

**PSYCHOLOGICAL CHARACTERISTICS OF ELITE AND
NON-ELITE LEVEL GYMNASTS**

A Record of Study

by

STEVEN B. WAPLES

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

December 2003

Major Subject: Physical Education

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December 2003

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ABSTRACT

Psychological Characteristics of Elite and
Non-Elite Level Gymnasts. (December 2003)
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Literature has indicated that there are psychological characteristics in elite athletes of various sports that are significantly different than those of non-elite level athletes.

The purpose of this study was to discover the different psychological characteristics associated with elite level gymnasts, and contrast the results with psychological characteristics of competitive gymnasts of other levels using the Athletic Coping Skills Inventory-28.

Participants in this study were 195 gymnasts from gymnastics training centers throughout the United States. Results indicated that there was a significant difference in the Personal Resources Score (PCR) between the elite gymnast and all other levels. Furthermore, a significant difference was demonstrated among four of the seven subscales making up the Athletic Coping Skills Inventory-28. The study supports the hypothesis that the psychological make-up of “elite” level gymnasts is different than that of other competitive gymnastics levels.

DEDICATION

I dedicate this Record of Study to my son, Tanner Rayne Waples, a beautiful baby boy who was sent to live with the angels on the day he was born, August 13th, 2001. Your mother and I love you very much and we find much solace in knowing that you are watching over your three brothers, Braeden, Zachary, and Ryland.

God Bless you,

Daddy and Mommy

ACKNOWLEDGMENTS

I would like to thank my family, friends, teachers, and students for their wonderful support in all that I have tried to accomplish over the past several years. I would especially like to thank my wonderful wife, Kimberly, for her ‘almost unlimited’ patience and support while I finished my education.

I would like to express my sincere appreciation to Dr. Tony Bourgeois and Dr. Arnold LeUnes for contributing so much help with my research and Record of Study, to Dr. Frank Ashley and Dr. John Dollar for their help and participation on my advisory committee, and to Dr. Robert Armstrong for his leadership and display of fairness.

I would also like to thank Dr. Darlene Schmidt for her friendship, help, and support over the past 20 years.

Finally I would like to extend a very special thank you to Dr. Carl Gabbard, serving as the Chairman of my doctoral committee, who has very patiently guided me through my doctoral program. Dr. Gabbard has given me a new appreciation for thoroughness, which I hope to remember and incorporate in all my work. Thank you for being there with your continual and invaluable support, effort, and assistance in the completion of this project.

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CHAPTER I

INTRODUCTION

The following section represents a review of literature on the psychological characteristics of elite and non-elite level gymnasts and focuses on the primary aspects of the topic related to the research questions set forth. This chapter is divided into two sections. The two sections include the following: (a) a summary of the research literature involving psychological assessments of competitive gymnasts, and (b) a review of the literature concerning studies involving the Athletic Coping Skills Inventory – 28 (ACSI-28).

Psychological Assessments of Competitive Gymnasts

There has been an increase in the amount of research on sport psychology in the United States, however, studies involving psychological descriptions of competitive gymnasts have received much less attention. The most popular method for assessing athletes psychologically is the use of self-report inventories. Sport psychologists use a variety of these inventories for the purpose of assessing an athlete's psychological characteristics and related behavior. Based on the results of such psychological assessment, strategies or programs designed to remediate noted psychological deficiencies may be implemented. Reasons for psychological assessments of athletes

This Record of Study follows the style and format of *The International Journal of Sport Psychology*.

include: assessing whether or not athletes might be ready to enter an elite training program (Porat, Lufi, & Tenenbaum, 1988), predicting the risk of injury (Lowry & Leveau, 1982; Kerr & Minden, 1988; Kolt & Kirkby, 1994), determining what position on a team players are most suited (Daus, Wilson, & Freeman, 1986), helping athletes with performance outcomes (Cheung & Lo, 1996; Cogan & Petrie, 1995; Mace & Carroll, 1989), predicting eating disorders (Petrie, 1993), and assessing why athletes may be leaving a sport early in their careers (Hayashi, 1998). Additionally, research delineating psychological characteristics of exemplary sport participants may allow identification of the strengths and weaknesses of individual athletes, and ultimately, with strategic interventions, facilitate performance enhancement.

A number of studies have been published involving psychological assessments of gymnasts. Krane, Snow and Greenleaf (1997) conducted a qualitative case study of an elite gymnast to determine whether the creation of too much pressure had detrimental effects on the gymnast. The study was based on a growing concern that too much of the wrong type of pressure has been applied to many elite level gymnasts. Often, administrators, coaches, parents, and athletes in elite gymnastics are willing to do whatever it takes to win, regardless of the long-term impact on the athletes. The results of this study demonstrated that an ego-involved motivational environment was developed and reinforced by the coaches and parents of the gymnast. An ego-involved athlete will most likely display behaviors that are counterproductive to long-term achievement in order to achieve immediate success (Duda, Chi, Newton, Walling, & Catley, 1995). In 1983, a sports psychology program was developed and implemented

with the USA Women's gymnastics team. It was a five-year service and research program, which included data for longitudinal analyses (Gordin & Henschen, 1989). The researchers specified five psychological characteristics that are important in the sport of gymnastics. The five critical areas studied were self-concept, emotional set, achievement motivation, concentration, and anxiety. The first of these, self-concept, was assessed by the Tennessee Self-Concept Scale (Fitts, 1965; Marsh & Richards, 1988). The researchers point out that self-concept of elite gymnasts is not always as high as it should be. The second psychological characteristic, emotional set, was assessed by the Profile of Moods State Inventory (POMS; McNair, Lorr, & Droppleman, 1971). Another characteristic, achievement motivation, was examined by the Scale for Sporting Environments (Rushall & Fox, 1980). As the researchers point out, it is extremely important in gymnastics to approach a competition with the thought of succeeding rather than avoiding failure. One of the most important psychological characteristics to a gymnast is concentration, which was quantified by Nideffer's Test of Attentional and Interpersonal Style (TAIS; Nideffer, 1990). Concentration is extremely important to a gymnast considering the difficult and dangerous skills they are performing as well as the need to be flawless in their execution. Finally, anxiety level was examined utilizing the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970). Anxiety, being transient, is one of the variables requiring frequent assessment.

Although the primary goal for Gordin and Henschen (1988) was to help prepare the national team for international competition and the 1988 Olympics, they were also

trying to put together data that could be used for future coaching and training. One of their biggest obstacles for acquiring data for this longitudinal study was the high attrition rate of the athletes. An interesting observation by the researchers was that the coaches needed as much or more help with stress and anxiety at the Olympics as did the athletes. It is likely that the coach's anxiety and stress was communicated to the athlete.

While the utility of sports psychology has been researched and practiced in the United States, quite a bit has also been done in Eastern Europe. To this end, Roberts and Kimiecik (1989) interviewed Dr. Gerd Konzag of the former German Democratic Republic (GDR). Many differences were pointed out between the Eastern European countries and the West. First of all, the inclusion of sports psychology was much more important to the Eastern European countries. Secondly, the approach to sports psychology is different. Sport psychologists in the USA work directly with the athletes, whereas, the Eastern Europeans believed that the coach should be the sport psychologist. In other words, the job of the sport psychologist is to help educate the coach. Furthermore, coaches in the former GDR completed a thorough training program that included extensive education in Sports Psychology. In western countries, coaches are seldom required to have formal training or to work closely with sport science practitioners or researchers. In an interview with Henrietta Onodi, 1992 Olympic gold medalist and world champion from Hungary, it was pointed out that she and her teammates have completed many psychological assessments throughout their

careers. In contrast, very few, if any of the 195 gymnasts surveyed in this researcher's study had ever been presented with a psychological assessment of any kind.

Edwards and Huston (1984) are in agreement with Dr. Konzag, at least on one principle. They believe it is essential that coaches need psychological training first since they set the tone of an athletic team. The researchers make some valid points that seem relevant to sports such as gymnastics. Few athletes have received psychological training that in any way approaches the complexity of their physiological training, even though many athletes believe that the mental aspects of their sport prevail over the physical aspects.

One of the benefits of more research on psychological variables in gymnastics, mentioned earlier, is for the development and implementation of intervention programs designed to enhance performance. Mace and Carroll (1989) studied the effect of stress inoculation training as related to gymnastics performance, which consisted of training in relaxation, imagery, and making self-statements in order to develop a set of coping skills. They found that stress inoculation training was effective in minimizing performance deterioration. Normally, competitive stress and the associated increases in anxiety result in considerable disruption of skill performance. This finding is particularly important since the ultimate aim of stress management programs in sport is to prevent high levels of anxiety from disrupting performance.

Up until the late '90's gymnastics experienced a rapid growth in number of participants. In fact, during the '70's and '80's women's gymnastics became the fastest growing sport in America (McAuley et al., 1987). Today, children are pursuing

athletic careers at younger ages, exposing an increasing number of them to potential injury. This trend is particularly evident in women's gymnastics (Caine, Cochrane, Caine, & Zemper, 1989). Anxiety has been the psychological factor most commonly linked to these sporting injuries, and there are reports of a high frequency of injuries in gymnastics (Kolt & Kirkby, 1994). Elite gymnasts were found to have the highest anxiety level when compared to elite athletes from eight different sports. Little attention has been paid to the relationship of anxiety and injury in gymnastics. Kolt and Kirkby tested 115 competitive gymnasts with the POMS-Bipolar Form (POMS-BI; Lorr & McNair, 1982) and the Competitive State Anxiety Inventory-2 (CSAI-2; Vealey, 1990) and found that gymnasts with four or more injuries scored higher on the CSAI-2 and the POMS-BI for measures of anxiety and tiredness, and lower scores on composure and feeling energetic. The question that might be asked is whether the gymnasts were more anxious and therefore became injured, or, were they more anxious because they have been injured. The answer to this question needs to be determined before any real conclusions can be made.

Another area that has been getting quite a bit of attention, especially in sports like gymnastics is that of eating disorders, where pressure to keep a specific body type has led to unhealthy eating styles. For example, Petrie (1993) showed that more than 60% of gymnasts in his study met the criteria for one of the intermediate disordered eating categories, while only 22% reported eating behaviors that could be classified as normal or non-disordered. For the interested reader, LeUnes (2002) provides a summary of studies concerning eating disorders in athletes.

Another study by Britton (1986) attempted to identify the nature and degree of specific cognitive attributes and affective attributes (state anxiety level) possessed by female junior elite gymnasts compared to a similar age group of females in the general population. Britton suggests that both cognition and affect are important elements of athletic performance. Her contention was that there were obvious physical ability differences between these two groups, but were there also personal and intellectual differences that would influence performance. The cognitive attributes were assessed using the Coding B Subtest of the Wechsler Intelligence Scale for Children – Revised (WISC-R; Wechsler, 1974), an instrument that measures various cognitive dimensions of intelligence. The affective attributes were assessed using the Sport Competition Anxiety Test (Martens, 1977). The results indicated that elite gymnasts differ significantly in the degree of specific cognitive attributes. These young gymnasts exhibited superior abilities in short-term visual memory, psychomotor speed, visual-motor coordination, and the capacity to learn new visual material quickly. The junior elite gymnasts also demonstrated a higher level of trait anxiety. In spite of their higher level of anxiety, the junior elite gymnasts still scored much higher on the Coding B Subtest. Because of this finding Britton suggested that there was no relationship between specific cognitive attributes and affective attributes for these athletes. She adds that this is contrary to previous research, which indicates that there is an interaction between the two, and that cognitive attributes are subject to influence by anxiety, distractibility, and working under pressure.

Reeds (1995) reports a study designed to predict performance from selected personality traits and state anxiety levels. Twenty-one male and 35 female competitive gymnasts participated in the study and were included in the data collection. The purpose of the study was to determine the relationship between selected personality traits, state (pre-competitive) anxiety and performance in competitive gymnasts. A second purpose was to develop a personality-anxiety-based model to predict performance among competitive gymnasts. The study failed to show that pre-competitive anxiety was a significant predictor of gymnastics performance. Furthermore, the hypothesis related to the personality-performance relationship was not supported.

Aronson (1982) utilized Nideffer's Test of Attentional and Interpersonal Style (TAIS; Nideffer, 1990) to identify attentional and interpersonal factors between elite and non-elite collegiate gymnasts. The basis for the TAIS is that athletic performance is closely related to attentional style or focus and, once this is isolated, predicting athletic performance in a variety of situations becomes possible (LeUnes & Nation, 2002). Results from the study indicated a significant difference between the two groups. On the other hand, qualitative analysis (interviews) of these same gymnasts, revealed few differences with respect to the way gymnasts prepare mentally for competition.

Hayashi (1998) examined anxiety levels and ways of coping in gymnasts in order to determine why certain gymnasts continue to participate in their sport and others do not. The results indicated an interaction between several variables and youth sport

participation. Specifically, gymnasts with higher anxiety and low abilities to cope with adversity are more likely to discontinue gymnastics training. On the other hand, gymnasts with support from family and friends were more likely to continue. This study also revealed that gymnasts who perceived coaches as providing low amounts of non-reinforcement/ignoring mistakes feedback (i.e., ignoring the athlete when she makes a mistake), and, who perceived coaches as providing high amounts of punishment-oriented feedback, (i.e., immediate conditioning, kicked out of the workout), were more likely to discontinue gymnastics training. It is the researcher's opinion that many gymnastics coaches believe that non-reinforcement/ignoring mistakes feedback and the use of punishment-oriented feedback are the best ways to inculcate disciplined performance in their athletes. On the other hand, to become a champion gymnast, the athlete must remain in the sport and continue to train. If gymnasts quit the sport because of too much non-reinforcement/ignoring mistakes and too much punishment-oriented feedback then they will not become successful in their sport.

Kerr and Pos (1994) demonstrated a difference in the psychological mood experience between high level and low level competitive gymnasts both in the training setting as well as the competition setting. The researcher utilized the Telic State Measure (Svebak & Murgatroyd, 1985) to measure mood during gymnastic training and competition, and the Stress Arousal Checklist (Mackay, Cox, Burroughs, & Lazzerini, 1978) to measure stress and arousal. The training program for the higher level gymnasts was longer and more serious-minded. The results indicated that the arousal

pattern was more consistent between training and competition for the higher level group than for the lower level group. The researchers concluded that for the lower level gymnasts to perform better in competition, they would need to decrease the arousal discrepancy between training and competition. It was also noted that there was little difference in the effort level for the higher level gymnasts between competition and training, whereas there was a significant difference for the lower level group.

Arguably, the study that best supports the need for psychological testing of competitive gymnasts was done to help understand why some gymnasts succeed and others do not (Fitzpatrick, 1999). The study involved comparisons of elite and non-elite level gymnasts, and found that the most commonly reported attributes for both successful and unsuccessful performance outcomes were psychological factors. Investigation of the types of causal attributions of 60 competitive gymnasts was assessed by the Sport Attributional Style Survey (SASS; Hanrahan & Grove, 1990). Causal attributions are inferences made about why something happened (LeUnes & Nation, 2002). Results indicated that successful performances were rated as stable, internal and controllable by the gymnasts. Up until this time, it was generally believed that ability was the most common cause of successful outcomes and that unsuccessful performance outcomes should result in unstable, external and uncontrollable attributions (Weiner, 1985).

As is evident from the literature, the psychological characteristics of gymnasts can have a profound influence on how they perform in their competitive careers. One important question is which psychological inventory will best assess these

characteristics. If only one characteristic is being studied, then the best test would be one specific for that characteristic. However, when trying to predict success in a sport like gymnastics, or trying to identify one of several psychological constructs to determine strengths and weaknesses, the Athletic Coping Skills Inventory-28 (ACSI-28; Smith, Schutz, Smoll, & Ptacek (1995) has emerged as one of the best.

The Athletic Coping Skills Inventory - 28

The Athletic Coping Skills Inventory-28 (ACSI-28) measures the factors deemed crucial to success in competitive athletic performance (LeUnes, Bourgeois, & Guarnieri, 1999). A description of the ACSI-28's sub-scales are as follows:

Coping with Adversity: Remains positive and enthusiastic even when things are going badly; remains calm and controlled; can quickly bound back from mistakes and setbacks.

Peaking under Pressure: challenged rather than threatened by pressure situations and performs well under pressure; a clutch performer.

Goal Setting and Mental Preparation: Sets and works toward specific performance goals; plans and mentally prepares herself for competition and clearly has a "game plan".

Concentration: Not easily distracted; able to focus on the task at hand in both practice and competition situations, even when adverse or unexpected situations occur.

Freedom from Worry: Does not put pressure on herself by worrying about performing poorly or making mistakes; does not worry about what others will think if she performs poorly.

Confidence and Achievement Motivation: Is confident and positively motivated; consistently gives 100% during practice and competition and works hard to improve her skills.

Coachability: Open to and learns from instruction; accepts constructive criticism without taking it personally and becoming upset.

The ACSI-28 was developed by Smith et al. (1995) of the University of Washington. Since then the ACSI-28 has been used in the evaluation of minor league baseball players (Smith & Christiansen, 1995), basketball players (Goudas, Theodorakis, & Karamousalidis, 1998), elite rowers (Baltzell, 1999), major league umpires, (LeUnes et al., 1999), nationally ranked soccer players (Junge et al., 2000), and Pacific 10 Championship golfers (Christiansen, 2000). Research to date, though sparse, suggests that the ACSI-28 shows promise as a measure of mental skills essential to success in sports (Bourgeois, Loss, Meyers, & LeUnes, 2003). Whereas results have been mixed, or even inconclusive for several psychological tests of athletes, the ACSI-28 has been regarded as a psychometrically sound and useful instrument.

Smith and Christiansen (1995) conducted a study designed to determine the role of physical and psychological skills as predictors of performance and continued participation in professional baseball players. Results indicated that psychological and physical skills were largely independent of one another and thus appear to be measuring separate and independent skill domains. The researchers found that scores from the ACSI-28 accounted for as much variance in batting average as did physical skills (about

20%). For pitching, the psychological measures accounted for much more variance in earned run average than did physical skills.

The ASCI-28 has also been shown to be an important correlate of successful golf performance in a study by Christiansen (2000) involving golfers participating in the Pacific-10 Golf Championships. The total Coping Skills score from the ACSI-28 was significantly correlated with overall stroke average for men and women, even after statistically controlling for ratings of physical talent and social desirability, indicating that the ACSI-28 had unique predictive ability. Of the seven subscales of the ACSI-28, Confidence and Achievement Motivation and Peaking under Pressure were significant predictors in both this and the previous study leading Christiansen to suggest that these two subscales may be particularly robust correlates of athletic performance.

Baltzell (1999) studied psychological factors related to rower's ability to cope in elite competition. Participants included 61 contenders and/or members of the United States national rowing team. The ACSI-28 and the Brief COPE (Carver, 1997) were tests administered in this study. The Brief COPE measure employed was developed to assess a broad range of coping responses whereas the ACSI-28 was specifically designed to assess the psychological skills implemented by athletes in order to better cope successfully within a sport context. Results indicated that coping was positively and significantly related to athletic coping skills. Coping correlated well with three of the ACSI-28 subscales: Confidence, Goal setting, and Mental preparation. Baltzell endorsed the ACSI-28 explaining that it may serve as a useful guide for future research since it appears to indicate which of the mental skills are most important for the athlete

to develop in order to enhance and optimize their coping skills. One concern that Baltzell had, however, was the lack of correlation between Coping and the Coping with Adversity subscale in the ACSI-28. Baltzell asserts that these two scales should be more closely related since theoretically, those athletes who cope effectively would also cope with adversity. More research needs to be done with both of these inventories to see if, indeed, they are measuring the same thing and, if future testing might show a closer relationship. Certainly, more thorough documentation of the psychometric characteristics of the Brief COPE scale is in order.

Psychological characteristics of soccer players were analyzed by Junge et al., (2000). As in other sports, soccer requires not only a high level of physical performance, but mental preparation and psychological skills. Junge and his associates hypothesized that players of different levels of play might display differences among the various psychological factors. Also, it was believed that identifying the psychological factors that influence soccer performance could provide important information to improve the athlete's preparation for the game, influence the occurrence of injuries and lead to intervention methods to improve fair play.

The ACSI-28 was used in part of Junge's study to assist with the analysis of soccer players and fair play. Results from the study indicated that the psychological characteristics of players who did not talk or listen to an opponent during a game were almost the opposite of those who did. Players, who refrained from verbal interaction with the opponent more often prepared mentally for the game, had better concentration,

were easier to coach, and coped better with adversity than the players who talked or listened to an opponent during the game.

A common problem encountered with self-report measures in all psychological assessment domains is the presence of socially desirable responding (Bourgeois et al., 2003). The ACSI-28 seems relatively immune to the effects of socially desirable responding. Bourgeois and his colleagues studied the relationship between the ACSI-28 and impression management and self-deception aspects of socially desirable responding. Results from this study found the ACSI-28 to be relatively free from impression management response bias. Interestingly, all the ACSI-28 subscales were strongly affected by self-deception response bias. The researchers suggest that further study is needed concerning the effects of self-deception response bias. Interestingly, they point out that self-deceptiveness may prove to be essential to the development of optimal psychological skills and therefore emerge as an important athletic coping skill.

The ACSI-28 was employed in this study as an index of psychological factors that might be related to performance. It seems that the ACSI-28 has proven to be psychometrically sound. Validation of the ACSI-28 instrument was done using confirmatory factor analysis (Smith, Schultz, Smoll, & Ptacek, 1995). The confirmatory validity of the instrument was evaluated with the traditional goodness of fit indices. The ACSI-28 exceeded the goodness of fit criteria, and, all factor loadings were significant at $p < .001$. It is clear that the ACSI-28 possesses factorial validity.

As has been shown in the very thorough documentation of the psychometric soundness of the ACSI-28, and, in view of its brevity (28 items), it is the instrument of

choice, in the present study, for the examination of differences in selected psychological characteristics between groups of elite and non-elite level gymnasts.

Purpose of the Study

The broad purpose of this study was to examine the psychological characteristics of competitive female gymnasts. More specifically, this study was designed to determine if there are psychological differences between elite and non-elite level gymnasts.

Assumptions and Limitations

Assumption

The following assumption is made.

The subjects responded truthfully to the questionnaire.

Limitations

The following limitations exist in this study.

The results of the survey were limited to gymnasts of USA Gymnastics (USAG) competitive programs.

Only female gymnasts participated in the study.

Only the sport of gymnastics was included in the study

Delimitations

The delimitation of the study is as follows: All respondents will be competitive gymnasts.

CHAPTER II

THE STUDY

Gymnastics is a sport that has gained considerable attention in recent years due in large part to its popularity and the very young age at which gymnasts begin heavy training. For years coaches of various sports, including gymnastics, have tried to pre-select potentially great athletes using different methods ranging from physical tests to an array of psychological assessments. The ability to predict the behavior of an athlete has many uses; one of the most important of these is being able to assess what contributions an athlete will provide to an organization two, three, or 10 years down the road (LeUnes et al., 1999).

Most prediction tests have been of the physical assessment nature. Typically, these involve tests of strength, flexibility, body type, speed, and power. In more recent years, testing has included psychological assessments. For example, Krane, Snow, and Greenleaf (1997) conducted a qualitative case study of an elite gymnast to determine whether creation of too much pressure had detrimental effects on the gymnast. The study was based on a growing concern that too much of the wrong type of pressure has been applied to many elite level gymnasts. Often, administrators, coaches, parents, and athletes in elite gymnastics are willing to do whatever it takes to win, regardless of the long-term impact on the athletes. The results of this study demonstrated that an ego-involved motivational environment was developed and reinforced by the coaches and parents of the gymnast throughout her career. Subsequently, the gymnast relied on

social comparison, an emphasis on external feedback and rewards, and a need to demonstrate her superiority for motivation.

A study by Britton (1986) attempted to identify the nature and degree of specific cognitive and affective attributes possessed by female Junior Elite gymnasts compared to a similar age group of females in the normal population. At the time of Britton's research very few studies had focused on the psychological differences rather than the physical differences of high level gymnasts. The results indicated that elite gymnasts differ significantly in degree of specific cognitive attributes. The finding demonstrated that these young gymnasts exhibited superior abilities in short-term visual memory, psychomotor speed, visual-motor coordination, and the capacity to learn new visual material quickly.

Reeds (1995) also examined gymnasts with the intent to predict performance from selected personality traits and state anxiety levels. The purpose of the study was to determine the relationship between selected personality traits, state (pre-competitive) anxiety and performance in competitive gymnasts. A second purpose was to develop a personality-anxiety-based model to predict performance among competitive gymnasts. The study found that pre-competitive anxiety was not predictive of gymnastics performance.

Collegiate gymnasts were the subjects in a study by Aronson (1982), that attempted to identify attentional and interpersonal factors between elite and non-elite gymnasts. Nideffer's Test of Attentional and Interpersonal Style (TAIS; Nideffer, 1990) indicated a difference between the two groups, however, qualitative analysis of

the subjective data, garnered via interviews, revealed few differences with respect to the way gymnasts prepare mentally for competition.

Hayashi (1998) examined anxiety levels and ways of coping in gymnasts in order to determine why certain gymnasts continue to participate in their sport and others do not. The results indicated an interaction between several variables and youth sport participation. Specifically, gymnasts with higher anxiety and low abilities to cope with adversity were more likely to discontinue training, while gymnasts with support from family and friends were more likely to continue. This study also revealed that gymnasts who perceived coaches as providing low amounts of non-reinforcement/ignoring mistakes feedback, and who perceived coaches as providing high amounts of punishment-oriented feedback, were more likely to discontinue gymnastics training.

Kerr and Pos (1994) demonstrated a difference in the psychological mood experience between high level and low level competitive gymnasts in training as well as competition settings. The training program for the higher level gymnasts was longer and more serious-minded. The results indicated that the pre-performance arousal discrepancy scores between competition and training were significantly different for the lower level group, but not for the higher level group. The researchers concluded that for the lower level gymnasts to perform better in competition, they would need to decrease the arousal discrepancy between training and competition. It was also noted that for the higher level gymnasts there was little difference in the effort between competition and training, whereas a significant difference was noted for the lower level group.

Finally, the study that perhaps best supports the need for psychological testing of competitive gymnasts was done to help understand why some gymnasts succeed and others do not (Fitzpatrick, 1999). The study involved comparisons of elite and non-elite level gymnasts, and found that the most commonly reported attributes for both successful and unsuccessful performance outcomes were psychological factors. An investigation by Unestahl (1981), involving 5000 Swedish athletes of various ages and gender who participated in different sports, showed a clear relationship between inner mental training and level of competence. Prior to this study, it was generally believed that ability was the most common cause of successful outcomes (Weiner, 1985).

The literature indicates two findings relevant to this study. First, gymnasts display different psychological characteristics depending on their level of competition (Fitzpatrick, 1999). If, indeed, higher level successful gymnasts can be determined by psychological characteristics, it could make it easier for coaches to decide which athletes to invest their time and effort in training for the elite level. Secondly, the literature indicates that with better information about the athletes, coaches are apt to be more careful recommending an athlete to commit to an elite training program (Kerr & Pos, 1994). As it stands now, many coaches solicit parents to enroll their children into expensive and time consuming training programs in hope of developing an elite gymnast. Knowing whether or not a young gymnast should be in an elite training program would be of benefit to the athlete, parents, and to the coach. Based on these comments, it is apparent that a study investigating psychological characteristics of different levels of gymnasts is warranted.

The broad purpose of this study was to examine the psychological characteristics of competitive female gymnasts. More specifically, this study was designed to determine if there are psychological differences between elite and non-elite level gymnasts.

Method

Participants

The general population consisted of female competitive gymnasts, 10 to 28 years of age, drawn from 17 gymnastics clubs. Initially, 18 clubs agreed to participate, however, the surveys from one club were never received, resulting in a 94.44% return. The clubs asked to participate were derived from an invitational mailing list of clubs competing within the USAG level format. This not only allowed for a broad sample of clubs but it provided consistency among the clubs in differentiating among levels of gymnasts. A purposive sampling technique was used in selecting clubs for obtaining subjects. The basis for club selection was three-fold: (a) gymnastics clubs with several levels of competitive gymnasts, (b) established clubs that had at least 10 gymnasts training at levels seven through elite, and (c) at least one club from each region of the country. Please refer to Table I for a summary of the respondents.

Participating in this study were the five highest levels of gymnasts based on criteria established by USAG, the national governing body for gymnastics. Level 11 is comprised of gymnasts ranked as “elite”. This is the highest level of competitive gymnastics and is the group from which the teams are selected to represent the USA in

TABLE I

Summary of Respondents

	Mailing N	Response N	Percentage of Original Sample
Gymnastics Clubs	18	17	94.44%
Gymnasts	235	195	83.00%

Regions of the Country

Gym Club Location	Northwest	Southwest	North Central	South Central	Northeast	Southeast
	N = 3	N = 2	N = 2	N = 7	N = 1	N = 2

international competition. This is a very select group of athletes, extremely serious in their training, and very competitive for positions on the national team. Level 10 is ranked just below the “elite” level. Gymnasts at Level 10 are very advanced and some of them will go on to become elite level (Level 11) competitors. Other gymnasts at Level 10 could quite possibly qualify for the elite level but for one reason or another choose not to. The majority, however, do not possess the skill level, competitiveness, and/or willingness to commit to the amount of time and training necessary to compete at the elite level. Nevertheless, these are very advanced and accomplished athletes. Level 9 is the next lower level and could be classified as “intermediate-advanced”. Gymnasts in this level are very good and many should work their way up to Level 10. Many others will finish their careers at this level. The biggest jump between levels may be from Level 9 to Level 10. The next lower level, Level 8, could be classified as intermediate. Many of the gymnasts at this level are young and are working their way up to higher levels. For others at this level, however, gymnastics is proving difficult for them and this will be a stopping place in their careers. Level 7 is a beginner-intermediate level. Although considered higher than the compulsory levels preceding it, Level 7 gymnasts are predominantly young and inexperienced gymnasts. Several at this level will move up to the higher levels, however, many will find that training and competing gymnastics is not what they really want to do. This is the level when gymnasts get their first personalized routines to train and compete making it especially fun and exciting for them.

Instrument

Psychological variables were assessed for each gymnast using the Athletic Coping Skills Inventory-28 (ACSI-28; Smith et al., 1995). The ACSI-28 is a self-report questionnaire developed using exploratory and confirmatory factor analysis. The questionnaire measures seven sport specific psychological coping skills as well as a total personal coping resource score. Specifically, the ACSI-28 provides indices of seven psychological coping skill subscales: (a) Coping with Adversity, (b) Peaking under Pressure, (c) Goal Setting and Mental Preparation, (d) Concentration, (e) Freedom from Worry, (f) Confidence and Achievement Motivation, and (g) Coachability. The scales are then summed to yield a Personal Coping Resources score, which should reflect a multifaceted psychological skills construct.

Procedure

A packet containing a two-page questionnaire was sent to the 18 gymnastics club head coaches and/or directors. At the top of the first page subjects were instructed to fill out a brief demographic summary. The categories included age, ethnicity, gender, and gymnastics level. The packet also included parental consent forms, pencils, an audiotape, containing the instructions and the survey questions, and a postage paid envelope for the return of the questionnaires. All 28 statements were formatted on a four point Likert type scale with response choices being "Almost Never", "Sometimes", "Often", and "Almost Always".

The assessment packages were mailed in the winter of 2002-2003. Follow-up telephone calls were made to encourage coaches and directors to return the completed

survey. A cover letter, which explained the nature and purpose of the study, along with instructions as to how to complete and return the questionnaire and consent forms, was included in the packet.

The use of a questionnaire has obvious limitations. One such limitation is basing our conclusions on self-reports rather than observations (Thomas & Nelson, 1990). However, for the purpose of this study it was the most effective way of obtaining the information needed. Furthermore, the questionnaire is psychometrically sound and has substantial support in the literature as a valid assessment tool, which will ensure the most valid results. Another limitation when using a questionnaire is the number of responses returned to the researcher relative to the number sent out. The design and appearance of the cover letter, and the questionnaire, encouraged the thoughtful participation of the subjects, and, providing stamped return envelopes ensured a high percentage of successfully returned questionnaires. The fact that 17 out of 18 gymnastics clubs (94.44%) surveyed successfully returned the completed materials was gratifying.

Data Analysis

SAS statistical analysis procedures were employed to conduct multiple analyses of variance (MANOVA) comparing ACSI-28 data by various performance levels. Subsequent to significant MANOVA and ANOVA results, Tukey's HSD was used for the multiple comparisons of the various performance levels.

TABLE II

Demographics of Respondents

Total Number of Respondents.....	195
Gender of the Respondents.....	Female
Age Range of the Respondents.....	10-28 years
Competitive Levels of Respondents.....	Level 7, 8, 9, 10, and Elite

Level (LV)	LV7	LV8	LV9	LV10	LV11 (Elite)
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Ethnicity (%)

White	96%	94%	81%	94%	88%
African/ American	3%	8%	2%	7%	
Hispanic	4%	3%	3%	2%	3%
Asian			8%	2%	
Native American					2%

Level	Total #	Percentage
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Level 7	27	14%
Level 8	36	18%
Level 9	48	25%
Level 10	46	24%
Level 11 (Elite)	38	19%

Results

The survey was completed by 195 volunteers. The sample included 38 gymnasts classified as Level 11's ("elites"), 46 as Level 10's, 48 as Level 9's, 36 as Level 8's, and 27 were classified as Level 7's. Hispanics comprised 1.5% of the sample, African-American 4.4%, Native American .3%, Asians 3.1%, and Whites 90.7%. Ages ranged from 10-21 years of age with one 28 year old. These parameters are illustrated in Table II.

Comparison by Level

Results of the MANOVA comparing ACSI-28 sub-scale scores of the five levels are shown in Table III. As noted, a significant MANOVA was found for the Levels Variable {Wilks' Lambda $F(32,673) = 3.97, p < .0001$ }, while ANOVA procedures revealed significance for the Coping with Adversity sub-scale { $F(4,190) = 3.93, p < .004$ }. Subsequent post hoc analyses (Tukey's HSD) indicated that Level 11, the elite gymnasts, scored significantly higher ($M = 7.81, SE = .40$) than did Level 9 gymnasts ($M = 6.10, SE = .35$) and level 8 gymnasts ($M = 5.72, SE = .41$).

A significant Level effect was also seen for the Goal Preparation variable { $F(4,190) = 3.88, p < .005$ }. Tukey's analyses indicated that Level 11 ($M = 6.35, SE = .42$) scored significantly higher on Goal Preparation than did Level 8 (Mean = 4.58, $SE = .42$) and Level 9 ($M = 4.55, SE = .36$). Significant effects were noted { $F(4,190) = 3.86, p < .005$ } for the Concentration sub-scale with Level 11 ($M = 8.24, SE = .40$) higher than Level 8 ($M = 7.47, SE = .40$). A significant ANOVA { $F(4,190) = 3.87, p < .005$ } for the Confidence and Achievement Motivation variable was observed with

TABLE III

*Summary of Analyses Comparing ACSI-28
Scores of Proficiency Levels*

ACSI-28 Subscale	Anova F(4,190)	Pr > F	R-Square
Coping with Adversity	3.93	.004	.08
Peaking under Pressure	2.28	.06	.05
Goal Preparation	3.88	.005	.08
Concentration	3.86	.005	.07
Freedom from Worry	1.48	.21	.03
Confidence and Achievement Motivation	3.87	.005	.07
Coachability	0.37	.83	.008
Personal Coping Resources Composite Score	2.76	.03	.05

Levels of Proficiency Manova: Wilks' Lambda $F(32,676) = 3.97; p < .001$

Level 11 ($M = 9.03$, $SE = .33$), which was higher than were Level 8 ($M = 7.56$, $SE = .34$) and Level 9 ($M = 7.47$, $SE = .29$). Finally, a significant effect $\{F(4,190) = 2.76$, $p < .03\}$ was observed for the Personal Coping Resources composite score with Tukey's analyses revealing that Level 11 ($M = 51.03$, $SD = 1.90$) scored higher than Level 9 ($M = 43.75$, $SE = 1.65$).

Discussion

This investigation examined the psychological characteristics of competitive female gymnasts. The following discussion focuses on the research question addressed.

Research Question

Are there psychological differences between elite and non-elite level gymnasts?

The study demonstrated that there are psychological differences between elite and non-elite level gymnasts.

The results of the MANOVA and subsequent ANOVAs comparing levels of competitive gymnasts resulted in a significant difference between Level 11 ("elites") and the other groups on the ACSI-28 subscales. Table IV displays the means and standard deviations for each level. Interestingly, the Level 11 ("elite") gymnasts consistently scored higher on the ACSI-28 subscales than did the other levels. It is noted that the scores for Level 11 gymnasts ("elites") are very similar to the scores for top players in the other sports indicating that the ACSI-28 is as valid for young "elite" level gymnasts as it is for older elite athletes in other sports. Table IV also shows the ACSI-28 scores for reviewed studies from other sports.

TABLE IV

Means and Standard Deviations for Each Level and Norms

ACSI-28 Subscale	Level 11 Elite	Level 10 Subelite	Level 9	Level 8	Level 7	** Smith	*** Smith	*Christ- iansen
COPE	7.81 (2.38)	6.42 (2.33)	6.10 (2.21)	5.72 (2.71)	6.27 (2.81)	6.11 (2.30)	7.55 (2.48)	6.95 (2.67)
PEAK	6.38 (3.00)	6.30 (3.05)	4.84 (3.25)	5.72 (3.06)	6.54 (2.37)	5.91 (3.04)	8.66 (2.29)	7.55 (3.15)
GOAL	6.35 (2.38)	5.57 (2.57)	4.55 (2.74)	4.58 (2.51)	4.58 (2.27)	4.98 (2.78)	6.56 (2.84)	6.40 (2.89)
CONC	8.24 (2.37)	7.53 (2.55)	7.22 (2.16)	6.19 (2.73)	6.61 (2.26)	6.78 (2.30)	8.40 (2.10)	7.67 (2.11)
WORR	4.59 (2.58)	4.91 (2.79)	5.02 (2.67)	5.86 (2.93)	4.35 (2.70)	6.64 (3.00)	7.24 (2.72)	6.83 (2.76)
CONFI	9.03 (1.69)	8.13 (2.00)	7.47 (1.93)	7.56 (2.60)	7.61 (1.86)	7.50 (2.33)	9.51 (1.95)	8.09 (2.39)
COACH	8.62 (2.30)	8.53 (2.34)	8.55 (2.47)	8.19 (2.15)	8.88 (1.77)	8.89 (2.60)	10.28 (1.72)	9.77 (1.95)
PCR	51.03 (11.1)	47.40 (11.1)	43.75 (10.6)	43.83 (14.0)	44.85 (10.3)	49.46 (9.3)	58.2 (9.3)	52.26 (12.05)

(SD)

**Smith, Schultz, Smoll, & Ptacek (1995) [n = 433; female high school athletes]

***Smith & Christensen (1995) [n = 104; male minor league baseball players]

*Christensen (2000) [n = 78; female collegiate golfers]

Although psychological assessment research has been sparse in the sport of gymnastics, studies in other sports indicate there are differences between “elite” and “sub-elite” athletes. Results from the present study seem to support the research in other sports. Therefore, although it is not suggested that this test be used to determine which athletes should be picked to compete at the “elite” level, it does indicate that the psychological make-up of the “elite” gymnast is different than that of other levels, and that psychological characteristics such as athletic coping skills indicate where those differences lie. From a practical viewpoint, observed discrepancies between the ACSI-28 scores of exemplary gymnasts and those of the less adept gymnasts may identify those psychological characteristics that are in need of improvement. As an example, if a Level 9 gymnast with real athletic potential scores low, for instance in the Concentration subscale, then strategies designed to bolster concentration could be implemented.

There are obviously significant differences between elite level gymnasts and non-elite level gymnasts, but on which of the ACSI-28 subscales do these differences show up most clearly?

Coping with Adversity

As noted earlier, a significant MANOVA was obtained for the Level of gymnast variable using the ACSI-28 scores as the dependent variable. Subsequent ANOVA and Tukey’s analyses showed a significant difference between Levels for the Coping with Adversity subscale. The “elite” group (Level 11) scored significantly

higher than did much better than did Level 9 and 8 gymnasts. Examples of adverse conditions inherent in competitive gymnastics are as follows: continuing to perform after a mistake or fall, persistence in competing while ill or injured (a frequent occurrence in the sport of gymnastics), problems with family or friends to which most teenage girls seem to be especially susceptible to, adjusting to changes in routine environmental conditions on the floor or equipment (for example, lighting conditions at variance with the familiar or expected), problems or difficulty with a particular skill just before competition, inadequate amount or too much chalk on the bars, or different types of equipment at the competition than they are used to in practice. Other adverse conditions include such factors as the tumbling floor being stiffer than what the gymnasts are used to. Also, the inability to get their steps correct on the vaulting runway, the pressure of higher levels of competition, dealing with media and publicity, and the stress of adjusting to jet-lag when traveling from one time zone to another. Every athlete encounters adversity and those who handle it better, will more than likely be more successful.

A significant difference was not noted between Levels 10 and 11 (“elite”) on Coping with Adversity. It may well be that differences between these groups are due to differences on other subscales or on physical or experiential factors.

It is interesting to note that the Level 7 gymnasts did not always follow the trend exhibited by the other levels in that they did not differ significantly from the “elites”. Earlier, when describing the Level 7 gymnast, it was mentioned that these gymnasts are beginner-intermediate in skill level and experience, and typically younger. This is the

level when they receive their first personalized routines (non-compulsory). They generally spend a lot less time training in the gym, travel much less, and do not have the same pressures to qualify to future competitions. In fact, they have very little pressure at all compared to the other levels. The simpler skills of which gymnasts in Level 7 compete make adversities such as differences in equipment almost a non-factor. If they become sick or injured, more than likely they will stay home from the gym or from competition. The higher level gymnasts are much more likely to train and compete while sick or injured.

Goal Preparation

A significant difference between Levels was shown for the Goal Preparation subscale. The goal setting variable indicates the extent to which athletes establish a firm set of goals and, through the use of strategies designed to attain a series of intermediate goals, are able to achieve the more long range goal of “Elite” status. Again, Tukey’s analyses indicated that Level 11 (“elite”) gymnasts scored significantly higher than Level 8 and Level 9. One reason for this might be that by the time gymnasts get to Level 10 and Level 11 (“elite”), these gymnasts have become used to setting goals for the year and for years to come. Many set goals of qualifying for state, regional, and national competitions, qualifying to the next level, and to master the skills needed to successfully compete during the next competitive season. The elite gymnasts seem to set short-term goals in preparation for the next competition and long term goals for possible college scholarships and qualifying for and competing in international events. The similarity in goal setting scores between Level 11 (“elite”) and Level 10

may be explained by the following: (a) Level 10 gymnasts are very advanced; some are every bit as good as elite gymnasts. (b) Many level 10 gymnasts will plan to continue competitive gymnastics at the collegiate level. It can therefore be assumed that Level 10 and Level 11 (“elite”) gymnasts habitually set and attain goals.

Concentration

Significant differences were noted for the Concentration subscale with Level 11 (“elite”) scoring higher than Level 8. The way gymnastics is (should be) taught utilizes a system referred to as progression. Basic skills are taught first until they are mastered. These basic skills lead to more advanced skills and combinations of skills. As the level of difficulty increases for skills and combinations of skills, more concentration is required. Gymnasts that go through the proper progressions should be able to demonstrate the highest levels of concentration by the time they reach Level 10 and 11.

There are several important things to concentrate on for competitive gymnastics: difficult skills, routines, presentation of the routine, etc. In fact, gymnasts may possess higher levels of concentration than do athletes in other sports. Certainly, the data shown in Table IV would support this contention. One important aspect of concentration is the need to focus totally on the task at hand and to be able to rule out distractions. This ability to maintain a high degree of concentration comes from competitive experience. Although Level 10 and Level 11 gymnasts generally have more competitive experience, often other gymnasts spend many years at levels below the elite level and thus acquire lots of competitive experience. Nonetheless, as can be seen in Table IV, there is a trend showing a linear relationship between Level and

Concentration scores. Specifically, with the possible exception of Level 7, it seems that higher level gymnasts report higher degrees of concentration.

Confidence and Achievement Motivation

A significant difference was also shown between Level 11 (“elite”) and the other gymnasts for Confidence and Achievement Motivation ACSI-28 subscale. Again, Tukey’s analyses demonstrated the elite level scoring higher than both Level 9 and Level 8. Clearly, elite gymnasts should display higher levels of confidence, and, perhaps the attainment of elite status was impelled by a high need for achievement or success, as opposed to the more paralyzing fear of failure. Certainly achievement at highly competitive levels in gymnastics would lead to enhanced confidence.

There are different ways to achieve in gymnastics: achieving the mastery of a new skill in training, overcoming a fear of a difficult skill, achieving a qualifying score to move up to a higher level, qualifying to state, regional, and national championship competitions, receiving a college scholarship, qualifying to the national team, or winning the gold medal at an international competition. It is intuitively obvious that those gymnasts who perform at higher levels are more achievement oriented than are the gymnasts who perform at lower levels.

Confidence, on the other hand, may not be as distinct a category. A lower level gymnast can be extremely confident of competing their routines successfully. The routines are much easier and the athlete can train more routines than the higher levels. During a practice session performing 10-20 routines for lower level gymnasts is not nearly as difficult as a Level 10 or elite gymnast doing the same thing. A lower level

gymnast can score 9.5-9.8 giving her a feeling of extreme confidence entering subsequent competitions. That same lower level gymnast, however, if thrust into high levels of competition, would not display a high degree of confidence in their chances. However, since the ACSI-28 assesses current status of a gymnast on psychological skills, the difference between confidence that an elite acquires when scoring well and a lower level gymnast acquires when scoring well may be minimal. What is important is that as a gymnast advances in skill and competitive level, confidence be maintained, or even enhanced. It may well be that achievement motivation may be more of a determining factor than confidence when calculating scores for the Confidence and Achievement Motivation subscale.

One factor that may differentiate gymnasts no matter what level they are is their approach to performing new skills, routines, and especially competition. Is the athlete's approach one of confidence that they will be successful, or, is their approach more of trying to avoid failure? The more successful athletes approach competition with a feeling of confidence that they will be successful (Gordin & Henschen, 1989).

Personal Coping Resources

The personal coping resources score, a composite score of all seven subscales, showed a significant LEVEL effect. Tukey's analysis revealed that the Level 11 ("elite") scored higher than Level 9. Once again, when viewing Table IV, a trend can be seen among the different PCR scores with the Level 11 ("elite") being highest and comparable to PCR scores of the highest level athletes in other sports.

Freedom from Worry

Very little difference was found among the levels for the Freedom from Worry subscale. Furthermore, gymnasts as a whole scored lower on this subscale compared to other sports (Table IV). Gymnasts, apparently, are not free from worry. Reasons for this may be due to several factors: (a) the relatively young age of these athletes, (b) fear of a skill causing them to worry all day at school and at night after they get home from practice, (c) worry about disappointing a coach or parent, or, (d) worry about not making it to the next level with their friends. Younger athletes may be more susceptible to worry. More research should be done in this area.

Coachability

As in the Freedom from Worry subscale, little difference is indicated among levels for the Coachability subscale. Also, the scores are lower for gymnasts than for athletes in other sports. Two factors that may be having an effect on low Coachability scores are fear and age. Many gymnasts are very young and may have difficulty handling fear. Older and more experienced athletes understand the fear and will try to work through it. Young athletes might blame the coach for making them do the skill and inadvertently become less coachable. Also, there are coaches in gymnastics who lack the training to coach effectively and safely. Many have difficulty to communicate and motivate their athletes. Athletes sense this at times, losing faith in their coaches which leads to mistrust and less coachability. This feeling is magnified if less than adequate coaching has led to injuries suffered by the athlete. Poor spotting on troublesome skills and/or poor judgment by the coach when deciding when and when

not to spot that results in injury causes the gymnast to lose confidence in her coach. If a tennis coach makes a mistake in coaching, chances are that the athlete will not get hurt. If a gymnastics coach tells an athlete to perform a skill she is not ready for, it could cause an injury, something not easily forgotten by the young gymnast.

Peaking Under Pressure

Although no significant differences were noted, viewing Table III does show a trend whereby the higher levels show higher scores for this subscale than do the lower levels. This may be a case whereby very experienced Level 10 gymnasts may have influenced the data quite a bit. As mentioned earlier, although there is a difference between Level 11 (“elite”) gymnasts and Level 10 gymnasts, there are Level 10 gymnasts who could have competed as elites. Furthermore, since scholarships are readily available to Level 10 gymnasts as well, many Level 10 gymnasts and their families decide that it isn’t worth the extra time, work, and expense to compete at the elite level. This leaves a fair number of experienced and successful gymnasts at this level. They know how to peak under pressure, as do the Level 11 (“elite”) gymnasts.

CHAPTER III

CONCLUSIONS

The psychological characteristics of female competitive gymnasts were examined using the Athletic Coping Skills Inventory-28 (ACSI-28). Additionally, a comparison of the coping skills was conducted to determine differences among the competitive levels. It was concluded that the Level 11 (“elite”) gymnasts consistently scored higher on the ACSI-28 subscales than did the other levels. Results also demonstrated that ACSI-28 scores for Level 11 (“elite”) gymnasts are very similar to the scores for top players in the other sports, indicating that the ACSI-28 is just as valid for “elite” level gymnasts as it is for “elite” level athletes in other sports. Furthermore, these results demonstrate that the instrument is valid for young “elite” athletes as well.

Studies in other sports indicate there are differences between “elite” and “sub-elite” athletes. Results from the present study seem to support the research in other sports. Therefore, it can be concluded that the psychological make-up of “elite” level gymnasts is different than that of other levels. Furthermore, it has been shown which athletic coping skills differentiate the “elite” level gymnasts from the non-elite level gymnasts.

From a practical viewpoint it is not being suggested that this test be used to determine which athletes should be picked to train and compete at the “elite” level, however, observed discrepancies between the ACSI-28 scores of exemplary gymnasts and those of the less adept gymnasts may identify those psychological characteristics

that are in need of improvement. Strategies designed to bolster those psychological characteristics in need of improvement may then be implemented.

Further Studies

It is clear that competitive gymnastics could benefit from more research involving psychological descriptions of the athletes. It would be interesting to see the same type of research involve the coaches of these athletes. In other words, how would the coping skills of gymnastics coaches compare with those of their athletes? Another study that could prove invaluable would be to retest the gymnasts after strategies designed to bolster those psychological characteristics that needed improvement had been implemented. It might be discovered that gymnasts who received psychological training strategies in specific areas would become much more adept competitors. After all, athletes and coaches continually invest extra work and time on difficult or problem areas in the gymnast's routines. Why not invest the same effort on difficult or weak areas in the psychological aspects of the gymnasts training?

Limitations of the Study

One of the limitations of this study was that only female gymnasts were involved as participants. The results might be different for male gymnasts. Therefore, research should be done involving male gymnasts.

REFERENCES

- Aronson, R. M. (1982). *Attentional and interpersonal factors as discriminators of elite and non-elite gymnasts*. Unpublished doctoral dissertation, Boston University School of Education, Boston, MA.
- Baltzell, A. (1999). *Psychological factors and resources related to rowers' coping in elite competition*. Unpublished doctoral dissertation, Boston University School of Education, Boston, MA.
- Bourgeois, A.E., Loss, R., Meyers, M.C., & LeUnes, A.D. (2003). The athletic coping skills inventory: relationship with impression management and self-deception aspects of socially desirable responding. *Psychology of Sport and Exercise, 4* (2), 72-79.
- Britton, S. E. (1986). *Identifying specific cognitive and affective attributes of female junior elite gymnasts*. Unpublished doctoral dissertation, Boston University, Boston, MA.
- Caine, D., Cochrane, B., Caine, C., and Zemper, E. (1989). An epidemiologic investigation of injuries affecting young competitive female gymnasts. *The American Journal of Sports Medicine, 17* (6), 811-820.
- Carver, C. (1997). You want to measure coping but your protocol is too long: Consider a brief cope. *International Journal of Behavioral Medicine, 4* (1), 92-100.

- Cheung, S. Y., & Lo, C. (1996). Psychological profiles and stress management training for Hong Kong national gymnasts. *Journal of the International Council for Health, Physical Education, Recreation, Sport, and Dance*, 32 (4), 61-64.
- Christiansen, D. S. (2000). *Self-efficacy, cognitive interference, sport anxiety, and psychological coping skills as predictors of performance in intercollegiate golf*. Unpublished doctoral dissertation, University of Washington, Seattle, WA.
- Cogan, K. D., & Petrie, T.A. (1995). Sport consultation: An evaluation of a season-long intervention with female collegiate gymnasts. *The Sport Psychologist*, 9, 282-296.
- Daus, A. T., Wilson, J., & Freeman, W. M. (1986). Psychological testing as an auxiliary means of selecting successful college and professional football players. *Journal of Sports Medicine*, 26, 274-278.
- Duda, J. L., Chi, L., Newton, M. L., Walling, M. D., & Catley, D. (1995). Task and ego orientation and intrinsic motivation in sport. *International Journal of Sport Psychology*, 26, 40-63.
- Edwards, S. W., & Huston S. A. (1984). The clinical aspects of sport psychology. *Physical Educator*, 41, 142-148.
- Fitts, W. H. (1965). *Tennessee Self-Concept Scale*. Nashville: Counselor Recording and Tests.

- Fitzpatrick, J. M. (1998). *Causal attributions of elite youth female gymnasts: An investigation of types and antecedents of attribution*. Unpublished doctoral dissertation, Michigan State University, East Lansing, MI.
- Friend, J., & LeUnes, A. (1999). *Predicting baseball player performance*. Unpublished research article. Texas A&M University, College Station, TX.
- Gordin, R. D., & Henschen, K. P. (1989). Preparing the USA Women's Artistic Gymnastics Team for the 1988 Olympics: A multimodal approach. *The Sport Psychologist, 3*, 366-373.
- Goudas, M., Theodorakis, Y., & Karamousalidis, G. (1998). Psychological skills in basketball: preliminary study for development of a Greek form of the Athletic Coping Skills Inventory-28. *Perceptual and Motor Skills, 86* (1), 59-65.
- Hanrahan, S. J., & Grove, J. R. (1990). Further examination of the psychometric properties of the Sport Attributional Style Scale. *Journal of Sport Behavior, 13*, 183-193.
- Hayashi, S.W. (1998). *Understanding youth sport participation through perceived coaching behaviors, social support, anxiety and coping*. Unpublished doctoral dissertation, Michigan State University, Lansing, MI. Microform Publications, University of Oregon.
- Junge, A., Dvorak, J., Rosch, D., Graf-Baumann, T., Chomiak, J., & Peterson, L. (2000). Psychological and sport-specific characteristics of football players. *The American Journal of Sports Medicine, 28* (5), S22-S28.

- Kerr, G., & Minden, H. (1988). Psychological factors related to the occurrence of athletic injuries. *Journal of Sport & Exercise Psychology, 10*, 167-173.
- Kerr, J. H., & Pos, E. H. (1994). Psychological mood in competitive gymnastics: An exploratory field study. *Journal of Human Movement Studies, 26*, 175-185.
- Kolt, G. S., and Kirkby, R. J. (1994). Injury, anxiety, and mood in competitive gymnasts. *Perceptual and Motor Skills, 78*, 955-962.
- Krane, V., Snow, J., & Greenleaf, C. A. (1997). Reaching for gold and the price of glory: A motivational case study of an elite gymnast. *The Sport Psychologist, 11*, 53-71.
- LeUnes, A. D. (2002). *Bibliography on psychological tests used in research and practice in sport and exercise psychology*. Lewiston, NY: The Edwin Mellen Press.
- LeUnes, A. D., Guarnieri, A., & Bourgeois, T. (1999). *Psychological characteristics of exemplary umpires*. Unpublished manuscript, Texas A&M University, College Station, TX.
- LeUnes, A. D., & Nation, J. R. (2002). *Sport psychology – An introduction (3rd Ed.)* Chicago, IL: Nelson-Hall Publishers.
- Lorr, M., & McNair, D. M. (1982). *Profile of Mood States – Bipolar Form (POMS-BI)*. San Diego, CA: Educational & Industrial Testing Service.
- Lowry, C. B., & Leveau, B. F. (1982). A retrospective study of gymnastics injuries to competitors and non-competitors in private clubs. *The American Journal of Sports Medicine, 10*, (4), 237-239.

- Mace, R. D., and Carroll, D. (1989). The effect of stress inoculation training on self-reported stress, observer's rating of stress, heart rate and gymnastics performance. *Journal of Sports Sciences*, 7, 257-266.
- Marsh, H. W., & Richards, G.E. (1988). Tennessee Self Concept Scale: Reliability, internal structure, and construct validity. *Journal of Personality and Social Psychology*, 55 (4), 612-624.
- Martens, R. (1977). *Sport Competition Anxiety Test*. Champaign, IL: Human Kinetics.
- McAuley, E., Hudash, G., Shields, K., Albright, J. P., Garrick, J., Requa, R., and Wallace, R. K. (1987). Injuries in women's gymnastics: The state of the art. *The American Journal of Sports Medicine*, 15 (6), S124-S131.
- McNair, D., Lorr, M., & Droppleman, L. (1971). *Manual for the Profile of Mood States*. San Diego, CA.: Educational and Industrial Testing Service.
- Nideffer, R. M. (1990). Use of the Test of Attentional and Interpersonal Style (TAIS) in sport. *The Sport Psychologist*, 4, 285-300.
- Petrie, T. A. (1993). Disordered eating in female collegiate gymnasts: Prevalence and personality/attitudinal correlates. *Journal of Sport and Exercise Psychology*, 15, 424-436.
- Porat, Y., Lufi, D., & Tenenbaum, G. (1989). Psychological components contribute to select young female gymnasts. *International Journal of Sports Psychology*, 20, 279-286.

- Reeds, G. K. (1984). *Prediction of performance from selected personality traits and state anxiety levels of competitive male and female gymnasts*. Unpublished doctoral dissertation, State University of New York at Buffalo.
- Roberts, G. C., & Kimiecik, J. C. (1989). Sport psychology in the German Democratic Republic: An interview with Dr. Gerd Konzag. *The Sport Psychologist*, 3, 72-77.
- Rushall, B., & Fox, D. (1980). *Scale for sporting environments*. Thunderbay, Ontario: Lakehead University.
- Smith, R.E., & Christiansen, D.S. (1995). Psychological skills as predictors of performance and survival in professional baseball. *Journal of Sport and Exercise Psychology*, 17, 399-415.
- Smith, R. E., Schultz, J. T., Smoll, F. L., & Ptacek, J. T. (1995). Development and validation of a multidimensional measure of sport-specific psychological skills: The Athletic Coping Skill Inventory-28. *Journal of Sport and Exercise Psychology*, 17, 379-398.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *STAI manual*. Palo Alto, CA: Consulting Psychologists Press.
- Svebak, S., & Murgatroyd, S. (1985). Metamotivational dominance: A multi-method validation of reversal theory constructs. *Journal of Personality and Social Psychology*, 48 (1), 519-528.
- Thomas, J. R., & Nelson, J. K. (1990). *Research methods in physical activity*. Champaign, IL: Human Kinetics Books.

- Unestahl, L. E. (1983). *The mental aspects of gymnastics*. Orebro, Sweden: VEGE Publishers, Inc.
- Vealey, R. S. (1990). Advancements in competitive anxiety research: use of the Sport Competition Anxiety Test and the Competitive State Anxiety Inventory-2. *Anxiety Research, 2*, 243-261.
- Wechsler, D. (1974). *Manual for the Wechsler Intelligence Scale for Children-Revised*. New York: Psychological Corp.
- Weiner, B. (1985). An attributional theory of achievement motivation and emotion. *Psychological Review, 92*, 548-573.

APPENDIX A

SURVEY

Athletic Coping Skills Inventory

Thank you, gymnasts, for volunteering your time to answer this survey questionnaire. You will be among 150 gymnasts who will be asked to complete a research project for Sports Psychology. On this answer sheet that your coach has handed out to you, please give a brief description of yourself regarding your:

GENDER (boy or girl) _____

AGE _____

ETHNICITY (circle one): White, African-American, Oriental, Hispanic, Native American, Other _____

COMPETITIVE LEVEL: (circle one): L7, L8, L9, L10, or ELITE

There are no right or wrong answers. Please answer the questions as to how you feel and not how you think your parents or coaches might answer them. Because the survey is anonymous, your answers will be known only to you. Remember that you can discontinue the survey at any time, however only those surveys that are completed, will be included in the study.

There are many things that athletes say which describe their experiences during training and competition. Please listen to each statement that I read to you carefully, and then choose as accurately as possible how often you experience that same thing. Mark your answers by placing a circle around the answer that indicates how often you have these experiences during training and competition. Your choices for answering each statement will be:

0 -----Almost Never

1 -----Sometimes

2 -----Often

3 -----Almost Always

Almost Never	Sometimes	Often	Almost Always
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WE will begin with number 1):

- | | | | | |
|---|---|---|---|---|
| 1) On a daily or weekly basis, I set very specific goals for myself that guide what I do. | 0 | 1 | 2 | 3 |
| 2) I get the most out of my talent and skills. | 0 | 1 | 2 | 3 |
| 3) When the coach tells me how to correct a mistake I've made, I tend to take it personally and feel upset. | 0 | 1 | 2 | 3 |

	Almost Never	Sometimes	Often	Almost Always
4) When I am doing gymnastics, I can focus my attention and block out distractions.	0	1	2	3
5) I remain positive and enthusiastic during competition, no matter how badly things are going.	0	1	2	3
6) I tend to perform better under pressure because I think more clearly.	0	1	2	3
7) I worry quite a bit about what others think about my performance.	0	1	2	3
8) I tend to do lots of planning about how to reach my goals.	0	1	2	3
9) I feel confident that I will perform well.	0	1	2	3
10) When a coach criticizes me, I become upset rather than helped.	0	1	2	3
11) It is easy for me to keep distracting thoughts from interfering with something I am watching or listening to.	0	1	2	3
12) I put a lot of pressure on myself by worrying about how I will perform.	0	1	2	3
13) I set my own performance goals for each practice.	0	1	2	3
14) I don't have to be pushed to practice or play hard; I give 100%.	0	1	2	3
15) If a coach criticizes or yells at me, I correct the mistake without getting upset about it.	0	1	2	3
16) I handle unexpected situations in my sport very well.	0	1	2	3
17) When things are going badly, I tell myself to keep calm, and this works for me.	0	1	2	3
18) The more pressure there is during a competition, the more I enjoy it.	0	1	2	3

	Almost Never	Sometimes	Often	Almost Always
19) While competing, I worry about making mistakes or failing to come through.	0	1	2	3
20) I have my own game plan worked out in my head long before the competition begins.	0	1	2	3
21) When I feel myself getting too tense, I can quickly relax my body and calm myself.	0	1	2	3
22) To me, pressure situations are challenges that I welcome.	0	1	2	3
23) I think about and imagine what will happen if I fail or mess up.	0	1	2	3
24) I maintain emotional control no matter how things are going for me.	0	1	2	3
25) It is easy for me to direct my attention and focus on a single object or person.	0	1	2	3
26) When I fail to reach my goals, it makes me try even harder.	0	1	2	3
27) I improve my skills by listening carefully to advice and instructions from coaches.	0	1	2	3
28) I make fewer mistakes when the pressure is on because I concentrate better.	0	1	2	3

Thank you for completing this survey. If you didn't have time to answer some of the questions feel free to go back and do so at this time. Please make sure that every question is answered. If you have completed the survey then please hand them to your coach. Make sure that your name is not on the survey itself, that you filled out the information section at the top, and that you handed in the consent forms to your coach, keeping a copy for yourself.

BEST OF LUCK IN YOUR UPCOMING SEASON!

APPENDIX B

COVER LETTER

October 1, 2002

Dear Coach (Director),

I would greatly appreciate your help and support in conducting a research project for my doctorate at Texas A&M University. I have included in this package an audio-taped survey for your gymnasts to listen to and answer on the forms provided. I have included a typed copy of the survey for you as well. As you will note, the questions are very easy to understand and none of them are of a sensitive nature. In fact, it is a survey that is recently getting quite a bit of attention in other sports.

The purpose of the study is to see if a difference exists in selected personality traits among the different levels of gymnasts. Although the results of the study will be made available to you upon request, individual results will not be available since the names of the subjects will not be on the survey.

The total time involved in listening to the tape and answering the questions will be less than 15 minutes. Being a coach myself, I realize that everyone is on a tight schedule, however, I feel that our sport would benefit from more research. By taking the survey by audio-tape, all gymnasts who participate may be tested at one time, altogether in your gym. I would like for all or your Optional Level gymnasts, ages 12 and older (Levels 7 – Elite) to participate in the survey. I would like to especially encourage any of your elites to participate because of the small number of elites in our country. If for any reason any of your gymnasts feel uncomfortable answering a survey please tell them that they may discontinue at any time. However, only completed surveys will be included in the data collection.

Also included in this package are “Parental Informed Consent Forms” for the parent of each gymnast under 18 years of age to sign, an “Assent Form” for each gymnast under 18 years of age to sign, and an “Consent Form” for each athlete 18 years and older to sign. Each athlete will be given two copies of each form to sign, a copy for them to keep and a copy to be sent back to me. I would just like to reiterate

that this is completely voluntary and anonymous. There is no pressure on the subjects. I will be happy to have as many surveys as possible from your team. All the questions are easy to understand and will be asked via audio-tape. Although you will be given a copy of the questions asked on the survey, it is important that you do not discuss them with the gymnasts. They must answer the questions completely on their own. There are no right or wrong answers to this survey.

This research study has been reviewed and approved by the Institutional Review Board – Human Subjects in Research, Texas A&M University. For research related problems or questions regarding subjects' rights, contact the Institutional Review Board through Dr. Michael W. Buckley, director of Support Services, Office of Vice President for Research at (979) 458-4067.

Thank you for your help.

Sincerely,

Steven B. Waples

Graduate Student

Texas A&M University

(210) 344-2308

Chairperson: Dr. Carl Gabbard (979) 845-1277

APPENDIX C

INSTRUCTIONS

Instructions for Administering the Survey

Dear Coach (Director),

Thank you for your participation and help. The survey will take approximately 15 minutes to administer. The responsibilities of the person administering the survey are as follows:

1. Assemble the athletes and give to each athlete the following forms to be completed and returned to you:
 - A. Parental Informed Consent Form (parents must sign if athlete is under 18 years of age)
 - B. Assent Form (athletes under the age of 18 must sign)
 - C. Consent Form (athletes 18 years and older must sign)

***One copy of the form should remain with the parent.
2. Assemble the athletes at a specified time determined by you and pass out the following items:
 - A. Pencils
 - B. Answer sheets
3. Play the audio-tape: The tape will instruct the athletes to mark down specific demographical information (gender, age, ethnicity, and competitive level that they have competed or qualified for).
4. The tape will then instruct the athletes on how to complete the survey and ask 28 questions for them to answer.
5. At the conclusion of the tapes, please collect all the answer sheets and return them along with the signed Consent, Assent, and Parental Informed Consent Forms in the stamped envelope provided. I do not need the pencils or audio-tape back.

That's it! Thank you for your help.

Steven B. Waples
Graduate Student, Texas A&M University

VITA

STEVEN B. WAPLES

Education

B.S. Bacteriology and Public Health, Washington State University, 1974

B.S. Biology, Washington State University, 1975

M.S. Biology, Washington State University, 1977

Doctor of Education, Texas A&M University, 2003

Professional Licenses

Teaching Certificate, Sciences, State of Washington

Lifetime Teaching Certificate, Sciences, State of Texas

Professional Experience

High School Teacher and Coach, Lake Roosevelt High School, Coulee Dam, WA

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