

2015

# Performance Enhancement and Precompetitive Anxiety Management among USAG Junior Olympic Gymnasts

Christian Lee Way  
*Walden University*

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# Walden University

College of Social and Behavioral Sciences

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Christian Way

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## Review Committee

Dr. William Disch, Committee Chairperson, Psychology Faculty  
Dr. Jay Greiner, Committee Member, Psychology Faculty  
Dr. Karen Gil, University Reviewer, Psychology Faculty

Chief Academic Officer  
Eric Riedel, Ph.D.

Walden University  
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Abstract

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USAG Junior Olympic Gymnasts

by

Christian L. Way

M.Ed. University of Massachusetts, State College at Boston, 1982

B.A. University of Massachusetts, State College at Boston, 1980

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Psychology

Walden University

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## Abstract

Precompetitive anxiety (PCA) is problematic for young gymnasts and may have an influence on a multitude of factors like self-confidence, perceived level of self-efficacy, and athlete's performance in a competition. The objective of this 2-part study was to discover how earlier competitive experience influences the young gymnasts' level of anxiety, perception of control, and self-efficacy. An additional goal was to explore the potential impact of Guided imagery (GI) and Autogenic training (AGT) in reducing precompetitive anxiety. In the first study, 80 USAG Junior Olympic female gymnasts between the ages of 7 and 16 (40 compulsory level and 40 optional level) participated. The purpose was to test differences in levels of PCA, locus of control, and self-efficacy among optional level and compulsory level gymnasts. An independent samples t test and a Mann-Whitney nonparametric test showed that optional level gymnasts had higher cognitive anxiety, lower confidence level, and higher internal locus of control compared with compulsory level gymnasts, with no significant mean difference in somatic anxiety and self-efficacy. For the second study, 30 participants were divided into 3 treatment groups: (a) AGT group, (b) GI group, and (c) control group. Results of repeated measure ANOVAs revealed that mean anxiety scores decreased over time for the autogenic group as compared to the control and guided imagery group. The internal LOC mean scores were lower for the autogenic group, compared to the other groups, but internal locus of control did increase over time for the autogenic group. The social significance of this study suggests that enhanced performance and enjoyment in sports may allow athletes to remain active in sports while teaching them life-long strategies to reduce anxiety.

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August 2015

## Dedication

To my father who has been my life long inspiration and most ardent supporter.

To my wife who has been my comforter and constant companion throughout life.

## Acknowledgments

First and foremost, I would like to thank Dr. Bill Disch for his support and encouragement throughout the entire dissertation process. His enduring patience, persistence, and his meticulous approach the dissertation process as well as focusing on getting the design correct from the beginning, paid dividends in the long run. Moreover, his insistence on being parsimonious in my writing, revising each chapter before moving forward to the next chapter, helped me to refine my writing and brought out the best in me. It would be remise of me in not recognizing the contributions provided by my committee member Dr. Jay Greiner. His expert advice helped me to identify significant methodological concerns prior to conducting the study that saved me time and fruitless efforts in the long run. Thank you for both for being consummate team players.

This study would not have been possible without the help of the gymnasts, coaches, and club owners who gave of their time and energy to participate in this study. The following New England clubs are recognized; Iron Rail Gymnastics (MA), Bakers School of Gymnastics (MA), Off the Wall (NH), Gym Nation (ME), Gymnastics at Brentwood Commons (NH), ABC Gymnastics (CT), Dudziak's (ME), and New Hampshire Academy of Gymnastics (NH). My sincerest thanks for participating and my hope is that you may benefit from the findings contained in this study.

Finally, I would like to express my deepest gratitude to Dr. David Ciampi whose insightful comments, editorial help, and constant words of encouragement helped me to persevere throughout this painstaking process.

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## Chapter 1: Introduction to the Study

### **Background of the Study**

Over the past four decades there has been substantial research conducted on the topic of precompetitive anxiety (PCA) in sports. Athletes who suffer from PCA, operationally defined as “the state of arousal that is unpleasant or negative and occurs during the 24-hour span prior to competition” (Hardy & Crace, n.d., p. 3513), regularly experience difficulty in their ability to perform tasks such as goal setting, also referred to as linking (Cox, 2002; Schofield, Dickson, Mummery, & Street, 2002). Common distractions associated with and contribute to the development of PCA in athletes include; (a) fear of making mistakes, (b) fatigue and (c) weather (Cox, 2002; Hardy & Crace, n.d., p. 3513).

PCA in athletes develops the night before competition, the morning of competition, immediately prior to or following event competition periods (Hardy & Crace, n.d.). Athletes who experience high levels of PCA, unlike those who do not suffer from this condition, commonly experience cognitive and somatic symptoms that include mild nausea, agitation, dysphoria, and increased muscle tension (Blais & Vallerand, 1986; Weiss, Wiese, & Klint, 1989). PCA is present in athletes of all ages and factors such as gender and skill ability appear to be inconsequential (Schofield et al., 2002).

### **Problem Statement**

The research problem addressed in this study is to evaluate the effect that PCA has on intermediate level gymnasts in terms of self-efficacy, locus of control, pleasure, and performance. PCA is a problem encountered in young gymnasts due to a multitude of

factors that include lack of competition experience, self-confidence to perform well in front of a crowd, fear of making a mistake, disappointing coaches, team, or family members, uncertainty of new routines or skills, and the fear of not qualifying to the next competitive level (Barber, Sukhi, & White, 1999; Butcher, Lindner, & Johns, 2002; Orlick & Zitzelsberger, 1990; Savoy & Beitel, 1997). PCA is a common social condition that exists along a continuum with highly elevated levels of cognitive difficulties and somatic complaints on one end with nonelevated levels of cognitive and somatic challenges at the other end.

### **Background of the problem**

Increased levels of PCA follow a curvilinear pattern with performance (Yerkes & Dodson, 1908; Hanin, 2003). That is, when PCA increases, performance decreases resulting in performance failure. Performance failure leads to a subsequent loss in self-efficacy and self-esteem in young athletes that in turn frequently leads to discontinuation of the sport (Barber, et al., 1999; Butcher, et al., 2002; Lindner, Johns, & Butcher, 1991).

As demonstrated in Figure 1, moderate arousal levels are yoked together with optimal performance in athletes (Williams, Landers, & Boutcher, 1993). Mackenzie (1999) argued that once arousal is increased, the level of performance also improves but only up to a certain point, which is the top of the inverted U. However, once arousal has been increased beyond this level, the performance of an athlete diminishes (Mackenzie, 1999). Consequently, the psychological ability of an individual to control anxiety appears to be a key factor in performing at an optimal level.

According to Weiss and Petlichkoff (1999), the primary reason children participate in sports is for fun. Csikszentmihali (1990) defined flow as the experience of enjoying the activity for the pleasure and joy it brings to the participant. The flow state is where the participant becomes completely absorbed in the activity. Jackson (1995) indicated that athletes that are in the flow state are “creating a state of consciousness where optimal levels of functioning often occur” (p.138). The flow state is facilitated through a positive precompetitive effect (Jackson, 1995). Elevated levels of PCA inhibit the achievement of the flow state and consequently the athlete’s potential pleasure derived from the activity.

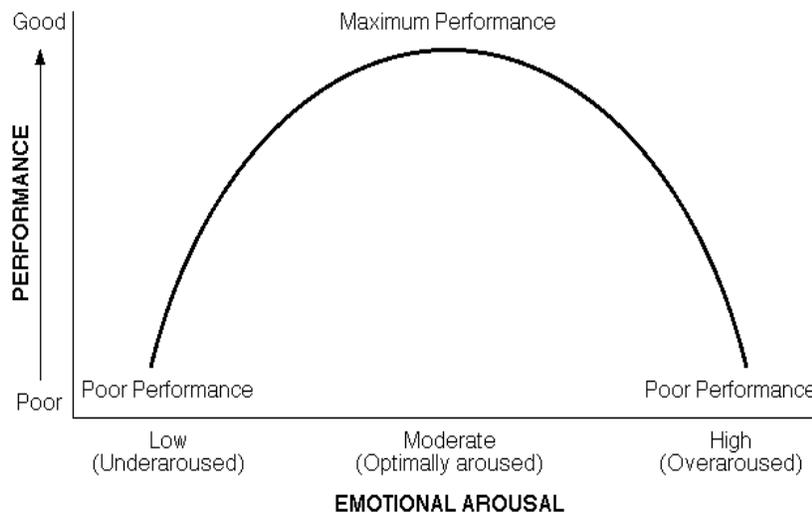


Figure 1. Inverted “U” hypotheses (From Williams, et al., 1993)

In modern colloquial speech, a phrase interchangeable with the term *flow* is *being in the zone*. The individualized zone of optimal functioning theory (IZOF) was first conceptualized by Hanin (2003), and means that “each athlete has an optimal level of arousal and anxiety or zone where peak individual performances are achieved” (Hanin,

1989, p. 20). Moreover, when “anxiety and arousal is within this optimal zone performance, pleasure is enhanced” (Hanin, 1989, p. 20).

Motivation to learn new skills (Cox, 2004), become physically fit (White, Duda, & Keller, 1998), and master the challenges and social aspects of sports (Ewing & Seefeldt, 1996), is another important factor that researchers have discovered when it comes to participating in youth sports (Ferrerira & Armstrong, 2002; Klint & Weiss, 1986; Molinero et al., 2009). Conversely, one of the primary reasons why children drop out of sports is that it is no longer fun (Weiss & Chaumeton, 1992). Three contributing factors lead to lack of pleasure in youth sports: (a) overemphasis on winning (Cox, 2003), (b) increased stress and anxiety (Orlick & Zitzelsberger, 1990) and (c) violence and aggression among adults (Nack & Munson, 2000).

The goal of this study was to investigate how competitive experience may influence PCA and to explore use of techniques to reduce PCA to acceptable levels in a heretofore under-utilized population group (intermediate level athletes). The purpose was to enhance performance and enjoyment in sports; thus allowing athletes to remain active in sports while teaching them lifelong strategies to reduce anxiety and stress in their lives. In any case, past research has indicated that adult athletes who have higher competitive experience in the past are less likely to experience somatic anxiety and more likely to use affective and problem focused coping mechanisms that effectively reduce PCA (Hanton et al., 2008). Prior researchers in the use of complementary alternative medicine (CAM) modalities have proved promising in the treatment of PCA (Greenspan & Feltz, 1989; Utay & Miller, 2006). The National Center for Complementary and Alternative Medicine

(2009) defined complementary alternative medicine as “health practices that are not considered to be a part of conventional medicine” (p. 1). CAM techniques such as progressive muscular relaxation (PMR), guided imagery (GI) and autogenic therapy (AGT) have been used effectively in the treatment of PCA (Barker et al., 2003; Campen & Roberts, 2001; Martin, Moritz, & Hall, 1999; Pournemati et al., 2009; Takai, Saijo, & Kusumoto, 2009).

### **Purpose of the Study**

The primary purpose of this study was to examine critically the influence of past competitive experiences on the levels of PCA of child gymnasts. I evaluated the effectiveness of applying a treatment by way of CAM techniques (AGT or GI) to child gymnasts who experience PCA, as this has been demonstrated to exhibit negative influences on the optimal performance of athletes. Secondly, the results are also objectively guided towards the provision of empirically based research strategies that athletes can apply in the recognition and monitoring of stress levels on an individual basis (Morton, 2003; Orlick & Zitzelsberger, 1990).

The result was a significant enhancement of performance, increased feelings of satisfaction, enjoyment with a more developed sense of team cohesiveness, conformity and compliance (Cox, 2002). Through the application of the CAM modalities, athletes will increase their feelings of self-efficacy and internal locus of control thereby allowing them to participate in the sport longer and thus receive the full physical, social and psychological benefits that sports have to offer (Barker et al., 2003).

### Nature of the Study

The goal of this two-part study was to examine the role PCA plays in gymnastics in a heretofore under-utilized population group (intermediate level athletes). The first part of the study was designed for the purpose of evaluating how prior experience in competitive sports may influence the level of anxiety of athletes and how it impacts their confidence, sense of control and perceived level of self-efficacy, that has been reported to have an impact on actual performance (Vadocz, Hall, & Moritz, 1997).

The second part of the study aims was to identify techniques that may help reduce PCA among younger athletes; thus enhancing the body of literature on PCA and suggesting future stress reduction models that may address performance and enjoyment in sports thereby allowing child athletes to actively participate in sports longer and enjoy the benefits that sports offers children (Barker et al., 2003). Both studies are quantitative in nature, to provide accurate answers to the study's research questions that require confirmation using measurable evidences

STUDY ONE DESIGN MODEL			
ANALYSIS OF PRECOMPETITIVE ANXIETY IN JUNIOR OLYMPIC GYMNASTS			
<i>PRE-TESTS</i>		<i>GROUP 1 - COMPULSORY LEVEL (n = 40)</i>	
CSAI-2C NSLOC SSSES	→	(3) AGE GROUPS	(4) USAG GYM LEVEL
<i>PRE-TESTS</i>		<i>GROUP 2 - OPTIONAL LEVEL (n = 40)</i>	
CSAI-2C NSLOC SSSES	→	(3) AGE GROUPS	(4) USAG GYM LEVEL
LEGEND			
CSAI-2C = Competitive State Anxiety Scale - 2C			
NSLOC = Nowicki Strickland Locus of Control			
SSSES = Sport Specific Self Efficacy Scale			

*Figure 2* Design model of first study

In Study 1, I used a quasi-experimental, mixed, between-within participants design. The within-groups component includes measurements on 3 dependent variables using survey data. Survey data included a sport-specific self-efficacy scale, locus of control scale (Nowicki-Strickland Locus of Control –NSLCS), and a competitive anxiety scale (Competitive State Anxiety Inventory – Version 2 for children – CSAI-2C). The between-groups component, assess similarities and differences between optional levels and compulsory levels on mean dependent variables scores. This was to explore the possible influence of past competitive experiences on PCA, internal locus of control and self-efficacy of young gymnasts (Butcher, et al., 2002).

For this study, 80 intermediate level gymnasts, 40 of whom are in compulsory level, the other 40 are in optional level, were asked to complete the 3 sets of questionnaires that were designed to measure the 3 independent variables. The study was cross-sectional, as the data were collected within one point in time, that is, only before a competition. The data collected were analyzed using independent samples *t*-test, in order to find out if there is a significant difference between the gymnasts who had higher competition experiences (optional levels) and those who have less experience (compulsory levels; Butcher, et al., 2002).

In Study 2, I also used a quasi-experimental, mixed, between-within-participants design. The within-groups component includes both pre and post measurements on 3 dependent variables using survey data. Survey data included a sport specific self-efficacy scale, locus of control scale (Nowicki-Strickland Locus of Control Scale – NSLCS), and

a competitive anxiety scale (Competitive State Anxiety Inventory – Version 2 for children – CSAI-2C).

The 30 participants were divided equally into the 3 conditions of the independent variable: (a) autogenic training, (b) guided Imagery and (c) control group. The scores of the participants on the 3 independent variables were measured prior to the implementation of the interventions. The scores were again measured after the subjects had completed the treatment. The pretest and the posttest scores were measured using Analysis of variance tests, in order to find out which group have recorded the most improvement in their PCA, internal locus of control and self-efficacy scores (Butcher, et al., 2002).

The between-groups assessment of the data, examined both similarities and differences between control and experimental groups on mean dependent variables scores.

STUDY 2 DESIGN MODEL ANALYSIS OF PRECOMPETITIVE ANXIETY IN JUNIOR OLYMPIC GYMNASTS				
<i>PRE-TESTS</i>		<i>GROUP 1 (n = 10)</i>		<i>POST-TESTS</i>
CSAI-2C NSLCS SSSES	→	AGT (6 WKS)	→	CSAI-2C NSLCS SSSES
<i>PRE-TESTS</i>		<i>GROUP 2 (n = 10)</i>		<i>POST-TESTS</i>
CSAI-2C NSLCS SSSES	→	GI (6 WKS)	→	CSAI-2C NSLCS SSSES
<i>PRE-TESTS</i>		<i>GROUP 3 (n = 10)</i>		<i>POST-TESTS</i>
CSAI-2C NSLCS SSSES	→	CTRL (6 WKS)	→	CSAI-2C NSLCS SSSES
LEGEND				
CSAI-2C = Competitive State Anxiety Scale - 2C NSLCS = Nowicki Strickland Locus of Control SSSES = Sport Specific Self Efficacy Scale AGT = Sport Specific Self Efficacy Scale GI = Guided Imagery CTRL = Control				

Figure 3 Image of Second Study

## Research Questions and Hypotheses

### Research Questions Study 1

S1-RQ 1: Is there a statistical difference in perceived levels of PCA, (as measured by Competitive State Anxiety Inventory-2C on the somatic and cognitive subscales) between compulsory level gymnasts and optional level gymnasts?

S1-RQ 2: Is there a statistical difference in perceived confidence levels, (as measured by Competitive State Anxiety Inventory-2C on the confidence subscale), between compulsory level gymnasts and optional level gymnasts?

S1-RQ 3: Is there a statistical difference in perceived levels of self-efficacy, (as measured by Sport Specific Self Efficacy Scale), between compulsory level gymnasts and optional level gymnasts?

S1-RQ 4: Is there a statistical difference in perceived levels of internal locus of control, (as measured by Nowicki-Strickland Locus of Control Scale), between compulsory level gymnasts and optional level gymnasts?

### **Hypothesis Study 1**

S1 - H1: It is hypothesized that the Optional level group will yield a statistically *significant increase* in perceived levels of PCA (as measured by Competitive State Anxiety Inventory-2C on the somatic and cognitive subscales), *levels of perceived internal locus of control* (as measured by Nowicki-Strickland Locus of Control Scale) and *decreased levels of perceived self-efficacy* (as measured by Sport Specific Self Efficacy Scale) as compared to the Compulsory level group.

### **Research Questions Study 2**

S2-RQ 1: Is it possible for child athletes to respond effectively to stress reduction modalities prior to participating in competitive sporting events, thus reducing the degree of their PCA and thereby feeling more in control of their emotions?

S2-RQ 2: Is there a statistical difference between perceived levels of PCA (as measured by Competitive State Anxiety Inventory-2C on the somatic and cognitive subscales) between treatment groups (AGT and GI) and control group?

S2-RQ 3: Is there a statistical difference between perceived levels of self-efficacy, (as measured by Sport Specific Self Efficacy Scale), between treatment groups (AGT and GI) and control group?

S2-RQ 4: Is there a statistical difference between perceived levels of internal locus of control, (as measured by Nowicki-Strickland Locus of Control Scale), between treatment groups (AGT and GI) and control group?

### **Hypothesis Study 2**

S2-H1: It is hypothesized that the Autogenic experimental group will yield a *significant reduction in perceived levels* of PCA (as measured by Competitive State Anxiety Inventory-2C), levels of perceived self-efficacy (as measured by Sport Specific Self Efficacy Scale) and *increase in levels of perceived internal locus of control* (as measured by Nowicki-Strickland Locus of Control Scale) between pre and posttesting as compared to Guided imagery and control group.

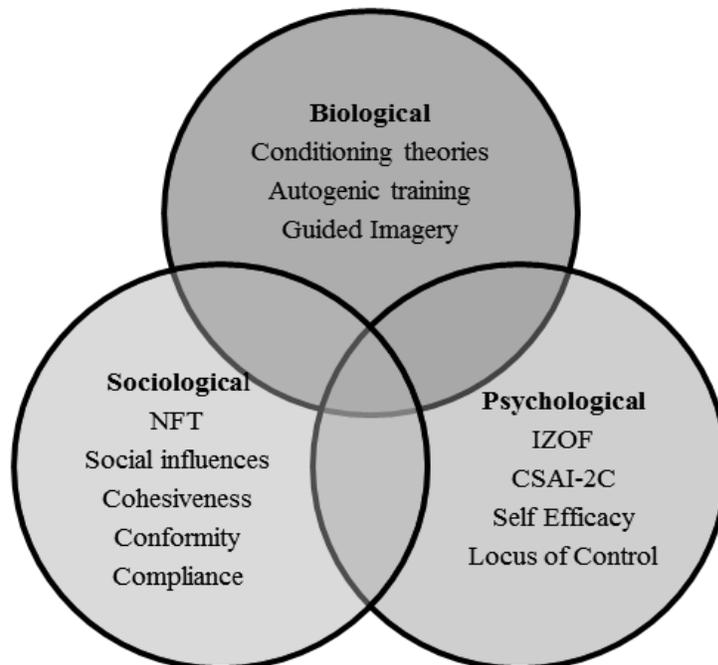
### **Theoretical Framework**

The overarching theoretical model employed in this study design is the biopsychosocial model (BPS). The BPS model was first proposed by Engel (1977) and posits that biological, psychological, and social factors liaise in human functioning and that disease or health is “best understood in terms of a combination of biological, psychological, and social factors that come into play in the human experience” (p.129). The biological component of this paradigm examines the causal factors of illness that originate from the different stratum of anatomical and physiological functioning within the individual body. The psychological component examines the potential psychological characteristics such as, lack of self-control, emotional turmoil, and negative thinking.

The social component explores myriad social issues that influence the emergence of diseases such as culture, socioeconomic status, poverty, and religion. The BPS model

examines how biological, psychological, and social factors influence human behavior and health. Furthermore, it has been used as a base model in several fields of investigation such as medicine, health psychology, nursing, and sport psychology (Allen, 2004; Armitage & Conner, 2000; DiMatteo, Haskard, & Williams, 2007; Engel, 1977).

Along with the biopsychosocial paradigm used to drive the hypotheses for this study, specific constructs from the theoretical framework for this study included: state and trait anxiety theory (Speilberger, 1972), the classical theory of conditioning (Pavlov, 1927), the social/cognitive learning theory of self-efficacy and locus of control (Bandura, 1994; Rotter, 1966), the individualized zone of optimal functioning theory (Hanin, 1989), the normative focus theory of Cialdini (1990). Below is a model of the theoretical constructs.



*Figure 4* Image of Biopsychosocial (BPS) Model for the Treatment of PCA

As illustrated in Figure 4, this synthesized model as visually depicted consists of 3 overlapping spheres. All of these contribute to the treatment of unhealthy state anxiety, physiological arousal in response to a dangerous situation, as opposed to trait anxiety, or a personality trait that predisposes a person to responds with state anxiety to an anticipation of a threatening situation (Dias, Cruz, & Fonseca, 2012; Lazarus, 1991). According to Endler et al. (1991), state anxiety is related to events that involve social evaluation or physical danger; both elements are present in gymnastics competitions.

The top sphere represents the biological constructs of classical conditioning theories, autogenic training, and guided imagery; the bottom right circle represents the psychological constructs of IZOF and the two constructs of social learning theory; the bottom left circle represents the sociological constructs of normative focus theory and the different social influences such as cohesiveness, conformity, and compliance. Note that the biological, psychological, and sociological spheres are inseparably connected in this synthesis model and are best understood as operating not singularly but synergistically (Corning, 2003).

To understand the complex interactions among the biological, psychological and sociological spheres in this study requires the incorporation of a comprehensive model that examines not only the individual construct but also the synergistic effect these interactions may have on the goal of reducing PCA while raising levels of internal locus of control and self-efficacy (Corning, 2003). Prior negative experiences like injuries (Hardy & Crace, 1990), or failure in previous competitions may have influenced a conditioned heightened arousal upon anticipating another competition, or even influence

the athlete to think that negative events and experiences are uncontrollable and are results of external factors (Mather & Sutherland, 2011). This influences the individuals' locus of control, PCA and ultimately, their performance in future competition (Martens, et.al, 1990; Taylor, 2003, p. 505).

The present study is predicated on the belief that following training in AGT and GI, child athletes may be able to reduce their PCA, thus enhancing performance, flow experience, and increasing feelings of self-efficacy and internal locus of control. Through the compartmentalization of the theories, I was able to employ a holistic approach to the study. Classical conditioning theory represented the primary experimental theoretical construct of this research inquiry. Classical conditioning theory, involves the process of pairing a neutral stimulus with an unconditioned stimulus. The pairing of a calm mind with autogenic/guided imagery may induce a more relaxed state in young gymnasts prior to competition (Spielberger, 1972, 1983).

This strategy is associated with two specific classical adjunct theories that this study shall make use of, the classical conditioning theory and the stimulus-stimulus theory, or SSiT. The said methodology falls under the classical conditioning theory as it entails the pairing of a neutral stimulus with an unconditioned stimulus. On the other hand, it also falls under SSiT as it is associated with an unconditioned stimulus, that is, pleasant images are paired with the threatening stimulus, or the anticipation of a competition (Hanin, 1989).

### **Definition of Terms**

*Anxiety*: Refers to state anxiety which is a temporary condition of dread or uneasiness stemming from a particular situation” (Taylor, 2003, p. 505).

*Autogenic Training*: Autogenic Training (AGT) is a relaxation technique used in order to reduce levels of stress (Bird & Pinch, 2002). More specifically, this technique consists of a series of mental exercises that are designed to elicit the two bodily sensations of heaviness and warmth. All autogenic trainings are composed of three essential components (a) heaviness and warmth, (b) visual imagery and (c) the use of specific themes (Cox, 2002).

*Biopsychosocial*: Disease model first introduced by George Engle in 1977 that postulates that an interaction of biological, psychological and social factors are responsible for degenerative health and disease (Buckworth & Dishman, 2002, p. 286).

*Central Nervous System (CNS)*: Portion of the nervous system that includes the brain and spinal cord.

*Conditioned Response (CR)*: Pavlovian conditioning, a “response elicited by a conditioned stimulus” (Chance, 2003, p. 449).

*Conditioned Stimulus (CS)*: “The stimulus that elicits a conditioned response” (Chance, 2003, p. 449).

*General Adaptation Syndrome (GAS)*: A model proposed by Hans Selye depicting physiological mechanisms that occur in response to a stressor over an extended period. There are three stages: (a) alarm stage which activates an arousal response (e.g. to fight or flee); (b) resistance stage is when the body attempts to cope with the stressor; (c)

exhaustion stage takes place if the stressor continues over a long period of time, leading to physical symptoms such as stomach ulcers.

*Guided Imagery:* Guided Imagery is a modality consisting of the use of simple visualization and direct imagery-based suggestion applied through metaphor and storytelling (Utay & Miller, 2006). The alternative medicine encourages patients to make use of their imagination in order to improve their health conditions (Medicine.net, 1999).

*Limbic system:* A series of sub cortical structures located near the edge of the medial wall of the cerebral hemisphere that includes the thalamus, hypothalamus, amygdala and hippocampus and “influences endocrine systems, emotion, and learning” (Buckworth & Dishman, 2002, p. 291).

*Locus of Control:* Theory proposed by Rotter (1966) is “the tendency of people to ascribe achievements and failures to either internal factors of control or external factors of being controlled (p. 102).

*Neuroendocrine:* Pertaining to the “interactions between the nervous system and endocrine system” (Pinel, 2003, p. 505).

*Precompetitive anxiety (PCA):* PCA is “the state of arousal that is unpleasant or negative and occurs during the 24-hour span prior to competition” (Hardy & Crace, n.d., p. 3513).

*Psychological resiliency:* “Resilience is the process of adapting well in the face of adversity, trauma, tragedy, threats, or even significant sources of stress -- such as family and relationship problems, serious health problems, or workplace and financial stressors” (APA, 2011, p. 1).

*Psychoneuroimmunology*: Refers to the interactions between behavioral, neuroendocrine, and immunological processes of adaptation in individuals (Ader, 1991).

*Self-efficacy*: “The belief that one is capable of performing the behaviors that will produce desired outcomes in any particular situation” (Taylor, 2003, p. 40).

*State anxiety*: An immediate emotional state attributed to a specific situation: (a) that elicits an emotional response of fear, (b) apprehension, or (c) tension and is marked by an increase in physiological arousal.

*Stress*: “The way in which load impinges on a physiological object; an imbalance in physiological systems that activates physiological and behavioral responses to restore balance, or homeostasis” (Buckworth & Dishman, 2002, p. 296).

*Stressor*: “A force that acts on a biological system to cause stress, an imbalance, or disruption in homeostasis” (Buckworth & Dishman, 2002, p. 296).

*Trait anxiety*: Is a predisposed personality characteristic response to perceive certain environmental situations as threatening and thus respond to these situations with atypical increased levels of anxiety.

*Synergy*: Refers to combined or cooperative effects produced by entities that operate together (Corning, 1998).

*Unconditioned stimulus(US)*: US in Pavlovian conditioning, is “a stimulus that elicits an unconditional response” (Chance, 2003, p. 455).

### **Assumptions**

The primary assumption in this study was that AGT/GI will induce a relaxed state and elevate athletes’ perception of internal versus external locus of control and self-

efficacy as rated quantitatively through the administration and scoring of the CSAI-2C, NSLCS and ESES and thus enhance performance and fun (Corning, 1998). It was further assumed that athletes' will be able to achieve a more relaxed state by recalling the images and sensations paired with the idea of competing of whether or not the genesis of PCA is a derivative of state anxiety, trait anxiety, or multidimensional. It was assumed that athletes answer truthfully on all of the aforementioned questionnaires and will actively practice and put forth a genuine effort to learn the stress reduction techniques believing that it will enhance their performance and overall enjoyment (Chance, 2003, p. 455).

### **Limitations**

The central objective of this study was to ascertain viable treatment options for individuals who engage in competitive sports in lieu of pharmacological treatments for reducing PCA. It only focuses on female children between the ages of 7 -12 and therefore, the results will not be generalized to explain the situation in males or older adults. In any case, in order for the study to be effective, the treatment must be practiced (Bull, 1991; Gould et al., 1990; Harris & Harris, 1984). It is hampered by effects such as fatigue, absence from training sessions, failure to practice at home, failure to carryover training rehearsals to actual performance (Weinberg & Williams, 2001), motivation of participants (Callow & Hardy, 2001) and the inability to effectively evoke images during the AGT/GI (Hall, 1998, Murphy & Martin, 2002). This is because they represent portions of variables that will not be evaluated in this study.

### **Scope and Delimitations**

The scope of this study was to examine how experiences in competitions may affect the level of anxiety experienced by athletes and to explore the effectiveness of using CAM methods that are used in specific dosages to enhance psychological resiliency and lower physiological and psychological threshold of PCA in female USAG JO level 5 gymnasts. I used a convenience sample with a target population with the first study having a sample size of  $N = 80$  and a sample size of  $N = 30$  in the second study. Population sample was limited to female gymnasts, between the ages of 7 – 12, who are enrolled in United States of America Gymnastics Junior Olympic Development programs (USAG JO).

All participants in both studies were drawn from local gymnastics clubs in the New England area. The participants for the second study were randomly selected to the experimental or control group. Study data was collected for both pre-and post-measurements in experimental and control groups on 3 dependent variables; SSSES, NSLCS, and CSAI-2C and 13 independent variables. The principal statistical methods included independent samples *t*-test, analysis of variance and post hoc tests. Additional statistical procedures included assessment of variables for assumption violations, outliers, missing data, assessment of central tendency, variation, and distribution properties. Statistical analyses performed using SPSS v21 statistical software (SPSS, 2012) with a selected significance level of .05 (Smoll, 1998).

This study did not investigate the effects of trait anxiety on PCA. It also did not address any specific influence of variables such as coaching style, coaching experience,

emphasis on winning versus having fun, the reverse dependency trap (Smith & Smoll, 1996), or frustrated jock syndrome (Smoll, 1998) by parents over involvement in their child's sport and vicarious living through their child, or individual differences in athletic skill by performers. Moreover, this study did not investigate the concept of appraisal, for example, what significance does the event, (or in this case competition) have to the person, (athlete) as expounded upon in Lazarus's theory of emotion (1991).

Lazarus's (1991) concept of appraisal indicates that anxiety towards an event is assumed to be a result of how an individual evaluates the impact of an event on his or her self or well-being. In the case of an athlete, this would be a cognitive manifestation in the form of a question, for example, what does the competition mean? In the sport of gymnastics, not all competitions carry the same significance in terms of outcome. For example, a local meet versus a state meet may carry far less PCA for the athlete due to the appraised difference of the stakes involved between each competition.

Individual finals versus team finals may be appraised differently for an athlete who is concerned about letting the team down with a potentially sub-par performance, versus letting her self down. Additionally, not all competitive events are appraised the same way. Some individuals may be confident in their ability to perform well on some events yet lack confidence and generate higher levels of PCA on other events. These variables were beyond the scope of this present study and thus were not evaluated (Lazarus, 1991).

### **Significance of the Study**

Prior researchers have indicated the efficacy of using GI and AGT to treat PCA in adult and child athletes, as well as in other population groups (Braud, 1978; Cox, 2002; Mamassis & Doganis, 2002; Page et al., 2001) when used separately. However, most researchers have looked at the impact of these practices among adults and limited studies have looked into younger competitors on an extensive review of the research literature. This proposed research initiative will shed light on the efficacy of using these modalities to help reduce levels of PCA among child gymnasts. I sought to provide a better examination and analysis of the relationship that links PCA and performance in young intermediate level athletes with less past experience on competing and to illuminate the potential discovery of factors that may aid in the elimination of PCA. In particular, the use of heretofore limitedly applied CAM techniques in sports may significantly reduce PCA among child gymnasts and, if so, provide a reduction in anxiety that may translate into greater performance and enjoyment while engaging in sporting activities (Braud, 1978).

At the conclusion of this study, I addressed the relationship of competition experience, PCA and the performance of young gymnasts. The results of this study aim to provide greater insights into the nature of PCA among young athletes and provide an optimal intervention for those athletes where the PCA affects their performance. The conclusions reached in this study may be used as a model for older athletes and nonathletes alike, who experience generalized anxiety when immersed in physically rigorous and competitive activities. The implications of this research endeavor may

generate novel insights into the nonpharmacologic treatment of phobias and its generalized anxiety disorders (Cox, 2002; Mamassis & Doganis, 2002). For instance, PCA may be a consequence of injuries in past competition experiences. Statistics on sports injury attest to an increase in injuries in competitive sports (Cheng et al., 2000). The fear of injuries may negatively affect optimum performance among young gymnasts in future competitions

Negative postcompetitive physiological and psychological consequences have been linked to anger, tension, and depressed moods among injured athletes. Among young gymnasts with a history of injury, anxiety and depression elevate to very high levels stimulating PCA and lowering performance standards (Newcomer, 2000). In such a context, the biopsychosocial model of anxiety and stress response is grounded on the stress response theory that pinpoints that stress and anxiety impacts on multidimensional functioning levels. The athlete's initial appraisal of the stressor plays a major role in defining the nature and severity of the behavioral, emotional, and physiological responses (Newcomer, 2000). According to the stress response paradigm, PCA can be managed by investigating injury precursors, mechanisms of physiological and psychological responses to stress, as well as the implications of distress on individual behavior. Posttraumatic psychological distress following injuries has been associated with avoidance behaviors and intrusive thoughts even in the absence of injuries.

The combination of avoidance behaviors and intrusive thoughts are the main cognitive-affective and behavioral mechanism involved in the maintenance of a negative effect before or after a stressful event. Notably, young gymnasts cope with this problem

by avoiding event related stimuli. When active efforts are invested in the stimuli avoidance mechanism, one's sensitivity to the stressful event is heightened. The result is an increase in the frequency of avoidance behavior, emotional distress and intrusive thoughts (Newcomer, 2000).

In this regard, the biopsychosocial model should encourage emotional disclosure, promote the processing of the competitive event, and reduce sensitivity to PCA. The incorporation of novel behavioral strategies built on maintenance of mental toughness, motivation, education, and performance counseling aimed at destroying the intrusion-distress avoidance cycle and curbing predictive psychological disturbances before competitive events, can be called upon successfully address the negative effects of PCA. CAM, as a novel biopsychosocial model, may serve as an alternative intervention. In the same manner, this research will also contribute to the enumeration of the above factors as they may help in the elimination of the negative effects of PCA in order to ensure improvement, and greater enjoyment, in the performance of gymnasts (Newcomer, 2000).

CAM practices are diverse in their foundations, methodologies, and applications. As a critical component of alternative medicine, CAM involves techniques aimed at changing attitudes, perceptions, and behaviors to achieve satisfaction, enjoyment, and enhanced performance. The social changes brought about by such techniques include increased appreciation of cohesiveness, conformity and compliance (Nichols, Sanborn, & Essery, 2007).

The physical, psychological, and social benefit that sports play in the physical-cognitive-social development of young athletes is well-documented (Bailey, 2006;

Nichols et al., 1994; Nichols, Sanborn, & Essery, 2007; Rowland, 2007; Sothern et al., 1998; Twisk, 2001). Moreover, for young athletes to benefit from these intrinsically multifaceted treasures, the athletic activities must primarily be fun. Research has clearly demonstrated that excessive competitive anxiety must be kept in abeyance for children enjoy the activity (AAP, 2007; Duda & Gano-Overway, 1996; Strauss et al., 2001; Stryer, Toffler, & Lapchick, 1998).

### **Summary and Transition**

Chapter 1 was a brief overview of PCA and the purpose of the study to examine the effects of using CAM techniques in the management of PCA, thus increasing the child athlete's feelings of self-efficacy and locus of control, which subsequently enhances their performance and level of enjoyment in non-elite level gymnasts. Eight research questions and two hypotheses directed the focus of this study. The theoretical foundation of this study is the biopsychosocial model with sub category theoretical import from classical conditioning theory, social cognitive learning theory, individualized zone of optimal functioning theory and normative focus theory.

What follows in Chapter 2 is an introduction to the review and the primary methodology encompassed in the review of the literature. The review concentrates on the relevant research on the experimental variables of the study within a biopsychosocial based model, autogenic training and guided imagery. Research regarding the application of PCA reducing techniques for children, the role motivation plays in stress reduction and behavior change, and the 3 dependent variables will be reviewed. In Chapter 3, a description of the study design, sample population, method for recruitment, the apparatus,

the measurements, and the procedures utilized in this study will be discussed, as well as the established validity and reliability of the aforementioned questionnaires.

Chapter 4 is the results of the analysis of the data collected that either support or fail to support the hypotheses underpinning the study. Finally, Chapter 5 is a discussion of the results, how they relate to the current available literature on PCA, its relation to competition experiences, and proposed modalities to treat PCA among young athletes. Limitations of the current study are also presented as well as the recommendations to future researchers, athletes, and coaches.

## Chapter 2: Literature Review

### **Introduction**

Few researchers have explored using a synergistic application of CAM modalities to mitigate stress among child gymnasts who experience PCA. I looked into the effectiveness of using CAM as an important therapeutic approach to reduce PCA among USAG JO Level 5 gymnasts (Wan et al., 2007).

The following sections contain an outline of the literature review methodology and a comprehensive review of the published literature pertaining to the impact of past competition experiences to PCA. I elaborate on how PCA relates to other variables like locus of control and self-efficacy as well as relevant research on the experimental variables of the study: (a) autogenic training and (b) guided imagery. Research regarding the dependent variables is reviewed followed by a review of the theoretical constructs and their relevance to the CAM variables used in the study (Cox, 2002; Hall, 2001; & Wan et al., 2007).

### **Literature Review Method**

The primary focus of the literature review is on the two CAM modalities employed in the study that addresses PCA in USAG JO Level 5 female gymnasts. The methodology employed in the review utilized advanced search feature functions of several electronic database resources. Access to electronic databases was provided by Walden University's online library service, Questia online library service, and Indiana University's on-campus and online library services. Additionally, access to local

university and community libraries was a quintessential factor in locating specific out-of-date articles and texts applied.

Review of PCA, CAM, dependent variables, and theoretical constructs, was generated, initially, by way of multidisciplinary electronic databases specifically, Thoreau, EBSCO-Academic Search Complete, ProQuest Central, SAGE Premier 2010, and ProQuest Dissertations & Theses. Secondly, CINAHL Plus with Full Text, MEDLINE with Full Text, Nursing & Allied Health Source, ProQuest Central, PsycARTICLES and PsycINFO databases were accessed and this yielded significant results.

The keywords selected for the search on PCA included: *precompetitive anxiety, performance anxiety, state anxiety, and competitive anxiety*. Additional keyword modifiers added to the search were *child, children, athlete, and gymnast*. These keywords yielded the following results: 52 articles were found that met the above criteria and from those 7 were chosen. The keywords searched for CAM treatments included; *autogenic, self-hypnosis, imagery, and guided imagery*. The terms; *precompetitive anxiety, performance anxiety, state anxiety and competitive anxiety*, as well as; *child, children, athlete and gymnast*, were additional keyword modifiers used to search each specific CAM treatment. There were 131 articles found with 11 selected for this review.

The keywords used for the dependent variables included *competitive state anxiety inventory 2C, state anxiety, arousal, trait anxiety, sport self-efficacy, self-confidence, Nowicki-Strickland internal versus external locus of control and locus of control*. Additionally, keyword modifiers used included, *child, children, athlete, gymnast*,

*precompetitive anxiety, performance anxiety, and competitive anxiety*. Over 1005 articles located on the general topics, of which only 55 total references were applicable for this review.

The keywords used for the theoretical constructs included, *classical conditioning, Pavlovian conditioning, Rescorla-Wagner, social learning theory, self-efficacy, locus of control, IZOF, Normative focus*. Additionally, keyword modifiers used included *child, children, athlete, gymnast, precompetitive anxiety, performance anxiety, and competitive anxiety*. The results of these searches yielded 225 articles.

The four most referenced journals were *Journal of Applied Sport Psychology, the Sports Psychologist, Journal of Sport Behavior* and *Journal of Sport and Exercise Psychology*. These journals supplied 34 articles out of the total 152 total references used in the review. From CAM and PCA, referenced articles were located across many disciplines, including nursing, medicine, sports psychology, child and neurological development, personality and social psychology. In the construction of this review, the author endeavored to present a comprehensive review of the literature surrounding the topics of GI and AGT.

### **Precompetitive Anxiety Review**

PCA is a major impediment to performance in athletes and is one of the most significant factors in young athletes dropping out of sports (Bejek, 1996; Campen & Roberts, 2001; Gano-Overway, 1996; Kerr & Pos, 1994; Kolt & Kirkby, 1994; Walpes, 2003; White & Duda, 1994). Researchers in PCA have focused primarily on adults and elite level athletes with few published studies carried out on average ability child athletes.

Tension and a lack of concentration are frequently cited symptoms of distress among children who participate in competitive sporting events (Blais & Vallerand, 1986; Hall & Kerr, 1997). PCA is the state wherein negative or unpleasant feelings are aroused in the 24 hour span before the athletes' competition (Hardy & Crace, n.d.). Elevated PCA levels may influence performance in several ways.

Anxiety control in sports usually implies reducing anxiety through anxiety management techniques such as relaxation, imagery, centering and focusing (Mamassis & Doganis, 2002). It should be understood learning to handle the demands of competition involves learning to read the thought patterns and physical responses, and to develop the skills necessary to find the ideal arousal level before the competition. PCA management requires excellent self-awareness because, if gymnasts' know themselves well, they would be able to understand the antecedents of their competitive anxiety.

Although studies have been published on anxiety control techniques to reduce PCA and stress in adult athletes (Campen & Roberts, 2001), children's sports and gymnastics in particular have received far less attention. Duda and Gano-Overway (1996) reported that competitive gymnasts frequently experience elevated internal stress levels that have an adverse effect their performance. The dedication required by gymnasts at a young age is unparalleled in most other youth sports. Gymnastics, in terms of training hours per week, the intensity of practice, public display of skills and critical evaluation of performance by judges, is considered overwhelming and highly stressful to many child gymnasts when compared to other athletes who do not undergo such training (Walpes, 2003).

A child's response to anxiety or stress may play a critical role in determining a successful performance in gymnastics, the gymnast's overall mood (Duda & Gano-Overway, 1996; Kerr & Pos, 1994; Kolt & Kirkby, 1994), as well as the quality of the gymnastics experience (Duda & Gano-Overway, 1996; Walpes, 2003). Gymnasts face unique and anxiety-producing challenges not present in many other sports. According to Walpes (2003), these include the following: (a) the intensity of training, (b) the public display of skills, and (c) performances evaluation by judges.

Specifically, gymnasts face having to warm up and compete in an event and then wait, warm up and compete again. During the interim period, PCA may heighten creating stress and inhibiting focus that subsequently affects performance. If child gymnasts who can be trained to reduce PCA to an optimal level before competition, they may be able to extend their mental focus on the impending performance and less on cognitive, affective, and physiological discomforts. Therefore, the need exists to provide a practical solution to PCA in child gymnasts (Duda & Gano-Overway, 1996; Hardy & Crace, n.d.; Mackenzie, 1999; Walpes, 2003).

First, researchers have determined that high PCA levels adversely disrupt the successful channeling of energy to the muscles to generate sufficient power needed for optimal performance (Duda & Gano-Overway, 1996; Mackenzie, 1999; Walpes, 2003). Second, Hardy and Crace (n.d.) argued that PCA interferes with an athlete's ability to think in a timely manner. Once athletes become anxious, they have the tendency to focus on themselves rather than channel their attention to more significant matters such as their participation in the sporting event. Once this happens, there is a tendency for less than

optimal performance as most of the thoughts of the athlete are generated based on anxiety.

Some sports psychologists contend that both adult and child athletes who achieve an optimal level of anxiety prior to their competition are often better able to focus on their performance and display fewer cognitive, affective, and somatic discomforts (Ando & Washio, 2007; Blais & Vallerand, 1986; Hall & Kerr, 1997; Hanin, 2000; Russell, 2001). Optimal level of anxiety is where the athlete experiences moderate levels of arousal, as well as moderate levels of somatic and cognitive discomfort. Athletic performance decreases when there is either too little anxiety or too much anxiety present, a concept known as the inverted U hypothesis; see Figure 1. The inverted U hypothesis suggests that athletic performance is best achieved at an optimal level of anxiety; and conversely, that performance progressively either declines as anxiety increases or decreases from each individual's optimal level.

### **Multidimensional Theory of Competitive Anxiety**

In relation to Spielberger's (1972) distinction between state and trait anxiety, the multidimensional theory of anxiety (MAT; Martens et al., 1990), stresses the strength of 3 psychological components related to anxiety in predicting performance: state self-confidence, the cognitive state anxiety, and somatic state anxiety. Morris and Hutchings (1981) defined cognitive anxiety as the individual's negative beliefs about him/herself and the circumstance and the negative expectations flowing from these beliefs. On the other hand, state self-confidence involves the extent to which the individual believes that he/she will perform well in a situation, in this case, the competition. The impact of

cognitive state anxiety on performance has been seen to differ from the effects of somatic anxiety among athletes (Krane, 1990), which supports the theory of the multidimensionality of competitive anxiety.

According to the theory, cognitive state anxiety is usually accompanied by lack of concentration to the task at hand, as the individual is preoccupied by his/her own fears and worries, thus, affecting his or her performance. Somatic anxiety impacts performance differently as it identifies with the actual reaction of the body to the potentially dangerous or high demand situation. This may include trembling, sweating, tensed muscles, and rising heart rate (Martens et al., 1990). The multidimensional theory of competitive anxiety postulates that somatic anxiety and its manifestations should begin to subside as the activity or performance starts, however, cognitive anxiety, as influenced by low self-confidence may continue to persist throughout the performance.

### **PCA and Prior Competition Experience**

In accordance to state and trait anxiety theory (Spielberger, 1972), different individuals or athletes react differently to the same stimuli, such as a sporting competition. One possibility is that those who are predisposed to trait anxiety are more likely to react more intensely and negatively to the situation, thus, exhibiting higher state anxiety (Spielberger, 1972). Researchers have looked at the difference in the level of anxiety between elite and nonelite athletes (Jones & Swain, 1995; Lundqvist, Kenttä & Raglin, 2011). Another possibility that previous studies have pointed out is the possible influence of past competitive experiences on precompetitive state anxiety. Donzelli et al.

(1990) reported that athletes with more competitive experiences have recorded lower levels of competitive state anxiety before a competition.

On the other hand, other studies have shown that elite and nonelite athletes do not differ significantly in the level of cognitive or somatic anxiety, however, the difference lies in how the groups perceive such anxiety. The elite groups of athletes are more likely to attribute the anxiety as facilitative to their performance, as opposed to the nonelite athletes who tend to look at their anxiety as a hindrance to their performance. Hanton et al. (2008) explored the potential relationship between prior experience and anxiety and concluded that positive and negative past experiences on similar incidences, that is, competitive events have different impacts on the way an athlete interprets, reacts, and deals with precompetitive anxiety.

More experienced athletes are more likely to perceive the anxiety that they feel as a positive experience that enhances their performance, as compared to more amateur athletes, since experienced athletes have more experiences that are positive in past competitions and are more likely to know how to manage anxiety (Athán & Sampson, 2013). Mellalieu, Hanton, and O'Brien (2004) also found that athletes with more competitive experiences interpret anxiety as facilitative, especially among athletes of gross explosive sports, as opposed to fine motor sports. Donzelli et al., (1990) as well as Highlen and Bennet (1983) suggested that the type of sport that athletes engage in has an impact on the way they perceive anxiety and make use of past experiences to manage PCA.

### **Complementary Alternative Medicine Review**

CAM refers to those health practices that are “not considered to be a part of conventional medicine” (National Center for Complementary and Alternative Medicine definition, 2009, p.1). Several debates have surfaced with regard to the appropriateness of using CAM in a traditional clinical setting. This is because several researchers noted the significance of the use of CAM in order to aid traditional medicine. Through this partnership, it is expected that individuals can receive holistic healing.

CAM or homeopathic treatments have received a fair amount of support in the public sector. Researchers recognized the favorable outcomes in the use of CAM as an alternative medicine, as well as in conjunction with traditional methods of healing (Kligler, 2003; Ratcliffe, 2004; Reilly, 2005; Roberts, 2004; Shore, 2004; Triestman, 2004). However, as is true in most cases, CAM modalities are not without its detractors with some researchers who oppose CAM or homeopathic treatments because it may raise legal and ethical questions about the clinical appropriateness of alternative therapies in pediatrics (Cohen & Kemper, 2005). Researchers pointed to potential problems when parents opt to use homeopathic treatments instead of proven allopathic medicines, thus placing children at risk (Cohen & Kemper, 2005; Marwick, 2005).

These critics call for the running of further studies and research in order to determine the safety and efficacy of these treatments. Benedetti (2009) raises the question of whether or not the effectiveness of CAM modalities is boosted by placebos. He stressed the importance of understanding the mechanisms at work for placebo and placebo related effects underlying the patient provider interaction. Although Benedetti raises this question, he does not offer any substantive evidence to support this conjecture.

According to Marwick (2005), one of the researchers who oppose the use of CAM in traditional clinical settings, the practice of the latter should be tested by the same standards as conventional medical practices to demonstrate their clinical effectiveness. Nevertheless, Marwick conceded that rigorous evaluation of alternative therapies could be complicated due to the ambiguous nature of many of the approaches and the difficulty in accurately measuring its outcomes. Marwick further questioned the feasibility of researchers obtaining quantitative evidence that demonstrates the effectiveness of acupuncture or aromatherapy in the reduction of chronic pain when the underlying physiological principles are not fully comprehended.

Hufford (2003) noted that “science is a necessary tool for the evaluation of complementary and alternative medicine, yet the ability of science to evaluate this relationship are constrained” (p. 198). Hufford (2003) went on to say that the primary relevant limits are not inherent in the scientific method, rather they lie in the limits set by the scientific community and the way in which scientific knowledge, theory and method are configured rhetorically and in the social context where science operates. In other words, how scientists view science and the questions they ask limit the possibility for understanding the functionalities of alternative medicine. For example, western science for decades postulated that a split exists between the mind and body. This dichotomous relationship between mind and body emerged in the 17th century as a compromise between the Roman Catholic Church and science.

Descartes (1649) argued that the universe is composed of two elements: (a) physical matter, which behaves according to the natural law and is thus suitable for

scientific inquiry, and (b) the human mind (soul or spirit), which lacks substance, controls human behavior, obeys no natural laws and thus is in the church's purview of authority. This philosophy, known as Cartesian dualism, postulates a split exists between the mind and body. Descartes' philosophical reasoning significantly influenced medical science for centuries and even today, his thoughts are recognized, valued, and debated. However, current scientific thought is moving away from dualism to a more holistic view; where mind and body are an integrated system. Kimble (1989) proposed a three-point model where the view of human behavior is an interaction between three factors: evolution, genetic endowment, the interaction between the environment, and one's genetic constitution. This biopsychosocial model helps to address how the mind and body, in conjunction with the environment, works collaboratively to affect human behavior.

The following subsections offer an extensive discussion of the biopsychosocial reactions to stress, pathological versus optimal levels of stress and two specific CAM modalities that are of vital importance in this study's use of a synergistic approach in determining how to overcome PCA in young gymnasts.

### **Biopsychosocial Reactions to Stress**

Stress, as noted by Taylor (2002), is the physiological and emotional reaction to a stressor. Taylor indicated that a stressor is a demand, situation, or circumstance that disrupts a person's equilibrium (internal balance) and initiates the stress response. When stress hits the system, the body attempts to reduce the stress and to return to homeostasis, which is the body's normal balanced level. The modern concept of stress, based upon the works of Cannon (1936) and Selye (1956), maintains when animals are faced with an

anxiety-producing event or danger, they essentially have two choices, (a) to either run away or (b) stand and fight. Cannon aptly coined this reaction as the fight or flight response.

In either case, the body activates a designed physiological and psychological defense mechanism to protect the individual. Selye pieced together the systematic physiological response individuals undergo in reaction to stress. Selye categorized stress as either negative (distress) or positive (eustress) and indicated that an individual's bodily system reacts to both positive and negative stressors in exactly the same manner. Furthermore, Selye (1956) identified and outlined a three-stage physical reaction to stress and referred to it as General Adaptation Syndrome (GAS). Buckworth and Dishman (2002) reported numerous physiological reactions that occur during a stressful event. The following is a synthesis of both authors' works:

### **General Adaptation Syndrome (GAS)**

**The alarm stage.** The following sequence of events occurs as a response to stressors. The individual perceives a threatening situation and this generates an emotional response to the perceived threat in the limbic system deep within the brain. Signals are sent to higher brain centers and the hypothalamus. The posterior hypothalamus sends a message to the pituitary gland through a neural pathway to release the hormones vasopressin and oxytocin. The adrenal medulla then secretes epinephrine and norepinephrine into the blood stream (Selye, 1956; Buckworth & Dishman, 2002).

Simultaneously, the posterior hypothalamus activates the sympathetic nervous system to prepare the body for fight or flight. The sympathetic nervous system then

causes the following: Heart rate increases, blood pressure increases, sweating increases, gastrointestinal tract begins to slow down its movements, pupils dilate, and breathing becomes faster and deeper. Moreover, blood begins to coagulate to help minimize blood loss in case of physical injury. At the same time, the anterior hypothalamus releases the corticotrophin-releasing hormone, CRH (controls the daily rhythms of the hormone, which controls the hormones in the adrenal cortex) to activate the anterior pituitary gland (Selye, 1956).

Anterior pituitary gland releases adrenocorticotrophic hormone (ACTH), which activates adrenal cortex to release adrenal-corticoids (a cortisol that mobilizes energy for action and inhibits the immune response) and mineral-corticoids (aldosterone that increases blood pressure by increasing the blood volume). Adrenal medulla releases epinephrine and norepinephrine, which increases blood flow to muscles by increasing the heart rate and the force of contraction (Selye, 1956; Buckworth & Dishman, 2002). These changes result in a huge burst of energy, improved vision and hearing, and increased muscular strength.

**The resistance stage.** The following occurs in the resistance stage: (a) Body attempts to return to a balanced state and (b) Body tries to repair damage caused by stressors.

**The exhaustion stage.** The exhaustion stage occurs when the body remains in a high state of stress for a prolonged period; and, the body is unable to repair itself from the damage. Bodily illness results from prolonged stress in the form of the following disorders: (a) high blood pressure, (b) ulcers, (c) depression, and (d) migraine headaches

(Balch & Rister, 2002). A stressor by definition has two components associated with it: (a) the experience or event encountered, and (b) the individual's internal self-talk about the event.

### **Optimal versus Pathological Stress**

Stress causes the body to react to the stressor signals by preparing for fighting or running away. In our modern day civilized society when these signals are activated in the body, the body is often unable to dissipate the energy that has been activated. Therefore, it remains in the system and has a toxic effect. There is stress in all activities. The goal is to be able to find the right amount of stress that is appropriate for the situation.

### **Guided Imagery (GI)**

Utay and Miller (2006) operationally defined guided imagery (GI) as an established CAM modality in which simple visualization and direct imagery based suggestion are applied through metaphor and storytelling. GI is one of the most widely researched and popular intervention strategies in use today by athletes. GI is a psychological activity that calls to mind the physical characteristics of any object, person, or place that is away from our perception (Denis, 1985). White and Hardy (1998) put forward that through imagery an individual can be aware of seeing an image, feeling movements as an image, or experiencing an image of smell, taste, or sound without experiencing the real thing.

Analyses of the influence of imagery training on performance have found moderate effect of sizes ranging from .48 (Feltz & Landers, 1983) to .68 (Hinshaw, 1991). Based on these findings, researchers conclude that in comparison to no practice at

all, imagery usually benefits performance (Durand, Hall, & Haslam, 1997). Hall (2001) suggested that imagery can serve as an effective supplement to regular physical practice and as a substitute for some amount of physical practice when athletes are unable to train.

Research on GI techniques has yielded significant results and confirmed their use as CAM techniques in the treatment of medical disorders, athletic performance, psychotherapy, as well as to promote relaxation, changes in attitude or behavior, and to encourage physical and psychological healing (Newsom, Knight, & Balnave, 2003; Page et al., 2001; Thelwell & Greenless, 2003; Utay & Miller, 2006). Researchers are turning to athletes as valuable sources of information to explore the benefits of imagery training (for reviews see Hall, 2001; Martin, Moritz, & Hall, 1999; Murphy & Martin, 2002). The key findings of these studies can be organized into different categories known as the 4 W's of imagery use: (a) where athletes use imagery (i.e., location), (b) when they use imagery (i.e., period), (c) what they image (that is, content) and (d) why they image, that is, function of imagery (Munroe et al., 2000).

However, guided imagery may not be entirely effective for all who use the intervention. In the study conducted by Brown et al., (2001), intrapartum nonpharmacological pain relief methods were assessed among laboring women. Ten strategies, including guided imagery were used on a sample of 46 women under labor and the women were asked to rate each strategy from *very effective* to *not very effective*. The study found guided imagery not to be as effective as breathing techniques, relaxation, acupressure, and massage. However, the study also found that no specific strategy was effective for all of the women.

Overall, research has found that athletes effectively use imagery during training and competition venues, as well as in a variety of locations such as school, work, and home (Hall, 2001; Martin et al., 1999). Athletes consistently report that they use imagery more just before competitions than during or after competitions, and more during training sessions than before or after training sessions. They also report that their imagery is generally accurate and clear and tends to be positive rather than negative in nature. Athletes use both internal (visualization of the activity from inside looking out) and external imagery (visualization of the activity from outside looking in) perspectives and they report that their imagery integrates different sensory experiences , (that is, visual, kinesthetic, and sometimes auditory and olfactory information). They tend to not only image the skills and strategies they perform in their sport, but also image other details such as the surroundings in which they are going to compete, for example competition venue, officials, teammates, and opposing competitors).

Paivio (1985) developed a simple analytical framework of imagery use to explain the functions of imagery in sport. Within this framework, imagery serves both cognitive and motivational functions, each operating at either a specific or a general level. The cognitive function images sport skills (for example, cognitive specific imagery) or game plans and strategies (for example, cognitive general imagery). Several researches have ascertained that cognitive specific imagery is an effective technique for enhancing learning and performance (Driskell, Copper, & Moran, 1994; Hall, Schmidt, Durand, & Buckolz, 1994). Case study reports confirmed performance benefits of cognitive general

imagery (Fenker & Lambiotte, 1987; Mace et al., 1987; MacIntyre & Moran, 1996; Rushall, 1988; White & Hardy, 1998).

Sports psychology literature also acknowledges the need for athletes to learn and practice psychological skills such as imagery and visualization (Harris & Harris, 1984; Weinberg & Williams, 2001). Psychological skills can be developed in a manner similar to physical skills, and positive effects will follow due practice and application (Weinberg & Williams, 2001). Visualization or imagery to rehearse cognitive specific psychological skills should be treated in a manner similar to physical practice (Hall, 2001). Researchers examining visualization use suggest that many athletes do not approach visualization practice in the same structured (i.e., plan duration and topics to be imaged) and regular (that is, at a specific time each day) manner in which they approach physical practice (Barr & Hall, 1992; Hall, Rodgers, & Barr, 1990; Rodgers, Hall, & Buckholz, 1991).

Hall et al. (1990) conducted a systematic comparison of visualization use across different sports and found that athletes varied their imagery use throughout the year and imagery sessions were not always structured, regular, or of the same duration. Elite athletes, however, reported more structured visualization sessions than their nonelite counterparts. Nonelite athletes perceived visualization as being less relevant to their competitive performance and practiced visualization much less than elite athletes (Cumming & Hall, 2002a). A study on adolescent figure skaters by Rodgers et al., (1991) showed that they did not structure their visualization practice as they would their physical practice and failed to practice visualization on a regular basis. These athletes believed

that visualization had some value, but did not regard it as a skill worthy of practice on its own, or were unaware of how to best develop and use their visualization skills.

Athletes who did not participate in a psychological skills training program felt that such skills were of little help to them (Bull, 1991). It can be concluded from these findings that there is a need for education and training on the values and benefits of using mental imagery for athletes, especially the developing ones. In addition, these athletes need to be shown how they may incorporate imagery more effectively into their training programs. Importantly, their goal should be in using imagery in a more structured and regular fashion and in maximizing their potential for performance benefits.

### **Autogenic Training (AGT)**

Whereas PMR relies upon dynamic contracting and relaxing of muscles, autogenic training (after herein referred to as AGT) relies upon the feelings associated with the limbs and muscles of the body (Cox, 2002). The German psychiatrist Johannes Schultz first developed AGT in 1932. In his work with hypnotized patients, Schultz noted that his patients consistently reported 2 bodily sensations associated with the relaxation response (Cox, 2002). These sensations are associated with a feeling of heaviness in the limbs due to the complete relaxation of the muscle, freedom from muscular tension, and a feeling of general warmth in the body, arms, and legs due to dilation of blood vessels, which is a parasympathetic response.

In its basic form, AGT consists of a series of mental exercises designed to elicit the 2 bodily sensations of heaviness and warmth. All AGT is composed of 3 essential elements: (a) heaviness and warmth, (b) visual imagery and (c) the use of specific themes

(Cox, 2002). Many times these elements are intermingled. Several authors have developed effective AGT programs for athletes (Nideffer, 1985; Orlick, 1986; Richmond, 2004). Cox (2002) indicates that the key component in all of these programs is establishing 6 initial steps designed to suggest to the mind a feeling of warmth in the body and a profound heaviness in the limbs.

Ostrander and Schroeder (1979) recommended that the 6 step process in autogenic training proceeds as follows: (a) begins with eliciting a feeling of heaviness in the dominant arm or leg, (b) a feeling of warmth is perceived in the dominant arm or leg, (c) a sensation of warmth is felt in the chest area with a perceptible reduction in the heart rate is achieved, (d) a calm and relaxed breathing response is experienced, (e) a feeling of warmth in the solar plexus area is felt, and (f) a sensation of coolness is perceived on the forehead.

In the second component, visualization is used to assist a deeper state of relaxation. Participants are encouraged to visualize images of relaxing scenes and to continue to focus on the warmth and heaviness in the limbs. The third component makes use of specific themes to assist in elevating the auto-hypnotic response. Davis (1995) noted that the use of positive self-statements, which suggest to the mind that it is in a more relaxed state, is an essential technique in AGT. Cox (2002) argued that while the benefits of AGT are well-documented, the evidence that AGT by itself enhances sports performance has not been substantiated.

Moreover, there are studies that indicate that autogenic training is ineffective in the perspective of other conditions that tend to result to changes in the autonomic nervous

system (ANS). In a study conducted by Jozsvai and Pigeau (1996), motion sickness was found to be one of these psychological conditions. Since previous literature found autogenic training to be effective in controlling motion sickness, they hypothesized that autogenic training with true feedback should be able to control for ANS responses as well as more tolerance for stress due to motion. Results of their study showed that their participants were able to learn to control ANS responses independently regardless of whether they were introduced to true or false feedback. These results suggested that autogenic training is not effective in providing an intervention for motion sickness.

Apart from the abovementioned study, several studies concluded that AGT is an effective CAM modality in the treatment of several conditions such as sports injuries, the enhancement of performance (Morton, 2003), reduction in stress cortisol levels (Johansson, & Unestahl, 2006), and significant improvement in the treatment of chronic headaches in children and adolescents (Kohen, & Zajac, 2007). Richmond (2011) discussed the importance of completing some preliminary work prior to the administration of AGT in order to increase its overall effectiveness, particularly when working with children. Just as in PMR, children need to understand the purpose of the AGT in an effort to increase compliance with the program (Richmond, 2011). They should be instructed at the beginning of each phase and should be made to take home an instructional sheet and audio tape outlining what they have learned (Richmond, 2011).

The use of autogenic exercises in changing unwanted behavior is accomplished by first recognizing that the unwanted behavior is ego dystonic; that is, a part of the self that is viewed as undesirable. Autogenic addresses the feelings attached to unwanted

behavior with visualization and suggestion. Richmond (2011) indicated that if an individual maintains consistency with the autogenic formula they are able to achieve a pleasant and calm autogenic state under almost any circumstances by using only one or two cycles of the final routine (which is a culmination of all preceding sequences) .

In summation, review of prior research as reported by Wan et al. (2007); Cox (2002); and Hall (2001), has been favorable on the efficacy of AGT, GI, and their use with children and adult athletes and other sample population groups. However, there is a paucity of published research findings regarding the possible interrelationships that may exist between GI and AGT modalities and many are not specific to child athletes. This study offers a novel approach for determining if the integration of GI and AGT, modalities have a synergistic effect in ameliorating precompetitive anxiety among young athletes who participate in competitive sporting events.

### **Dependent Variables**

#### **Competitive State Anxiety Inventory-Version 2 Child (CSAI-2C)**

The CSAI-2C instrument, (based on the multidimensional theory of competitive anxiety), differentiates between cognitive state anxiety and somatic state anxiety (Cox, Russell, & Robb, 1998). These authors indicate that this is an important distinction that helps sport psychologists understand the relationship between anxiety and performance. The CSAI-2C is the children's version of the CSAI-2 and takes less than 5 minutes to administer (Stadulis, Eidson, MacCracken, & Severance, 1995). The CSAI-2C is a self administered, 15-item questionnaire, and is rated on a Likert scale from 1 (*not at all*) to 4 (*very much so*). The 15 items represent three 5-item sub-scales: cognitive anxiety (for

example, I have self-doubts), somatic anxiety (for example, my body feels tense) and self-confidence (for example, I feel secure), each yielding separate scores between 5 and 20. Alpha coefficients ranging between .79 and .90 have demonstrated a sufficiently high degree of internal consistency for the CSAI-2C sub-scales.

Studies investigating the construct validation of the CSAI-2C have supported the 3 sub-scales as sport specific measures of state anxiety. The construct validity of this measure was supported by principal factor analysis ( $N = 632$ ). Psychometric properties have not been fully established for the CSAI-2C due to the lack of published research using this measurement. However, from the initial validation of the CSAI-2C (Stadulis, Eidson, MacCracken, & Severance, 1995), a Carmine's Theta internal consistency coefficient of .96 ( $N = 632$ ) and Cronbach alpha internal consistency coefficients of .75 (cognitive anxiety), .78 (somatic anxiety), and .73 (confidence) emerged.

### **Nowicki-Strickland Locus of Control Scale (NSLCS)**

This instrument will measure youth gymnasts' generalized expectancies for internal versus external control of their anxiety (Nowicki & Strickland, 1973). The Nowicki-Strickland Locus of Control Scale is a self-administered, paper and pencil measure that consists of 40 questions that are answered either yes or no by placing a mark next to the question. The higher the score, the more external locus of control exhibited. Briefly, internal versus external control refers to the degree to which people expect that a reinforcement or an outcome of their behavior is contingent on their own behavior or personal characteristics versus the degree to which persons expect that the reinforcement

or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable (Rotter, 1966).

The NSLCS has a reported a split-half reliability coefficient of .74 and test-retest reliability of .66. Additional studies support the validity of the scale, including correlations between it and the Intellectual Achievement Responsibility Scale,  $r = .51$  for seventh graders and  $r = .40$  ( $p < .001$ ) for fifth graders (Nowicki & Strickland, 1973). The psychometric properties of this assessment instrument have an adequate reliability and validity for the populations investigated in this particular study (Miller et. al., 2003).

### **Sport Specific Self Efficacy Scales (SSSES)**

The use of a task or sport specific efficacy scale is an effective measuring tool in assessing efficacy that is specific in the sport setting. In the study of McAuley and Gill (1983), the use of the Physical Self Efficacy Scale in the sport setting was investigated in terms of reliability and validity. The study was conducted on 52 female gymnasts in the college level who represented seven universities and volunteered to become the participants in the said study. The results of the study showed an adequate overall reliability with a value of .72. The results also showed that the test is valid in measuring the participants' overall physical self-efficacy in the sport.

## **Theoretical Constructs and Synthesis of CAM**

### **Classical Conditioning Theory**

Classical conditioning theory, also referred to as Pavlovian conditioning theory, involves the procedure of pairing a neutral stimulus (typically referred to as a conditioned stimulus or CS) that is typically part of a conditioned reflex, with a stimulus (typically

referred to as an unconditioned stimulus or US) that elicits an unconditioned response (Pavlov, 1927; Chance, 2003). Pavlov (1927) postulated that conditioning involved the reformulation of new neurological pathways between the CS and the US. This “theoretical model of conditioning psychology suggests humans and other animals can learn to associate a new stimulus (CS) with a preexisting stimulus (UCS) and can react or respond to the CS as if it were actually the UCS” (Kirsch et al., 2003, p. 369).

In other words, the CS substitutes for the US. Chance (2003) suggested that the conditioned response (CR) is essentially the same as the unconditioned response (UR). Rescorla (1973) observed that *a cognitive component* is essential to grasping the mechanisms at play in classical conditioning with human participants. Rescorla postulated that an animal or human can learn to associate a conditioned stimulus (CS) with the unconditioned stimulus (US), resulting in an observable behavior (Kirsch, Lynn, Vigorito, & Miller, 2004). Fundamentally, Rescola Wagner model (RWM) postulates that “associative learning occurs not because two events occur but because that simultaneous occurrence is unanticipated based on current associative strength” (Rescorla & Wagner, 1972, p.42). For the purpose of this study, AGT as a relaxation technique will comprise of a set of mental exercises specifically targeted at eliciting the two bodily sensations of heaviness and warmth. With regard to classical conditioning theory, a retinue of guided mental exercises procedurally pairs a neutral stimulus with an unconditioned stimulus to elicit an unconditioned response and allows the aforementioned predetermined PCA (feeling of heaviness) to be alternated with a feeling of warmth and subsequent increased

levels of strength and locus of control. The RWM is representative of the mapping of changes in associative strength.

### **Social and Cognitive Learning Theory**

Social Cognitive Learning Theory, (SCLT), as delineated by Bandura (1994) theorizes that human behavior is determined through the multiple and varied interactions between 3 fundamental factors: (a) cognitive factors, (b) environmental forces and (c) behavioral factors. Social behavior according to Bandura (1994) is learned primarily by observing and imitating the actions of others, but is influenced by one's own underlying perceptions and belief systems. Two primary paradigms from social learning theory will be employed by this study: self-efficacy model and locus of control model.

**Self-Efficacy.** Self-efficacy, as defined by Bandura (1994) relates to people's beliefs about their capabilities to achieve designated levels of performance that exercise influence over events that affect their lives. Self-efficacy beliefs determine how people feel, think, motivate themselves, and behave (Bandura, 1994). Such beliefs produce diverse effects through 4 major processes: (a) cognitive, (b) motivational, (c) affective, and (d) selection processes (Bandura, 1994). Additionally, Bandura (1997) outlined 4 crucial determinants in developing self-efficacy and self-confidence. They include: (a) an individual's past history of successful performance, (b) vicarious experiences, (c) verbal persuasions, and (d) emotional arousals.

**Locus of control (LOC).** Rotter (1966) defined Locus of Control "as the tendency of people to ascribe achievements and failures to either internal factors of control or external factors of being controlled" (p. 102). A basic assumption of Rotter's

(1954) social learning theory is that an individual's behavior is determined "not only by the nature or importance of goals or reinforcements but also by the person's anticipation or expectancy that these goals will occur" (p. 102). The latter of these variables, that of expectancy, is defined as "a probability or contingency held by the subject that any specific reinforcement or group of reinforcements would occur in any given situation or situations" (Rotter, 1954, p. 165).

The research proposed a linkage of (AGT/GI + Competition) =E (effect) to model feelings of self-efficacy and locus of control. Through the synergistic application of AGT/GI's to predetermined competitions, athletes are allowed to match their feelings of warmth prior to a competitive event with a reduction in muscular tension and other somatic complaints. Thus, by achieving integration of these CAM strategies, athletes are able to control the integrity of their biological, psychological, social, and environmental determinants and enhance performance excellence. In line with the SCL theory, these innately acquiesced reinforcements strengthen the expectancy that the competitive event will be preceded by prerequisite reinforcements hence enhancing overall performance in child gymnasts (West et al., 1996).

### **Individualized Zone of Optimal Functioning Theory (IZOF)**

In the individualized zone of optimal functioning theory (hereinafter after referred to as IZOF), Hanin (2003) postulated that athletes have *an optimal zone* whereby they achieve their best performances. Moreover, when their level of anxiety is maintained in this zone, their performance excels. Furthermore, the level of optimal state anxiety may differ significantly between individual athletes and individual situations (Hanin, 2003)

and when anxiety is either below or above the individual's optimal zone, performance deteriorates (Sands, Henderson, & Kilgore, 1999).

In this study, GI is used on a participant-to-participant basis to stimulate the reliance on imagination to relieve or reduce PCA. The application of this theoretical paradigm is objectively guided towards enabling athletes to employ novel imaginative scenarios to control anxiety in an anxiety provoking situation on an individual basis. Since psychological aptitude directly influences performance, athletes are only likely to use positive imagination to influence their performance outcomes. Additionally, AGT is also a key psychological construct with regard to IZOF (Hanin, 2003).

### **Social Influence and Normative Focus Theory (SINFT)**

Social influence embodies the techniques and tactics used by an individual or group that are wittingly designed to change the attitude, belief, perception, or behavior of another person or group of people (Baron & Byrne, 2004; Cialdini et al., 1990). Factors such as cohesiveness, conformity, and compliance are critical social elements of concern when working with groups of athletes. Martens and Peterson (1971) have demonstrated there is a circular relationship between satisfaction, cohesiveness, and success. Teams who are more cohesive are more successful and successful teams boast greater satisfaction from participation than unsuccessful teams (Martens & Peterson, 1971). Often the terms *cohesion* or *cohesiveness* are used to describe a group in which the members all work together toward a common goal or one in which everyone is ready to take responsibility for group tasks (Carron, 1982).

In addition to cohesiveness, conformity and compliance are social factors that are of considerable importance. Conformity is defined as a type of social influence by which individuals change their attitudes or behavior in order to adhere to existing social norms (Baron & Byrne, 2004). Compliance, on the other hand, is a social influence that involves an individual who attempts to get others to say yes or comply to a direct request (Baron & Byrne, 2004). Researchers have consistently demonstrated that individuals will frequently acquiesce to social pressures towards conformity, compliance, and obedience even when they believe it is the wrong choice (Asch, 1951; Cialdini, 1994; Janes & Olson, 2000).

The CAM techniques - GI and AGT, - operate in the objective pursuit of the applications of social influence/normative focus theory (SINFT). These CAM techniques are directed towards transforming the attitude, belief, and perceptions of the athletes as a sports group. Through didactics, applied experiences, and supervision, performance psychology enhances human performance especially in areas where excellence is the supreme goal, as in gymnastics. The incorporation of normative focus theory applications leads to psychosocial resiliency, enjoyment, satisfaction, and enhanced performance (Baron & Byrne, 2004).

The motivational functions have also been linked to performance benefits by demonstrating increased motivation in athletes (Callow & Hardy, 2001), improved regulation of arousal (Hecker & Kaczor, 1988), and anxiety levels (Vadocz, Hall, & Moritz, 1997), as well as the enhanced capability to modify cognitions such as self-efficacy (Feltz & Riessinger, 1990) and self-confidence (Callow, Hardy, & Hall, 2001).

## **Review of Comparative Methods**

This section discusses a review of different experimental methods. The section also includes each method's description and particular use in different research designs.

### **The Experimental Method**

One of the main goals of psychology is to be able to explain specific human behaviors. In order to generate sufficient evidences, various methods of research must be incorporated, such as the experimental method. The experimental method is one of the most popular means of addressing the problem of explaining behaviors. The results generated by this method transcends to answering how and why a particular behavior is manifested. Through experimentation, it becomes possible to answer inquiries about the causes of human behavior (Davis & Bremner, 2006). One of the principal advantages of using the experimental method is that it is able to permit generalizations in terms of cause and effect relationships that interplay between variables. The results produced by this method of research have potency that is unmatched by other research methods (Weiten, 2008). The experimental method features a number of designs, namely true experiments, quasi-experiments, single-subject experiments and pretest-posttest among others (Callow & Hardy, 2001).

#### **True Experiments**

A true experiment is the strongest among all the experimental methods as it is able to provide the strongest evidence for a cause and effect relationship between an independent variable and a dependent variable. However, the design may have a number of challenges. Firstly, it is important that the treatment groups contain people who are not

similar in terms of preexisting characteristics. However, this strong characteristic of the true experiment may pose to be its greatest potential weakness. The use of random assignment to the different levels of the independent variable may result in levels of that variable to simulate conditions that may be deviant from the real-world setting, making the results of the true experiment questionable in terms of validity (Davis, 2003).

### **Quasi-Experiments**

The term quasi means *seemingly*, making the quasi-experimental design to be similar to true experiments to some degree. The only difference is that a quasi-experiment does not make use of randomization of research participants into groups. This particular experimental design is intended for studies in the natural setting where the groups are naturally intact. In general, a quasi-experiment possesses poor external validity but has good internal validity (Berg & Latin, 2008).

Quasi-experiments are used in conditions when randomizations become very expensive, or are impossible to attempt and monitor. This type of experiment is also used when there are challenges in the experimental process such as ethical considerations. In some situations, a quasi-experiment is also used when the study is retrospective and the program that is being under investigation is already in process. This is because a true experiment is not able to replicate the social, organizational, and behavioral conditions in a psychological laboratory (Gray, 2009).

### **Single Participant Experiments**

A single participant experiment studies a variable under a variety of conditions where analysis is carried out. This design is considered one of the traditional designs used

in the field of behavioral science. It is important to take note that this experimental research design is different from a case study, which features only a single participant that is cast in a narrative manner. A single participant experiment is a quantitative research design in which the participants “serve as their own control, a principle known as baseline logic (Gast, 2010, p. 14).” In this design, the participants are exposed to a control condition and at the same time, an experimental condition. The behavior that is intended in the study is measured repeatedly, depending on the context of one of the varieties of this research design, they are intended to control for any threats to the study’s internal validity (Gast, 2010).

### **Pretest-Posttest Experiments**

A pretest-posttest experiment is primarily used for comparison between two groups as well as for evaluating change after an intervention has been given. This measurement of change is considered essential for evaluating the effect of an intervention as well as the effect of certain counseling or other related programs. However, using this design may also lead to some issues regarding validity. Firstly, a method for measuring change in terms of gain scores may not be appropriate because it may lack clarity. Secondly, to rely on raw scores for measuring change may be misleading because these scores depend on the difficulty of the test items (Dimitrov & Rumrill, Jr., 2003).

### **Summary**

The second chapter highlighted various literature and studies that pertains to PCA along with relevant research on the two experimental variables in the present study. The chapter had a particular focus on GI and AGT as I considered these as variables that play

a pivotal role in the present study. Moreover, the focus on these particular therapies is marked by its use in nonelite/child athletes that is an uncharted, unappreciated, and underdeveloped CAM modality as a PCA stress reducing modality.

Aside from the experimental variables, the chapter also discussed a review of the research regarding the 3 dependent variables, followed by a review of the theoretical constructs and their relevance to the CAM variables used in the study. Access to electronic databases was provided by Walden University's online library service, Questia online library service, and Indiana University's on-campus and online library services. Additionally, access to local university and community libraries was a quintessential factor in locating specific out-of-date articles and texts applied to the review.

The first sections of the chapter featured a review of precompetitive anxiety as well as on complementary alternative medicine. Overall, research has found that athletes use imagery predominately at training and competition venues, as well as in a variety of locations such as school, work, and home. The effects of AGT was also discussed.

Review of this research revealed that prior research, as reported by Wan et al. (2007), Cox (2002), and Hall (2001), has been favorable on the efficacy of AGT/GI, and their use with children and adult athletes and other sample population groups. However, a paucity of published research findings regarding the possible interrelationships may exist among the aforementioned variables and many are not specific to child athletes. This study offers a novel approach for determining if these modalities have an effect in ameliorating precompetitive anxiety among young individuals who participate in competitive sporting events.

The dependent variables of the study are also discussed in the literature. It highlights the use of a task- or sport-specific efficacy scales in measuring efficacy that is focused on the sport setting. Theoretical constructs as well as the synthesis of CAM is discussed, which focused on classical conditioning theory, social and cognitive learning theory, individualized zone of optimal functioning theory and the social influence and normative focus theory. Afterwards, comparative methods were also reviewed, which focused on the experimental method.

The experimental method is one of the most popular means of addressing the problem of explaining behaviors. The results generated by this method transcends to answering how and why a particular behavior is manifested. Through experimentation, it becomes possible to answer inquiries about the causes of human behavior (Davis & Bremner, 2006). The experimental method features a number of designs, namely true experiments, quasi-experiments, single subject experiments, and pretest-posttest among others. The next chapter will delineate the methodological processes associated with this research initiative.

## Chapter 3: Research Method

### **Introduction**

This designed program for children has been kept simple and short. Some children may have a short attention span and unless they see the usefulness or applicability of it, they are not apt to perform the techniques prescribed (Richmond, 2011). Additionally if the program is not enjoyable, the odds are that it will not be maintained. Hence, the program must be educational, instructive, and fun for children (Kraag, Van Breukelen, Kok, & Hosman, 2009; Pirker-Binder, & Lang, 2005). Another difficulty one encounters when attempting to develop a stress management program for children is making it accessible to all children (Kraag, Van Breukelen, Kok, & Hosman, 2009; Pirker-Binder, & Lang, 2005).

Variables such as age, socio-economic status, culture, and religious affiliation should be taken into account (Compas, Malcarne, & Fondacaro, 1988; Seiffge-Krenke & Shulman, 1990). Care must be taken in the selection of the terminology used to describe the program to ensure the inclusion and participation of all possible groups of children (Kraag, Van Breukelen, Kok, & Hosman, 2009; Pirker-Binder, & Lang, 2005). The techniques used in this study (See Appendices D and E) are to be performed in progressive stages. As the children achieve a certain level of proficiency, they move on to the next stage.

### **Research Design**

A quasi-experimental design methodology that includes a mixed between-within design was utilized for both the first and second study. The within-groups component for

the first study included the scores on all 3 of the dependent variables, that is, scores on SSSES, NSLCS, and CSAI-2C. For the second study, the use of both pre and post measurements on the 3 dependent variables were utilized. The between-groups component assessed the similarities and differences on mean dependent variables scores between the optional level gymnasts and compulsory level gymnasts in the first study and the control and experimental groups in the second study. Specifically, the second experimental treatment design includes the use of 2 CAM variables , used in specific dosages to enhance psychological resiliency and lower the physiological and psychological threshold of PCA in child gymnasts (Pirker-Binder, & Lang, 2005).

### **Population and Sample**

This quantitative and experimental study made use of a convenience sample and drawn from local gymnastics clubs in the New England area of the United States. Eighty participants took part in the first study and 30 in the second. The research specifically targeted child gymnasts, which explains the integrity of the sampling method used. Controls employed in the research design were used to lessen the effect of nonrandom convenience sampling to ensure that results obtained are representative (Callow & Hardy, 2001).

Three specific facets directed the sampling method: proximity, willingness to participate, and ease-of-access (Fink, 2008; Urdan, 2005). To present a more homogeneous group, participants in this study only included female gymnasts between the ages of 7 and 16, enrolled in a United States of America Gymnastics Junior Olympic Development Program (USAG JO). The age determination and subsequent age groups

are preestablished for competitive gymnasts enrolled in USAG JO (Callow & Hardy, 2001).

The rationale behind choosing female gymnasts exclusively is due primarily to the complications involved in the creation of separate guided imagery tapes for Junior Olympic boys that is beyond the scope of this study. Additionally, USAG JO, Level 5 female gymnasts represent an intermediate level of competitors that have had some competitive experience and are subsequently familiar with PCA. There were no restrictions on cultural and ethnic backgrounds used in the selection of participants for the study (Fink, 2008).

### **Statistical Power and Sample Size**

Statistical power analysis helped determined the sample size part 1 of this study. The minimum required sample size necessary for yielding a statistical power of .80, to detect a medium effect size of 0.70 with a Type I error held at the .05 level of statistical significance (two-tailed test), was determined to be 34 (for each group) for an independent samples *t* test (Cohen, 1988). The sample size was increased slightly (to 40 per group) to account for possible attrition.

In part 2 of the study, each subgroup of the independent variable has a sample size of 10, which is adequate, since it is recommended to have a minimum sample size that is more than the number of dependent variables. Any statistical result that was significant at 95% confidence level was considered a significant result that rejects the null hypothesis (Cohen, 1988).

### **Treatment Design**

**Study Part 1**

Eighty participants who comply with the inclusion criteria discussed in the previous section were included in the sample. The participants were chosen based on the independent variable, which is the level of competitive experience. One group, comprised of 40 participants, were gymnasts who are considered within the compulsory levels of USAG JO. The other groups, also with 40 participants, are the more experienced optional level group also were USAG JO members. Both groups were asked to complete CSAI-2C, NSLCS, and SSES prior to their competition. All data were collected within one time point, making this a cross-sectional study (Fink, 2008).

**Study Part 2**

Participants ( $N = 30$ ) in the study were selectively divided into 3 groups: Group A = Treatment: AGT group ( $n = 10$ ), Group B = treatment: GI group ( $n = 10$ ) and Group C = Control group ( $n = 10$ ). Even though experimental designs use a random sampling method and is arguably more superior to the quasi-experimental design, it may not always be possible to replicate the social and behavioral conditions in a research setting (Gray, 2004). The added feature of control groups to the research via the quasi-experimental design methodology helps to promote the plausibility of alternative interpretations, while also taking into account the threats each alternative interpretation poses to experimental internal validity. An element of a time series design in the experimental design utilized allows for the evaluation of the context with regard to historical changes between groups (Druckman, 2005). The study was completed in 3 phases:

**Phase 1 (Pretest phase).** Participants in the treatment group and control group were administered CSAI-2C, NSLCS, and SSSES prior to their first competition of the season (Urdan, 2005).

**Phase 2 (Treatment phase).** Participants in the treatment group underwent a 6 week training session consisting of 2 sessions per week – self-administered by the participant at the participant’s home. The prearranged training sessions with the parents and gym clubs worked around the athletes’ schedules. This flexibility provided athletes an opportunity to complete the program in the study with the least amount of interference. During this phase, Group A participants were instructed to perform the exercise presented in Appendix H (autogenic training) and Group B was given the instructions presented in Appendix G (guided imagery). Participants were told to consistently perform the exercises at home at regular intervals throughout the 6 week training. The control group received no CAM training (Fink, 2008; Urdan, 2005).

**Phase 3 (Posttest phase).** The treatment groups were asked to perform the practice for their respective treatment once again prior to the competition. The questionnaires CSAI-2C, NSLCS, and SSSES were re-administered after their program was completed before the competition. The control group was asked to complete the questionnaires. Please note that ideally gymnasts would be tested prior to the first competition – receive the treatment – and then be tested prior to the second competition. However, in reality this was not the case (Callow & Hardy, 2001).

Gymnasts at this level are attempting to qualify for advancement to sectional competitions or state competitions. The coach therefore dictates which competitions

gymnasts must compete in and may schedule competitions while gymnasts are still actively engaged in the treatment phase. Regardless of this potential unfavorable condition, I maintain that through statistical analysis of the results rendered between the treatment group and the control group, while factoring in all divergent variables, it did not invalidate the study. Please refer back to Figure 3; it presents a design model for the study (Kraag, van Breukelen, Kok & Hosman, 2009).

### **Order Effects**

This experiment is predicated on the belief that training in AGT or GI will help athletes to reduce PCA. The treatment, in order to be effective, must be practiced (Kraag, Van Breukelen, Kok, & Hosman, 2009; Richmond, 2011). Therefore, effects such as practice, fatigue, treatment carryover, and sensitization do not appear to be of concern to this study. The advantage of using this design enabled the experimenter to evaluate the effectiveness of using two different treatment modalities to produce a more relaxed state prior to competition. As previously mentioned, studies have been conducted on the effectiveness of the independent variables alone among adult athletes; however, its impact on young athletes in this specific sporting event still lacks adequate support. I hope to show that this will produce an effective treatment for PCA among young female gymnasts with little experience on competing (Richmond, 2011).

### **Data Collection**

The methodological steps involved in the collection of quantitative data are based on the mandated requirements of Walden University's Institutional Review Board (IRB) review, The Department of Health and Human Services (2009) and the National Institute

of Health policy and guidelines on the inclusion of children involving human participants (NIH, 1998). The collection procedures were as followed: (a) collection of gym club owners consent form to conduct study by the principle researcher at all locations, (b) collection of parent consent and participants forms by the principle researcher at all locations, (c) collection of pre testing raw data sheets on the 3 dependent variables by the principle researcher at all locations (that is, Competitive State Anxiety Inventory for Children-2, Locus of Control Scale, and the Sport Specific Self Efficacy Scales), and (d) collection of post testing raw data sheets on the 3 dependent variables for both control and treatment groups by the principle researcher at all locations, for study 2.

### **Data Analyses**

Based on the aforementioned research designs and procedures, the proceeding research questions were derived:

#### **Study 1**

Is there a statistical difference in perceived levels of PCA, (as measured by Competitive State Anxiety Inventory-2C on the somatic and cognitive subscales), confidence levels, (as measured by Competitive State Anxiety Inventory-2C on the confidence subscale), internal locus of control, (as measured by Nowicki-Strickland Internal External Locus of Control Scale), perceived levels of self-efficacy, (as measured by Sport Specific Self Efficacy Scale), between compulsory level gymnasts and optional level gymnasts? It is hypothesized that the Optional level group will yield statistically significant higher scores in perceived levels of PCA and levels of perceived internal locus

of control and lower levels of perceived self-efficacy as compared to the compulsory level group (Stoneburner, Goguen, & Feringa, 2011).

In order to test this hypothesis, an independent sample *t*-test was conducted after confirming that the data complies with the assumptions of normality and equality of variance. Data that violated the assumptions were analyzed using a non-parametric test the Mann-Whitney test. These tests showed whether there was a significant difference in scores in any of the dependent variables between the two groups of the independent variable: optional and compulsory level gymnasts. Measures of central tendency and other descriptive statistics of the demographic variables were also analyzed in order to provide an accurate description of the sample that would help in judging the generalization of the conclusions (Stoneburner, Goguen, & Feringa, 2011).

## **Study 2**

Is it possible for child athletes to respond effectively to stress reduction modalities prior to participating in competitive sporting events, thus reducing the degree of their PCA and thereby feeling more in control of their emotions? It is hypothesized that child athletes in the experimental group will show a statistically significant reduction in perceived levels of PCA (as measured by CSAI -2C), increase in levels of perceived internal versus external locus of control (as measured by NSLCS), and increase levels of perceived self-efficacy (as measured by SSES) between pre and posttesting scores compared to child athletes in the control group (Stoneburner, Goguen, & Feringa, 2011).

To test the hypothesis the statistical design and analysis chosen for this study included 3 repeated measures ANOVA to test for any significant improvement in scores.

All statistical analyses were done using the software SPSS v21 (Stoneburner, Goguen, & Feringa, 2011).

The results of this quasi-experimental study are shared in the next chapter. The chapter is sub divided into sections that present demographic characteristics of the sample, descriptive statistics of the data collected, research questions and hypotheses posed, supplementary analyses, additional findings and a concluding summary (Stoneburner, Goguen, & Feringa, 2011).

### **Instrumentation, Materials and Apparatus**

#### **Instrumentation**

The aforementioned specific scales used in this quasi-experimental designed study are the CSAI-2C, NSLCS, and SSSSES. The Competitive State Anxiety Inventory-2C (CSAI-2C; Stadulis, Eidson, MacCracken, & Severance, 2002), utilizes a 4 point Likert scale (1 = *not at all*, 2 = *somewhat*, 3 = *moderately* and 4 = *very much so*). The construct validity of this measure was supported by principal factor analysis ( $N=632$ ). Psychometric properties have not been fully established for the CSAI-2C. However, initial validation of the CSAI-2C (Stadulis, Eidson, MacCracken, & Severance, 2002), a Carmine's Theta internal consistency coefficient of .96 ( $N = 632$ ) and Cronbach alpha internal consistency coefficients of .75 (cognitive anxiety), .78 (somatic anxiety) and .73 (confidence) emerged.

The Nowicki-Strickland Internal External Locus of Control Scale (NSLC; Nowicki & Strickland, 1973) is a paper and pencil measure consisting of 40 questions that are answered either yes or no by placing a mark next to the question. The NSLC has

a reported a split-half reliability coefficient of .74 and test-retest reliability of .66. Additional studies support the validity of the scale, including correlations between it and the Intellectual Achievement Responsibility Scale,  $r = .51$  for seventh graders and  $r = .40$  ( $p < .001$ ) for fifth graders (Nowicki & Strickland, 1973). The psychometric properties of this assessment instrument have an adequate reliability and validity for the populations investigated in this particular study (Miller et. al., 2003).

The sport specific -efficacy scale is an effective measuring tool in assessing efficacy that is specific in the sport setting. McAuley and Gill (1983), conducted a study using a sport specific self-efficacy scale on 52 college level female gymnasts who represented seven universities. The results of the study showed an adequate overall reliability with a value of .72. The results also showed that the test is valid in measuring the participants' overall physical self-efficacy in the sport.

### **Materials and Apparatus**

- 10 - Pre-recorded autogenic tapes
- 10 - Pre-recorded guided imagery tapes (USAG JO comp. level-5 routines)
- 10 - Autogenic training packets and forms
- 10 – Guided imagery training packets and forms
- 10 – Control group packets and forms
- 40 – Compulsory-level group packets and forms
- 40 – Optional-level group packets and forms
- 1 - Laptop computers
- 1 – SPSS software v21

### **Ethical Protection and Assessed Level of Risk to Participants**

There are no invasive techniques used in the study that would pose as a danger. Therefore, the rated risk to participants was *minimal risk* to research participants as outlined by Walden University IRB standards and the National Institute of Health policy and guidelines on the inclusion of children involving human participants (NIH, 1998). The author obtained prior permission from parents, gym owners, and participants before the study. Precautionary intervention measures to participant's protection included a written statement of permission to freely discontinue the experiment that is disseminated to parent's, gym club owners, and coaches in the unlikely event that a complication arises during the experimental phase of the treatment. The researcher maintains primary responsibility to refer participants in the study who experience any medical or psychological symptoms connected to the study, to follow up with the appropriate sources regarding the outcome of the referral, and to report said information to dissertation committee members and Walden University IRB committee (Hosman, 2009).

Compliance with the Ethical Principles of Psychologists and Code of Conduct (APA, 2002), Department of Health and Human Services (2009), and the National Institute of Health policy and guidelines on the inclusion of children involving human participants (NIH, 1998) were strictly adhered to as well as debriefing procedures administered to gym club owners and participants following the experiment. Additional protective procedures include both dissertation committee oversight and Institutional Review Board (IRB) review. Appendix K contains IRB approval.

### **Data Protection**

The researcher acts as the sole investigator and therefore the data obtained from the study will be inaccessible to any third party entities. The data included in this study consist of: (a) participant registration form, (b) pre and post questionnaires on competitive anxiety inventory, locus of control scale, and sport specific self-efficacy scales. The results will be held under protection for a minimum of five years. Protection of electronic digital, audio and written information is one of the primary tasks undertaken in the management of data security (Stoneburner, Goguen, & Feringa, 2011) and is mandated under APA ethical standards to insure the protection of participant's information to unauthorized third party entities (APA, 2002).

Examples of recommended precautions include keeping written documents and other forms of media data, e.g. audio or visual tapes, CD's, DVD's, in locked storage cabinets that are accessible only to the primary researcher (Stoneburner, Goguen, & Feringa, 2011). Stoneburner, et al. (2011), recommend the use of encrypted passwords used to protect electronic data as well as coded information in lieu of descriptive terms for demographic and other types of data that may conform to this type of conversion. Protection measures used in this study include: (a) encrypted passwords for electronic data storage, (b) locked file cabinet for written documents and (c) coded numbers or letters for demographic and or descriptive data sets (Stoneburner, et al., 2011).

### **Informed Consent**

Consent forms (see Appendices E and F) were adapted from the recommended consent form provided by Walden University and therefore meet the informed consent requirements. Gym club owners, coaches, parents, and participants were briefed

regarding the contents of the consent form and were provide a copy of the form to keep for their records. The consent forms included contact information on research supervisors and outlined basic information regarding the study, what the information would be used for, and procedures taken to withdraw from the study (Stoneburner, Goguen & Feringa, 2011). Participants also signed and received a copy of the debriefing form (see Appendix E and F).

### **Instructions and Debriefing**

Participant instructions (see Appendix I) review the purpose of the study, the researcher's primary hypothesis; the results of the data and the conclusions reached on the efficacy of using the combination of CAM techniques of autogenic training and guided imagery to address PCA in level 5 gymnasts. In chapter 4, the statistical analysis and the results from the study are presented.

### **Summary**

In chapter three, a quasi-experimental design methodology that includes a mixed between-within design was utilized for both the first and second study. The within-groups component for the first study included the scores on three dependent variables, i.e., scores on SSSES, NSLCS, and CSAI-2C. The second study, utilized both pre and post measurements on the same aforementioned dependent variables. The between-groups component assessed the similarities and differences on mean dependent variables scores between the optional level gymnasts and compulsory level gymnasts in the first study and the control and experimental groups on the second study. The second experimental

treatment design includes the use of two CAM variables autogenic sequencing and guided imagery.

This two part study made use of a convenience sample drawn from local gymnastics clubs in the New England area of the United States with 80 participants in the first study and 30 in the second. The minimum required sample size necessary for yielding a statistical power of .80, to detect a medium effect size of .70 with a Type I error held at the .05 level of statistical significance (two-tailed test), was determined to be 34 (per cell) for independent samples *t*-test. For the current study, there were 40 participants per cell so there was adequate power to find any medium effects.

Study 1 posed the question; “Is there a statistical difference in perceived levels of PCA, internal locus of control, and perceived levels of self-efficacy between compulsory level gymnasts and optional level gymnasts?” It was hypothesized that the optional level group would yield statistically significant higher scores in perceived levels of PCA and levels of perceived internal locus of control and lower levels of perceived self-efficacy as compared to the compulsory level group. Independent sample *t*-test was conducted after confirming that the data complies with the assumptions of normality and equality of variance. Data that violated the assumptions were analyzed using a non-parametric test the Mann-Whitney test. Measures of central tendency and other descriptive statistics of the demographic variables were also analyzed in order to provide an accurate description of the sample that would help in judging the generalization of the conclusions.

Study 2 asked: “Is it possible for child athletes to respond effectively to stress reduction modalities prior to participating in competitive sporting events, thus reducing

the degree of their PCA and thereby feeling more in control of their emotions?” It was hypothesized that child athletes in the experimental group would show a statistically significant reduction in perceived levels of PCA, increase levels of perceived self-efficacy, and increase in levels of perceived internal versus external locus of control between pre and posttesting scores compared to child athletes in the control group. Statistical analyses chosen were 3 repeated analysis of variances (ANOVAs). A repeated measure ANOVA is appropriate to use when you have one repeated measure variable and one between-group variable. In all of the analyses, our between-group variable is the group (for example, experimental groups and control group). The independent measures were repeated, as they were measured across the study period (for example, time). ANOVAs have several assumptions: normal distribution of the dependent variable, independence, and homogeneity of error variance (e.g., Levene’s test). ANOVAs are robust to assumptions of normality, as long as other groups are fairly even (Schmider, et al., 2010). All statistical analyses were done using the software SPSS v21.

The materials and procedures were delineated and the participants were protected through confidentiality and findings as outlined by Walden University IRB standards and the National Institute of Health policy and guidelines on the inclusion of children involving human participants (NIH, 1998). In chapter 4 the specific results of this 2 part quasi-experimental study is sub divided into sections that present demographic characteristics of the sample, descriptive statistics of the data collected, research questions and hypotheses posed, supplementary analyses, additional findings and a

concluding summary is presented. Chapter 5 will discuss implications of the findings and make recommendations for future research as well as concluding remarks.

## Chapter 4: Results

### Study 1

The first part of the study was conducted in order to address the research questions that investigate how optional level gymnasts might differ from compulsory level gymnasts in terms of precompetitive anxiety, locus of control and self-efficacy. It has been hypothesized that the optional level group will yield a statistically significant increase in perceived levels of PCA, as measured by Competitive State Anxiety Inventory-2C (Stadulis, Eidson, MacCracken, & Severance, 1995); levels of perceived internal locus of control, as measured by Nowicki-Strickland Internal External Locus of Control Scale (Nowicki & Strickland, 1973); and decreased levels of perceived self-efficacy, as measured by Sport Specific Self Efficacy Scale (McAuley & Gill, 1983), as compared to the compulsory level group. The results of the study are presented in the following subsections.

#### **Demographic Characteristics of the Sample**

Eighty participants whose ages range from 7 to 16 years old comprise the first study. From the information gathered about them, the mean age of the participants is 11.11 ( $SD = 2.36$ ). In addition, participants who are aged 9 comprise 20% of the sample and the distribution of the sample in terms of age is presented in Table 1.

The participants were divided into age groups according to their gymnastics level. Most of the participants from the compulsory level were within the 9 to 11 age group (27, 33.8%), while among the participants from the optional level, most of them are in the 12-14 age group (17, 21.3%).

Table 1  
*Frequency - Study 1 Distribution Table of the sample by Age (N = 80)*

<i>Age</i>	<i>Frequency</i>
7	2
8	7
9	16
10	12
11	12
12	8
13	7
14	7
15	6
16	3
Total	80

In terms of competition history, 40% (32) have competed once or twice before. Only 13.7% have competed more than 6 times before. The distribution of the participants in terms of competition history is presented in Table 2. As for the state from where the participants came from, 60% of the participants (48) are from Massachusetts, 22.5% (18) are from Maine, 11.3% (9) are from New Hampshire, and 6.3% (5) are from Connecticut (distributions are depicted in Table 3).

Table 2  
*Frequency - Study 1 Distribution Table of the sample by competition history (N = 80)*

<i>Competition History</i>	<i>Frequency</i>
1	14
2	17
3	7
4	11
5	11
6	8
7	3
8	9
9	1

Table 3

*Frequency - Study 1 Distribution Table of the sample by State (N = 80)*

<i>State</i>	<i>Frequency</i>
Massachusetts	48
Maine	18
New Hampshire	9
Connecticut	5
Total	80

The distribution showed that the location where the gymnasts were from is not evenly distributed across the other states; thus, this should be taken into consideration in deciding the generalization of the possible conclusions of the study. Most of the participants have only been in their current level for a year (56, 70%). The rest of the participants have been in their current level for two to four years. The diminishing distribution of the participants is apparent in Table 4.

Table 4

*Frequency - Study 1 Distribution Table of the sample by Year in current level (N = 80)*

<i>Year in current level</i>	<i>Frequency</i>
1	48
2	18
3	9
4	5

In terms of hours of training per week, the typical respondent spends 12.46 ( $SD = 6.99$ ) hours training in the gym, with a range of 4 to 24 hours per week, among the sample. The distribution shown in Table 5, shows that a lot of them train for 24 hours per week, or 6 hours per week. More than 33% (27) of the participants are in gymnastics level 7. Levels 4 and 5 are represented in the sample by 26.3% (21) and 23.8% (1), respectively.

Table 5

*Frequency - Study 1 Distribution Table of the sample by Amount of training per week in hours (N = 80)*

<i>Hours per week training</i>	<i>Frequency</i>
4	7
5	3
6	15
7	1
8	2
9	6
10	4
11	5
12	6
13	10
15	1
16	2
20	4
24	16

The distribution in Table 5 above shows that majority train between 13-24 hours per week. The distribution of the participants in terms of these variables is presented in order for the reader to assess accurately the representativeness of the sample; allowing more careful generalization of the results of the study.

### **Descriptive Statistics of the Data Collected**

#### **Cognitive Anxiety**

On a scale that measures cognitive anxiety among the participants from both compulsory and optional levels, the participants demonstrated a lower than average level of anxiety. The individual scores on this particular subscale of the CSAI-2C may range from a lowest of 5 to highest of 20; a higher score indicates higher cognitive anxiety. For the sample, the mean score was 9.43 ( $SD = 3.3$ ), which falls lower than the midpoint of the scale, which is 12.5. This mean score suggests that the participants think that they are feeling little anxiety or doubts their ability to compete. The distributions of the scores on

cognitive anxiety of the participants is presented in Table 6. From the distribution, those who scored high on cognitive anxiety are much less, than those with lower scores are.

Table 6  
*Level of CSAI-2C (N = 80)*

<i>CSAI-2C Scales</i>	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>SD</i>	<i>Median</i>
Cognitive anxiety	80	5	20	9.43	3.3	12.5
Somatic anxiety	80	5	20	9.26	3.54	12.5
Confidence	80	5	20	14.23	3.81	12.5

(Note: Mean= refers to the average; Median = refers to the middle score; SD = the square root of the variance.)

### **Somatic Anxiety**

In terms of how anxiety influences the way the participants feel about their somatic functioning, the mean score of the participants was recorded to be 9.26 ( $SD = 3.54$ ). This suggests that the participants felt a little somatic anxiety or they were feeling somewhat anxious. As reflected in Table 6, very few of the participants reported very high levels of somatic anxiety.

### **Confidence**

On a possible range of 5 to 20 on the confidence subscale of the CSAI-2C, the participants scored a mean score higher than the midpoint of the scale. The mean score was computed to be 14.23 ( $SD = 3.81$ ). Higher scores on this scale suggest that the participants are more confident and secure of their abilities to compete. This means that the sample is moderately confident in how they will do in the competition. The level of confidence of the participants is consistent with the level of somatic and cognitive anxiety that they feel, as the more anxiety that they feel, the less confident they are. The distribution of confidence scores are also presented in Table 6, which shows that fewer participants feel low confidence, while most of them feel some moderate level of confidence.

## Overall Anxiety

The mean scores of the participants in each of the 3 subscales indicate that the participants feel a less than moderate level of anxiety and they are generally confident of their skill and ability to compete. The intensity of the anxiety they feel, both somatic and cognitive are relatively low and they feel a moderate intensity of self-confidence.

## Locus of Control

The internal locus of control of the participants refers to what extent the sampled participants perceive things as being controllable by the individual, or the extent to which the participants attribute events, achievement, or failures on internal factors of control rather than chance or luck. The distribution of the scores of the participants show that more participants have a high score on internal locus of control, thus suggesting that most of them perceive things as being controllable. On the other hand, few participants scored relatively lower on the scale, which means that these individuals are more likely to attribute their achievements or failures to uncontrollable circumstances.

Table 7  
*Internal Locus of Control (N = 80)*

<i>Measures</i>	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>SD</i>	<i>Median</i>
Internal locus of control	80	0	40	24.69	5.96	25.50

(Note: Mean refers to the average; Median refers to the middle score; SD refers to the square root of the variance.)

The mean score on internal locus of control of the participants was 24.69 ( $SD = 5.96$ ) on a scale that ranges from 0 to 40, where a higher score indicates greater tendency to perceive things because of internal controllable factors. The mean score falls slightly above the midpoint of the scale, which might suggest that the participants have slightly

higher tendency to view life events because of internal factors, however, they also have a slight tendency to look at some things because of uncontrollable external factors.

### Self-Efficacy

To measure the level of self-efficacy of the participants, they were asked to rate how certain they are in performing certain skills in each of the four event subscales. The ratings on each subscale would range from 1 to 4, with higher ratings indicating higher level of perceived self-efficacy in that particular category of skills. In the vault category, the mean score of the participants was 2.99 ( $SD = .755$ ), with majority of the sample rating themselves at level 3 (51.3%, 41). The distribution of the self ratings of the participants on this category is presented in Table 9. These mean results suggest that many of them have moderate to high levels of perceived self-efficacy in the vault category. The distribution of the self-ratings of the participants on this category is presented in Table 8.

Table 8

*Frequency - Study 1 Distribution Table on Ratings on self-efficacy (N = 80)*

<i>Self-efficacy frequency</i>	<i>Vault</i>	<i>Bars</i>	<i>Beam</i>	<i>Floor</i>
1	2	2	9	7
2	18	18	25	15
3	41	41	21	23
4	19	19	25	37
<i>N</i>	80	80	80	80
<i>Mean</i>	2.99	2.78	2.71	3.09
<i>SD</i>	0.7455	1.02	0.917	1.02

(Note: Mean refers to the average; SD refers to the square root of the variance).

In the frequency distribution of ratings depicted in Table 8 above, it could be observed that most of the participants rated their own efficacy in bars within the 2 to 4 range, with almost even 30% distribution. Only a few of the participants had low self-efficacy in bars (2, 11.3%)

In the beam routine category, the participants showed a mean rating of 2.71 ( $SD = .917$ ), with majority of them rating themselves on the middle of the scale, which suggests that the participants had an average level of sense of self-efficacy when it came to the skills in the beam category as demonstrated in Table 8 above.

The mean rating of self-efficacy of the participants on the skills on the floor routine category is slightly higher than the mean ratings of the self-efficacy on the other categories. A mean score of 3.09 ( $SD = 1.02$ ) was recorded with the majority of the participants giving themselves the highest rating of 4 on this category (46.3%, 37). It can be seen that the frequency of the self-efficacy rating increases as the ratings increase, as is also shown in Table 8 above.

In summary, the total mean score on self-efficacy on all four categories would range from 4 to 16, with a score of 16 indicating the highest level of perceived self-efficacy on all categories. A mean score of 11.56 ( $SD = 2.53$ ) was obtained, which indicates a slightly above moderate level of perceived self-efficacy among the respondents.

## **Research Questions**

### **PCA and Competition Level**

The first research question inquires about any statistical difference between perceived levels of PCA between compulsory level gymnasts and optional level gymnasts. This is to find out whether the level of competitive anxiety is the same or not between gymnasts who are in the less restricted or difficult levels, like those in the compulsory levels and the gymnasts who are in the higher, more difficult optional levels.

It is hypothesized that the optional-level group will yield a significantly higher perceived level of PCA, as measured by Competitive State Anxiety Inventory-2C, as compared to the compulsory-level group.

**Table 9**  
*Mean and SD of scores of Compulsory and Optional groups on the CSAI-2C subscales*

<i>CSAI-2C Scales</i>	<i>Condition</i>	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Kurtosis</i>
Cognitive anxiety	Compulsory	40	8.45	2.764	0.839	0.056
	Optional	40	10.40	3.529	0.277	-0.847
Somatic anxiety	Compulsory	40	9.20	3.824	1.333	1.463
	Optional	40	9.33	3.292	0.464	-0.821
Confidence	Compulsory	40	15.60	3.318	-0.322	-0.958
	Optional	40	12.800	3.802	0.086	-0.732

*Note:* Mean refers to the average; SD refers to the square root of the variance; Skew refers to the lack of symmetry of a probability distribution; and Kurtosis measures the “heaviness of the tails” of a distribution in comparison to a normal distribution. Kurtosis is positive if the tails are "heavier" for a normal distribution and negative if the tails are "lighter" than for a normal distribution. The normal distribution has kurtosis of zero.

Given the descriptive statistics measuring the central tendencies of both groups in each of the subcategories of the CSAI-2C inventory presented in Table 9, it could be observed that the optional group recorded a higher mean score in both cognitive and somatic anxiety subscales and lower on the confidence subscale compared to the compulsory group.

### **Inferential Statistics**

Independent samples *t*-tests were carried out to determine if the observed differences between the two groups were significant enough to assume that the differences in mean scores in PCA and confidence were accounted for by the difference in gymnastics level.

### **Testing for Normality**

The data set was first tested for the assumptions of normality and homogeneity of variance before the statistical testing could continue. A test proposed by West, Finch, and Curran (1996) for normality of data is to check the skewness and kurtosis statistics of the distribution of scores for each of the subgroups from the sample. A skewness statistic absolute value of less than 2 is considered close enough to normal distribution and a kurtosis statistic absolute value of less than 4 could be considered as not significantly departing from normality (West et al. 1996). The skewness and kurtosis statistics of the data from the two groups for the three subscales are presented in Table 9. It could be observed from the Table above that the data for all 3 subscales comply with the assumption of normality that is required in order to proceed with the independent samples *t*-test.

### **Testing for Homogeneity of Variances**

The Levene's test for equality of variances was conducted. The results obtained are presented in Table 11. It could be seen that none of the values are significant ( $p < .05$ ); thus, the null hypotheses for all three subscales cannot be rejected that the variances of the scores of the compulsory and optional groups are equal. Thus, all data are complying with the assumptions of the independent samples *t*-test that the variances are homogenous.

It was observed that a mean difference of 1.95 was found between the scores on cognitive anxiety of the participants from the compulsory and the optional groups, wherein the mean score of the optional group is higher. This suggests that the gymnasts from the optional group experience higher levels of cognitive anxiety compared to the

gymnasts from the compulsory group. The  $t$ -test result showed that this difference is significant enough to assume that the mean difference in cognitive anxiety is accounted for by the difference in the competitive level,  $t(78) = -2.75, p = .007$ .

Table 10

*Tests for equality of variance and equality of means of CSAI-2C scores of compulsory and optional groups*

CSAI-2C Scales	Test for Equality of Variances			t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Cognitive anxiety	3.412	.068	-2.752	78	.007	-1.950
Somatic anxiety	.228	.635	-.157	78	.876	-.125
Confidence	.819	.368	3.509	78	.001	2.800

In terms of somatic anxiety, the mean difference between the two competitive levels is not as significant as the difference in cognitive anxiety scores. The scores of the optional group are slightly higher by a mean difference of .125 as compared to the compulsory group. However, this slight difference was not seen to be statistically significant,  $t(78) = -.157, p = .876$ . The mean difference between the two groups in the confidence scores was recorded to be the highest among the 3 subscales. The confidence means score of the optional group is lower by 2.8 as compared to the compulsory group, indicating that the compulsory group has higher confidence. This difference was found to be significant,  $t(78) = 3.51, p = .001$ . The results of the  $t$ -test provided partial support to the study's first hypothesis; the compulsory and the optional group only differed in cognitive anxiety and confidence, but not in somatic anxiety.

### **Internal locus of control and competition level**

The second research question asked: Is there a statistical difference between perceived internal locus of control between compulsory level gymnasts and optional level gymnasts? It is hypothesized that the optional-level group will yield significantly higher levels of perceived internal locus of control, as measured by Nowicki-Strickland Locus of Control Scale, as compared to the compulsory-level group. The descriptive statistics of the two groups on the Internal Locus of control scale is presented in Table 11.

It could be observed that the optional level gymnasts have recorded a higher score on the internal locus of control scale, indicating that they are more likely to attribute achievements and failures because of controllable internal factors, as compared to the compulsory group.

Table 11  
*Mean and SD of scores of Compulsory and Optional groups on the NSLCS scale*

<i>Scale</i>	<i>Condition</i>	<i>n</i>	<i>Mean</i>	<i>SD</i>	<i>Skew</i>	<i>Kurtosis</i>
Internal Locus of Control	Compulsory	40	22.93	6.681	-.334	-.979
	Optional	40	26.45	4.574	-.948	1.392

The skewness and kurtosis statistics of the two subsamples on the internal locus of control scale complies with the criteria on normality set by West et al. (1996), thus the assumption of normality is not violated. However, upon testing for homogeneity of variance, the Levene's equality of variances test showed that the null hypothesis of equal variance has been rejected ( $p = .007$ ). Thus, it will be problematic to conduct the  $t$ -test with one assumption violated. Result of Levene's test is presented in Table 12.

Table 12  
*Levene's test of equality of variances and t-test for equality of means.*

NSLCS	Test for equality of variances		t-test for Equality of Means			
	<i>F</i>	<i>Sig.</i>	<i>t</i>	<i>df</i>	<i>Sig. (2-tailed)</i>	<i>Mean Difference</i>
Locus of Control Internal	7.811	.007	-2.753	78	.007	-3.525

In order to remedy this, the more robust non-parametric test of Mann-Whitney U test was used (see Table 13). The result of the test showed that the difference is significant,  $t(N=80) = 563.0, p = .022$ . Thus, the hypothesis is supported that gymnasts on the optional level are more likely to have a higher level of internal locus of control as compared to the gymnasts from the compulsory level. The descriptive statistics of the two groups on the Locus of Control Scale is presented in Table 13.

Table 13  
*Non-parametric test of Mann-Whitney U test on NSLCS scale*

Non-parametric Test	Locus of Control Internal
Mann-Whitney U	563.000
Z	-2.286
Asymp. Sig. (2-tailed)	.022

### **Self-Efficacy and Competition Level**

The third research question aims to find out if there is a statistical difference between perceived self-efficacy, measured by Sport Specific Self Efficacy Scale, between compulsory level gymnasts and optional level gymnasts. It is hypothesized that optional level gymnasts are more likely to have higher levels of perceived self-efficacy in doing their gymnastics routines as compared to compulsory level gymnasts. It could be observed that the mean score on self-efficacy of the compulsory group is higher than the optional group in the vault, bars and beam routine, as well as in the self-efficacy total

score. The optional group recorded a higher mean score than the compulsory group on self-efficacy only on the floor routine. To test these differences for statistical significance, the distribution of the scores for the two subgroups was first tested for normality.

Table 14 displays the mean scores of the two groups of gymnasts on perceived self-efficacy in performing vault, bars, beam and floor routines and the total self-efficacy mean. The skewness and kurtosis statistics of the scores distribution are also presented in Table 14. From this Table, it could be seen that the skewness and kurtosis statistics of all the distributions comply with the standards of normality suggested by West et al. (1996).

Table 14

*Mean and SD of scores of compulsory and optional groups on the SSSES subscales*

Sport Self Efficacy Scale		<i>n</i>	<i>M</i>	<i>SD</i>	<i>Skew</i>	<i>Kurtosis</i>
Compulsory	Total	40	11.78	2.731	-.419	-.323
Optional	Total	40	11.35	2.338	-.282	.332

Table 15.

*t-test results of self-efficacy scores between optional and compulsory groups*

Self-Efficacy	Levene's Test for Equality of Variances		t-test for Equality of Means			
	<i>F</i>	<i>Sig.</i>	<i>t</i>	df	Sig. (2-tailed)	Mean Difference
Total	.807	.372	.748	78	.457	.425

The result of Levene's test of equality of variance, as shown in Table 15, also shows that the assumptions of the independent samples *t*-test are not violated, as the homogeneity of variances is not rejected. The result of the independent samples *t*-test showed that the mean differences observed in in the total self-efficacy scores is not significant. The results of the statistical tests showed that the third hypothesis of the first study is rejected and that the perceived levels of self-efficacy of compulsory and optional

level gymnasts do not differ significantly from each other. These results are presented in Table 15.

### **Summary**

The first study tests the hypothesis that the gymnasts from the optional level are more likely to score higher on scales that measure PCA, internal locus of control and on self-efficacy. The results of the statistical testing showed partial support to the hypothesis. The optional group showed statistically higher cognitive anxiety and lower confidence; however, they exhibited a statistically equal level of somatic anxiety with the compulsory group. The optional group also showed a statistically higher level of internal locus of control. However, in terms of self-efficacy, the compulsory and the optional groups showed no significant difference in the total self-efficacy score.

### **Study 2**

The second part of the study was conducted in order to address the research question that investigates the ability of child athletes to effectively respond to stress reduction modalities prior to participating in a competitive sporting event, thus reducing the degree of their PCA and thereby feeling more in control of their emotions. In order to address this, the 30 participants were divided into 3 groups; 1 group underwent a self-administered autogenic training, group 2 used guided imagery, and group 3 served as the control group. It was hypothesized that the autogenic experimental group will yield a significant reduction in perceived levels of PCA (as measured by Competitive State Anxiety Inventory-2C), increased levels of perceived internal locus of control (as measured by Nowicki-Strickland Locus of Control Scale), and increased levels of

perceived self-efficacy (as measured by Sport Specific Self Efficacy Scale), between pre and posttesting as compared to guided imagery and control group. The results of the analyses of the pre and post test results of all 3 groups are presented in the following sections.

### **Demographic Characteristics of the Sample**

Study 2 was made up of 30 respondents divided equally between the 3 conditions of stress reduction modalities. The whole sample's age ranges from 7 to 13, where the mean age is 9.6 ( $SD = 1.24$ ). Distribution is depicted in Table 16.

Table 16  
*Age frequency distribution (N = 30)*

Age	Frequency	Percent
7	1	3.3
8	3	10.0
9	12	40.0
10	8	26.7
11	4	13.3
12	1	3.3
13	1	3.3
Total	30	100.0

In terms of number of hours of training per week, the mean was 8.43 hours ( $SD = 2.4$ ). The respondents of the sample trains for 4 to 16 hours a week, where majority of them (40%, 12) trains for 8 hours. This information is presented in Table 17. Most of the participants have competed once before (70%, 21), while others have competed twice up to 4 times. Table 18 shows the competition history frequency distribution of the sample. The data collected from the participants indicated that all 20 participants from the 2 treatment groups have reported to spend a total of 30 hours practicing their respective intervention at home.

Table 17  
*Frequency distribution of training hours per week (N = 30)*

Training hours per week	Frequency	Percent
4	2	6.7
5	1	3.3
6	3	10.0
8	12	40.0
9	5	16.7
10	2	6.7
11	3	10.0
12	1	3.3
16	1	3.3
Total	30	100.0

Table 18  
*Frequency distribution competition history (N = 30)*

Competition history	Frequency	Percent
1	21	70.0
2	5	16.7
3	3	10.0
4	1	3.3
Total	30	100.0

## Descriptive Statistics of the Data Collected

### Measures of Central Tendency

The Table 19 shows the mean scores that the sample obtained in the pre-test and the post-test in all of the dependent variables. It could be observed that anxiety increased from the pretest to the posttest. The level of internal locus of control also increased, indicating an improvement in how well the participants manage stressful events. The level of self-efficacy also seemed to increase among the entire sample.

Table 19

*Mean and SD of pretest and posttest scores on all dependent variables (N = 30)*

<i>Measures</i>	<i>Pretest</i>		<i>Posttest</i>	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Total anxiety	58.43	22.58	71.03	12.34
Internal locus of control	20.60	7.161	21.57	6.500
Over all Self Efficacy	116.47	30.58	120.37	25.15

### **Normality of Distribution and Equality of Variance Tests**

Before performing any statistical test on any of the scores among the groups of the intervention variable, the test for the assumptions of normality and equality of variance was first conducted in order to know if the intended tests of the repeated measures ANOVA were appropriate. Upon inspecting the normality statistics, all the distributions of all scores from all 3 subgroups comply with the standards set by West et al (1996); thus, all data could be assumed to be from a normally distributed population. In terms of homogeneity of variance, Levene's test was used. A significant p-value ( $p < .05$ ) indicates that the assumption has been violated. In this case it has not.

Table 20

*Levene's Test p-values for all ANOVAs*

<i>Measures</i>	<i>Levene's Test</i>	
	<i>Pre Score</i>	<i>Post Score</i>
Anxiety	.13	.28
Internal locus of control	.59	.96
Self-efficacy	.42	.21

### **Hypothesis Testing**

The second study hypothesized that the autogenic experimental group will yield a significant reduction in perceived levels of PCA (as measured by CSAI-2C), increase in levels of perceived internal locus of control (as measured by NSLC Scale), increase in

levels of perceived self-efficacy (as measured by SSSE Scale), between pre and post testing as compared to guided imagery and control group.

In order to find out if these hypotheses have support, 3 repeated measures ANOVAs were conducted.

### **ANOVA Precompetitive Anxiety**

The first hypothesis tested was that the autogenic experimental group will yield a significant reduction in perceived levels of PCA (as measured by CSAI-2C) between pre and posttesting as compared to guided imagery and control group. Please see Tables 21 and 22 for descriptive statistics and tests of within-subjects effects below.

Table 21  
*Descriptive Statistics for Total Anxiety Score*

	<i>Condition</i>	<i>Mean</i>	<i>SD</i>	<i>N</i>
CSAI pre Total anxiety score	Autogenic	87.20	10.758	10
	GI	47.50	10.395	10
	Control	40.60	3.658	10
	Total	58.43	22.580	30
CSAI post Total anxiety score	Autogenic	65.30	14.000	10
	GI	70.40	9.823	10
	Control	77.40	10.783	10
	Total	71.03	12.341	30

There was a significant main effect of time on perceived levels of PCA, ( $F(1, 27) = 19.88, p < .01, \eta^2 = .424$ ). There was also a significant main effect of condition,  $F(2, 27) = 20.83, p < .01$  (Table 23). Post scores ( $M = 71.03, SD = 12.34$ ) were higher than pre scores ( $M = 58.43, SD = 22.58$ ). See Tables 21-24.

Table 22  
*Tests of Within-Subjects Effects for Total Anxiety*

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>a</sup>
CSAI2C Total	Sphericity Assumed	2381.400	1	2381.400	19.878	.000	.424	19.878	.990
	Greenhouse-Geisser	2381.400	1.000	2381.400	19.878	.000	.424	19.878	.990
	Huynh-Feldt	2381.400	1.000	2381.400	19.878	.000	.424	19.878	.990
	Lower-bound	2381.400	1.000	2381.400	19.878	.000	.424	19.878	.990
CSAI2C Total * Condition	Sphericity Assumed	9409.900	2	4704.950	39.272	.000	.744	78.544	1.000
	Greenhouse-Geisser	9409.900	2.000	4704.950	39.272	.000	.744	78.544	1.000
	Huynh-Feldt	9409.900	2.000	4704.950	39.272	.000	.744	78.544	1.000
	Lower-bound	9409.900	2.000	4704.950	39.272	.000	.744	78.544	1.000
Error (CSAI2C Total)	Sphericity Assumed	3234.700	27	119.804					
	Greenhouse-Geisser	3234.700	27.000	119.804					
	Huynh-Feldt	3234.700	27.000	119.804					
	Lower-bound	3234.700	27.000	119.804					

Note: Computed using alpha = .05

Table 23  
*Tests of Between-Subjects Effects for Anxiety*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>a</sup>
Intercept	251424.267	1	251424.267	2632.511	.000	.990	2632.511	1.000
Condition	3979.033	2	1989.517	20.831	.000	.607	41.662	1.000
Error	2578.700	27	95.507					

a. Computed using alpha = .05

From Figure 5 (below), the autogenic group was the only group that decreased their PCA scores over time, both the guided imagery group and the control group PCA scores increased over time. However, the autogenic group scores were higher at pre-testing than the other two conditions.

Table 24  
*Multivariate Tests for total anxiety*

Effect		Value	F	Hypothesis df	Error df	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>c</sup>
CSAITOT	Pillai's Trace	.424	19.878 <sup>b</sup>	1.000	27.000	.000	.424	19.878	.990
	Wilks' Lambda	.576	19.878 <sup>b</sup>	1.000	27.000	.000	.424	19.878	.990
	Hotelling's Trace	.736	19.878 <sup>b</sup>	1.000	27.000	.000	.424	19.878	.990
	Roy's Largest	.736	19.878 <sup>b</sup>	1.000	27.000	.000	.424	19.878	.990
	Root								
CSAITOT * Condition	Pillai's Trace	.744	39.272 <sup>b</sup>	2.000	27.000	.000	.744	78.544	1.000
	Wilks' Lambda	.256	39.272 <sup>b</sup>	2.000	27.000	.000	.744	78.544	1.000
	Hotelling's Trace	2.909	39.272 <sup>b</sup>	2.000	27.000	.000	.744	78.544	1.000
	Roy's Largest	2.909	39.272 <sup>b</sup>	2.000	27.000	.000	.744	78.544	1.000
	Root								

*Note:* a. Design: Intercept + Condition Within Subjects Design: CASITOT, b. Exact statistic, c. Computed using alpha = .05

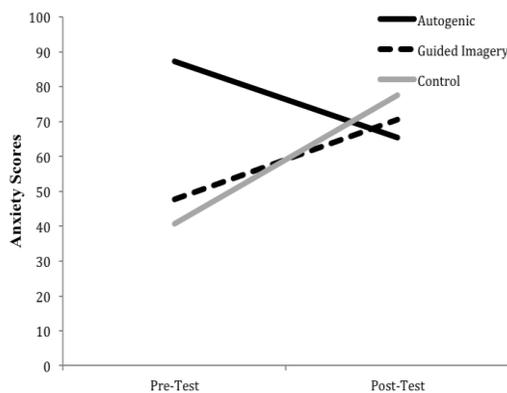


Figure 5 ANOVA Results of Time and Condition on Anxiety

Post-hoc tests revealed that the autogenic group had significantly higher scores than guided imagery group ( $p < .01$ ) and the control group ( $p < .01$ ). Please refer to Table 25. However, there was a significant interaction effect between time and experimental condition on perceived levels of PCA, ( $F(2, 27) = 39.27, p < .01, \eta^2 = .744$ ). Refer to Table 24.

Table 25  
*Post Hoc tests for Anxiety*

	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval		
						Lower Bound	Upper Bound	
Tukey HSD	Autogenic	GI	17.30*	3.090	.000	9.64	24.96	
		Control	17.25*	3.090	.000	9.59	24.91	
	GI	Autogenic	-17.30*	3.090	.000	-24.96	-9.64	
		Control	-.05	3.090	1.000	-7.71	7.61	
	Control	Autogenic	-17.25*	3.090	.000	-24.91	-9.59	
		GI	.05	3.090	1.000	-7.61	7.71	
	Scheffe	Autogenic	GI	17.30*	3.090	.000	9.30	25.30
			Control	17.25*	3.090	.000	9.25	25.25
GI		Autogenic	-17.30*	3.090	.000	-25.30	-9.30	
		Control	-.05	3.090	1.000	-8.05	7.95	
Control		Autogenic	-17.25*	3.090	.000	-25.25	-9.25	
		GI	.05	3.090	1.000	-7.95	8.05	
Tamhane		Autogenic	GI	17.30*	3.281	.000	8.64	25.96
			Control	17.25*	3.155	.000	8.88	25.62
	GI	Autogenic	-17.30*	3.281	.000	-25.96	-8.64	
		Control	-.05	2.817	1.000	-7.47	7.37	
	Control	Autogenic	-17.25*	3.155	.000	-25.62	-8.88	
		GI	.05	2.817	1.000	-7.37	7.47	

Note: Based on observed means. The error term is Mean Square (Error) = 47.754.

\*. The mean difference is significant at the .05 level.

## ANOVA Internal Locus of Control

The second hypothesis tested was that the autogenic experimental group will yield a significant increase in internal locus of control (as measured by Nowicki-Strickland Locus of Control Scale) between pre and posttesting as compared to guided imagery and control group. Please see Tables 26 and 27 for descriptive statistics and tests of within-subjects effects below.

Table 26  
*Descriptive Statistics for Internal Locus of Control*

	Condition	Mean	SD	N
Locus of control pre internal	Autogenic	14.00	4.595	10
	GI	22.60	5.621	10
	Control	25.20	6.015	10
	Total	20.60	7.161	30
Locus of control post internal	Autogenic	15.10	4.864	10
	GI	24.30	4.945	10
	Control	25.30	4.218	10
	Total	21.57	6.500	30

Table 27  
*Tests of Within-Subjects Effects for Internal Locus of Control*

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>a</sup>
ILOC	Sphericity Assumed	14.017	1	14.017	6.420	.017	.192	6.420	.685
	Greenhouse-Geisser	14.017	1.000	14.017	6.420	.017	.192	6.420	.685
	Huynh-Feldt	14.017	1.000	14.017	6.420	.017	.192	6.420	.685
	Lower-bound	14.017	1.000	14.017	6.420	.017	.192	6.420	.685
ILOC * Condition	Sphericity Assumed	6.533	2	3.267	1.496	.242	.100	2.992	.291
	Greenhouse-Geisser	6.533	2.000	3.267	1.496	.242	.100	2.992	.291
	Huynh-Feldt	6.533	2.000	3.267	1.496	.242	.100	2.992	.291
	Lower-bound	6.533	2.000	3.267	1.496	.242	.100	2.992	.291
Error (ILOC)	Sphericity Assumed	58.950	27	2.183					
	Greenhouse-Geisser	58.950	27.000	2.183					
	Huynh-Feldt	58.950	27.000	2.183					
	Lower-bound	58.950	27.000	2.183					

There was a significant main effect of time on internal locus of control, ( $F(1, 27) = 6.40, p = .02, \eta^2 = .192$ ). Post-scores ( $M = 21.57, SD = 6.50$ ) were higher than pre-scores ( $M = 20.60, SD = 7.16$ ). There was also a significant main effect of condition, ( $F(2, 27) = 13.29, p < .01, \eta^2 = .496$ ). Refer to Table 28.

Table 28  
*Tests of Between-Subjects Effects for Internal Locus of Control*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>a</sup>
Intercept	26670.417	1	26670.417	539.745	.000	.952	539.745	1.000
Condition	1312.933	2	656.467	13.285	.000	.496	26.571	.995
Error	1334.150	27	49.413					

Note: Computed using alpha = .05

Table 29  
*Post Hoc multiple comparisons for total anxiety*

	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Autogenic	GI	-8.90*	2.223	.001	-14.41	-3.39
		Control	-10.70*	2.223	.000	-16.21	-5.19
	GI	Autogenic	8.90*	2.223	.001	3.39	14.41
		Control	-1.80	2.223	.700	-7.31	3.71
	Control	Autogenic	10.70*	2.223	.000	5.19	16.21
		GI	1.80	2.223	.700	-3.71	7.31
Scheffe	Autogenic	GI	-8.90*	2.223	.002	-14.66	-3.14
		Control	-10.70*	2.223	.000	-16.46	-4.94
	GI	Autogenic	8.90*	2.223	.002	3.14	14.66
		Control	-1.80	2.223	.723	-7.56	3.96
	Control	Autogenic	10.70*	2.223	.000	4.94	16.46
		GI	1.80	2.223	.723	-3.96	7.56
Tamhane	Autogenic	GI	-8.90*	2.221	.003	-14.75	-3.05
		Control	-10.70*	2.161	.000	-16.39	-5.01
	GI	Autogenic	8.90*	2.221	.003	3.05	14.75
		Control	-1.80	2.285	.825	-7.81	4.21
	Control	Autogenic	10.70*	2.161	.000	5.01	16.39
		GI	1.80	2.285	.825	-4.21	7.81

*Note:* Based on observed means. The Error term is Mean Square (Error) = 24.706.

\* The mean difference is significant at the .05 level.

From Figure 6 (below), the autogenic group did have lower scores than the guided imagery group and the control group but these scores did not increase much over time.

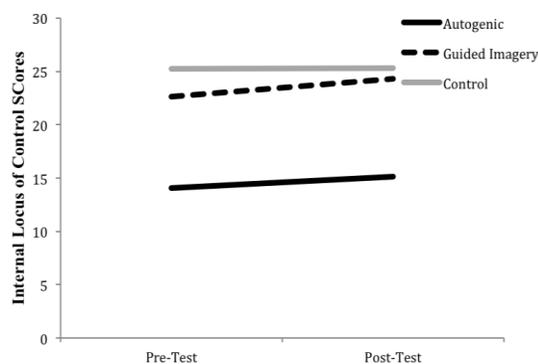


Figure 6. ANOVA Results of Time and Condition on Internal Locus of Control

Post-hoc tests revealed that the autogenic group had significantly lower scores than guided imagery group ( $p < .01$ ) and the control group ( $p < .01$ ). See Table 29.

There was no significant interaction effect between time and experimental condition on internal locus of control, ( $F(2, 27) = 1.50, p = .24, \eta^2 = .100$ ). See Table 27.

### **ANOVA Self-Efficacy**

The third hypothesis tested was that the autogenic experimental group will yield a significant increase in levels of perceived self-efficacy (as measured by Sport Specific Self Efficacy Scale), between pre and posttesting as compared to guided imagery and control group.

Table 30

*Descriptive Statistics for Self-Efficacy*

	<i>Condition</i>	<i>Mean</i>	<i>SD</i>	<i>N</i>
Self-efficacy pre total	Autogenic	141.30	26.940	10
	GI	91.00	18.361	10
	Control	117.10	23.335	10
	Total	116.47	30.583	30
Self-efficacy post total	Autogenic	140.80	27.026	10
	GI	105.70	17.205	10
	Control	114.60	16.487	10
	Total	120.37	25.150	30

There was no significant main effect of time on self-efficacy, ( $F(1, 27) = 2.99, p = .10, \eta^2 = .100$ ). Refer to Table 31.

Table 31  
*Tests of Within-Subjects Effects for Self-Efficacy*

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>a</sup>	
SE	Sphericity Assumed	228.150	1	228.150	2.987	.095	.100	2.987	.385
	Greenhouse-Geisser	228.150	1.000	228.150	2.987	.095	.100	2.987	.385
	Huynh-Feldt	228.150	1.000	228.150	2.987	.095	.100	2.987	.385
	Lower-bound	228.150	1.000	228.150	2.987	.095	.100	2.987	.385
SE * Condition	Sphericity Assumed	884.800	2	442.400	5.791	.008	.300	11.583	.829
	Greenhouse-Geisser	884.800	2.000	442.400	5.791	.008	.300	11.583	.829
	Huynh-Feldt	884.800	2.000	442.400	5.791	.008	.300	11.583	.829
	Lower-bound	884.800	2.000	442.400	5.791	.008	.300	11.583	.829
Error(SE)	Sphericity Assumed	2062.550	27	76.391					
	Greenhouse-Geisser	2062.550	27.000	76.391					
	Huynh-Feldt	2062.550	27.000	76.391					
	Lower-bound	2062.550	27.000	76.391					

Note: a. Computed using alpha = .05

Table 32  
*Multivariate Tests for Self-Efficacy*

Effect	Value	F	Hypothesis df	Error df	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>f</sup>	
SE	Pillai's Trace	.100	2.987 <sup>b</sup>	1.000	27.000	.095	.100	2.987	.385
	Wilks' Lambda	.900	2.987 <sup>b</sup>	1.000	27.000	.095	.100	2.987	.385
	Hotelling's Trace	.111	2.987 <sup>b</sup>	1.000	27.000	.095	.100	2.987	.385
	Roy's Largest Root	.111	2.987 <sup>b</sup>	1.000	27.000	.095	.100	2.987	.385
SE * Condition	Pillai's Trace	.300	5.791 <sup>b</sup>	2.000	27.000	.008	.300	11.583	.829
	Wilks' Lambda	.700	5.791 <sup>b</sup>	2.000	27.000	.008	.300	11.583	.829
	Hotelling's Trace	.429	5.791 <sup>b</sup>	2.000	27.000	.008	.300	11.583	.829
	Roy's Largest Root	.429	5.791 <sup>b</sup>	2.000	27.000	.008	.300	11.583	.829

Note: b. Exact statistic computed using alpha = .05

Table 33  
*Tests of Between-Subjects Effects for Self-Efficacy*

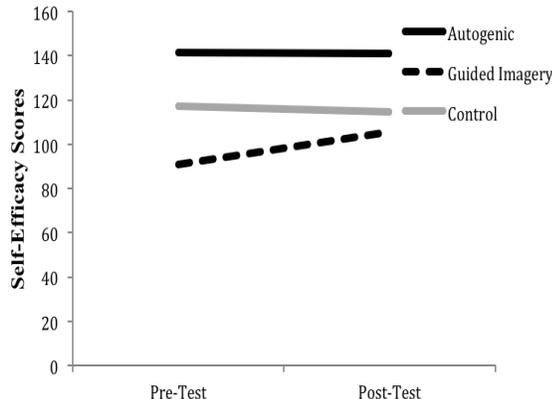
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	$\eta^2$	Noncent. Parameter	Observed Power <sup>a</sup>
Intercept	841350.417	1	841350.417	943.040	.000	.972	943.040	1.000
Condition	18430.533	2	9215.267	10.329	.000	.433	20.658	.977
Error	24088.550	27	892.169					

Note: a. Computed using alpha = .05

Table 34  
*Post Hoc multiple comparisons for Self-Efficacy*

	(I) Condition	(J) Condition	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Tukey HSD	Autogenic	GI	42.70*	9.445	.000	19.28	66.12
		Control	25.20*	9.445	.033	1.78	48.62
	GI	Autogenic	-42.70*	9.445	.000	-66.12	-19.28
		Control	-17.50	9.445	.172	-40.92	5.92
	Control	Autogenic	-25.20*	9.445	.033	-48.62	-1.78
		GI	17.50	9.445	.172	-5.92	40.92
Scheffe	Autogenic	GI	42.70*	9.445	.000	18.24	67.16
		Control	25.20*	9.445	.042	.74	49.66
	GI	Autogenic	-42.70*	9.445	.000	-67.16	-18.24
		Control	-17.50	9.445	.199	-41.96	6.96
	Control	Autogenic	-25.20*	9.445	.042	-49.66	-.74
		GI	17.50	9.445	.199	-6.96	41.96
Tamhane	Autogenic	GI	42.70*	9.738	.002	16.44	68.96
		Control	25.20	10.476	.082	-2.60	53.00
	GI	Autogenic	-42.70*	9.738	.002	-68.96	-16.44
		Control	-17.50	7.942	.120	-38.52	3.52
	Control	Autogenic	-25.20	10.476	.082	-53.00	2.60
		GI	17.50	7.942	.120	-3.52	38.52

There was a significant main effect of condition, ( $F(2, 27) = 10.33, p < .01, \eta^2 = .433$ ). Refer to Table 33. Post-hoc tests revealed that the autogenic group had significantly higher scores than the guided imagery group ( $p < .01$ ) and the control group ( $p = .03$ ). Refer to Table 34 for results. There was a significant interaction effect between time and experimental condition on self-efficacy, ( $F(2, 27) = 5.79, p = .01, \eta^2 = .300$ ). Refer to Table 31. From Figure 7 (below), the autogenic group did have higher self-efficacy scores than the guided imagery group and the control group but self-efficacy scores for the autogenic group did not change much over time. The guided imagery group's self-efficacy scores did increase over time, whereas the control group's scores slightly decreased over time.



*Figure 7. ANOVA Results of Time and Condition on Self-Efficacy*

### Summary

For the second study, 30 participants were divided into 3 treatment groups: (1) AGT group, (2) GI group and (3) control group. Results of 3 repeated measure ANOVAs revealed that anxiety scores decreased over time for the autogenic group as compared to the control and guided imagery group. The autogenic group had higher self-efficacy scores but these scores did not change over time. Lastly, internal locus of control scores were lower for the autogenic group, compared to the other groups, but internal locus of control did increase over time for the autogenic group. Results suggest that enhanced performance and pleasure associated with competition by targeting precompetitive anxiety in intermediate level gymnasts is possible.

## Chapter 5: Discussion, Conclusions, and Recommendations

### **Introduction**

The primary purpose of this study was to examine the influence of past competitive experiences on the levels of precompetitive anxiety (PCA) of child gymnasts. PCA is a problem encountered in young gymnasts due to a multitude of factors that include lack of competition experience, self-confidence to perform well in front of a crowd, fear of making a mistake, disappointing coaches, team, or family members, uncertainty of new routines or skills, and the fear of not qualifying to the next competitive level (Barber, Sukhi, & White, 1999; Butcher, Lindner, & Johns, 2002; Orlick & Zitzelsberger, 1990; Savoy & Beitel, 1997).

The goal of this study is to investigate how competitive experience may influence PCA and to explore use of techniques to reduce PCA to acceptable levels in a heretofore under-utilized population group (intermediate level athletes), with the purpose of enhancing performance and enjoyment in sports, thus allowing athletes to remain active in sports while teaching them life-long strategies to reduce anxiety and stress in their lives.

The first part of the study was a field study that used prior experience to competition as independent variable, which divided the participants into 2 groups, (a) compulsory-level gymnast, or the group with lesser experiences on competition and the (b) optional-level gymnasts, or the group that has higher prior competitive experiences. The dependent variables were (a) PCA, which included both cognitive and somatic precompetitive anxiety, (b) self-confidence, (c) internal locus of control, and (d) self-

efficacy, which included four gymnastic routines: vault, bars, beam, and floor. The differences in scores on these variables between the 2 groups of the independent variable were analyzed. It was hypothesized that the optional level group will yield statistically significant higher scores in perceived levels of PCA and levels of perceived internal locus of control and lower levels of perceived self-efficacy as compared to the compulsory level group.

The results showed that optional level gymnasts had significantly higher scores in cognitive anxiety but not in somatic anxiety. Additionally, the mean difference between the two groups in the confidence scores was recorded to be the highest among the 3 subscales. The confidence means score of the optional group is lower by 2.8 as compared to the compulsory group, indicating that the compulsory group has higher confidence. The level of internal locus of control was statistically higher among the optional level gymnasts while no significant difference between the self-efficacy scores was found between the two groups. These results show partial support to the hypothesis of the first study. There was, indeed some significant difference in precompetitive anxiety, specifically in cognitive anxiety and in level of self-confidence, between optional and compulsory level gymnasts, though not in the direction that was earlier expected, and this will be discussed later.

The second approach or facet of this study involved the use of a treatment condition as the independent variable, which was divided into 3 groups: (a) autogenic training group, (b) guided imagery group, and (c) control group. It was hypothesized that child athletes in the experimental group will show a statistically significant reduction in

perceived levels of PCA (as measured by CSAI -2C), increase in levels of perceived internal versus external locus of control (as measured by NSLCS), and increase levels of perceived self-efficacy (as measured by SSES) between pre and posttesting scores compared to child athletes in the control group.

The results of repeated measure ANOVAs revealed that mean anxiety scores decreased over time for the autogenic group as compared to the control and guided imagery group. The internal locus of control mean scores, were lower for the autogenic group, compared to the other groups, but internal locus of control did increase over time for the autogenic group. Lastly, the autogenic group had mean higher self-efficacy scores but these scores did not change over time.

### **Interpretation of the Findings**

#### **Classical Conditioning**

This study made use of the biopsychosocial paradigm to construct its conceptual model. The archetype proposed that the combination, interaction, and synergy of the 3 domains, biology, psychology, and social factors contribute to the formation of precompetitive anxiety among athletes (Martin, Moritz, & Hall, 1999). It is also within these overlapping domains that the impacts of PCA are observable. Thus, the study proposed that the treatment of debilitating levels of PCA should be targeted within these areas (Martin, Moritz, & Hall, 1999).

One of the biological factors within the conceptual framework of the study was classical conditioning, which best allowed the study results to be explained. It was expected that the optional level gymnasts who have had more competitive experience

would be likely to have lower PCA since they have had more experience in managing stress (Athán & Sampson, 2013); however, the results of the study have shown that confidence is higher among compulsory level gymnasts and they reported lower cognitive precompetitive state anxiety.

The compulsory level gymnasts have had less experience in competing compared to the optional level gymnasts, which is why the results are contradictory to the studies by Donzelli et al. (1990) and Hanton et al. (2008). According to the principles of classical conditioning, it might be possible for optional level gymnasts to have associated their past failures, evaluation apprehension, and negative experiences with the idea of competitive events. Thus, their mind and body gets automatically aroused upon the thought of an upcoming competition, thus, hindering their self-confidence. Compulsory level gymnasts, by contrast, have fewer experiences and they have not yet learned to associate the negative emotions they experienced to the actual event of competing.

### **Participant Age**

The ages of the participants should also be taken into consideration, as past research on prior competitive experience usually use the adult athlete population (Athán & Sampson, 2013; Mellalieu, Hanton, & O'Brien, 2004), whose competitive experiences are so high that they might have conditionally learned to desensitize themselves from the anxiety they felt in their earlier years of experiences in competitions. Alternatively, they have learned to associate more favorable responses to competitive events since they have a lot of previous experiences that they can remember, like winning a previous competition, that might elicit a more pleasing response prior to another competition.

Moreover, Donzelli et al. (1990) as well as Highlen and Bennet (1983), indicate that the impact of prior experience might be dependent on the nature of the sport. Since gymnastics is a complex and dangerous sport (Walpes, 2003), the level of anxiety of the participants as they progress to higher levels might increase since the pressure to perform also increases. In terms of locus of control, the optional group is more likely to believe that outcomes of sporting events are controllable by the individual rather than by external factors. It is possible that since these athletes believe that the outcome of the competition is largely dependent on how they perform and not on luck, they feel more pressure to do well, thus, they have rated higher in cognitive anxiety (Walpes, 2003). It would have been interesting to find out whether this level of cognitive anxiety of the optional level gymnasts was perceived as facilitative or beneficial to the performance, however, this was not part of the scope of this current study (Walpes, 2003).

### **Impact of autogenic training and guided imagery**

The second part of the study investigated the potential link between biological and psychological factors that influence PCA, locus of control and self-efficacy and ultimately performance. The impact of autogenic training and guided imagery on the body and mind of the athlete has been seen to reach the psychological domain of anxiety, confidence, and locus of control. Both AGT and GI have been seen to be effective in improving the physiological state of the young athletes in the sample (albeit AGT was slightly higher), which provides support to the theoretical model of this study, since these results show a direct interaction of the biological, sociological, and psychological facets of anxiety. The results of the study showed no particular pattern for the self-confidence

variable, which might suggest that this variable is very closely associated with the level of precompetitive anxiety of the athletes. It is possible that sociological factors will have come into play in shaping the level of self-confidence of the athletes before a competition (Walpes, 2003). For example, coaches that emphasize exclusively on winning or focus too heavily on mistakes made versus positive performance improvements, may hinder self confidence in athletes (Cox, 2000; Hall & Kerr, 1997; Hardy & Crace, 1991)

The effectiveness of guided imagery in improving PCA and even perceived levels of self-efficacy have provided further support to various previous studies that had similar results (Fenker & Lambiotte, 1987; Mace, Eastman, & Carroll, 1987; MacIntyre & Moran, 1996; Rushall, 1988; White & Hardy, 1998). Its impact on the psychological factors that make up PCA might also be explained by classical conditioning, as the participants learn to associate more favorable images to the actual competition, which may have initially evoked fear and apprehension. Thus, the interplay of the general domains defines and shapes the level of PCA of these athletes.

Autogenic training has been seen to be more effective in reducing overall PCA (particularly) somatic anxiety, as it targets the muscles of the body, which releases the tension and improves performance (Morton, 2003). This influences the PCA levels to decrease due to the relaxed emotions that the participants learn to associate with the stimulus that usually triggers their anxiety, which is the competition. From the results of the study, it is apparent that targeting the body through visual images and relaxation techniques translates into the other domains that are connected to the biological domain;

that is, the impact becomes apparent in the psychological state of the athlete, which in turn influences his or her performance (Mace, et al., 1987).

When taken together, cognitive and somatic anxiety made up the overall variable of PCA. Both AGT and GI had a positive effect in reducing PCA, however, GI was seen to be less effective in reducing somatic anxiety. The self-efficacy variable, the overall variable that accounted for all four subscales of routines, was slightly impacted by condition of treatment (Mace, et al., 1987). It was shown that GI proved effective in improving self-efficacy, but only for the floor routines. This may be due to the influence of music and its ability to enhance memory due to rhythmical patterns associated with paired specific movements in the floor routine. Floor exercise is the only event that incorporates music into the routine, and requires compulsory gymnasts to perform certain elements on cues contained in the music. Additionally, optional level gymnasts pair tumbling and dance elements to changes in rhythm and tempo contained in their floor routines. Research has demonstrated a positive correlation between music and motor learning (Finney & Palmer, 2003; Brown & Palmer, 2012).

These results provided partial support to the second study's hypothesis that the autogenic experimental group will yield a significant reduction in perceived levels of PCA, increase in levels of perceived internal locus of control, and levels of perceived self-efficacy between pre and posttesting as compared to guided imagery and control group (Mace, et al., 1987).

### **Limitations**

Some limitations of this study were previously discussed under the scope, the method, and the execution of the research. In terms of scope, the study made use of a multitude of dependent variables to measure the impacts of the CAM modalities, however, the modalities tested were only two, namely AGT and GI (Taylor, 2003). Other modalities such as aromatherapy, biofeedback, effects of music, have not been fully explored by previous researchers with nonelite level gymnasts; however, this current study has been limited by time and financial restraints, and including further modalities would require more instruments to use and more time that it would take to complete the programs.

Another limitation with the scope is the study's neglect to explore the sociological domain of the theoretical model of the study (Martens, et.al, 1990). The study has focused more on the link between the biological and psychological aspects of PCA, so that the sociological factors such as compliance, teamwork, cohesiveness, and conformity have not been fully explored (Corning, 2003). In terms of method, one limitation of the study was the use of self-administered treatment, specifically in part 2 of the study; there was no way to monitor whether or not the participants complied with the set schedule and standards of practicing the treatment method that was designated to them. This method of self-administration was employed for the convenience of the young participants; however, it might be more beneficial to the study if an effective monitoring system could have been employed (Martens, et.al, 1990).

In terms of execution, the limitation found was the lack of representativeness of the sample. Enlisting the participation of athletes who are still very young and are already very busy with their training has posed a problem in reaching the desired sample size (Callow & Hardy, 2001). Not all of the qualified participants consented to comply with the quasi-experiment, thus, a smaller sample size than earlier targeted was used. Since the sample is not very representative of the young gymnast's population, the ability to generalize from the conclusions has been limited as well (Weinberg & Williams, 2001).

Further limitations of this study include individual differences in coaching styles. Watson (1984), as well as Vosloo, Ostrow, and Watson (2009), found that there is a positive correlation between motivational climate created by coaches who emphasize winning with the development of PCA in athletes. This factor may help to explain why there was a mean difference in baseline scores between the three groups particularly in the area of internal locus of control. Population selection for each group was based on club affiliation and not random selection. Consequently, coaching style differences may have contributed to the noted baseline differences.

Attributional factors that individual athletes ascribe towards different competitions were also a limitation. Factors such as competing against a local rival club or gymnast, qualification competitions versus local competitions, state competitions versus sectional competitions, may all influence the levels of PCA in gymnasts.

### **Recommendations**

It is recommended for future researchers to explore more CAM modalities and their impact on PCA and related variables. Prior research utilizing CAM modalities to

address PCA, as reported by Wan et al. (2007), Cox (2002) and Hall (2001), have been favorable on the efficacy of aromatherapy (AT) and progressive muscular relaxation (PMR), and music (Bishop, Wright, & Karageorghis, 2014) used with children and adult athletes or other sample population groups. Additionally, AT's use in non-elite/child athletes represents an uncharted, unappreciated, and underdeveloped CAM modality as a PCA stress reducing modality (Lin, Hsu, & Esposito, 2011). Thus, it might be a good starting point for future research to look into the effects of these underdeveloped modalities.

The exploration of the social factors and its impact on PCA and biological treatment would also be recommended, in order to provide adequate structure and support to this current research that used the biopsychosocial paradigm as its foundation. Lastly, future researchers (Cox, 2000; Wan et al. 2007) could use a more sound research methodology that involves experimenter administered treatment and representative sample size.

### **Implications**

The results of this study imply that competitive state anxiety experienced by athletes is linked to and interrelated with the individual's biological functioning and social situation. The anxiety that athletes experience is mostly learned from prior experience or from social interactions (Hall, 1998; Murphy & Martin, 2002). Thus, the body can be conditioned to learn new things that are more favorable, and this would replace the anxiety inducing thoughts that athletes associate with competing (Utay & Miller, 2006). CAM modalities that target the body by relaxation techniques or the mind

through induced positive images should be used regularly in order to replace negative feelings and apprehensions associated with competing, excessive amounts of which have been seen to be detrimental to performance (Lin, Hsu, & Esposito, 2011).

In order for athletes to benefit from this research, it is highly recommended for them to practice self-administered autogenic and guided imagery in order to target low perceptions of self-efficacy, or autogenic training in order to target somatic anxiety (Newcomer, 2000). Both these modalities also decrease cognitive anxiety significantly (Cox, 2002; Mamassis & Doganis, 2002). Coaches and individual athletes should be aware of these techniques in order to prevent younger athletes from losing heart from a failed performance and ultimately from quitting the sport all together (Hall, 1998, Murphy & Martin, 2002). The proper management of stress and anxiety as well as facilitative outlook on the effect of anxiety on performance might spell the difference between continuing and discontinuing in the sport (Lin, Hsu, & Esposito, 2011).

### **Conclusions**

Biology, psychology, and social factors interact to shape the reactions of athletes to potentially stressful situations like competitions. Previous experiences or social influences might have an impact in heightening the level of anxiety that young athletes feel (De Pero et al., 2013; Newcomer, 2000). In order to remedy debilitating precompetitive anxiety, young athletes could regularly practice learning more favorable responses to stressful situations; this could be achieved through the biological and psychological channels, that is, by conditioning the body to relax and commanding the

mind to picture pleasant and positive thoughts (Chase, Magyar, & Drake, 2005; Munroe-Chandler et al., 2012).

The results of this study supports the cliché *mind over matter*, since athletes are able to go past their fears and apprehensions by guiding their mind to utilize positive images that they could associate with what scares them, which in turn works toward improving their actual performance, by reducing the level of tension and stress in their bodies. The study indicates that athletes can improve their performance once they are motivated and overcome their worries that impact negatively on the training and overall gymnastic performance. Future training should be focused on helping athletes overcome their worries and mixed feelings related to self-confidence, which greatly threatens their levels of performance and enjoyment of the sport. This concept applies to all *athletes* and not just gymnasts.

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## Appendix A: Title of Appendix

## Appendix A: CSAI-2C

## CSAI-2C

DIRECTIONS: Below are some statements about how girls feel who participate in sports, like gymnastics. Please read each statement below and color in the circle to the right of the statement about how you feel at this time, this present moment. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer which describes your feeling right now. If you do not understand any statement or word please ask the tester for help.

CODE	#	QUESTIONS	NOT AT ALL	SOMEWHAT	MODERATELY	VERY MUCH
W	1	I am concerned that I may not perform as well as I can today	(1)	(2)	(3)	(4)
S	2	My body feels tense	(1)	(2)	(3)	(4)
C	3	I feel self-confident	(1)	(2)	(3)	(4)
S	4	I feel tense in my stomach	(1)	(2)	(3)	(4)
C	5	I feel secure	(1)	(2)	(3)	(4)
C	6	I'm confident that I can meet the challenges of competing well today	(1)	(2)	(3)	(4)
W	7	I'm concerned that I will compete poorly today	(1)	(2)	(3)	(4)
S	8	My heart is racing	(1)	(2)	(3)	(4)
C	9	I'm confident that I will perform well today	(1)	(2)	(3)	(4)
W	10	I'm worried about not reaching my gymnastics goals	(1)	(2)	(3)	(4)
S	11	I feel my stomach sinking	(1)	(2)	(3)	(4)
W	12	I feel others will be disappointed in my gymnastics performance	(1)	(2)	(3)	(4)
C	13	I'm confident because, in my mind, I picture myself reaching my goal	(1)	(2)	(3)	(4)
S	14	I am concerned about not being able to concentrate today	(1)	(2)	(3)	(4)
W	15	My body feels tight	(1)	(2)	(3)	(4)

## Appendix B: NSLC

LOCUS OF CONTROL		
The Nowicki-Strickland Locus of Control scale is a paper and pencil measure consisting of 40 questions which are answered by marking either yes or no by coloring in the appropriate circle after the question.		
1. Do you believe that most problems will solve themselves if you just don't fool with them?	<input type="radio"/>	<input type="radio"/>
2. Do you believe that you can stop yourself from catching a cold?	<input type="radio"/>	<input type="radio"/>
3. Are some kids just born lucky?	<input type="radio"/>	<input type="radio"/>
4. Most of the time do you feel that getting good grades means a great deal to you?	<input type="radio"/>	<input type="radio"/>
5. Are you often blamed for things that just aren't your fault?	<input type="radio"/>	<input type="radio"/>
6. Do you believe that if somebody studies hard enough he or she can pass any subject?	<input type="radio"/>	<input type="radio"/>
7. Do you feel that most of the time it doesn't pay to try hard because things never turn out right anyway?	<input type="radio"/>	<input type="radio"/>
8. Do you feel that if things start out well in the morning that it's going to be a good day no matter what you do?	<input type="radio"/>	<input type="radio"/>
9. Do you feel that most of the time parents listen to what their children have to say?	<input type="radio"/>	<input type="radio"/>
10. Do you believe that wishing can make good things happen?	<input type="radio"/>	<input type="radio"/>
11. When you get punished does it usually seem it's for no good reason at all?	<input type="radio"/>	<input type="radio"/>
12. Most of the time do you find it hard to change a friend's (mind) opinion?	<input type="radio"/>	<input type="radio"/>
13. Do you think cheering more than luck helps a team to win?	<input type="radio"/>	<input type="radio"/>
14. Do you feel that it's nearly impossible to change your parent's mind about anything?	<input type="radio"/>	<input type="radio"/>
15. Do you believe that your parents should allow you to make most of your own decisions?	<input type="radio"/>	<input type="radio"/>
16. Do you feel that when you do something wrong there's very little you can do to make it right?	<input type="radio"/>	<input type="radio"/>
17. Do you believe that most kids are just born good at sports?	<input type="radio"/>	<input type="radio"/>
18. Are most of the other kids your age stronger than you are?	<input type="radio"/>	<input type="radio"/>
19. Do you feel that one of the best ways to handle most problems is just not to think about them?	<input type="radio"/>	<input type="radio"/>
20. Do you feel that you have a lot of choice in deciding who your friends are?	<input type="radio"/>	<input type="radio"/>
21. If you find a four-leaf clover do you believe that it might bring you good luck?	<input type="radio"/>	<input type="radio"/>
22. Do you often feel that whether you do your homework has much to do with what kind of grades you get?	<input type="radio"/>	<input type="radio"/>
23. Do you feel that when a kid your age decides to hit you, there's little you can do to stop him or her?	<input type="radio"/>	<input type="radio"/>
24. Have you ever had a good luck charm?	<input type="radio"/>	<input type="radio"/>
25. Do you believe that whether or not people like you depends on how you act?	<input type="radio"/>	<input type="radio"/>
26. Will your parents usually help you if you ask them to?	<input type="radio"/>	<input type="radio"/>
27. Have you felt that when people were mean to you it was usually for no reason at all?	<input type="radio"/>	<input type="radio"/>
28. Most of the time, do you feel that you can change what might happen tomorrow by what you do today?	<input type="radio"/>	<input type="radio"/>
29. Do you believe that when bad things are going to happen they just are going to happen no matter what you try to do to stop them?	<input type="radio"/>	<input type="radio"/>
30. Do you think that kids can get their own way if they just keep trying?	<input type="radio"/>	<input type="radio"/>
31. Most of the time do you find it useless to try to get your own way at home?	<input type="radio"/>	<input type="radio"/>
32. Do you feel that when good things happen they happen because of hard work?	<input type="radio"/>	<input type="radio"/>
33. Do you feel that when somebody your age wants to be your enemy there's little you can do to change matters?	<input type="radio"/>	<input type="radio"/>
34. Do you feel that it's easy to get friends to do what you want them to?	<input type="radio"/>	<input type="radio"/>
35. Do you usually feel that you have little to say about what you get to eat at home?	<input type="radio"/>	<input type="radio"/>
36. Do you feel that when someone doesn't like you there's little you can do about it?	<input type="radio"/>	<input type="radio"/>
37. Do you usually feel that it's almost useless to try in school because most other children are just plain smarter than you are?	<input type="radio"/>	<input type="radio"/>
38. Are you the kind of person who believes that planning ahead makes things turn out better?	<input type="radio"/>	<input type="radio"/>
39. Most of the time, do you feel that you have little to say about what your family decides to do?	<input type="radio"/>	<input type="radio"/>
40. Do you think it's better to be smart than to be lucky?	<input type="radio"/>	<input type="radio"/>

## Appendix C: SSSE

**SSSE FORM**

DIRECTIONS: Please mark how confident you are that you will perform well today.

EVENTS	NOT AT ALL	SOMEWHAT	MODERATELY	VERY MUCH
Vault	①	②	③	④
Bars	①	②	③	④
Beam	①	②	③	④
Floor	①	②	③	④

## Appendix D: Gym Club Owners Recruitment Ltr

July 10, 2012

Gym club owners name:

Address:

Dear \_\_\_\_\_,

Let me introduce myself. My name is Christian Way. I am a former collegiate competitive gymnast, coach, and gym club owner (Iron Rail Gymnastics Academy, Wenham Massachusetts). I have been active in the sport of gymnastics for over 30 years. I recently retired from coaching to complete my Ph.D. in the area of health and clinical psychology. Please let me take a moment to ask for your assistance.

I am currently recruiting level 5, female gymnasts for an experimental study to investigate the effects of guided imagery/autogenic training (a form of self-hypnosis) on pre-competitive anxiety, locus of control, self-efficacy and confidence levels in level 5 gymnasts as part of my dissertation in Health Psychology at Walden University. This experiment will require minimal work on your part and is essentially a self-administered program that the gymnasts participate in at home.

The following is a brief synopsis of the proposed study, the materials used, methodology, and specific activities involved by the participants in the study.

### **INITIAL RECRUITMENT PHASE:**

1. Gymnasts and parents will be asked to participate in an initial meeting that outlines the program and sign permission slips.

### **BASIC STUDY DESIGN:**

1. Initial recruitment of 120 female level 5 compulsory gymnasts (ages 7 – 11).
2. Following the recruitment phase, the gymnasts will be placed into 3 separate groups:
  - a. Group 1 (Guided imagery) = 40 gymnasts
  - b. Group 2 (Autogenic training) = 40 gymnasts
  - c. Group 3 (Control group) = 40 gymnasts
3. All gymnasts in the study will be given a packet that contains the following:
  - a. Directions for completing the study.
  - b. Form 1 = Predicted score and confidence level form.
  - c. **Form 2 = Competitive State Anxiety Inventory Scale – children’s version (CSAI-2C).** *The CSAI-2C instrument is based on the multidimensional theory of competitive anxiety that differentiates between cognitive state anxiety and somatic state anxiety. The CSAI-2C can be administered to children in less than 5 minutes. The CSAI-2C is a self-administered, 15 questionnaire and is rated on a Likert scale from 1 (not at all) to 4 (very much so). The 15 items represent three 5-item sub-scales: cognitive anxiety (e.g., I have self-doubts), somatic anxiety (e.g., My body feels tense), and self-confidence (e.g., I feel secure), each yielding separate scores between 5 and 20.*
  - d. **Form 3 = Locus of Control Scale (NSLCS).** *The Nowicki-Strickland Locus of Control Scale is a self-administered, paper and pencil measure that consists of 40 questions that are answered either yes or no by placing a mark next to the question. Briefly, internal versus external control refers to the degree to which persons expect that a reinforcement or an outcome of their behavior is contingent on their own behavior or personal characteristics*

*versus the degree to which persons expect that the reinforcement or outcome is a function of chance, luck, or fate, is under the control of powerful others, or is simply unpredictable.*

- e. Form 4 = Sport Specific Self Efficacy Scale.** (Self-efficacy, in general, is the belief that one is capable of performing the behaviors that will produce desired outcomes in any particular situation). The use of a task or sport specific efficacy scale is an effective measuring tool in assessing efficacy that is specific in the sport setting. *Sport Specific Self Efficacy Scale is a paper and pencil measure consisting of 20 questions based on the elements in the USAG Level 5 compulsory routines. The participant rates on a scale between 0 = (cannot do at all) to 10 = (certainly can do). The higher the score is to 10, the more self-efficacy is exhibited.*
4. Gymnasts in all 3 groups will be instructed to fill out the forms prior to their 1<sup>st</sup> competition of the season.
  5. The day after the meet the gymnasts in Groups 1 and 2 will begin a self-administered program whereby they listen to a cd that leads them through a series of exercises that help to initiate a relaxation response. The subjects will listen to their pre-programed cd prior to bedtime (2 times per week for 6 weeks). The subjects in the control group will not participate in either of the 2 interventions.
  6. Following completion of this program, gymnasts in all 3 groups will complete forms 1 – 4 prior to their next competition.
  7. The gymnasts will then mail the results back to me in a pre-paid envelope.
  8. Upon completion of the statistical analysis of the data the results of the study will be made available to all participants.

The benefits to your club include:

- a. Acknowledgement of you and your clubs' participation documented in the study.
- b. Potential health benefits to your gymnasts should the interventions prove effective.
- c. Contribution to the body of research that address pre-competitive anxiety in intermediate level gymnasts.

I have attached a sample packet of the forms used in the study, as well as the written scripts contained on the compact discs. You will also find sample permission forms that parents, gymnasts and club owners will sign. Thank you for your consideration.

Sincerely,

*Christian Lee Way*

Christian Way, Ph.D. (Cand.), M.Ed., LMHC

Email: waychristian@yahoo.com

## Appendix E: Child Assent Form

### CHILD ASSENT FORM

#### **INTRODUCTION:**

Hello, my name is Christian Way and I am doing a research project to learn about pre-competition anxiety (nervousness before you compete). I am inviting you to join my project. I want you to learn about the project before you decide if you want to be in it.

#### **WHO I AM:**

I am a student at Walden University. I am working on my doctoral degree. I am a former competitive collegiate gymnast and former gym club owner/coach at Iron Rail Gymnastics Academy.

#### **ABOUT THE PROJECT:**

If you agree to be in this project, you will be asked to:

- Complete 2 FORMS. (This will take between 10 to 15 minutes)

Here are some sample questions:

- I am concerned that I may not perform as well as I can today.
- I feel others will be disappointed in my gymnastics performance.

#### **IT'S YOUR CHOICE:**

You don't have to be in this project if you don't want to. We are hoping this project might help others by teaching children how to manage stress (nervousness) and to enjoy sporting activities more. You will not be paid for being in this study but you will be helping researchers to understand how to help athletes to perform better when they feel anxious. The results from your group will also be compared another group. Your commitment time to be in the study is 15 min.

#### **PRIVACY:**

Everything you tell me during this project will be kept private. That means that no one else will know your name or what answers you gave.

Please sign your name below if you want to join this project.

Child's Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Parent Signature: \_\_\_\_\_

Researcher's Signature: \_\_\_\_\_

You may ask any questions you have now. Or if you have questions later, you may contact the researcher via email @ christian.way@waldenu.edu or cell phone 207-337-3443. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210.

**IMPORTANT:** Please keep a copy of this form for your records.

## Appendix F: Parent Consent Form

### **Introduction:**

Your child is invited to take part in a research study to assess pre-competition anxiety in optional level gymnastics. This form is part of a process called “**informed consent**” to allow you to understand this study before deciding whether to allow your child to take part. This study is being conducted by a researcher named Christian Way, who is a doctoral student at Walden University. He is also a former collegiate gymnastics competitor and former gymnastics coach.

### **Background Information:**

The purpose of this study is to examine pre-competition anxiety (PCA) in child gymnasts; as this has been demonstrated to exhibit negative influences on the optimal performance of athletes. The goal is to help athletes participate in the sport of gymnastics longer, and thus receive the full physical, social and psychological benefits that gymnastics has to offer. Your child’s participation in the study would play a critical role in evaluating PCA.

### **Procedures:**

- Complete 2 forms that contains the following: (This will take between 10 to 15 minutes)
  1. Competitive State Anxiety Inventory (CSAI-2C) and Sport Specific Self Efficacy (SSSE) form
  2. Locus of Control form.

The **CSAI-2C** provides a measure of performance anxiety (Nervousness). It provides a score on three dimensions: 1) Thinking anxiety, 2) Anxiety perceived through the body (Butterflies in the stomach), 3) Level of confidence in competing. The **SSSE** provides a general score on how confident the gymnast feels on each of the competitive events. **Locus of control** provides a measure on the extent to which individuals believe that they can control events that affect them. A statistical analysis will be performed to compare compulsory level groups with optional level groups on a number of different variables.

### **Voluntary Nature of the Study:**

Your child’s participation in this study is voluntary and neither you nor your gym will treat you any differently based on whether or not you participate. The estimated time of your commitment to this study is 15 min.

### **Benefits of Being in the Study:**

- Participating in research that may help to alleviate pre-competitive anxiety in athletes and other population groups.
- The potential for enhancing performance and enjoying competition.

### **Confidentiality:**

Any information your child provides will be kept confidential. The researcher will not use your child’s information for any purposes outside of this research project. Also, the researcher will not include your child’s name or anything else that could identify her in any reports of the study. Please keep a copy of this form for your records.

### **Statement of Consent:**

I have read the above information and I feel I understand the study well enough to make a decision about my child’s involvement. By signing below I am agreeing to the terms described above.

Child’s Name: \_\_\_\_\_ D.O.B.: \_\_\_\_\_

Printed Name of Parent: \_\_\_\_\_ Date of consent: \_\_\_\_\_

Signature \_\_\_\_\_

You may ask any questions you have now. Or if you have questions later, you may contact the researcher via email @ christian.way@waldenu.edu or cell phone 207-337-3443. If you want to talk privately about your rights as a participant, you can call Dr. Leilani Endicott. She is the Walden University representative who can discuss this with you. Her phone number is 1-800-925-3368, extension 1210. **IMPORTANT:** Please keep a copy of this form for your records.

## Appendix G: Guided Imagery Script

### Guided Imagery Script

#### Gymnastics Guided Imagery Meditation

Feeling relaxed and confident can help you learn to compete and learn new skills more easily. This meditation aims to help increase confidence and motivation when training in gymnastics.

To begin this meditation, find a comfortable position in an environment free of distractions. Loosen any tight clothing, and adjust your position until you are comfortable.

To begin the relaxation process, imagine that you are at the top of a stairway. At the bottom of the stairway is a state of peace, calm, and relaxation.

1. Take note of how you are feeling right now, at the top of the stairway.
2. Now take a deep breath and breathe in... and breathe out. Feel how calm and relaxed you are.
3. Breathe in... and breathe out. Feel how breathing helps to relaxes you.
4. Take another deep breath in ...and relax as you exhale.
5. Keep breathing slowly and deeply, remembering to exhale fully between each breath.
6. Imagine taking a step down the stairway... a single step closer to relaxation.
7. Further descend the stairway, going down toward relaxation..... down.... down.... to a state of calm and relaxation.
8. Picture yourself going slowly down the stairway, one step at a time. It is a comfortable, safe descent to a place of relaxation. Move down step by step, at your own pace, becoming more and more relaxed with each step you take.
9. Take another step down.... and another.... more deeply relaxed with each step. Feel your arms becoming very heavy. So heavy you can hardly lift them... it is a good feeling of relaxed heaviness. Allow your arms to rest at your sides... feeling loose and heavy. Your legs might even be getting heavier as well. Feel the heaviness in your legs... a warm, pleasant feeling.
10. You might even become a bit sleepy as you get closer and closer to relaxation. That's okay. Allow your mind to drift and your body to relax, heavy and comfortable.
11. Moving down the stairway, down, down... almost to the bottom now.... when you reach the bottom you will be pleasantly relaxed. Notice how your whole body is relaxed and heavy now. Becoming more and more relaxed... deeper and deeper.
12. Take the last few steps down to the bottom of the stairway.....
13. Reaching the bottom now.... a state of calm and relaxation. Peaceful and relaxed.
14. Rest quietly for a few moments... enjoying the relaxation you are experiencing.
15. (pause)
16. Think now about your Level 5 routines and how you would like to perform them at a competition. Notice how being relaxed allows you to think with clarity, and prepares you for performing well without fear or nervousness.
17. You know you are fully capable of performing these routines. Imagine yourself at a competition... easily performing the routines without falling or making mistakes. Easily memorizing and remembering the necessary details.
18. Now picture yourself on the vault. Your next up...Picture yourself taking in a deep cleansing breath... smell the lavender scented cotton ball...holding in your breath for one second and then breathe out. As you breathe out you feel a sense of calm with all nervousness leaving your body. You are confident that you will perform well. You go through your pre-vault warm ups that your coaches have taught you. You know that you have a great vault. Your mind is powerful... your body is powerful...nothing can stop you. You see the judge hold up her hand. You salute and step on to the runway. You take one more deep breath...breathing in breathing out. You notice that a sense of calm and focus takes over. All negative thoughts float away and only positive ones remain. You start your run...with each step you gain confidence. You hit the board exactly where you need to. You are keeping your body tight...arms tight...legs tight. You have a powerful block off the horse. You fly through the air your feet come in contact with the mat...you have perfect control on your landing and you stick it... holding the landing position for a few seconds, then turn and salute the judge. You notice how much control you felt during the vault. You experience a strong feeling of accomplishment and confidence that you were able to control your thoughts and your body. You are having fun.

19. Now imagine yourself preparing for the bars. See yourself mentally rehearsing your routine as you put on your grips. You are up next... Picture yourself taking in a deep cleansing breath... smell the lavender scented cotton ball...holding in your breath for one second and then breathe out. As you breathe out you feel a sense of calm with all tension and nervousness leaving your body. You are confident that you will perform well. While you chalk up, you remember the special instructions and cues your coaches have taught you. You know that you have a great bar routine. Your mind is powerful... your body is powerful...nothing can stop. You see the judge hold up her hand. You salute and step on to the mat. You take one more deep breath...breathing in breathing out. See yourself performing the Glide kip with straight arms and good extension and form immediately into the front hip circle and cast to horizontal position. Return to support position with control and then cast to squat on. Jump to you long hang kip with straight arms and good form an immediately cast to horizontal. See yourself performing your back hip circle to the under-swing. Do the counter swing to 30° below horizontal to tap swing forward. Do you counter swing to 15° below horizontal and then tap swing forward with ½ turn dismount. Feel your feet come in contact with the mat...you have perfect control on your landing and you stick it... holding the landing position for a few seconds, then turn and salute the judge. You notice how much control and power you felt during the bars. You experience a strong feeling of accomplishment and confidence that you were able to control your thoughts and your body. You are having fun.
20. Now imagine yourself preparing for the beam. See yourself mentally rehearsing your routine as you wait. You are up next... Picture yourself taking in a deep cleansing breath... smell the lavender scented cotton ball...holding in your breath for one second and then breathe out. As you breathe out you feel a sense of calm with all tension and nervousness leaving your body. You are confident that you will perform well and you remember the special instructions and cues your coaches have taught you. You know that you have a great beam routine. Your mind is powerful... your body is powerful...nothing can stop you. You see the judge hold up her hand. You salute and step on to the mat. You take one more deep breath...breathing in breathing out. You see yourself performing your mount the double leg swing mount, one arm up and then behind...“V” sit then stand up on one leg. Step coupé Heel snap turn. Perform the straight leg leap (90°) move to the cross Handstand hold 1 second, finish, kick in front and then in back with arms out. Complete your 2 Pivot turns...turn to side. leg position forward coupé arms. pose, kick half turn... cartwheel, pose...straight jump, split jump(90°)...arms lower after each jump, walks after jumps- step step and kick below horizontal and bring in front of foot standing on, bending knees slightly, step & step Arabesque (>45°) below hor. Scale (above horizontal), 1 pivot turn, pose...bow arm circle while walking... cartwheel to side handstand, (hold 2 seconds) 1/4 turn dismount. Feel your feet come in contact with the mat...you have perfect control on your landing and you stick it... holding the landing position for a few seconds, then turn and salute the judge. You notice how calm and how much control and grace you felt during the beam routine. You experience a strong feeling of accomplishment and confidence that you were able to control your thoughts and your body. You are having fun.
21. Now imagine yourself preparing for the floor routine. See yourself mentally rehearsing your routine as you wait . You are up next... Picture yourself taking in a deep cleansing breath... smell the lavender scented cotton ball...holding in your breath for one second and then breathe out. As you breathe out you feel a sense of calm with all tension and nervousness leaving your body. You are confident that you will perform well and you remember the special instructions and cues your coaches have taught you. You know that you have a great floor routine. Your mind is powerful... your body is powerful...nothing can stop you. You see the judge hold up her hand. You salute and step on to the floor. You take one more deep breath...breathing in breathing out. You see yourself performing your initial pose while your wait for the music to start. You are calm and focused. your initial pose while your wait for the music to start. You are calm and focused. You begin... Arm side and down...Other arm up and down...Spot, turn, arms up and down...Bounce, bounce...Straddle jump (120°)...Lunge, turn, lunge run, Forward dive roll, stand, finish. Side chassé w/ ¼ turn, passé hop with ¼ turn, pose, stand. Run, front handspring rebound, land, arch back, run run stand. Curved run. Straight leg leap (120°) step leg swing forward with hop ¼ turn...Slide to floor, turn, kneel, front splits, turn, stand. Prance, prance, weight transfer front and back. 1/2 Turn, Backward roll to handstand with straight arms, finish. Step, kick, step to curtsy. Pose, tuck, step, prepare. Full turn...leg position in forward coupé...finish. Hitch-kick, swing turn. Back walkover, finish, stand. Run, round off- back handspring- back handspring- rebound- finish. Pose-relevé. You notice how focused and calm you were during the routine and how much control and grace you felt during the floor routine. You enjoyed doing the routine and how much fun the challenge is. You experience a strong feeling of accomplishment and confidence that you were able to control your thoughts and your body. You are having fun.
22. Now I want you to notice that you can review mentally the process of completing the routines in your mind. This mental practice is as effective as physically practicing.

23. Take a moment now to envision yourself practicing, learning the routines and new skills that are important to you.
24. (pause)
25. This meditation to learn routines is most effective when followed by actual physical practice. Perhaps you will find a few minutes after this session concludes to actually practice the skills or routines you will be learning.
26. Feel the excitement and interest... looking forward to the enjoyment you will experience when practicing and competing. Learning is enjoyable. Know that you will make mistakes as you go, and will learn from them in order to become even more skilled.
27. Take a few moments now to enjoy how relaxed you are feeling... and to enjoy the anticipation of looking forward to practicing.... eager to learn your routines and new skills.
28. Feel your confidence building, knowing that you can quickly and easily expand your skills.
29. Enjoy the confidence, the anticipation, the interest you feel. Learning new skills enhances your life. You are probably looking forward to the richness this new skill.... this physical exercise... will bring.
30. (pause)
31. Take a few more moments to meditate on the idea of learning to compete. Feeling a range of positive emotions as you think about the process.
32. Now it is time to conclude your relaxation experience, while keeping with you a relaxed feeling.
33. Imagine that you are at the bottom of a stairway. At the top of the stairway is a state of alert and calm. With each step up, you become more and more awake.
34. Picture yourself beginning to ascend the stairway. Taking a step up, becoming slightly more awake, more alert.
35. Take another step up, and another, feeling your body and mind reawaken more and more with each step.
36. Continue up the stairway, nearing the middle of the stairway. Becoming more awake. More alert. Feeling your energy increasing, flowing through your body.
37. Climb further up the stairway, another stair, and another, more awake with each one. Nearing the top of the stairway. Only three steps left before you reach your usual level of awareness, feeling calm yet alert and energized.
38. Three.... two..... one.

Script adapted for use from Raudebaugh, C. (2012). *Guided Relaxation Scripts. Inner Health Relaxation Studio: Coping skills and Relaxation Resources.* <http://www.innerhealthstudio.com/>

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## Appendix H: Autogenic Training Script

**Step 1: Pre-Training** – There is nothing “mystical” about this training. It’s pure physiology. The training sequence takes 6 weeks with 2 sessions per week. The sessions should be practiced at night, in bed before you go to sleep. During the training, try to focus on how you feel and try to ignore outside noises or distractions. You may have dream-like experiences or may experience a very relaxed state where your arms or legs feel asleep. This is normal and part of the training. You need to practice this three times per week to gain the full benefit from the training. Be patient, the training builds on past training and the more you practice the better you become at it. Just like in gymnastics when you learn a new skill it takes time before you get better at performing it.

**Step 2: The Breathing Warm-up** – Lie down and get into a comfortable state.

**Step 3:** Focus completely on your breathing. Let all other thoughts go.

1. Breathe in ...2...3...4... hold...2...3... Exhale...2...3...4...5...
2. Breathe in ...2...3...4... hold...2...3... Exhale...2...3...4...5...
3. Breathe in ...2...3...4... hold...2...3... Exhale...2...3...4...5...
4. Focus on just your breathing. There is nothing else you need to be doing at this moment. Nowhere else you need to be. Allow your worries to be released as you simply focus on the present. Breathe.
5. Breathe in ...2...3...4... hold...2...3... Exhale...2...3...4...5...
6. Breathe in ...2...3...4... hold...2...3... Exhale...2...3...4...5...
7. Breathe in ...2...3...4... hold...2...3... Exhale...2...3...4...5...
8. Continue the autogenics process by turning your attention to your right hand. Imagine your right hand becoming warm. Starting at the tips of your thumb and fingers, the feeling of warmth spreads to your palm... to the back of your hand... to your wrist...
9. Your right hand is very warm... Very heavy... Relaxed.
10. Focus now on your left hand. Feel the feeling of warmth in your left hand... in your thumb and fingers... your palm... the back of your hand... your wrist...
11. Your left hand is warm, heavy, and relaxed.
12. Continue the autogenics session, enjoying the relaxation you are experiencing.
13. Notice your right arm becoming heavy and warm. Relaxing into warmth and heaviness... your forearm... elbow... upper arm...
14. Your whole right arm is warm... Very warm and heavy... The feeling of heaviness is very comfortable and relaxing....
15. Now turn your attention to your left arm. Feel your left arm warming, relaxing... Your left arm feels warm and heavy. Feel your left forearm... elbow... upper arm relaxing... warming... your entire left arm is heavy and warm... very relaxed.
16. Turn your attention now to your feet. Notice the feeling of warmth spreading from your right toes... to your right foot... the bottom of your foot... the top of your foot... your ankle... Your right foot feels very heavy... warmer... heavier... relaxed.
17. Feel the warmth beginning in the toes of your left foot. Your left foot is becoming warm... from the bottom of your left foot... to the top... to your ankle... your left foot is warm... heavy... Relaxing...
18. Both of your feet are pleasantly warm... A relaxed feeling of heaviness... Warmth... And relaxation...
19. Feel the relaxation moving... growing... your right lower leg becomes warm... Your knee... Your right upper leg... Your right leg is heavy and warm...
20. Feel your left lower leg warming and relaxing... Your knee... upper leg... your left leg is warm and heavy...
21. Both of your legs are completely relaxed...
22. Repeat the following relaxing statements in your mind, imagining each one:
23. My right arm is warm
24. My left arm is warm
25. My right arm is heavy
26. My left arm is heavy
27. My right arm is warm and heavy
28. My left arm is warm and heavy
29. Both arms are warm and heavy
30. My right leg is warm
31. My right leg is heavy
32. My left leg is warm

33. My left leg is heavy
34. Both legs are warm and heavy
35. My arms and legs are warm
36. My arms and legs are heavy
37. My arms and legs are very warm and very heavy
38. My heart rate is slow and regular
39. My heart beat is slowing comfortably
40. My forehead is cool
41. My arms and legs are warm and heavy
42. My heart beat is slow and steady
43. My forehead is cool
44. My arms and legs are very warm... relaxed...
45. My arms and legs are so heavy and relaxed
46. My heartbeat is steady... Slow... Relaxed...
47. My forehead is smooth and cool
48. I am relaxed
49. I am relaxed
50. (pause)
51. Now it is time to reawaken your body from this autogenics session. Feel your mind becoming more alert.
52. Wiggle your fingers. Feel your hands and arms reawakening.
53. Wiggle your toes.
54. Take a deep breath in as you stretch your arms, reaching high above your head. Exhale and lower your arms.
55. Open your eyes, and sit quietly for a moment as you become fully alert.
56. When you have returned to your usual level of wakefulness, your autogenics session is complete.

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## Appendix I: Stadulis Letter

**Subject:** Re: Permission to use the CSAI-2C  
**From:** robert stadulis (rstaduli@gmail.com)  
**To:** way1lt@yahoo.com;  
**Date:** Monday, January 30, 2012 1:02 PM

Christian:

Thank you for responding to my request so quickly. Sharing your proposal abstract was very helpful in conveying the utility of the CSAI-2C within your study. We are pleased always to see the CSIA-2C employed in investigations and **grant permission** to you to use the CSAI-2C in your dissertation research.

When your study is completed, we would appreciate receiving a copy of your dissertation abstract to add to our listing of studies completed using the CSAI-2C.

Best wishes for the successful completion of your investigation and your degree.

Bob Stadulis

On Mon, Jan 30, 2012 at 12:42 PM, Chris Way <way1lt@yahoo.com> wrote:

Dear Dr. Stadulis,

It is an honor to write to you. I am a doctoral student and I am interested in using the CSAI-2c for my dissertation. I need to gain permission from the copyright holder to comply with the legal requirements of the University IRB process. May I have your permission to use your scale in my study. I have attached a copy of the proposal abstract if you are interested in my proposed study. Thank you for considering my use of this scale.

Sincerely,

Christian Way

--

Robert E. Stadulis  
Emeritus Professor (Active)  
Exercise Science & Sport Studies  
College of Education, Health & Human Services  
Kent State University  
Kent OH 44242  
330-672-2117  
fax: 330-672-4106  
rstaduli@kent.edu

## Appendix J: Nowicki Letter

**Subject:** RE:  
**From:** Nowicki Jr., Stephen (snowick@emory.edu)  
**To:** way1lt@yahoo.com;  
**Date:** Sunday, January 29, 2012 4:34 PM

Dear Chris,

You have my permission to use the ANSIE. It looks like a very interesting project. Let me know if you need a copy of the ANSIE manual and/or the index and reference list of studies that have used the scale.

Good luck in your work.

Steve Nowicki

---

**From:** Chris Way [mailto:way1lt@yahoo.com]  
**Sent:** Sunday, January 29, 2012 10:59 AM  
**To:** Nowicki Jr., Stephen  
**Subject:**

Dear Dr. Nowicki,

It is an honor to write to you. I am a doctoral student and I am interested in using the Nowicki-Strickland Locus of Control Scale for my dissertation. I need to gain permission from the copyright holder to comply with the legal requirements of the University IRB process. May I have your permission to use your scale in my study. I have attached a copy of the proposal abstract if you are interested in my proposed study. Thank you for considering my use of this scale.

Sincerely,  
Christian Way

## Appendix K: IRB approval

IRB &lt;IRB@waldenu.edu&gt;

Apr 18

Dear Mr. Way,

Notice: The Walden IRB approval for the study # 05-21-12-0024558, will expire on 5/30/14. If you wish to request an additional year of IRB approval, please make sure the IRB receives this form requesting continuing review prior to 5 p.m. central time on 5/9/14. Failure to return this form will result in expiration of your Walden IRB approval for your study.

Please note, you **ONLY** need to submit the attached form if you are still collecting data or if there is a chance you will be collecting more data in the future. If you are done with the data collection and are in the data analysis stage, or the study is complete, it is fine to let the approval expire.

Sincerely,  
Jenny Sherer, M.Ed., CIP  
Associate Director  
Office of Research Ethics and Compliance  
Email: [irb@waldenu.edu](mailto:irb@waldenu.edu)  
Fax: [626-605-0472](tel:626-605-0472)

Office address for Walden University:  
100 Washington Avenue South, Suite 900  
Minneapolis, MN 55401

Information about the Walden University Institutional Review Board, including instructions for application, may be found at this link: <http://researchcenter.waldenu.edu/Office-of-Research-Ethics-and-Compliance-IRB.htm>

## Appendix L: Community Partners Cooperation Ltr.

*Letter of Cooperation from Community Research Partner*

**To:** Christian Way  
 1 Idlewood Lane #63  
 Kittery, ME 03904  
 EMAIL: christian.way@waldenu.edu

**From:** (**Place your name and gym club name and address here**)

Place potential # of (USAG L2 - L6 ) compulsory level participants for study: \_\_\_\_\_

Place potential # of (USAG/AAU) Optional level participants for study: \_\_\_\_\_

April 2, 2013

Dear Chris,

Based on my review of your research proposal, I give permission for you to conduct your study on competitive anxiety among USAG Junior Olympic Gymnasts within our club (**Place your gym club name here**). As part of this study, I (**Place your name here**) authorize you to send survey forms and consent forms to be distributed to the participants enrolled in the study. Individuals' participation will be voluntary and at their own discretion.

We understand that our organization's responsibilities include: handing out forms, collecting forms and mailing forms back in pre-addressed stamped envelope. We (**Place your gym club name here**) reserve the right to withdraw from the study at any time if our circumstances change.

I confirm that I am authorized to approve research in this setting.

I understand that the data collected will remain entirely confidential and may not be provided to anyone outside of the research team without permission from the Walden University IRB.

Sincerely,

---

Please type/sign your name here and date

Walden University policy on electronic signatures: An electronic signature is just as valid as a written signature as long as both parties have agreed to conduct the transaction electronically. Electronic signatures are regulated by the Uniform Electronic Transactions Act. Electronic signatures are only valid when the signer is either (a) the sender of the email, or (b) copied on the email containing the signed document. Legally an "electronic signature" can be the person's typed name, their email address, or any other identifying marker. Walden University staff verify any electronic signatures that do not originate from a password-protected source (i.e., an email address officially on file with Walden).

insert appendix here. Appendices are ordered with letters rather than numbers. If there is but one appendix, label it Appendix, followed by the title, with no letter designation.

The appendices must adhere to the same margin specifications as the body of the dissertation. Photocopied or previously printed material may have to be shifted on the page or reduced in size to fit within the area bounded by the margins.

If the only thing in an appendix is a table, the table title serves as the title of the appendix; no label is needed for the table itself. If you have text in addition to a table or tables in an appendix, label the table with the letter of the appendix (e.g., Table A1, Table A2, Table B1, and so on). These tables would be listed in the List of Tables at the end of the Table of Contents.

If you include in an appendix any prepublished materials that are not in the public domain, you must also include permission to do so.

*Template updated 2/18/15.*