 27 studies revealed females displayed higher levels of anxiety than male athletes as well as noting increased anxiety levels for athletes of individualized sports in comparison with team sport athletes. Results from Correia and Rosado's (2019) investigation with 601 Portuguese athletes mirror these results. In youth athletes, Grossbard and colleagues (2009) reported differences between male and female youth athletes' anxiety experiences using a three-factor model which included somatic anxiety, worry and concentration disruption. Here, female youth athletes were found to have significantly higher levels of worry while male youth athletes had higher levels of concentration disruption during competition (Grossbard, Smith, Smoll, & Cumming, 2009).

Interestingly, gendered anxiety experiences seem to differ in relation to the level of sport participation. Abrahamsen, Roberts, and Pensgaard (2008) studied performance anxiety with elite athletes in individual sports revealing higher levels of somatic anxiety, worry and concentration disruption for female athletes than male athletes. This evidence in comparison with the Grossbard and colleagues' (2009) population of youth athletes who participated in community sports indicated level of sport participation can potentially contribute to how female and male athletes potentially differ in their experience of anxiety.

Meanwhile, Stenling, Hassmén, and Holmström (2014) determined females are more prone to experiencing competitive anxiety than males regardless of whether they competed in individual or team sports. All the more puzzling is more recent research negating gender differences among elite table tennis athletes. Hagan, Pollmann, and Schack (2017) evaluated the multidimensional anxiety components of intensity, interpretation, and frequency of anxiety responses across gender while also considering the athletes' use of psychological skills and the level of stress experienced during the event. In this context, no differences across gender were found in the selection of coping behaviors, self-confidence levels, or multidimensional anxiety experiences. However, the sample size for this study was significantly smaller (N = 23) which may have contributed to the lack of significant differences in the analyses (Hagan, Pollmann, & Schack, 2017). The evidence provided signifies the importance of competitive anxiety in the female athletes' performance experience. This paired with the lack of anxiety related research in the sport of figure skating, a sport primarily composed of youth female athletes, calls for further investigation in this area, although this will not be addressed in the current study.

Competitive experience and Competitive anxiety

Meta analyses have additionally suggested athletes' perceived anxiety levels decrease as competitive experience increases (Rocha & de Osório, 2018). Therefore, athletes who are in the beginning stages of their competitive participation may be in need of additional support to develop anxiety related coping skills. A more direct approach to understanding figure skaters' anxiety experiences both before and during their performance as well as the degree coping skills are utilized by these skaters can aid future intervention development for these athletes. Competitive experience (to be measured here as testing experience) may prove to be a better predictor of competitive anxiety than age with this specific population because some figure skaters begin the sport at a very early age (3 and 4 years old) while others join in their adolescent years.

Measures

Measures of competitive anxiety have gone through significant development and adaptation in an attempt to understand the multidimensional nature of the competitive anxiety response and its subsequent impact on athlete performance. Many of these measures have been developed alongside theoretical models of anxiety and will presently be discussed in chronological order ending with the measure chosen for the current study.

The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Luschene, 1970) measures state and trait anxiety with a total of 40 items using 4-point Likert scales. State anxiety represents a state dependent response to perceived threat with feelings of apprehension, tension, and increased physiological arousal. Whereas trait anxiety is more stable and characteristic of an individuals' general response to threatening situations. In relation to sport performance, high trait anxious individuals also showed high state anxiety which resulted in a decrease in performance

(Horikawa & Yagi, 2012; Spielberger, Gorsuch & Luschene, 1970). Researchers wanted to more specifically delineate the experience of state anxiety given its relationship with performance which contributed significantly to the development of a multidimensional approach to anxiety.

Sport Anxiety Scale (SAS; Smith, Smoll, & Schutz, 1990) measures a three-factor model of anxiety that includes two cognitive anxiety factors (worry and concentration disruption) and one somatic factor. Revised versions of the scale came forth in response to insufficient fit with youth populations (SAS-2; Smith, Smoll, Cumming, & Grossbard, 2006; Grossbard et al., 2009) resulting in a 15-item measure. The subscales were shown to significantly correlate with each other bringing into question the ability of this scale to effectively measure distinct constructs.

The Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990) separated the cognitive and physiological (somatic) responses of competitive anxiety as distinct constructs in concurrence with the Multidimensional theory of anxiety. Additionally, the development of the measure revealed self-confidence as a potential inhibitor on the effects of anxiety and was thus added as a subscale. The final version had 27-items and reported athletes' perceived intensity of their cognitive and physiological anxiety symptoms as well as their perceived confidence. This measure has been revised a few times (CASI-2R; Cox, Martens, Russell, 2003; CSAI-2C; Stadulis, MacCracken, Eidson, & Severance, 2002) and has received scrutiny regarding its validity in predicting performance (Craft, Magyar, Backer, & Feltz, 2003). However, many current studies (Hagan, Pollmann, & Schack, 2017; Lundqvist, Kentta, & Raglin, 2009) can still be found utilizing this measure in conjunction with the directional scale (Jones, 1991; Jones and Swain, 1992) created to add an interpretation dimension to the CSAI-2.

The Directional scale (Jones, 1991; Jones and Swain, 1992) allows athletes to indicate the degree to which they experience the somatic and cognitive symptoms measured on the CSAI-2 as being either facilitative or debilitative to their performance. The direction of each symptom is rated using a bipolar scale ranging from -3 (very debilitative) to +3 (very facilitative). However, this system of measurement has been challenged for its potential flaws as athletes' coping style may involve ignoring or denying anxiety symptoms or athletes' may simply be unaware that their physiological responses are attributed to anxiety (Cheng, Hardy, & Markland, 2009).

A greater need has been addressed for research to explore additional dimensions of the anxiety response to balance the saturation of assessments relating to athletes' perceived intensity levels (Mellalieu, Hanton, & Fletcher, 2006). The introduction of the regulatory dimension within the competitive anxiety response has likely been an effective response to that call by harnessing the adaptive potential of competitive anxiety. First introduced as the three-factor model by Cheng and colleagues (2009), it has now been refined and established as the first fully differentiated hierarchical model for competitive anxiety (Jones et al., 2019). In the refined model, the cognitive dimension includes thoughts of worry, private self-focus (concern attending to inner feelings and thoughts), and public self-focus (awareness of one's effect on others in the social context). The physiological dimension includes autonomous hyperactivity and somatic tension producing physical symptoms related to involuntary (internal organs) and voluntary (motor) muscle groups. Finally, the third dimension is termed the regulatory dimension to represent the underlying regulatory process in response to a perceived threat. This regulatory process, referred to as perceived control, includes an individual's perception of whether he or she has the capacity to cope with the stressor. Therefore, during the competitive anxiety response, athletes evaluate the internal and external threats to their goal as well as their potential to meet the demands of the task. The regulatory dimension effectively illustrates the adaptive nature of anxiety in light of participants' performance expectations (Cheng et al., 2009).

The most recent improvement of the hierarchical model has potential for a more refined diagnosis of anxiety which can then allow for the development and implementation of effective interventions to improve athlete performance. However, continued research with this model is recommended to look for effects between performance and lower order factors of the model (Jones et al., 2019).

Purpose of the Study

The purpose of this study is to determine whether the subscales of the refined three factor hierarchical model of competitive anxiety (Jones et al., 2019) can predict figure skaters' test performance. A secondary purpose is to determine relationships between the cognitive, physiological, and regulatory dimensions of anxiety with the number of attempts for the given test, years of testing experience and months spent training for a given skating test.

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APPENDIX C

DEFINITION OF TERMS

Anxiety: “a mental state that is elicited in anticipation of threat or potential threat” (Gross & Hen, 2004, p. 545).

Competitive anxiety: “A specific negative emotional response to competitive stressors” (Mellalieu, Hanton, & Fletcher, 2006, p. 3). “A tendency to perceive competitive situations as threatening and to respond to these situations with feelings of apprehension and tension” (Martens, Vealey, & Burton, 1990). Importance of the competition, previous performance, the athlete’s personality, and current situation of the athlete may serve as antecedents to competitive anxiety. Typically, athletes experiencing competitive anxiety also express a fear of being evaluated by others, fear of the unknowns associated with performance, and have high expectations for themselves (Patel, Omar, & Terry, 2010).

Performance anxiety: A fear of performing in public or in front of a captive audience, also known as stage fright. Traditionally associated with the fear of negative evaluation by others. This term is most frequently used with those within the performing arts such as musicians, actors, singers, and general performers (Wilson & Roland, 2002).

Facilitative Anxiety: “Anxiety that results in improved performance” (Patel, Omar, & Terry, 2010, p. 326) as a result of the athlete’s perceived ability to control the stressor (Jones, 1995).

Debilitative Anxiety: “Anxiety that results in worsened performance” (Patel, Omar, & Terry, 2010, p. 326) as a result of the athlete’s perceived inability to control the stressor (Jones, 1995).

Competitive State Anxiety: “Anxiety induced by a specific competitive situation such as a team game that requires performance. May encompass worry about failure, others’ expectations, social critique, and parental pressure” (Patel, Omar, & Terry, 2010, p. 326).

Competitive Trait Anxiety: "Anxiety that is an enduring characteristic of a person's personality which influences one's perception of a competitive situation" (Patel, Omar, & Terry, 2010, p. 326).

Somatic Anxiety: Expression of anxiety through a variety of physiological symptoms, i.e. sweat, tremors, and increased heart rate (Patel, Omar, & Terry, 2010).

Cognitive Anxiety: Expression of anxiety through psychological symptoms, i.e. worry, inattention, inability to concentrate, negative thoughts about performance (Patel, Omar, & Terry, 2010) and thoughts of failure (Hanton, Mellalieu, & Williams, 2015).

Competitive Stress: "An ongoing transaction between an individual and the environmental demands associated primarily and directly with competitive performance" (Mellalieu, Hanton, & Fletcher, 2006, p. 3). Particularly, stress is the result of a perceived imbalance between the resources of the athlete and the environmental demands related to competition (Martens, Vealey, & Burton, 1990).

Competitive Stressor: "The environmental demands associated primarily and directly with competitive performance" (Mellalieu, Hanton, & Fletcher, 2006, p. 3).

Perceived Control: "The perception of one's capacities to be able to cope and attain goals under stress," also referred to as a regulatory dimension of anxiety (Cheng, Hardy, & Markland, 2009).

APPENDIX D

UNITED STATES FIGURE SKATING TEST STRUCTURE

Progression of Tests

Moves in the Field	**Singles Free Skate**
Pre-Preliminary	Pre-Preliminary
Preliminary	Preliminary
Pre-Juvenile	Pre-Juvenile
Juvenile	Juvenile
Intermediate	Intermediate
Novice	Novice
Junior	Junior
Senior	Senior

2019-2020 US Figure Skating Rulebook Test Expectations

(Pages 170-172; 180-181; 184-196)

<u>Moves in the Field Tests</u>

5101 Pre-Preliminary Moves in the Field Test

Test expectations: “The purpose of this test is to encourage beginning skaters to learn the fundamentals of ice skating. No great deal of technical ability, carriage or flow is expected. The candidate must show knowledge of the steps, fairly good edges and some evidence of good form.”

1. Forward perimeter stroking
2. Basic consecutive edges
3. Forward right and left foot spirals
4. Waltz eight

5102 Preliminary Moves in the Field Test

Test Expectations: “The purpose of this test is to continue the encouragement of beginning skaters to learn the fundamentals of ice skating. The candidate must show knowledge of the steps and a good sense of power (speed and flow). Attention should be given to depth of edges and proper curvature of lobes.”

1. Forward and backward crossovers
2. Consecutive outside and inside spirals
3. Forward power three-turns
4. Alternating forward three-turns
5. Forward circle eight
6. Alternating backward crossovers to backward outside edges

5103 Pre-Juvenile Moves in the Field Test

Test expectations: "The fundamentals of ice skating must be demonstrated, although not necessarily mastered. Good edges, flow, power, extension and posture are required and must be strongly emphasized."

1. Forward and backward perimeter power stroking
2. FO-BI three-turns in the field
3. FI-BO three-turns in the field
4. Forward and backward power change of edge pulls
5. Backward circle eight
6. Five-step mohawk sequence

5104 Juvenile Moves in the Field Test

Test expectations: "Candidates must skate the correct steps and turns on good edges, with good form, flow, power and preciseness to their steps."

1. Stroking: Forward power circle
2. Stroking: Backward power circle
3. Eight-step mohawk sequence
4. Forward and backward free skate cross strokes
5. Backward power three-turns
6. Forward double three-turns

5105 Intermediate Moves in the Field Test

Test expectations: "Strong, true edges, smooth turns, correct posture and effortless flow are expected of the candidate."

1. Backward double three-turns
2. Spiral sequence
3. Brackets in the field sequence
4. Forward twizzles
5. Inside slide chasse pattern

5106 Novice Moves in the Field Test

Test expectations: "The candidate must give a performance that is generally good. The preciseness of the footwork should be nearly faultless, the body motion well timed and the flow and power very good. No major consistent errors should be in evidence."

1. Inside three-turns/rocker choctaws
2. Forward and backward outside counters
3. Forward and backward inside counters
4. Forward loops
5. Backward rocker choctaw sequence
6. Backward twizzles

5107 Junior Moves in the Field Test

Test expectations: "The candidate must give a performance that is generally very good in all respects. Focus should be on power, flow, edge quality and line and footwork control."

1. Forward and backward outside rockers
2. Forward and backward inside rockers
3. Power pulls
4. Choctaw sequence
5. Backward loop pattern
6. Straight line step sequence

5108 Senior Moves in the Field Test

Test expectations: "The candidate must give an excellent performance, displaying power, strong edge control and depth, extension and precise footwork control."

1. Sustained edge step
2. Spiral sequence
3. BO power double three-turns to power double inside rockers
4. BI power double three-turns to power double outside rockers
5. Serpentine step sequence

<u>Free Skate Tests</u>

6301 Pre-Preliminary Free Skate Test

Test expectations: "The purpose of this test is to encourage beginning skaters to learn the fundamentals of free skating. No great deal of technical ability, carriage or flow is expected. The candidate must show knowledge of the elements, fairly good edges and some evidence of good form. See rule 6481 for element requirements and optional program duration."

6302 Preliminary Free Skate Test

Test expectations: "The purpose of this test is to continue the encouragement of beginning skaters to learn the fundamentals of free skating. The candidate must demonstrate knowledge of the elements and a good sense of power (speed/flow). A relationship with the music should be attempted in the program. See rule 6471 for element requirements and program duration."

6303 Pre-Juvenile Free Skate Test

Test expectations: "The fundamentals of free skating must be demonstrated, although not necessarily mastered. Good edges, flow, power, extension and posture are required for all of the elements of free skating (jumps, spins and connecting moves). The program should utilize the ice surface and demonstrate some relationship with the music. See rule 6461 for element requirements and program duration."

6304 Juvenile Free Skate Test

Test expectations: "The candidate must skate the selected elements (jumps, spins and connecting steps) on good edges, with good form, flow, power and preciseness. The candidate must also skate to the music and utilize the ice surface. See rule 6452 for element requirements and program duration."

6305 Intermediate Free Skate Test

Test expectations: "Strong, smooth edges and turns, combined with correct posture and effortless flow while utilizing the music and the ice surface are expected of the candidate in all types of free skating elements (jumps, spins, and connecting steps). See rule 6442 for element requirements and program duration."

6306 Novice Free Skate Test

Test expectations: "The candidate must give a performance that is generally good. The preciseness of the footwork should be nearly faultless, body motions well timed with the music, and the flow and power very good in all free skating elements (jumps, spins and connecting steps). The program should fully utilize the ice surface, and no major or consistent errors should be in evidence. See rule 6432 for element requirements and program duration."

6307 Junior Free Skate Test

Test expectations: "The candidate must give a performance that is generally very good in all respects. Focus should be on power, flow, edge quality, line and footwork control. The program should demonstrate a good, harmonious composition that is skated to the music with rhythm and expression, while utilizing the full ice surface. See rule 6422 for element requirements and program duration."

6308 Senior Free Skate Test

Test expectations: "The candidate must give an excellent performance displaying power, strong edge control and depth, extension and precise footwork control in all aspects of the selected elements. The program should fully utilize the ice surface, have a change of pace and superbly express the mood and rhythm of music. Harmonious steps and connecting movements in time to the music should be maintained throughout the program. See rule 6412 for element requirements and program duration."

APPENDIX E

DEMOGRAPHICS QUESTIONNAIRE

1. How old are you? ____________________

2. What is your gender? (circle one)

Female Male I'd rather not say

3. What is your ethnicity? (may circle more than one):

White/Caucasian

Black or African American

Asian

Native American or Alaskan Native

Pacific Islander or Native Hawaiian

Hispanic or Latino

Other: _____________

4. What is the <u>highest</u> level you have competed? (circle one)

Pre-Preliminary	Intermediate	Not applicable
Preliminary	Novice	
Pre-Juvenile	Junior	
Juvenile	Senior	

5. How many years have you been taking USFSA Skating skills tests? ________________________

6. The level of the Moves in the Field or Free Skate test I took today is _________________________

7. About how many months have you spent training for the Moves in the Field or Free Skate test you took today? ______________months

8. For the test I took today, this is my….

First try Second try Third try Fourth try Fifth try ___________________

9. Please <u>circle</u> the result of your Moves in the Field or Free Skate test and indicate the score you received from each judge.

Pass Retry Score 1: ____________ Score 2: ____________ Score 3: ___________

APPENDIX F

THREE FACTOR ANXIETY INVENTORY (TFAI)

Think back to how your mind and body felt in the time before you stepped on the ice to take your figure skating Moves in the Field test. Rate your level of agreement with each statement on a scale of 1 - totally disagree to 5 – totally agree. There are no right or wrong answers. If you do not understand any statement or word, CIRCLE that statement or word, THEN ask the tester for an explanation.

	Totally Disagree				Totally Agree
1. I am worried that I may make mistakes	1	2	3	4	5
2. I tend to dwell on shortcomings in my performance	1	2	3	4	5
3. I am conscious about the way I will look to others	1	2	3	4	5
4. I feel physically nervous	1	2	3	4	5
5. My chest feels tight	1	2	3	4	5
6. I believe in my ability to perform	1	2	3	4	5
7. I am worried about the uncertainty of what may happen	1	2	3	4	5
8. I am aware that I will scrutinize my performance	1	2	3	4	5
9. I am conscious that others will be judging my performance	1	2	3	4	5
10. I find myself trembling	1	2	3	4	5
11. I feel tense in my stomach	1	2	3	4	5
12. I am prepared for my upcoming performance	1	2	3	4	5

13. I am worried about the outcome of my performance	1	2	3	4	5
14. I am aware that I will be conscious of every movement I make	1	2	3	4	5
15. I am worried that I may not meet the expectations of important others	1	2	3	4	5
16. I have a slight tension headache	1	2	3	4	5
17. My heart is racing	1	2	3	4	5
18. I am confident that I will be able to reach my target	1	2	3	4	5
19. I am worried that I may not perform to the best of my ability	1	2	3	4	5
20. I feel lethargic	1	2	3	4	5
21. I feel a lump in my throat	1	2	3	4	5
22. I feel I have the capacity to cope with this performance	1	2	3	4	5
23. I am worried about the consequence of failure	1	2	3	4	5
24. My body feels tense	1	2	3	4	5
25. My hands are clammy	1	2	3	4	5

APPENDIX G

COMPETITIVE STATE ANXIETY INVENTORY-2 CHILDREN'S FORM (CSAI-2C)

Think back to how your mind and body felt in the time before you stepped on the ice to take your figure skating Moves in the Field test. Rate your level of agreement with each statement on a scale of 1 – Not at all to 4 – Very much so. There are no right or wrong answers. If you do not understand any statement or word, CIRCLE that statement or word, THEN ask the tester for an explanation.

	Not at all	Somewhat	Moderately so	Very Much so
1. I am concerned that I may not test as well as I can today.	1	2	3	4
2. My body feels tense.	1	2	3	4
3. I feel self-confident.	1	2	3	4
4. I feel tense in my stomach.	1	2	3	4
5. I feel secure.	1	2	3	4
6. I'm confident I can meet the challenge of testing well today.	1	2	3	4
7. I'm concerned that I will test poorly today.	1	2	3	4
8. My heart is racing.	1	2	3	4
9. I'm confident that I will test well today.	1	2	3	4
10. I am worried about reaching my testing goal.	1	2	3	4
11. I feel my stomach sinking.	1	2	3	4
12. I'm concerned that others will be disappointed with my testing performance.	1	2	3	4
13. I'm confident because, in my mind, I picture myself reaching my goal.	1	2	3	4
14. I'm concerned about not being able to concentrate today.	1	2	3	4
15. My body feels tight.	1	2	3	4

APPENDIX H

NOTATIONS FOR THREE FACTOR ANXIETY INVENTORY

Below are the notations (in italics) that were created for potentially challenging or confusing items of the TFAI. Specific words or items were identified as challenging during pilot testing and have been noted here with underlined text. Clarification was consistently provided throughout data collection using these notations when and if participants indicated they did not understand the meaning of an item.

	Totally Disagree				Totally Agree
1. I am worried that I may make mistakes	1	2	3	4	5
2. I tend to dwell on shortcomings in my performance **Mistakes or movements that weren't good enough*	1	2	3	4	5
3. I am conscious about the way I will look to others **Aware of*	1	2	3	4	5
4. I feel physically nervous	1	2	3	4	5
5. My chest feels tight	1	2	3	4	5
6. I believe in my ability to perform	1	2	3	4	5
7. I am worried about the uncertainty of what may happen	1	2	3	4	5
8. I am aware that I will scrutinize my performance **Be critical of, pick out mistakes*	1	2	3	4	5
9. I am conscious that others will be judging my performance	1	2	3	4	5
10. I find myself trembling **Shaking*	1	2	3	4	5

11. I feel tense in my stomach	1	2	3	4	5
12. I am prepared for my upcoming performance	1	2	3	4	5
13. I am worried about the outcome of my performance	1	2	3	4	5
14. I am aware that I will be conscious of every movement I make **Notice*	1	2	3	4	5
15. I am worried that I may not meet the expectations of important others	1	2	3	4	5
16. I have a slight tension headache	1	2	3	4	5
17. My heart is racing	1	2	3	4	5
18. I am confident that I will be able to reach my target	1	2	3	4	5
19. I am worried that I may not perform to the best of my ability	1	2	3	4	5
20. I feel lethargic **Sluggish, tired, low energy*	1	2	3	4	5
21. I feel a lump in my throat	1	2	3	4	5
22. I feel I have the capacity to cope with this performance **Ability to handle*	1	2	3	4	5
23. I am worried about the consequence of failure	1	2	3	4	5
24. My body feels tense	1	2	3	4	5
25. My hands are clammy	1	2	3	4	5