

The Effects of Stress on Student -Athletic Performance

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## **ABSTRACT**

The purpose of this study was to determine if stress relieving techniques have an effect on the level of success an athlete achieves in the sport of swimming at the collegiate level. The participants in this study consisted of twenty student-athlete swimmers at a NCAA Division III school in Maryland. This study involved the use of a survey to perform a causal-comparative analysis of the data. The results determined no significant difference between the success of the athletes, though these results could be attributed to a number of factors. Research in the area of stress in collegiate student-athletes should continue given the constant strain these athletes are under and the negative outcomes that follow improper stress relieving techniques.

# **CHAPTER I**

## **INTRODUCTION**

### **Overview**

In competitive sports, the athlete's mental ability is just as, if not more, important than their physical ability. Research has shown that athletes who train their mind as well as their body have a greater chance of achieving success as defined as showing vast improvement and rising above their peers. Yet, stress is often a major deterrent in demonstrating positive mental abilities. Thus, research has been conducted in order to find techniques that best help athlete's overcome stress in their minds. Techniques that have been found to be most effective include listening to music, self-talk, and a pep-talk.

In the sport of swimming, the mental strength of the athlete is vital for the athlete is not only competing against the other swimmers in the pool, but also themselves and doing so on their own. By competing individually, the athlete relies entirely on their own abilities and does not have a team to offer support, in the physical sense. Therefore, the swimmer must be mentally tough to overcome the stress of competition. This study has been created in order to find what stress management technique is most effective specifically for swimmers prior to competition.

### **Statement of Problem**

The purpose of this study is to determine if stress relieving techniques prior to competition have an effect on the overall success of the swimmer.

### **Statement of Research Hypothesis**

The type of stress relieving technique used by a swimmer prior to competition has no effect on the level of success, as marked by the placement at the Conference Championship Swim Meet, the swimmer achieves.

### **Operational Definitions**

In this study, the definition of an athlete refers to an individual participating in an intercollegiate, varsity, NCAA Division 3 swim team. The independent variable is the different pre-race techniques used to achieve optimal stress levels. These techniques include listening to music, self-talk, a pep-talk, and other. The dependent variable is the success of the athlete measured by their ranking in an individual event at the Conference Championship Meet.

## **CHAPTER II**

### **REVIEW OF THE LITERATURE**

This literature review examines how stress can affect athletic performance and the methods to help alleviate said stress. Section one observes why stress management is important and the causes of the stress in the average collegiate student. Section two examines the causes of stress in collegiate athletes. Finally, section three details different stress management techniques that have seen success in helping athletes alleviate stress.

#### **Stress in the Average Collegiate Student**

The transition to college can be one of great stress. Often, students face the stressors of, “academic content, finances, relocation, . . . sex, and the day-to-day rigors of being in college” (Dusselier, Dunn, Wang, Shelley, & Whalen, 2005, p. 15). If not properly managed, “Excessive stress reduces work effectiveness, contributes to bad habits, and results in negative long-term consequences, including addictions, crime, absenteeism, poor academic performance, school dropout, professional burnout, and ultimately, career failure” (p. 16). In terms of academics, the higher demands college places on students compared to high school causes, “freshmen and sophomores [to] report higher academic stress than upperclassmen” (Goldman & Wong, 1997, p. 621). Furthermore, Goldman and Wong state, “self esteem declined in the first year, then recovered during the second year” (p. 605). Freshmen can be more prone to high levels of stress because of the great transitions that are taking place in their lives.

For most freshmen students, this is their first experience of living on their own. “They must adjust to being away from home for the first time, maintain a high level of academic achievement, and adjust to a new social environment” (Ross, Neibling, & Heckert, 1999, p. 2). Part of the new social environment is living with a roommate. In most cases, freshmen year



marks the first time a student must share a room with not only another individual, but a stranger. Naturally, roommate conflicts are common which create additional stress on the students involved. Also, there are many personalities within the dorm setting causing difficulties in studying for those who live in the dorms. Dusselier et al. (2005) found, “Students who were unable to study in the residence halls experienced higher levels of stress, probably because most students living in residence halls prefer to study in the residence halls when they are engaged in study outside of class” (p. 22). When the students are unable to get the proper study time in, their grades begin to suffer, which increases their stress levels.

As stress levels rise, sleep can also be affected. According to a study by Lund, Reider, Whiting, & Prichard (2010), “when asked “If your sleep is at all compromised, to what one factor do you most strongly attribute this?” in force-choice question, the majority of students responded that academic (39%) or emotional (25%) stress most interfered with their sleep” (p. 9). In addition, “poor-quality sleepers also reported higher levels of stress during the week and weekends, compared to optimal-quality sleepers” (p. 7). Thus, sleep affects stress and stress affects sleep. The living environment of the residence halls can also be a major aspect that contributes to the lack of sleep (Dusselier et al., 2005, p. 22).

Overall, college students have a unique lifestyle. “While jobs outside the university setting involves their own sources of stress, such as evaluation by superiors and striving for goals, the continuous evaluation that college students are subject to, such as weekly tests and papers, is one which is not often seen by non-students” (Ross et al., 1999, p. 2). Furthermore, there is a high demand to earn top grades that will lead to a degree while juggling excessive homework, unclear assignments, and (positive or negative) relations with professors. Students are under a constant scrutiny and, thus, receiving a lower grade than expected has been

determined to cause a great deal of stress on students. The lower grade could affect their, “perceptions of scholastic competence [which] may affect the individuals self perceptions” (Goldman &, Wong, 2007, p. 606). The lower self-perception or self-esteem leads to high levels of stress.

### **Stress in Collegiate Athletes**

Collegiate athletes have additional stressors compared to the typical student. In addition to classes, family, and peer stress, collegiate athletes have to juggle “time demands, physical demands, and travel schedules” (Etzel, Watson, Visek, & Maniar, 2006, p. 518). While in season, collegiate athletes may be working up to 20 hours a week solely dedicated to their sport. Time management becomes a major factor in their academic and athletic success. Many psychological studies have been conducted over the past twenty years that have demonstrated that collegiate athletes are at a higher risk of developing a psychological disorder compared to their fellow students. This insinuates the need for athletic physicians to be more proactive and receptive of the high potential of their patients developing a psychological disorder.

Furthermore, physicians need to be aware of the “effect of life stress and other psychological variables on the incidence of athletic injury” (Mann, Grana, Indelicato, O’Neill, & George, 2007, p. 2145). Still, physicians are less likely to discuss non-physical related injury issues, such as psychological problems that may steam from the physical injury. And the athletes may find it inappropriate to ask non-injury related questions, making it difficult for the physician to know exactly what the athlete is feeling. Nonetheless, it is important to understand that “athletes demonstrate emotional and behavioral problems at rates similar to or even higher than those of nonathletes...These problems, when they occur, are often reactions to stress associated with serious injuries” (p. 2140). Furthermore, the unique demands collegiate student-athletes are

under from school, parents, peers and coaches creates many areas for over-stress and anxiety to occur. With physical injury being linked to the psychological well-being of the athlete, sports medicine staff and physicians must be on the lookout for signs of psychological distress to ensure their physical health does not deteriorate any further.

Overtraining is one way that psychological distress occurs. Many coaches today are leaning towards the ‘more is better’ training thought process which means the athletes are spending more time on rigorous activity causing recovery time to be decreased (Etzel et al., 2006). As a result, the student athletes are getting burned-out and are at a higher risk for injury. Both cause further stress to the athlete, making this situation to spiral out of control. As the stress builds, the student athletes will look for ways to try to destress their minds and bodies. Often times, this leads to alcohol and drug abuse. Depression and suicidal tendencies are also likely to occur. Although the risk for a student athlete to develop depression is higher than the average student, they are most likely to “underuse mental health services” (p. 527). In consequence, with the day to day stressors of a typical student plus the added stressors of being involved with sports, athletes are at a higher chance of developing stress and anxiety related issues both on and off ‘the field’.

According to Gearity and Murray (2011), poor coaching can also have psychological effects on the athletes. In their study, athletes were interviewed about their experiences with poor coaches. Five themes were discovered upon analyzing the interviews: “poor teaching by the coach, uncaring, unfair, inhibiting athlete’s mental skills, and athlete coping” (p. 213). Inhibiting an athlete’s mental skills and coping directly correlates with the psychological wellbeing of the athlete. Through inhibiting the athlete’s mental skills, the coach could be distracting, engendering self-doubt, demotivating, and dividing the team. Athlete coping is how the athlete

relates to the poor coaching. This could be ignoring it, rising above it, transferring teams, or leaving the sport all together. Both scenarios found, “the coach to be a source of distress” (p. 219). Moreover, the self-determination theory suggests that the personality an athlete has, combined with their social-environment, will determine how the athlete will react to different situations (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). For example, one person may be motivated when yelled at while another would find being yelled at debilitating. This is based on each individual’s psychological need thwarting, or the feeling that a person’s needs are not being met. In sports, this could lead to heightened exhaustion, depression, disordered eating, or burnout.

Thus, when analyzing an athlete’s stress levels and the techniques for stress management, evaluating the coach-athlete relationship may be a good starting point. At some points in the season, the collegiate athlete may be spending upwards of 20 hours a week with the coach. If the coach is being a poor influence on the athlete, the athlete will need to know how to approach the coach or learn tricks in order to better handle the stress the coach puts on the athlete.

Finally, “psychological distress reliably predicts the occurrence of adverse health-related outcomes” (Perna, Antoni, Baum, Gordon, & Schneiderman, 2003, p. 66). As the athlete experiences stress, their bodies are more likely to develop illness or injury due to the “prolonged presence of post exercise catabolic hormones” (p. 66). In turn, as their bodies weaken their stress levels continue to rise as they are forced to take time away from their sport. The longer the time away from the sport, the more frustration and stress ensues, again heightening the chances of further injury or illness. Perna, et al. (2003) do suggest a remedy to the stress in athletes in order to lower their chances of injury or illness with the study of Cognitive Behavioral Stress

Management (CBSM). This method will be further discussed in Section Three of this literature review.

### **Techniques for Managing Stress for the Athlete**

Being able understand the unique situation a collegiate athlete is in compared to the average student is but only half the battle. The next half is determining type of stress the athlete is experiencing and what steps need to be taken in order to help the athlete find relief.

According to Cohen (2000), stress can be viewed in three ways, “from the perspective of the stimulus, the response, or the interaction between the person and the environment” (p. 187). First, from the perspective of the stimulus, the evaluator is looking at the event/s that causes the stress and the person’s ability to adapt. In this scenario four stressors have been identified: acute, sequence, chronic and intermittent, chronic. Acute is a time-limited stressor like walking over a bridge when one is afraid of heights. Sequence is best described through the example of the loss of a loved one. Chronic and intermittent are stressors that are constant but have varying degrees of intensity depending on timing. For example, a cancer patient going through chemotherapy treatments. Finally, chronic stressors are a constant source of stress like having a chronic debilitating illness. The response to stress is the way in which a person experiencing stress reacts to its effects. Biologically, the reaction of stress is induced in order to alert the body of a changing atmosphere and the need to adapt to the new setting. If the person is unable to adapt, prolonging the stress, long term psychological effects may take root. Finally, the interaction between the person and the environment will evaluate the surroundings of the person and how that may affect their mental well-being. This view emphasizes the importance of the individual’s capabilities to react. Each person is born and develops different temperaments and different cognitive abilities to handle situations. Depending on the individual, the reaction to stressors will

vary, causing the solution for the relief from stress to vary person to person. Fortunately, psychologists' have been studying stress for many years and have developed multiple techniques for relieving stress.

As discussed through-out this literature review, "it is widely accepted within the psychological community that our attitudes and emotions directly affect our bodies at a physiological level" (Gee, 2010, p. 393). Precompetitive anxiety is experienced by every athlete, but it is the degree of anxiety the athlete experiences which determines success or failure in competition. Within this scope, two types of anxieties can occur: cognitive and/or somatic. Under the cognitive anxiety, sports psychologists can perform rational emotive therapy (RET). "The process of RET is intended to help the athlete appraise and interpret the competitive situation from a more rational and grounded perspective" (p. 395). Although this seems to be straightforward, "the process of restructuring human thought patterns is one that is quite labor intensive and requires extensive professional training" (p. 395). Somatic anxiety affects the physical aspects of their performance, i.e. butterflies in their stomachic. Relaxation strategies such as meditation, centering, breathing, and imagery help to alleviate their anxiety.

Another tool for relieving stress is Cognitive Behavioral Stress Management (CBSM) as studied by Perna et al. on collegiate rowers. CBSM involves "relaxation training, imagery, and cognitive reconstruction", and has been found to, "decrease competitive anxiety and improve performance among athletes", as well as reduce pain from surgery and quicken recovery time (p. 67). Their study found that in comparison to the controlled group, the group that CBSM was introduced to experienced significantly positive effects. The CBSM group experienced fewer days out due to injury and/or illness and fewer doctor office visits.

Peluso, Ross, Gfeller, and Lavoie (2005) agree that imagery along with self-talk will increase positive athletic performance. To further understand the benefits of self-talk and imagery, Peluso et al. studied what is the optimal time frame between self-talk and a golf-putting activity in collegiate students. Golf is viewed to be a more mentally demanding sport, while, for example, football is viewed as a more physically demanding sport. Thus, the mental aspect of golf is tremendously important to the outcome of the athletic performance and, as such, must be understood as much as the physical demands of the sport. On this scale, swimming and track and field also tend to be viewed as a more mentally demanding sports for the athletes are required to focus on technique rather than pure physical strength.

In the study conducted by Peluso et al. (2005), the students were divided into nine conditions groups. While the researchers found self-talk and imagery significantly increased putting ability, a difference was found in which technique was preferred based on the amount of physical activity the student was adapted to. It was found that “participants who endorsed limited athletic familiarity and activity (e.g., ten hours or less) preferred self-talk practice whereas participants who endorsed higher ratings scores of athletic familiarity and activity (e.g., ten hours or more) preferred imagery strategies” (p. 547). This discovery is imperative in deciding which technique should be preferred when assisting varsity collegiate athletes with mental strategies.

Similar to Peluso et al. (2005), Robazza and Bortoli (1998) found Olympic archers use imagery during competition. Their study also found the archers to use, “autonomic control, imagery, task-focused concentration, and reaction to mistake” (p. 7). Furthermore, the high achieving Archers tended to have higher self-confidence. Their high self-confidence was found in more than just their sport, but also went into their everyday lives. Concentration is another factor they found to be important. The archers were able to narrow their concentration to focus

solely on their activity and block out all other activity around them. This concentration includes being able to control their emotions to the point of optimal performance. Each archer, and person, will have different levels in which they perform at their optimal levels and it is each individual's job to find that optimal level. The athlete will need to play around with their emotional levels during practice to find what level will work best for them. Concentration and imagery also needs to be practiced prior to competition. Once the athlete masters their emotions, concentration, and imagery in practice, their performance in competition should have positive outcomes.

Test of Performance Strategies (TOPS) is another strategy that can be used to evaluate and alleviate stress. Taylor, Gould and Rolo (2008) studied the difference of mental strategies between medalist and non-medalist in the 2000 Sydney Summer Olympics using TOPS. Overall, medalists were more likely to use mental strategies both in practice and competition than non-medalists. These strategies include emotional control, self-talk, and imagery. It was found that “emotional control made a significant contribution to the differences between medalists and nonmedalists in both the competition and practice analyses” (p. 32). Furthermore, differences were found between males and females, “goal setting, imagery, and activation for males; and for self-talk, emotional control, goal setting, imagery, activation, negative thinking, and relaxation for females” (p. 31). Taylor and colleagues further the suggestion that self-talk, emotional control, and imagery are the best tools to use when working to better stress management in collegiate swimmers.

Finally, music has been found to help athletes control their anxiety and achieve their optimal arousal state. A study conducted by Sorenson, Czech, Gonzalez, Klein, & Lachowetz (2008) at Georgia Southern University found, “those who listen to motivational music perform



significantly better than those who did not listen to music” (p.14). Music has been found to promote, “thoughts that encourage physical activity” (p. 14). Thus, an athlete can use music to ‘pump themselves up’ for competition. Moreover, the researchers found that when athletes who suffer from high anxiety listen to music they find to be calming, the athlete is able to relax themselves to the optimal anxiety level. These findings suggest that music gives the athlete a positive distraction from the pending competition or activity. Furthermore, the study found that music helps to “block out sensations of fatigue or other distractions because the music narrows the individual’s attention” (p. 15). Overall, music has been found to be a major asset in the assistance to athlete for controlling their emotions and stress levels.

## **CHAPTER III**

### **METHODS**

#### **Design**

This study has a causal-comparative design conducted using a convenience sample. The independent-like variable in this study is the pre-race stress relieving techniques used by collegiate swimmers. The dependent-like variable is the success of the athlete measured by the athlete's ranking at the Conference Championship Meet. This study used a convenience sample because the participants were existing athletes of the researcher. The athletes were chosen based on their participation on the varsity swim team for the school. The athletes were given the same survey. There was no pre-test or post-test.

#### **Participants**

The participants were selected from a small, private, liberal arts, Division III college located in the Mid-Atlantic region of the United States. The participants are currently athletes for the college's intermural swim team. Their ages range from 18-23 years old. Both men and women were studied.

#### **Instrument**

The instrument used for this study was a survey. The survey was divided into three parts: used, how often, and effectiveness. How often had three options: a couple of times, quite a bit, or most of the time. Effectiveness had four options: never, somewhat, satisfactory, or outstanding. The completed surveys were then divided by the success of the athlete based on their standings at the Conference Championship Meet.

## **Procedure**

1. Administer Survey: The participants were notified via email of the study and asked to complete the study by hand and return it to this researcher. The directions on the survey read as follows: “This study is to examine how swimmers cope with stress prior to a race. As an example, it is well known that Michael Phelps listens to music before his races. This survey is to determine various swimmer’s approaches to stress.” The full survey questions can be found in appendix A.
2. The returned surveys were then divided into two groups determined by the athlete’s placing at the Conference Championship Meet. Group 1 placed amongst the top 16 in at least one of their three events at the Conference Championship Meet.

## **CHAPTER IV**

### **RESULTS**

#### **Analysis of the Data**

This study examines if stress relieving techniques prior to competition have an effect on the overall success of the swimmer. In particular swim team members were surveyed on what techniques they used to mentally prepare for a meet, with what frequency the techniques were used and how useful the techniques were. Swim team members were divided into two groups: Group 1 included members who placed in the top 16 at the Conference Championship Swim Meet and Group 2 included team members who did not place. There were 10 swimmers in each of the groups.

Several analyses were run. Because the data were survey responses to a point scale; the data, therefore, were not a linear scale but a small range of numbers and thus the statistical analysis of choice was chi-square tests of independence. All such tests turned up as not statistically significant so the null hypothesis was retained.

For the benefit of other researchers; graphs of the data are depicted below and although the data may show some differences in dispersions there is no statistical significance between the groups in any of the comparisons.

Table 1

*Data for Techniques Used At Least Once*

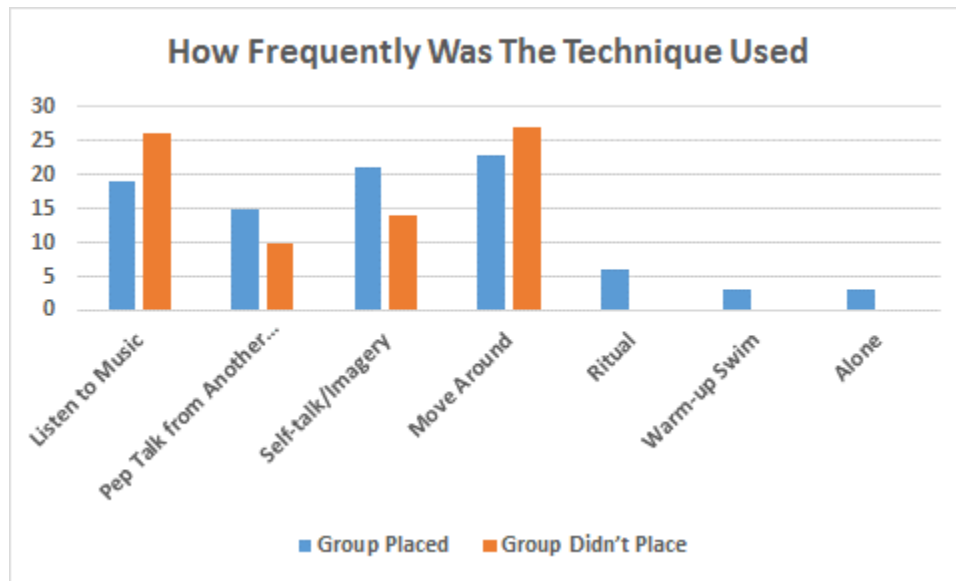


Table 2

*How Frequently Were The Techniques Used*

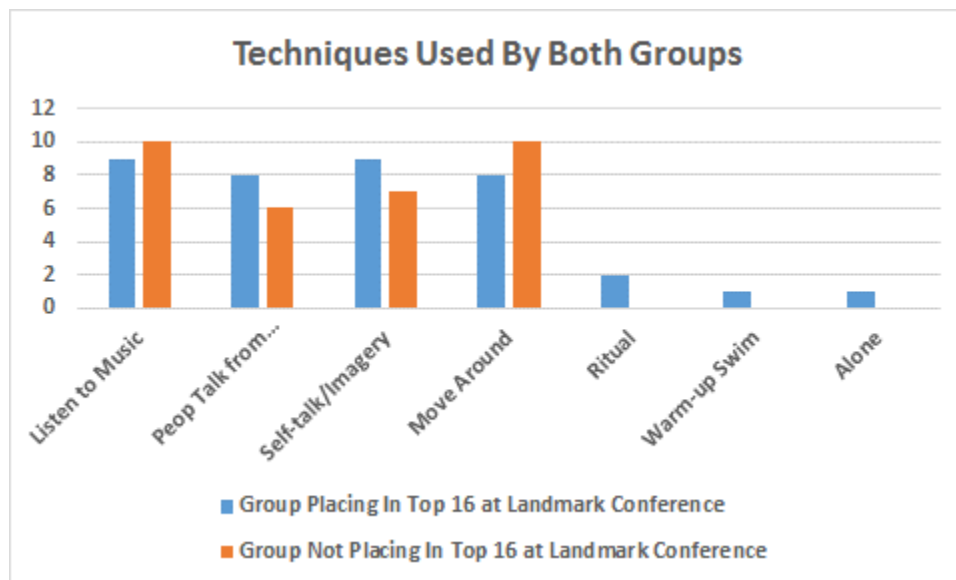
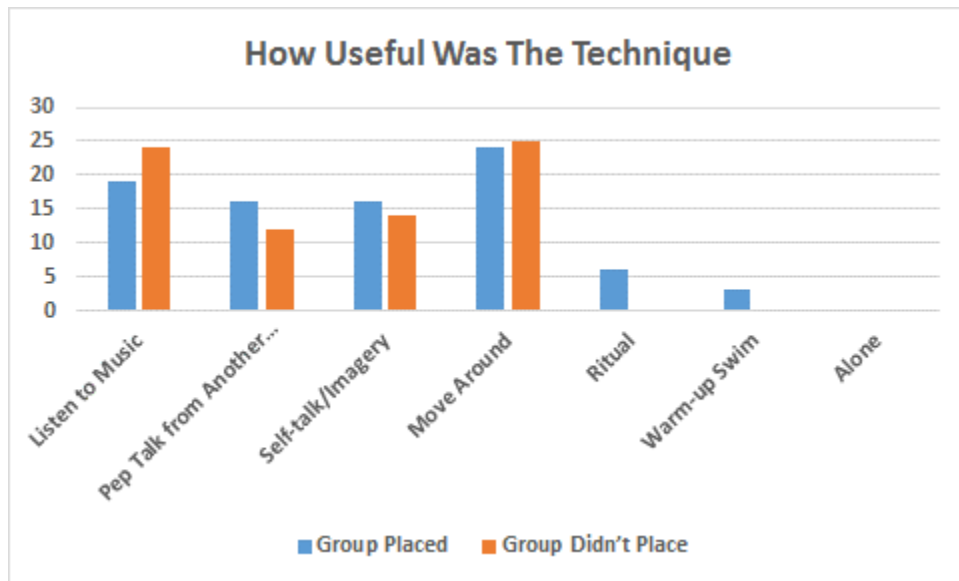


Table 3

*How Useful Were The Techniques*



## **CHAPTER V**

### **DISCUSSION**

This study examines if stress relieving techniques prior to competition have an effect on the overall success of the swimmer. Statistical analysis of the data indicated that there were no statistically significant differences between the two groups in either the techniques used, the frequency of the techniques used, or the usefulness of the techniques.

#### **Implications of Results**

The implication of results demonstrates higher caliber swimmers do not use certain stress relieving techniques more often than lower caliber swimmers prior to racing in swim meets. This finding suggests the difference between the higher and lower caliber of swimmer is due to physical attributes rather than mental. Furthermore, this study did not test the level of competency when using stress relieving techniques prior to competition. Therefore, suggesting that while the higher and lower caliber swimmers may use the same techniques, the level of competency between the two may be a factor in the level of achievement the athlete reaches.

#### **Threats to Validity**

This study utilized a survey methodology that was descriptive. There were two groups whose perceptions were compared on preparation techniques used prior to a swim meet. As in any study there are threats to internal validity and external validity. In terms of external validity, the biggest concern is obviously the lack of randomization. As such, the question arises if such conclusions would be found across all teams and levels of swimming. Additionally, this study did not take into account the overall achievement levels in the sport but rather examined a small fraction of that amount. Furthermore, the test subject's opinions of each technique and frequency

may have caused differences in answers which in turn creates a threat to the validity of this study.

Similarly, there are threats to internal validity, which include the determining factor in the definition of high and low caliber swimmers. The determining factor was whether the swimmer achieved the ranking of top 16 at the Conference Championship Swim Meet in 2016. Issues surrounding that include the exclusion of an entire team within the conference competing at the meet and the number of swimmers registered to swim in an event. In other words, in some of the more challenging events, there were barely 20 people racing yet, easier events saw nearly 40. Depending on what race a person swam they had a higher probability in achieving the status of top 16, making that standing less prestigious.

### **Connections to Previous Studies**

Additional research has been conducted to determine techniques used to help relieve stress prior to competition. There is a plethora of techniques used to alleviate stress. The following studies found a portion of those techniques useful when assisting athletes.

Robazza and Bortoli (1998) conducted a study to determine what techniques Olympic level archers use to relieve stress while competing. The researchers found imagery, task-focused concentration, reaction to mistake, autonomic control, concentration, and high self-confidence to be factors in achieving optimal performances from these athletes. Taylor, et al. (2008), went further by differentiating between males and females' preferences in stress relieving techniques. The researchers studied the differences in mental strategies between medalists and non-medalist at the 2000 Sydney Summer Olympic Games. In addition to emotional control, the researchers found males preferred the use of goal setting, imagery, and activation, while females preferred self-talk, goal setting, activation, negative thinking and relaxation.



Gee (2010) differentiated between the two types of anxieties that occur prior to competition: cognitive and somatic. The way to relieve the cognitive anxiety requires training the mind through a therapy called rational emotive therapy (RET). Somatic anxiety affects physical aspects to the athlete so meditation, breathing, and imagery are suggested to help alleviate such anxiety or stress. Through-out multiply studies there is a common theme of imagery being a useful tool to combat stress. This study found the majority of athletes used imagery with all of the higher caliber swimmers using imagery prior to racing.

Finally, Sorenson, et al. (2008) determined music to have a positive influence on athletes trying to combat stress. The study found music offers a positive distract for the listener to focus on instead of the upcoming competition. Moreover, music was found to help increase and decrease heart-rates making it a great to tool to pump up an athlete or to calm them. Again, this study found the majority of the athletes surveyed use music prior to competition as a way to get them mentally ready to race.

### **Implications for Future Research**

Further research on effective methods used to relieve stress prior to competition would be beneficial in determining how to prepare athletes mentally for an optimal performance. Due to the time demands, physical demands, and travel schedules, student-athletes have more stressors place upon then in comparison to the average student. Due to this, student-athletes are also more likely to develop depression and other psychological disorders over their classmates (Etzel, 2006). Upon evaluating the sport of swimming, it is determined that in order to perform at the optimal level, an athlete must possess physical and mental toughness. Swimming relies heavily on the mental strength of the athlete. Therefore, techniques on managing mental stressors is

necessary for the athlete. In future research, the researchers need to take into account the level of the athletes they are testing. This study's findings suggest the sample was not conclusive in determining techniques for mental preparedness prior to competition.

Moreover, future researchers may find benefit in conducting a quasi-experiment study in order to better define and determine the definitions of each technique to the test subjects. This will allow for future researchers to observe and record the changes the techniques made without the issue of validity of the test subject's opinions.

### **Summary**

In conclusion, the null hypothesis was supported in this study. The results of this study have not proven one stress relieving technique is more effective than another in terms of pre-competition stress. Additional research is necessary with the adjustment of the type of study conducted and the definitions of each technique as proposed to the test subjects in order to determine the most effective stress relieving technique for student-athletes prior to competition

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