DIFFFERENCES IN PSYCHOLOGICAL SKILL USE AMONG DIVISION I ATHLETES

by

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A Thesis for the Degree

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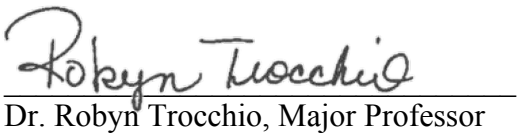

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Chapter 1: Introduction

High-level athletes experience stress and anxiety associated with the pressures of their sport and competition. Athletes use psychological skills and pre-performance routines (PPR) to decrease this stress to achieve an optimal state of arousal and focus (Hagan & Schack, 2019). An effective PPR reduces stress and increases performance outcomes for an athlete (Gretton, 2020; Hagan & Schack, 2019; Hazell et al., 2014; Jackson, 20013; Lee et al., 2015; Moradi, 2019; Phelps & Kulinna, 2015; Wergin, 2020). This study focused on relaxation techniques as well as imagery, the mental visualization of a scene or skill, and coping skills, all which can be a part of an effective PPR. Athletes achieve mental relaxation by using self-talk, or the regulation of their thinking, whereas they achieve physical relaxation through techniques such as breathing concentration (Hardy et al., 1996). Both are useful in providing a sense of relaxation and individuals can choose the one they find the most effective or enjoyable.

Athletes can draw upon four types of relaxation procedures: (1) progressive relaxation, (2) autogenic training, (3) meditation, and (4) biofeedback. Progressive relaxation is a technique through which individuals tense muscles one by one in their body before they relax each one, helping athletes to feel the difference between the two states, tense and relaxed (Jacobson, 1929). Autogenic training also relies upon feelings associated with the limbs, but the individual follows a pattern of feeling heavy, and allowing warm, and cool sensations in each part of the body. The individual then uses imagery to picture relaxing scenes and may go on to use self-statements to inform the mind that the body has relaxed. Meditation helps individuals to focus their attention on a single thought, sound, or object. Various forms of mediation ask participants to chant mantras throughout the practice (Hashim et al., 2011; Kudlackova, 2011; Pineschi et al., 2013). Lastly, biofeedback exemplifies the physical skills of relaxation, which allows individuals to be taught to regulate bodily processes that usually would occur involuntarily, such

as heart rate, blood pressure, muscle tension, and skin temperature (Durand & Barlow, 2009; Shaffer & Moss, 2006; Wang et al., 2015). This monitoring can be performed through devices such as electromyography, thermal biofeedback, and heart rate monitors (Yucha & Montgomery, 2008).

An individual's physiological sensations, such as how fast their heart is beating, alert them to their level of relaxation. More specifically with athletes, Ortega et al. (2018) used HR as a predictor of performance in rifle athletes. The athletes who used self-talk, relaxation, and imagery before they took their turn shooting had a lower heart rate, a higher sense of self-efficacy, and a better performance outcome. In many sports, having a lower heart rate allows athletes to think clearly and read relevant cues in the performance arena. When the body is showing relaxed physiological responses, athletes can identify situations more clearly and tend to feel more confident about approaching the situation. There is little research that indicates which sports athletes benefit most from using relaxation techniques, as some sports may require an increased physiological arousal level for optimal performance, such as hockey or martial arts. These sports need the athlete to be excited and ready to quickly handle the aggression and physicality that comes with this sport.

Many studies have focused in a broad sense on how athletes use psychological skills in their performances (Hagan et al., 2017; Keilani et al., 2016; Lee et al., 2015; Mozen, 1999; Ortega et al., 2018). There is limited research concerning how athletes are specifically using these techniques, how they learned them, and how these skills are helping their performances. Researchers have established various relaxation and imagery skills help some athletes, but few studies have demonstrated which of these techniques better suit performance-sport athletes and which better suit the general population. One study, which examined the relationship between psychological skills and the intensity and direction of competition anxiety, found that athletes

use these techniques in catastrophic situations such as when unanticipated stimuli comes into the environment or the athlete makes a large mistake during a performance (Wadey & Hanton, 2008). There is limited research examining whether elite athletes may use these techniques outside of catastrophic situations where their performance is becoming negative or will result in failure.

In addition to these relaxation skills, such as progressive relaxation and meditation, athletes may use imagery as a form of mental relaxation. Imagery can be utilized for a variety of purposes such as practicing skills, learning advanced skills, mental rehearsal, and relaxation. However, the focus of this study was on an athlete combining multiple senses to create a vivid and controlled mental image of themselves performing a skill (Di et al., 2019). According to the symbolic learning theory (Janssen & Sheik, 1994), mental imagery is effective because the individual is planning exact actions in advance, creating a cognitive goal before a physical response becomes necessary. By envisioning an action before it even occurs, athletes can feel great relief, helping them relax and stay confident. Imagery can benefit novices or elite athletes learning new skills (Moradi, 2019). By picturing an effective movement, the individual gains confidence that they can perform the task.

Di et al. (2019) found that while imagery was effective for both team and individual sports, athletes involved in individual sports have better imagery capabilities compared to those in team sports. Little data supports this finding or indicates if underlying mechanisms contribute to the effectiveness of imagery. In contrast, team-sport athletes of sports such as basketball, hockey, soccer, and softball, in multiple studies use certain types of imagery more frequently than those in individual sports (Adegbesan, 2009; Short & Short, 2005; Short et al., 2005). When individuals can imagine a successful outcome in their mind, their confidence increases,

which reduces their anxiety about the upcoming performance and may produce feelings of relaxation.

Many individuals use a combination of both relaxation and imagery simultaneously to prepare for an event. Kudlackova et al. (2013) found that elite athletes use deep breathing, imagery, and muscle relaxation to cope with competitive anxiety. Additionally, this study found that elite athletes use relaxation and imagery to promote recovery while stretching after a performance. These findings give insight as to why athletes may also want to use these techniques after a performance, instead of only to combat precompetitive anxiety. Clearly, then, athletes can use psychological skills, such as relaxation and imagery, as coping strategies for individuals.

When presented with a stressful situation, individuals must pick a technique that is right for both the situation and their personality. There are two types of coping strategies that are most popular among athletes. The first approach, problem-focused coping, is directed at problem solving and uses strategies that are aimed at changing the stressful situation. This can also be known as problem-focused coping (Nicholls & Polman, 2007). The second mechanism is emotion-focused which is aimed at trying to reduce the psychological discomfort through cognitive avoidance, finding alternative rewards, acceptance, or resignation, and trying to lower the stimulus without modifying the situation (Folkman & Lazarus, 1986; Moos, 1993). Psychological coping skills would fall under the emotion-focused coping strategy category, which focuses on reducing the response felt by an individual to the stressful situation. While not all athletes may use psychological skills as a coping technique, these skills can help them continue to assess and navigate stressful situations for optimal performance outcomes. Avoidance focused coping strategies are not as popular in sport, as they are efforts to direct

attention away from the stress and may even be ignoring the problem all together (Green et al., 2010).

Research has generated little information to indicate which psychological skill techniques are most favorable or most used by athletes. Keilani et al. (2016) found that athletes who use mental techniques, such as relaxation and imagery skills, had increased concentration, enhanced motor skills, and improved ability to handle arousal and stress. Similarly, Kudlackova (2011) has also shown that relaxation skills increase mental toughness, which can reduce anxiety and negative perceptions during a performance. Progressive muscle relaxation and autogenic relaxation result in more positive mood states in individuals (Hashim et al., 2011). Positive mood states in combination with mental toughness and decreased anxiety create a strong and predictive arousal level most likely to produce optimal performance outcomes.

Whether athletes use relaxation or imagery before, during, or after their performance remains a gap in the literature. When investigating the different parts of a PPR, studies have found athletes quite enjoy relaxation phases (Lee et al., 2015). This finding is important because enjoyment increases the likelihood of adherence. Additionally, past research has found no differences among genders in their use of psychological skills (Hagan et al., 2017). This finding does not have conclusive support behind it, as the research is contradictory if genders differ in their use of psychological skills (Liu et al., 2019). The present study examined gender differences to determine how athletes who participate as males or females use relaxation and imagery. The issue merited examination because we know that females perceive stress, anxiety, arousal, and emotional states in competition differently than males, and both genders may have different needs during a competition (McLean & Anderson, 2009). For example, Menzies & Clark (1995) found that women when compared to men, are more likely to overestimate danger probability. This is likely a result of evolutionary tendencies to identify ambiguous situations as

threatening to help preserve the safety of offspring (Wood & Eagly, 2002). While the sport may not threaten an athlete's offspring, women still tend to see any situation that is not clearly identifiable as more dangerous than her male counterpart would. This explains why in competition settings, women may need different psychological and coping strategies than men to take control of heightened anxiety levels.

Purpose of the Study

The purpose of this study was to better understand gender and sport differences in the use of relaxation and imagery techniques among National Collegiate Athletic Association (NCAA) Division I (DI) athletes before, during, and after performances. A second purpose of this study was to investigate how DI collegiate athletes use different types of coping skills and if they might use psychological skills as a coping mechanism in their sport. Lastly, the third purpose of this study was to explore how athletes are learning relaxation and imagery skills, and how long they have been using these skills.

Chapter 2: Review of Literature

In this chapter, the research is synthesized to current literature relevant to the use of relaxation and imagery techniques among athletes, as well as coping strategies. Past studies have shown that relaxation and imagery can reduce precompetitive anxiety, which is appealing to high-level athletes (Wadey & Hanton, 2008). While these psychological skills can be useful for any type of athlete, the research indicates elite athletes tend to use these techniques more frequently and benefit from them more significantly than a novice (Hagan et al., 2017a). A wide variety of skills and activities fall under relaxation and imagery techniques that sport psychology (SP) professionals can deploy to help athletes. The purpose of this literature review was to explore previous research to understand how athletes use these skills and how they may have different impacts on various groups of individuals. This literature review will begin with a broad discussion of psychological skills and their use in the athletic field, and then discuss relaxation and imagery, explaining each of their benefits and uses among elite athletes. Following this discussion, this section will explain the importance of deliberate practice and the effects that it has on performance. Then, the discussion will explore using psychological skills in practice versus competition and the differences in these skills' use by team- versus individual-sport athletes, and by male and female athletes. Lastly, the discussion will address various coping strategies used by athletes to handle stressful situations.

Psychological Skills

The term *psychological skills* encompasses many different types of mental strategies and activities athletes can use to create an optimal state of arousal, change levels of pre-competitive anxiety, or direct attention to certain cues. According to Vealey (2007), four categories of psychological skills exist: (1) foundation skills, (2) performance skills, (3) personal development skills, and (4) team skills. Psychological skills can include goal setting, positive

self-talk, mental imagery, emotion and anxiety management, relaxation skills, motivation goals or orientations, and attention regulation.

Psychological skills are important because if athletes can regulate their mental state, they can enhance their performance and protect against anxiety (Hagan et al., 2017b). SP professionals can help teach and implement these skills to athletes and coaches for future use. SP professionals stated by using psychological skills training in their work with clients, this helped improve their consulting effectiveness (Filion, 2018). SP professionals explained they use deep breathing, goal setting, self-reflection, time management, imagery, mindfulness, self-talk, biofeedback, and neurofeedback (providing a simple visual or auditory stimulus to help individuals regulate their brain activity to accomplish their intentions) (Molina et al., 2009) in their consulting practices. Implementing psychological skills can result in more consistent successful performance outcomes and will likely enhance the enjoyment of the sport in general, as this activity causes fewer negative emotions.

To understand more about how high-intensity elite sports use psychological skills, Birrer and Morgan (2010) examined how psychological skills may enhance sport performance. They presented a model with three levels (psychological demands, skills, and techniques) to help identify the psychological demands of the sport, which then allows the professional to understand which psychological skills this sport and athlete require. This model is a great step-forward in helping professionals recognize that psychological skills are very useful to athletes, but only when they implement the right ones. Athletes may not need help with self-talk in their sport, but may need to focus instead on meditation or mindfulness techniques. For example, a rifle athlete may not need help with pumping themselves up with positive self-talk, but rather need to use meditation techniques to calm their heart rate before performing. It's the SP professional's job to understand both the demands of the sport and the athlete to best help them

with their psychological skill training. Psychological skill implementation should be systematic, goal-oriented, planned, controlled, and evaluated (Seiler & Stock, 1994). Without a clear structure and plan in place, the athlete will be unable to measure progress, will lose motivation, and will be unable to reap the benefits of these skills.

While studies have shown the importance of psychological skills, it is interesting to notice the differences between athletes that use these skills, and athletes that do not. Heydari et al. (2018) examined the importance of psychological skills and their application in both teaching and learning to improve exercise skills using the Ottawa Mental Skills Assessment Tool (OSMAT), trait confidence, and state confidence questionnaires. Professionals taught one group of participants the skills of goal setting, positive self-talk, and imagery through 24 sessions, three times per week for 20 minutes each. Results indicated that the group that learned psychological skills, when compared to the control group, experienced a significant positive effect on mental state and trait self-confidence. These heightened levels of confidence help athletes achieve peak performance and optimum self-confidence levels when they practice and compete. To achieve this desired outcome, athletes can deploy multiple psychological skills at various times during a competition or in practice, depending on the situation. One study has shown that elite athletes can predict their psychological skill use in response to a situation they perceive as stressful. Elite athletes consistently varied their psychological skills when given various stressful environments (Hagan et al., 2017b). These skills included self-talk, goal setting, imagery, and relaxation to manage the demand of the competition situation. When implemented correctly, psychological skills can improve self-confidence in an athlete, which can help increase performance outcomes. When teaching these skills, though, one must place equal emphasis on all types of skills, since each can fit different situations.

Athletes can use psychological skills in competition and practice, but also in rehabilitation settings. Athletes can utilize different skills to help relieve anxiety such as through meditation, or help individuals keep their muscle memory through imagery. Psychological skills are essential during the rehabilitation of injured athletes, in order for a quick and successful recovery. They have a unique role as anxiety-reduction techniques in a rehabilitation setting, especially when athletes may be feeling pressured to return to their sport too soon after the injury has occurred (Hamson-Utley et al., 2008). Two main components of psychological skills commonly used in rehabilitation settings or as anxiety-reduction techniques, in general, are relaxation and imagery. This combination is the optimal mix for reducing anxiety, building confidence, and improving self-efficacy. Imagery allows the individual to build and keep muscle memory and to plan an event before it happens. This effect of imagery decreases state anxiety by letting athletes know their body can do the activity even before they begin the movement. Relaxation helps to calm individuals, which leads to an increase in confidence in themselves by allowing their body and mind to relax and focus on the correct cues.

Relaxation

Relaxation Training

As a psychological skill, relaxation can bring many benefits to individuals, helping to ease anxiety and increase confidence in performance. The overarching goal of relaxation techniques is to bring athletes into the present moment, make them aware of their bodily sensations, lower their muscle tone, and calm their breathing (Pineschi & Di Pietro, 2013). More specifically, relaxation can dissipate muscle tension, help with recovery processes when the time between two exhausting events is short, help with insomnia before an important event, and help the body store energy to use during a key movement and facilitate the cool-down period (Pineschi & Di Pietro, 2013). The most common relaxation techniques used in athletic settings

include muscle relaxation, autogenic relaxation, deep breathing, eastern relaxation, meditation, and imagery (Kudlackova, 2011). When initiating the development of relaxation skills, one should first teach athletes three lessons. These include (1) learning to relax and control abdominal breathing, (2) learning to do a body scan to detect localized muscle tensions, and (3) learning to use imagery of a peaceful and agreeable place that involves all senses (Pineschi & Di Pietro, 2013). These starting points help the athlete to become self-aware of their bodily sensations and how to induce relaxation at a physiological level. SP professionals need to teach athletes to become self-aware, so that they know what is normal for themselves and detect changes in their mental and physical states. By connecting mental imagery while relaxed with physiological feelings, the individual feels more in control and a greater sense of calm. SP professionals use two groups of learning relaxation skills: muscle to mind and mind to muscle. Muscle-to-mind techniques are in the somatic (affecting the physical body) category: they include body relaxation and progressive relaxation. This technique uses bodily sensations to relax muscles, which signals to the mind that it is relaxed. Skills in the other group, mind-to-muscle, use such cognitive (affecting the mind) techniques as autogenic training and meditation. Signals from a calm mind led the body to become quieter and more relaxed (Pineschi & Di Pietro, 2013). Additionally, athletes can use multimodal relaxation techniques which incorporate both types of relaxation skills. For example, an athlete may use progressive relaxation while doing meditation techniques for a full mind-body relaxed state.

Some athletes like to implement relaxation phases into pre-competitive routines. When using relaxation before the competition (Lee et al., 2015), participants found this phase helpful, as it allowed them to stay calm and focused whether the performance was good or bad. When the performance did not go as planned, athletes managed to calm their minds and avoid becoming discouraged. Additionally, relaxation can be useful during a competition as various

negative stressors appear in the sport environment. Relaxation helps to regulate an individuals' perception so that they remain calm and focused. These skills have also shown a strong correlation with mental toughness when measured using the Deliberate Relaxation for Sport Survey—which forms the basis of this study's methods (Kudlackova, 2011). As individuals use relaxation techniques more frequently, they experience an increase in mental toughness, which Jones et al. (2002) defines as having a competitive edge that allows one to cope with the demands that sport places on a performer. This increase in mental toughness is intuitive because as it becomes easier for individuals to control their thoughts and regulate emotions, they show more stability to stressful situations and remain more mentally stable throughout them. Relaxation techniques share qualities with mindfulness as well, which, when implemented into training programs, can be a great supplement in a stress reduction program, as it decreases levels of perceived stress, lowers rumination, and increases psychological flexibility (Lundqvist et al., 2018). All of these results play a role in mental toughness, as they make the mind more flexible to stress responses.

Benefits of Relaxation

Those who practice mindful breathing disrupt their mental connection to adverse thoughts they may have. Mindful breathing also helps to reduce reactivity to repetitive thoughts (Feldman et al., 2010). Athletes can easily incorporate breathing into any practice or competition and can fight against negative thoughts that may decrease self-efficacy and increase competitive anxiety. Previous research indicates that athletes who use relaxation techniques, such as progressive relaxation, imagery, and deep breathing, can improve their quality of life. Shahriari et al. (2017) investigated 50 adults and found that when implementing the previously mentioned relaxation skills, they showed increased positive mood states and improved quality of

life. If athletes use these skills on a daily basis, they will have an increased positive outlook on their sport.

Not all relaxation measures have to be subjective, as the results of these skills can be physiological responses as well. One sport that uses these techniques commonly for a bodily response is rifle shooting. For accurate shooting, this sport requires a low heart rate and calm breathing. Every sport, though, can benefit from the physiological response of relaxation at some point in their practice or competition. When examining heart rate as an indicator of psychological state from a physiological perspective, researchers found a positive correlation among heart rate, self-efficacy, and performance. When interviewing participants as to how they achieved a low heart rate in rifle shooting, the researchers found that they used self-talk, relaxation, and imagery (Ortega et al., 2018). When the body and mind are both in sync and in calm conditions, individuals can process thoughts more efficiently, plan movements, and focus their attention correctly.

Relaxation and Recovery

Relaxation techniques can facilitate the recovery processes as well. Progressive muscle relaxation can help decrease sport-related anxiety over time (Wade, 2010). Studies have found a relationship among higher anxiety, longer recovery times, and higher pain levels (Hamson-Utley et al., 2008; Wade, 2010). Many aspects of becoming injured and the process afterwards can induce many stress responses. Athletes become angry and scared of their recovery process, and what it will look like to return to their sport. Connecting the mind and body once again to promote healing, using imagery to display a successful recovery and return, and lowering physiological stress responses can all facilitate recovery in a positive fashion. Literature has shown that mental practice is better than no practice at all, but one should keep in mind that it is less effective than the true physical practice of a skill. When athletes use mental practice in

combination with physical practice, they see the best results (Caliari, 2008; Feltz & Landers, 1983; Grouios, 1992; Hinshaw, 1991; Smith et al., 2008). Once they can move those muscles again, they should continue to use relaxation skills to yield the best results and recover from their injury in a strong fashion.

Imagery

Like relaxation, imagery can help athletes increase their performance level. Imagery allows athletes to recreate or envision an activity or skill in their mind, using all senses (Mozen, 1999). Two aspects important to include are the vividness and controllability of the image that an individual can produce. Those who can produce more vivid motor images seem to benefit more from using imagery in motor enhancement (Munroe et al., 2000). Vividness relates to how clear and life-like the image becomes in one's mind, using all senses to create a scenario. Controllability refers to the individual's ability to alter an image, including the viewpoint from which they see it. Imagery creates a mental image and sensation within the individual that allows them to feel like they are practicing a skill without actually moving. Athletes can use imagery in a multitude of ways, including improvement in skill development, focus, confidence, motivation, arousal regulation, and relaxation (Short et al., 2001; Zhang et al., 1992). Imagery has both cognitive and motivational factors that operate at both the specific and general levels (Shearer et al., 2007; Short & Short, 2005). Imagery that is specific is focused on improving a certain motor skill, while general imagery is imaging an entire performance or sequence of events. Motivational specific imagery is used to image achieving personal goals in contrast with motivational general mastery which has the individual image being mentally tough and confident in all aspects of their sport performance (Adegbesan, 2009). This ability is extremely beneficial in skill development, mastering advanced skills, and rehab settings. While athletes use imagery in numerous ways, there are two different viewpoints they can use: external and

internal. By using external imagery, an athlete obtains an image of themselves performing a movement from an outside perspective. By contrast, athletes use internal imagery to obtain a mental image from the vantage point of their own eyes, as normally seen during a skill. Another important term here to incorporate is kinesthetic imagery, which involves individuals simulating the somatosensory experience of the task as if they were truly going through the motions (Di Corrado et al., 2019). Athletes should use external and internal imagery in different settings, though, as they have different benefits, which will be discussed later.

PETTLEP Imagery

The more detailed and life-like a mental image is, the more effective it will be in helping an athlete. PETTLEP imagery, introduced by Holmes and Collins (2001), in sport settings provides a very realistic framework to create mental images. PETTLEP considers physical, environmental, task, timing, learning, emotional, and perspective factors for a complete imagery experience. This model creates a formula that individuals should follow so that their imagery experience resembles the real-life situation. This mental perspective creates a strong parallel between mental and physical practice from the mental perspective, increasing confidence for when it comes time to perform. One can argue that the physical aspect of imagery may be the most important factor, which is why professionals should include physiological responses in the imagery instructions to mimic real-life practice. One should practice imagery in an environment as similar as possible to the performance environment. Some ways to replicate the environment are to use video or audio to help mimic this. The task being imaged should be appropriate to the skill level and the personal preferences of the athlete. Athletes need to perform the mental image in real-time. They should use slow imagery only to help correct errors in their form-base skills. Once they have corrected these errors, the imagery should revert back to real-time. In response

to feelings and cognitions developing as the individual becomes more skilled, the content of imagery will adapt as well.

Imagery and Performance

As stated previously, imagery can help reduce trait and state competitive anxiety. When investigating the relationship between basic psychological skills, including goal setting, imagery, self-talk, and relaxation, with the intensity and direction of competitive anxiety, researchers determined that imagery yielded elevated levels of self-confidence (Wadey & Hanton, 2008). This finding is important because higher levels self-confidence can benefit performances greatly.

The type of imagery used in a performance or during a motor task to gain the most benefits, is the one that best matches the nature of the performance or task. Using the Vividness of Visual Imagery Questionnaire to assess imagery ability, researchers found that external visual imagery improved athletes' form-based tasks by making it easier for them to imagine the global positions and movements crucial to success. In comparison, Di Corrado et al. (2019) revealed that internal visual imagery improved goal-directed tasks or skills that require fast changes in the visual field. Both athletes and professionals need to know which types of skill the athlete uses in order to implement the right technique of imagery into their performance.

Imagery as a Relaxation Technique

Imagery can be a relaxation technique, specifically imagining a peaceful and agreeable place to relax (Pineschi & Di Pietro, 2013). Researchers have started to investigate the relationship between emotional factors and physiological symptoms. Their results indicate close ties between the two factors, demonstrating that our emotions can exacerbate physiological symptoms such as rapid breathing, increased heart rate, and closed airways (Lahmann et al., 2009). Feeling the emotional effects of stress or anxiety can have a direct impact on how

athletes' bodies respond, which may turn into a circular relationship when stress levels rise due to troubled breathing. This same study investigated how guided imagery and functional relaxation may help dissipate these symptoms, finding that, in the short term, guided imagery relives physiological symptoms associated with stress.

To have a greater physiological response, an image needs to be vivid and engage all senses available to the individual (Callow et al., 2006). Individuals also need to feel a great sense of control over their image, as this feeling translates into an increased confidence level for their performance. To imagine and manipulate certain aspects of the image can alleviate future stress about a performance, as individuals now know they can control aspects that may vary during a task (Vealey & Greenleaf, 2010). Using imagery as a relaxation technique enhances athletes' concept of control over their performance, which will inherently reduce anxiety and stress, increasing relaxation. When athletes feel confident that they can perform a task, they will remain calm and collected. Athletes must practice imagery consistently, like any other skill they perform. It takes time to become good at imagining different scenarios, controlling them, and producing the desired relaxation effect

Use in Practice and Competition

One area that needs to be emphasized to athletes is when they are implementing psychological skills, specifically both during practice and competition. Many times, athletes deploy psychological skills right before or during a competition to try and combat any adverse situations they may be facing. Doing so is not an effective way to use these mental skills, though, as they require repeated practice to master. Just as one cannot learn a new skill during competition under immense pressure and expect success, athletes should not expect these skills to work effectively or see results when only implemented during competition. Frey et al. (2003) have associated psychological skill use with accomplishments during practice and in

competition. This study found the more athletes use psychological skills prior to competition, the more likely they are to see themselves as successful individuals, both prior to and during competition. Coaches should encourage athletes to use these mental skills when they are practicing their physical skills to help increase the quality of their practice and the following performances (Hagan et al., 2017b). Many athletes remain unaware of the benefits that may result from using psychological skills throughout practice while performing physical skills.

Hagan and colleagues (2017a) showed that athletes use psychological skills less and less often during the week before a competition. Because imagery skills are necessary to the refinement of routines to help replace natural negative images with positive images to reflect back on during a mistake in performance, these findings are a cause for concern (Hagan et al., 2017a). More research could explain these findings and how to keep athletes practicing and using psychological skills at a steady rate leading up to the competition. Athletes need to continue to use these skills as competition gets closer, so that the positive images and skills are fresh in their mind, and they can deploy them easily in a stressful situation.

In a study examining psychological skills usage in competition, Wadey and Hanton (2008) found that individuals with a strong background in psychological skills could maintain the intensity of their anxiety response before a competition through goal-setting, imagery, or self-talk to help them understand what they were feeling. Individuals also used relaxation techniques to elicit this effect. By having a strong skill set, athletes managed to control their anxiety levels to the optimal level of arousal until performance. They can control arousal through relaxation skills if they are too anxious, or through self-talk to help increase their confidence levels and become excited. While this finding is important, individuals who only deploy psychological skills during competition tend to use them solely during catastrophic situations (Wadey & Hanton, 2008). When only used in extremely stressful situations, without

practice, these techniques will not show successful results nor have desired benefits. Those who use these skills prior to a competition will have more successful results, ending in better performance outcomes and heightened self-confidence. Only a limited number of studies have examined this subject, and more research could explain when, specifically, athletes use these skills. A majority of athletes are using these skills during both practice and competition, but the use may vary by type of sport, personality type, or the needs of the sport itself.

Psychological Skill Use in Team Versus Individual Sports

Only a few studies investigated how the use of psychological skills differs between individual and team athletes. Specifically, since most of the literature focuses on imagery skills, few studies have examined relaxation skills. Results of imagery research conflict, which is why researchers need to keep studying this topic and discuss both sides of the findings. One study found that team-sport athletes use motivational-general mastery imagery more frequently than those in individual sports (Short & Short, 2005; Adegbesan, 2009). These findings were consistent across such sports as women's volleyball, basketball, hockey, soccer, and softball (Short et al., 2005). In contrast with these findings, Di Corrado et al. (2019) found that individual-sport athletes have better imagery abilities than team-sport athletes. While these findings differ in the frequency of use versus capabilities, they reveal a contrast to previous findings as they likely go hand in hand. Those who practice more tend to have higher capabilities. This study also found that individual-sport athletes used more motivation general arousal types of imagery than team-sport athletes do. This research contrasts with the findings previously stated (Adegbesan, 2009; Short & Short, 2005). Variables among participants, athletic ability, previous psychological skills training, and types of sport prevent researchers from generalizing findings. Certain sports even in one regional area may require different psychological skills than the same sport in a different area of the country. More research could

provide a comprehensive understanding of the underlying causes of why athletes playing individual and team sports use these skills differently.

The use of psychological skills can also differ based on non-contact versus contact sports. Findings have shown that those in individual non-contact sports used fewer mental imagery skills than individual contact sports and team sports (Whitehead & Basson, 2005). These results could be due to the nature and demands of the task at hand. Non-contact sports may have less complicated skills and movements compared to contact sports, in which much of the development of the play depends on the involvement of the opponent. These findings could also reflect the need in individual and team contact sport athletes for a higher level of cognitive thinking in certain aspects, needing a strategy to plan ahead. Such athletes may utilize imagery in this sense to help see their opponent's possible moves. Many of these studies also compared how males and females used these skills differently, just as individual and team sports use these techniques differently.

Psychological Skill Use in Male versus Female

Like many other things, males and females tend to differ in athletics and their perception of the environment because of a difference in brain compositions. Substantial evidence indicates that women, on average, report greater fear than men and are more likely to develop anxiety disorders than men (Arrindell, 2000; Bourdon et al., 1998; Davey, 1994; Weissman & Merikangas, 1986). Coaches and athletic trainers need to take into consideration the distinct difference in women's brain composition that may predispose them to feel more fear than men. This statement should not be taken as a generalization that women do not like to attempt challenging feats or try new skills. This finding is rather important since, if women are more likely to develop anxiety disorders, we should understand as helping professionals that they may need to use relaxation techniques and anxiety control strategies more frequently than men. In

addition, McLean and Anderson (2009) found that women have a greater tendency to worry, which usually decreases physiological reactivity. Just because women may not actively speak up or show strong physiological responses to their stressors does not mean that they are not experiencing these thoughts or symptoms of anxiety. By contrast, men usually have a stronger physiological reaction to acute stressors. Coaches and other professionals in sport settings should note that males and females may present their stress symptoms differently, but they are both experiencing stressful situations.

Research has also been inconsistent in this area of psychological skills, another reason why researchers need to review and continue to conduct studies. When researchers have used the Test of Performance Strategies (TOPS) to examine athletes' use of imagery, goal-setting, self-talk, automaticity, emotional control, and negative thinking or attentional control during both practice and competition, they have identified no differences between genders (Hagan et al., 2017b). When researchers examine specifically imagery, their results have been more consistent but are still conflicting results. Males tend to have better imagery abilities than females, and use imagery more frequently and consistently (Weinberg et al., 2003). These findings contrast with results that no significant differences exist across gender in terms of ability when researchers have investigated imagery perspectives and preferences (Liu et al., 2019; Munroe et al., 2000; Hall, 2001; Whitehead & Basson, 2006).

Some studies have examined adolescents (14 and 15 years of age) and their use of psychological skills, such as coping with adversity, peaking under pressure, goal setting/mental preparation, concentration, freedom from worry, confidence, and coachability. A five-year longitudinal study found that boys have higher scores in seven of the eight measured sport psychological skills, but in general boys and girls have similar sport psychological skills (Kruger et al., 2019). Studies have not yet determined when the two genders grow apart and

their similarities diminish. Males and females may possess similar skills at a younger age as they do not have as much experience in their sport or have not learned yet about which skills may be most effective for them. Based on these results, researchers need to conduct more studies to determine gender differences in the use of psychological skills between genders. All athletes are different, depending on the sport they play, their emotional arousal levels, psychological skills training, and personality. More research can explain the compounding factors that may bring some males or females to use imagery or psychological skills more than others in their group.

Deliberate Practice

Both relaxation and imagery have been found to be helpful psychological skills as was just discussed, but to use them effectively, athletes need to practice them frequently and with deliberation. *Deliberate practice* means to practice solely for enhancing performance, instead of practicing for enjoyment or fun. According to Ericsson et al. (1993), to construct a deliberate practice framework, athletes must consider four aspects of such practice: relevance, effort, concentration invested in the activity, and enjoyment. An activity using deliberate practice should have high relevancy to performance. The coach should align practices with the athletes' needs during performance. Deliberate practice also requires high effort levels in order to increase performances. To increase one's performance, one needs to exert full concentration during an activity. If an individual fails to concentrate fully on a task, they will experience no improvement in performance. Finally, deliberate practice is not inherently enjoyable usually, as it requires intense effort and concentration. Deliberate practice is the difference between expert and novice athletes, with these athletes completing a life-long period of deliberate practice to specifically improve their performance (Ericsson et al., 1993).

Developing imagery and relaxation skills, which may take months or years to master, requires athletes to engage in deliberate practice both in and out of competition. Vealey and Greenleaf (2010) provide detailed practical suggestions for helping athletes improve their imagery skills and implement them into performance. This program focuses on enhancing the vividness and controllability of the images that the athlete sees. Step one is to find a non-distracting place where the athlete feels comfortable and to become completely relaxed before beginning. Secondly, the athlete visualizes a colored circle that takes up the entire visual field, and then shrinks to a dot and goes away. The athlete changes the circle into a different color and repeats this process, each with a different color. In step three, the athlete creates the image of a three-dimensional glass. Then they put a colorful liquid inside of the glass and adds ice cubes and a straw. In the fourth step, the athlete finds a couple of scenes and images, and develops them within their mind in vivid detail. These scenes should include sport-related images and people, including strangers and friends. In the fifth step, the athlete pictures the sport setting of their choosing, and visualizes watching someone else perform the skill the athlete wants to do. The athlete should project themself into that image and perform the task successfully, repeating this process with different sport settings. In the final step, the athlete ends the imagery session with deep breathing and slowly adjusts to the external environment once again.

Practicing imagery is a detailed and complex practice. It requires great work and both athletes and coaches need to take it seriously. Deliberate practice includes making time for athletes to develop these skills in order to enhance the athlete's performance. Imagery practice can take place at practice, or in the home and away from the practice field. Researchers have found a high correlation between off-season and in-season use of imagery, where more elite athletes are using imagery a high amount in both seasons (Cumming & Hall, 2002; Hall et al., 2009). These findings are a key factor in helping athletes reach elite levels of performance.

Researchers classify deliberate relaxation as a psychological skill, as athletes are using relaxation only in relation to their sports performance (Kudlackova, 2011). Times when the individual is incidentally using relaxation techniques or using them but not purposefully to enhance their performance would not fall under this category as they are not using it to enhance their performance. Athletes who use relaxation skills deliberately must be aware of their actions in order for these activities to qualify as deliberate (Kudlackova, 2011). Deliberate relaxation techniques can include muscle relaxation, meditation, eastern relaxation activities, stretching to release stress and tension, deep breathing, autogenic relaxation activities, and imagery (Smith, 1999). In accordance with the framework developed by Ericsson et al. (1993), mentioned earlier, athletes should think of relaxation in terms of relevance to sport performance. Overall relaxation is a great sensation to have, but when used in deliberate practice, it needs to be specific to the sport and stressors within that context. Confounding results in literature justify additional studies of athletes using deliberate practice. Some researchers have found a deliberate practice for performance enhancement to be enjoyable (Cumming & Hall, 2002; Kudlackova, 2011), but such enjoyment conflicts with the framework of Ericsson et al. (1993). If athletes really enjoy deliberate practice, they might find it easier to implement in both practice and competition, which would have more significant and impactful results on performance.

Coping

When athletes step into their sport, they appraise a variety of potential stressors, which may include fear, pain, lack of preparation or confidence, demands of the sport, stress from the coach, or opponents. Athletes must have techniques to cope with these potential stressors, so that they may overcome these obstacles and not allow them to cause failure in their performance. Experts categorize coping strategies into two broad categories: approach- or problem-focused and avoidance- or emotion-focused. Approach strategies seek to alter the

stressful situation, where avoidance seek to alter the emotional distress that comes with the situation (Lazarus & Folkman, 1984). Avoidance coping includes both removing oneself from the situation and cognitively distancing oneself from the situation (Krohne, 1993). Approach mechanisms requires the individual to confront the source of stress and try to reduce it through direct action (Roth & Cohen, 1986). In addition to approach and avoidance style coping mechanisms, appraisal-focused coping is a smaller category that involves the individual reevaluating the situation to try and lower the importance level to the athlete by restructuring their perception of the environment and stressor (Cox & Ferguson, 1991). Individuals may prefer one type of coping strategy and use it in every situation, or they may switch their strategy depending on the situation they are facing.

Strong evidence indicates athletes do use a variety of coping strategies, and the stressor an athlete is facing affects the type of coping strategy they deploy (Anshel, 1996; Anshel et al., 2001; Anshel et al., 1997). This strategy reflects a transactional perspective on coping, meaning that the individual engages in a dynamic and recursive process that involves interactions between a person's internal and external environments (Lazarus, 1999). This perspective means that athletes may change their coping strategy to try and manage when the perceived demands exceed their resources, by changing their cognitive and behavioral efforts, including the type of coping strategy they deploy. Similarly, other studies have supported the idea that coping is a dynamic process (Holt & Hogg, 2002; Poczwardowski & Conroy, 2002). Their findings suggest that athletes use a variety of different coping responses usually in response to the same stressor they may face. An individual may not prefer one style of coping, and so will change their strategy multiple times.

Research has shown that athletes prefer to use emotion-focused coping strategies during their sport, which includes seeking social support (Crocker, 1992; Park, 2000), imagery (Dale,

2000), venting unpleasant emotions (Gaudrea & Blondin, 2002), humour (Giacobi et al., 2004), and remaining confident (Pczwardowski & Conroy, 2002). SP researchers found athletes may use higher-order dimensions of coping such as avoidance coping (Koowalski & Crocker, 2001). All of these different strategies serve the purpose of regulating individuals' emotions and thoughts so that they may have a clear head when they are trying to perform.

Coping in Team Versus Individual Sports

As mentioned before, social support can play a large role in the way individuals cope, or how they choose their coping strategy. Kerdijk et al., (2016) found that teammates are an important factor when athletes, specifically hockey players, are appraising their stress and coping skills in team sports. The athletes in this study reported for over half of their perceived stressors, others influenced the coping strategy they chose. This is an important finding to note, as it shows that teammates and others (coaches, trainers, etc.) can impact how an athlete operates. This study also found that when surrounded by influential people, athletes tended to see a situation as a challenge and apply problem- or emotion-focused coping strategies. The findings from this study demonstrate sport professionals need to understand the complex and dynamic environment that may be impacting an athlete. Athletes may have a variety of coping strategies at hand and understand how to use them, but one way to reduce their overall stress is to eliminate any environmental factors that may be in play. In addition, athletes must understand how their teammates or coaching staff may influence their stress levels and therefore performance. Once they understand the sources of their stress, they also need to know how to correctly deploy the right coping strategies to effectively deal with these environmental factors.

Coping strategies can help to increase confidence in an athlete, by altering their psychological state to a more positive and sport-focused one. Coping can be a learned psychological skill, as confidence and self-motivation can help an athlete increase their

performance and achieve their goals (Taha et al., 2018). As previously demonstrated with imagery and relaxation, any psychological skill that helps athletes achieve an optimal mental state and enhances their performance should become a part of their routine. Taha et al. (2018) found though that while coping strategies did help to increase performance in archers, athletes also needed such psychological skills as reliance and self-motivational strategies in sport. Coping strategies and psychological skills, therefore, can go hand in hand. Athletes know how to overcome and deal with situations that they perceive as stressful. Equally important is the ability to move their mental state from unsteady and stressful into a confident and prepared state in a quick and deliberate manner. Professional athletes have used such relaxation techniques like deep breathing, imagery, and muscle relaxation types to cope with competitive anxiety (Kudlackova et al., 2013). Similar findings from Wadey and Hanton (2008) found that elite athletes use deep breathing and imagery to cope with competitive anxiety. The time that athletes spend in deep breathing and imagery was positively related to their competing effectively. This finding shows that athletes may use their existing psychological skills to cope with stress, instead of learning new coping strategies or combining these relaxation and imagery skills with other coping strategies. One could categorize relaxation and imagery as emotion-focused coping strategies since athletes use them to alter their arousal and stress levels to achieve an optimal mental state.

Coping in Males and Females

Similar to psychological skills, men and women use coping skills in varying ways. This finding has a very strong tie to the research discussed earlier about how men and women perceive fear. How individuals perceive fear will determine how they prefer to cope with this stressor. Evidence suggests that males and females use coping strategies in different ways (Anshel et al., 1998; Goyen & Anshel, 1998; Madden et al., 1989). Men tend to favor problem-

focused coping strategies as a response to pain, injury, or criticism. When faced with these same stressors, females preferred to use emotion-focused coping strategies (Yoo, 2001). This difference may result from females' tendency to associate feelings with situations more than men, who may see a stressor as a straight-forward problem. Hammermeister and Burton (2004) found that males and females perceived stressful situations in a similar manner, which is interesting to note since previous research found that men and women have very different perceptions of fear and predispositions to anxiety disorders. This study additionally found that females tend to use more social support, vent their emotions, reinterpret situations positively, and engage in dissociation—all of these falling into the emotion-focused coping strategies consistent with previous research. By contrast, males favored the use of suppression of competing activities and association to cope with the same stressor, which are both avoidance-coping strategies. Women tend to favor emotion-focused coping strategies and men tend to favor problem-focused coping strategies. Perhaps this difference in preference explains the ongoing controversy among researchers about how men and women use these skills. While not an overwhelming trend, some research has found no gender differences in the use of problem-focused coping strategies (Crocker & Graham, 1995; Kolt et al., 1995). It is not known if genders differ in their use of emotion-focused coping strategies, but females and males may carry the skill set of using problem-focused coping strategies, even though that may not be their preference.

Conclusion

Overall, relaxation and imagery benefit the performance of athletes when used consistently and deliberately during practice and competitions. Athletes and coaches need to implement the correct psychological skills based on anxiety and arousal levels, as well as on the needs of the athlete and the performance outcomes. Previous literature demonstrates that these

skills have a wide range of effects and levels of usage across different types and groups of individuals. Researchers should continue to study these different groups such as team and individual sports and males and females to come to a more cohesive conclusion about psychological skill implementation.

Research Questions and Hypotheses

The first research question asked if there were differences in the amount of time spent in relaxation and imagery skills by sport type and gender? First, it was hypothesized that athletes in team sports will use relaxation and imagery more frequently than athletes involved in individual sports. The second hypothesis was that females will use relaxation and imagery skills more often than male athletes.

The second research question asked if there were differences in the levels of deliberate practice with relaxation and imagery skills by sport type and gender? Third, it was hypothesized that there will be no sport type differences in terms of deliberate practice. Fourth, it was hypothesized that females will have higher levels of enjoyment and concentration.

The third research question asked if there were differences when relaxation and imagery skills are being used? Fifth, it was hypothesized that both sport types will use these skills more often in competition. Similarly, and sixth, it was hypothesized that both genders will use these skills more often in competition.

The fourth research question asked if there were differences in the functions of relaxation and imagery skills by sport type and gender? Seventh, it was hypothesized that both sport types will use relaxation most frequently to cope with competitive anxiety. Team sports will use imagery to practice physical skills and enhance mental skills. Eighth, it was hypothesized that females will use relaxation more to cope with everyday psychological stress and will use imagery more to practice physical skills and enhance mental skills.

The last research question asked if there were differences in coping strategies by sport type and gender? Ninth, it was hypothesized that individual sports will use emotion-focused coping more frequently, while team sports will use problem-focused coping more often. Lastly, and tenth, it was hypothesized that females will use emotion-focused coping more frequently, while males will use problem-focused coping more often.

This research also included exploratory questions considering how athletes learned relaxation and imagery skills, and their use over time.

Significance of the Study

Many studies have focused on how athletes use psychological skills in their sport, but few have examined how athletes deliberately use these skills, as well as how they feel using imagery and relaxation may be beneficial to them in their sport. Additionally, there is still conflicting research results of the differences in how males and females as well as sport types may use psychological skills differently. The present study was innovative and helps to provide explanation in how individuals use and benefit from imagery and relaxation in their sport. This knowledge provides more conclusive evidence available to assist future SP professionals to correctly advise athletes on how they might want to incorporate psychological skills into their routines. Additionally, this study examined how athletes are coping with the demands of their sport, and if these psychological skills are being used as coping techniques. This is also significant in that this study provides results that further support those psychological skills are effective in reducing stress in sport.

Assumptions and Limitations

The assumptions that were made for this research study was that the participants answered each question honestly, that they are over the age of 18 and are currently in a D I sport. One delimitation made was to only include D I athletes, so the study could focus on a

more homogenous athlete group who might experience more similar stressors, instead of including all college athletic divisions. This study examined DI athletes who are currently participating in their sport. This population sample may have caused limitations as not all schools and universities in the sample population have the same sports. Additionally, different sports play in different seasons, which affected the timing of this data.

Variables

The variables that were investigated were time spent in imagery and relaxation, the effects of imagery and relaxation on performance and stress levels, the use of coping strategies for sport related reasons, and lastly, gender both male and female, and sport type both individual and team.

Chapter 3: Methods

Participants

This study included a total of 156 DI NCAA athletes from universities across the United States, however only 117 were included in data analysis, as they completed at least one section of the survey. All participants were required to be active on their sport roster. This study included 29 males and 88 females. Of the group, 45 participants play individual sports, and 72 team sports. The average age of participants was 20 years old *(M* = 20.04, *SD* = 1.44), with the range of ages between 18 and 24. White was the predominate race (N = 97) of the participants included in this study, followed by Black or African American (N = 19), American Indian or Alaskan Native (N = 2), Asian (N = 2), and other (N = 6). Of the participants, 24 responded they did work with the SP professional, 67 did not but their school has a SP professional, 23 did not but their school does not have a SP professional, and three were not sure.

Data Collection

Before the survey was given to the participants, informed consent was obtained from each participant explaining the risks and benefits of the study.

Demographic Questionnaire

The demographic information recorded in this section included gender, age in years, race, year in college, scholarship status, if they compete as a male or female in their sport, type of sport (individual or team), what sport they play, current playing status on their team, number of years participating both collegiately and in lifetime total, and injury status.

The Deliberate Relaxation for Sport Survey

Previous research by Kudlackova (2011) developed and used The Deliberate Relaxation for Sport Survey successfully, and it has been used in previous research (Kudlackova et al., 2013). For this research, the survey was modified to fit the scope of the study by taking out

certain questions that were no trelevant. Additionally, the researcher added in performance imagery under each subsection. The Deliberate Relaxation for Sport Survey is based on previous research about deliberate practice (Ericsson et al., 1993) and deliberate imagery practice (Cumming & Hall, 2002). This survey included five parts measuring different aspects of how athletes incorporate relaxation and performance imagery into their lives (See Appendix A).

Extent of engagement in relaxation and performance imagery activity type. This section inquired about the extent to which the participant engages in various relaxation and performance imagery activities during a typical training week. Based on previous relaxation research, progressive muscle relaxation, autogenic relaxation, eastern relaxation, stretching relaxation activities, meditation, imagery relaxation, and deep breathing were selected as the relaxation activity types for this survey (Benson, 1975; Benson, 1983; Hardy et al., 1996; Smith, 1999). Performance imagery is also described in this section. For each of the various activities, the researcher asked participants to answer how long they approximately spent on the activity during a training week in minutes. They responded on a 10-point Likert-type scale ranging from "0 minutes," increasing by 15-minute bandwidths, and ending at "more than 120 minutes." The middle point of each bandwidth range represented the raw score for that bandwidth. For an example of scoring, the 1-15 minute bandwidth was taken as 7 minutes. *Time spent engaging score* for each type of activity was be recorded.

Perceived relevance, enjoyment, and effort associated with relaxation and performance imagery activities. The survey asked participants for their perception of the relevance of relaxation and performance imagery to maintaining and improving performance and performing effectively in competition. This section also asked participants how enjoyable these activities are regardless of the results of engaging in these activities (Ericsson et al., 2003),

and how much concentration they need to complete these tasks. This section contained an 11-point Likert-type scale where 0 is “not at all” and 10 is “highly.” The Likert scale generated a separate score for relevance to practice, relevance to competition, enjoyment, and concentration. An example of a question asked here is “To what extent are the relaxation activities you engage in relevant to you competing effectively?”

Engagement in relaxation and performance imagery activities during and outside of practice and competition. This section asked participants when they engage in relaxation or performance imagery activities, whether that occurs immediately before or during practice, immediately before or during the competition, or outside of practice and competition. This section contained a 5-point Likert-type scale where 0 is “never” and 4 is “always.” An example of a question in this section is “To what extent do you engage in relaxation activities immediately before or during practice?”

Functions of relaxation and performance imagery activities. This section questioned participants about the reasons they engage in relaxation and performance imagery activities, and how these activities help them cope with anxiety at pre-competitive events, cope with everyday psychological stress from the nature of being an athlete and promote recovery and healing that is necessary given the physical demands of practice and competition. An example of a question in this section is “To what extent do you engage in performance imagery activities to prepare mental focus for competition?” A 5-point Likert-type scale was given to participants, ranging from 0, which corresponds to “never” to 4, which corresponds to “always” to answer the given questions. Each of the three functions of relaxation activities had its own separate score. After researching athletes coping with both competitive and non-competitive stressors, a selection of certain items was chosen concerning the function of relaxation activities (Dugdale et al., 2002; Goyen & Anshel, 1998; Nicholls et al., 2009a; Nicholls, et al., 2009b). The second subsection,

focused on performance imagery, contained different functions to focus more on the uses of performance imagery related to performance and the demands of competition. An example of some of the functions asked about included mental focus, to learn performance strategies, and to automate pre-performance routines.

How relaxation and performance imagery activities were learned. This section of the study focused on how participants learned relaxation and performance imagery activities that they are currently using. The three ways an athlete may have learned the technique are learning through a professional such as the SP professional or coach, teaching themselves through a book or other sources, or lastly, trying out different activities to see what works for them. Participants indicated their agreement on a 4-point Likert-type scale ranging from 0 which is "strongly disagree" to 3 which is "strongly agree." A score was generated for the agreement for each of these relaxation activity learning items. An example of an agreement statement from this section is "I taught myself the relaxation activities by obtaining information about these activities (e.g., form a book, the internet, etc.)."

Extent of engagement in relaxation and performance imagery activities over athletic career. This section asked about the total engagement they have had over their athletic career in relaxation and performance imagery activities. Participants were asked to describe their experience using relaxation or performance imagery through different stages of their lives (youth, high school, college). The participant was asked to describe their engagement for each period in a brief description.

The Brief COPE (B-COPE)

The Brief Cope was adapted from the COPE Inventory, which was originally created to investigate the different ways that individuals may cope with stressful situations (Carver et al., 1989; Carver, 1997). The B-COPE is a widely used inventory that is accepted in sport

psychology literature, providing justification for its use in this study (Crocker & Graham, 1995; Eubank & Collins, 2000; Giacobbi & Weinberg, 2000; Ntoumanis & Biddle, 2000). This inventory was chosen for this study to measure coping techniques in a short manner, as to not have participants become unmotivated or fatigued while taking these questionnaires. This inventory was adapted from the original COPE Inventory as participants became impatient while taking the original full instrumentation. The B-COPE was modified by using previous factor analysis and participant feedback. The items that were chosen in this adapted inventory had to have a high loading in the original factor analysis in addition to good ratings in terms of clarity to participants. Self-blame was added to the B-COPE, as it has been used in many other coping measures, and is a common coping strategy (Carver, 1997).

The Brief COPE includes 28 items and 14 scales, with each scale having two items per scale (see Appendix B). Each scale is a different coping strategy that are identified to be the most used. These include active coping, planning, positive reframing, acceptance, humor, religions, using emotional support, using instrumental support, self-distraction, denial, venting, substance use, behavioral disengagement, and self-blame. Each item is numbered on a scale from one to four to indicate how often the individual participates in that type of coping. A "one" on the scale indicates "I usually don't do this at all," while a four indicates "I do this a lot." The scores for each strategy are calculated by summing the scores together from the two items.

The items are divided into three subscales: emotion-focused, problem-focused, and avoidance. The scores were summed and put into a score range for avoidance coping from 12-48, emotion-focused coping from 10-40, and problem-focused coping from 6 to 24. The coping responses mentioned above are divided into approach and avoidance coping strategies by the items and whether the strategy focused on the stressor or not. There is no overall coping scale, because each of the scales are independent from another and should be examined as such. The

coping strategies that were labeled as approach coping strategies are active, seeking emotional support, seeking instrumental support, positive reframing, planning, acceptance, and religion. The seven avoidance coping strategies are self-distraction, denial, substance use, behavioral disengagement, venting, humor, and self-blame.

Carver (1997) reported internal consistency of all subscales ($\alpha > 0.50$). The subscales with their alpha levels are active coping (0.68), planning (0.73), positive reframing (0.64), acceptance (0.57), humor (0.73), religion (0.82), using emotional support (0.71), using instrumental support (0.64), self-distraction (0.71), denial (0.54), venting (0.50), substance use (0.90), behavioral disengagement (0.65), and self-blame (0.69). The Brief COPE has been found to be both reliable and valid when operationalized as emotion-focused, problem-focused, and dysfunctional subscales. This scale has also been found to have both construct validity and good internal consistency (Cooper et al., 2008). Previous research looking into the validity and reliability in careers of people with dementia, and found the brief COPE to be reliable, showing alpha scores as 0.72 for emotion-focused scale, 0.84 for problem-focused scale, and 0.75 for the dysfunctional coping scale (Cooper et al., 2008).

Procedure

Before data collection began, IRB approval was obtained. The researcher compiled a list of all DI athletic staff and coaches including athletic trainers, support staff, strength and conditioning coaches, graduate assistants, and head coaches. The researcher emailed each staff member with information pertaining to the survey and asked if they would be willing to pass along the survey to their athletes. If they agreed, a second email was sent to be forwarded to the athletes which contained a link to the survey. Each contact was emailed twice, once in the fall and once in the spring, in case they were in season during the first round of recruitment and not

able to participate. Additionally, recruitment occurred through word of mouth by asking personal connections of athletes and coaches if they would be willing to participate.

The Qualtrics survey began with an informed consent form for all participants. Participants read the document and signed it if they chose to participate. After providing consent, the participant completed the demographic survey, the Deliberate Relaxation for Sport Survey, and the B-Cope. The completion of the questionnaire took between 10 and 15 minutes. After the participant completed the survey, their response was recorded through Qualtrics. The participants were debriefed and thanked for their participation. The researcher kept all participant information anonymous throughout the entire study and afterwards.

Data Analysis

SPSS Statistics software was used to analyze the data. A multivariate analysis of variance (MANOVA) compared the differences in relaxation and performance imagery between gender (male and female) and type of sport (individual and team). Alpha was adjusted using the Bonferroni correction to control for type I errors when multiple comparisons were made or follow up tests were used. Descriptive statistics was used to analyze the demographic information. An independent samples t-test was used to investigate the time spent in relaxation and performance imagery. A follow-up ANOVA was used to determine any interaction effects.

Chapter 4: Results

Extent of Engagement in Relaxation Activities and Performance Imagery

To answer the first research question, participants were asked to rate the approximate time in minutes spent in each relaxation activity per week on a scale from 0 to over 120 minutes per week, grouped intro increments of 15 (i.e., 0, 1-15, 16-30, 31-45). Examining the whole sample, athletes spent most time stretching *(M*= 42.17, *SD* = 37.526), followed by deep breathing *(M* = 22.15, *SD* = 28.832). The relaxation activity used the least was autogenic relaxation *(M*= 8.12, *SD* = 17.051). Athletes typically spent around 28 minutes in performance imagery *(M* = 27.82, *SD* = 31.072). This section included 116 participants: 28 males, 87 females, 45 individual-sport athletes, and 71 team-sport athletes.

Differences by gender

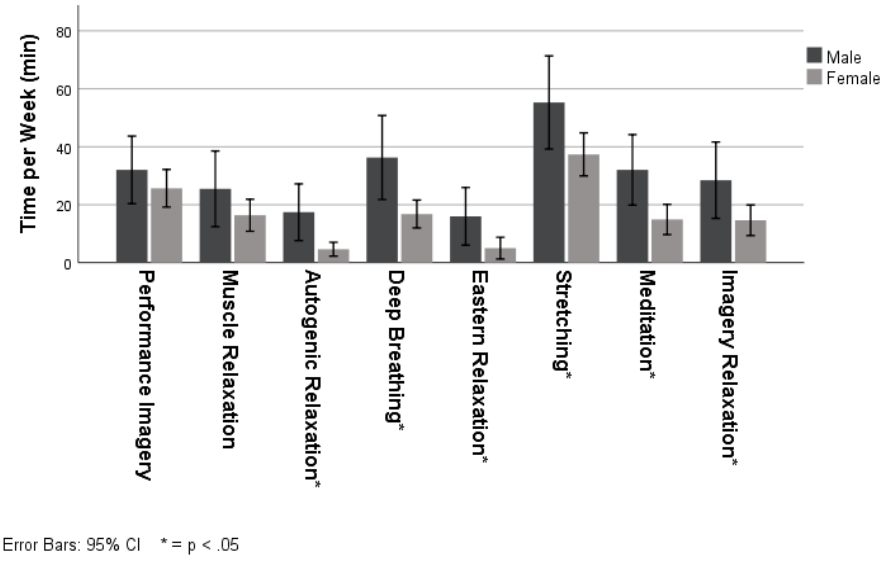
An independent samples t-test was used to determine differences in the amount of time spent in the seven different relaxation skills (i.e., muscle relaxation, autogenic relaxation, deep breathing, eastern relaxation, stretching activities, meditation activities and imagery relaxation) between males and females, seen in Figure 1. Hypothesis two was rejected, as significant differences were not found. These results indicated males *(M* = 18.66, *SD* = 25.636) spent significantly more time in autogenic relaxation than females *(M* = 4.70, *SD* = 11.322); *t* (31.71) = 2.840, *p* = .008, equal variances not assumed. Additionally, males *(M*= 38.41, *SD* = 38.437) and females *(M* = 16.90, *SD* = 22.822) spent significantly different amounts of time in deep breathing activities, *t (*34.811) = 2.852, *p* = .007, equal variances not assumed. Again, males *(M* = 18.83, *SD* = 29.422) spent significantly more time in eastern relaxation activities per week, compared to females *(M* = 5.08, *SD* = 17.780); *t (*35.063) = 2.376, *p* = .023, equal variances not assumed. Stretching also resulted in significant differences between males *(M* = 56.76, *SD* = 41.437) and females *(M* = 37.36, *SD* = 35.285); *t (*114) = 2.453, *p* = 0.016. Additionally, males

spent about 34 minutes per week *(M* = 33.79, *SD* = 32.245) and females spend bout 15 minutes per week *(M* =14.99 = 24.796) in meditation for relaxation; *t (*39.625) = 2.870, *p* = .007, equal variances not assumed. Lastly, males *(M* = 30.86, *SD* = 35.808) spent almost double the time on average in relaxation imagery per week compared to females *(M*= 14.38, *SD* = 24.891); *t (*37.430) = 2.301, *p* = .027.

An independent samples t-test was used to examine differences in the time spent in performance imagery between males and females. No significant differences were found and hypothesis two was rejected. Males *(M* = 34.31, *SD* = 31.93) typically spent around 34 minutes in performance imagery each week, while females *(M* = 25.98, *SD* = 30.71) typically spent around 26 minutes per week. The large standard deviation notes that the responses are widely varied in how often athletes spend in performance imagery. These results can be seen in Figure 1.

Figure 1

Average Time Spent in Relaxation Activities and Performance Imagery by Gender

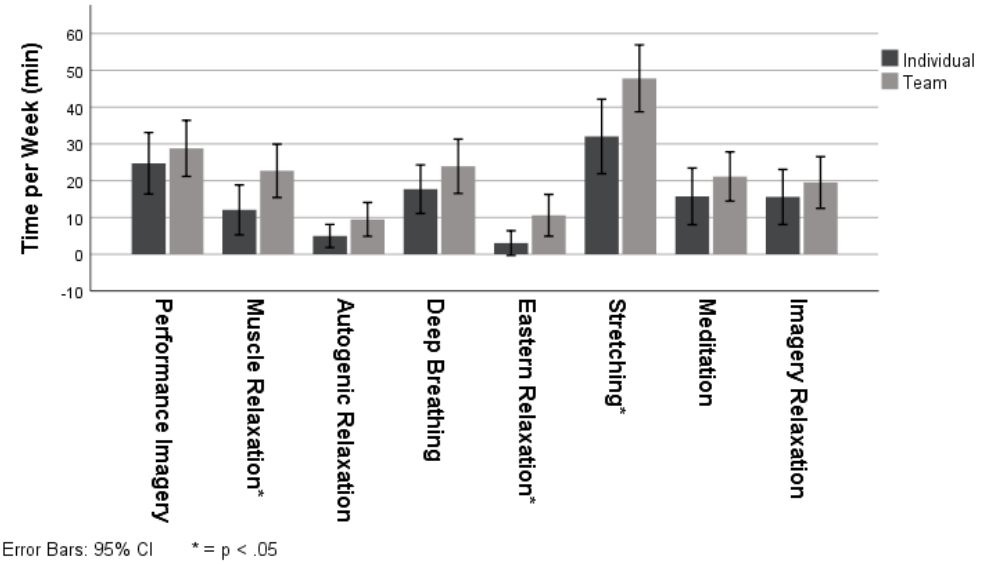


Differences by sport type

An independent samples t-test was conducted to determine differences in the amount of time spent in different relaxation skills between sport types. Hypothesis one was partially accepted. Team sport athletes *(M* = 22.69, *SD* = 30.630) used muscle relaxation activities far more each week than individual-sport athletes *(M* = 12.07, *SD* = 22.601); *t (*111.280) = -2.143, *p* = .034, equal variances not assumed. Again, team-sport athletes *(M* = 11.81, *SD* = 26.013) typically used eastern relaxation activities more often than individual-sport athletes *(M* = 3.07, *SD* = 11.130); *t (*104.253) = -.507, *p* = .014 equal variances not assumed. Lastly, there was a significant difference in the time spent in stretching activities between individual-sport athletes *(M* =32.02, *SD* = 33.695) and team-sport athletes *(M* = 48.51, *SD* = 38.615); *t (*102.910) = -2.433, *p* = .020. Results can be seen graphically in Figure 2.

Figure 2

Average Time Spent in Relaxation Activities and Performance Imagery by Sport Type



An independent samples t-test was used to examine if there were differences in the time spent in performance imagery between sport types. Hypothesis one was partially accepted.

Individual *(M* = 24.73, *SD* = 27.83) and team *(M* = 29.75, *SD* = 32.97) sport athletes spent similar amounts of time in performance imagery**.**

Interaction of gender and sport type

A two-way ANOVA was conducted to examine the effect of gender and sport type on time spent in relaxation activities. A statistically significant interaction was found between the effects of gender and sport type on the time spent in relaxation activities. Post hoc analysis revealed that gender and sport type had a significant effect specifically on autogenic (p = .017), deep breathing (p = .001), stretching (p = .025), and relaxation imagery (p = .038).

Differences in the Levels of Deliberate Practice of Relaxation Activities and Performance Imagery

Deliberate practice includes four levels: sport performance, competing effectively, enjoyability, and concentration. To answer research question two, participants were asked to answer on a scale of 0 (not at all) to 5 *(*moderately) to 10 (highly) the extent to which they thought their relaxation activities were relevant to different areas of deliberate practice (i.e., sport performance, competing effectively, enjoyable, and mental concentration). A higher score such as 8 or 9 would mean that the athlete felt that relaxation activities were relevant to that level of deliberate practice.

Athletes moderately used relaxation to maintain or improve their current level of performance *(M* = 6.76, *SD* = 2.70). Athletes used relaxation activities to help them compete effectively *(M* = 7.16, *SD* = 2.62). Similar to improving current level of performance, athletes thought relaxation activities were moderately enjoyable *(M* = 6.79, *SD* = 2.84), and were moderately concentrated when they practiced relaxation *(M* = 6.59, *SD* = 3.11). Athletes across all aspects of deliberate practice were very similar in their ratings of relevance to performance imagery. Athletes had a moderate rating of the relevance of maintaining or improving current

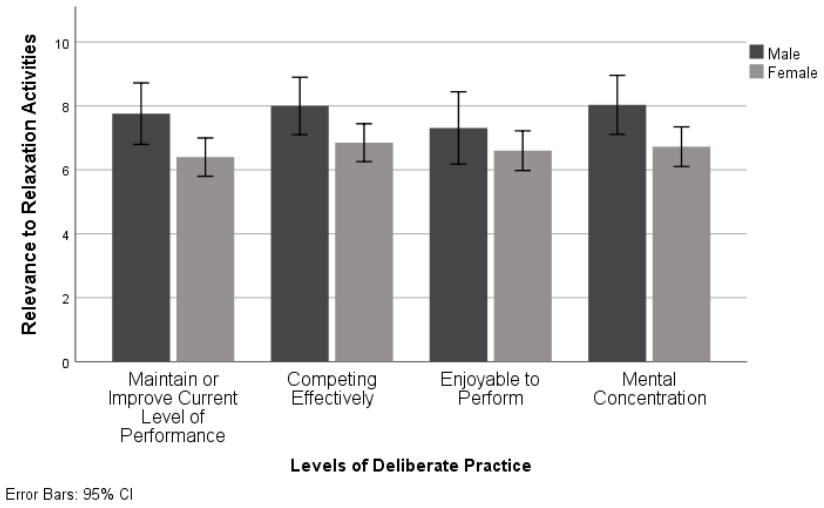
level of performance *(M* = 6.59, *SD* = 3.11), competing effectively *(M* = 6.59, *SD* = 2.98), enjoyability *(M* = 6.08, *SD* = 3.14), and mental concentration *(M* = 6.65, *SD* = 3.10).

Differences by gender

A MANOVA was used to examine differences between levels of deliberate practice by gender in relaxation techniques. This analysis included 29 males and 80 females (*N* = 109). There was not a statistically significant difference in the levels of deliberate practice based upon an individual's gender, therefore hypothesis four was rejected, *F (*4, 102) = 1.237, *p* = .300. Males believed that relaxation skills were more relevant to areas of their deliberate practice as demonstrated by higher average scores on the scale in comparison to females. For sports performance, males on average rated a 7.76 (*SD* = 2.53), and females averaged a 6.40 (*SD* = 2.69). For competing effectively, males averaged an 8.00 (*SD* = 2.36), and females averaged a 6.85 (*SD* = 2.66). For enjoyability, males on average scored a 7.31 (*SD* = 2.97), and females on average rated a 6.60 (*SD* = 2.79). Lastly, for mental concentration, males on average rated relaxation for this purpose an 8.03 (*SD* = 2.42), and females averaged a 6.73 (*SD* = 2.78), which both scores showed these athletes thought mental concentration was moderately-high importance. Results can be seen in Figure 3.

Figure 3

Differences in the Levels of Deliberate Practice of Relaxation by Gender

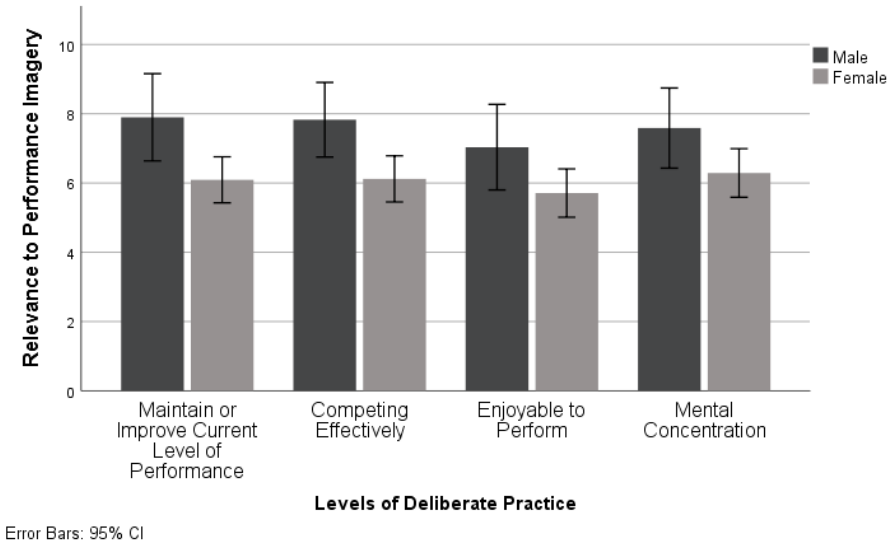


A MANOVA examined differences in the levels of deliberate practice (i.e., sport performance, competing effectively, enjoyable, mental concentration) by gender in performance imagery. This analysis included 29 males and 76 females (N = 105). Hypothesis four was rejected as no significant differences were found between the levels of deliberate practice by gender F (4, 98) = 1.481, p = .214. However, when examining the sample more descriptively, males and females are typically rating these levels of deliberate practice differently. Again, males typically rated performance imagery more highly relevant to each level of deliberate practice, in comparison to females. For the relevance of performance imagery compared to maintaining the current level of performance, males had a higher score (M = 7.90, SD = 3.31) compared to females (M= 6.09, SD = 2.90). Looking at performance imagery for competing effectively, both males (M= 7.83, SD = 2.82) and females (M=6.12, SD = 2.91) on average rated the relevance moderately high. Males (M=7.03, SD = 3.24) and females (M= 5.71, SD = 3.05) also on average rated performance imagery to be enjoyable moderately high, with females toward the more moderate end. Lastly, when asked about how mentally concentrated they are

when doing performance imagery, we see a moderately high rating on average again for males *(M*= 7.59, *SD* = 3.04) and females *(M*= 6.29, *SD* = 3.07). Results can be seen in Figure 4.

Figure 4

Differences in the Levels of Deliberate Practice of Performance Imagery by Gender



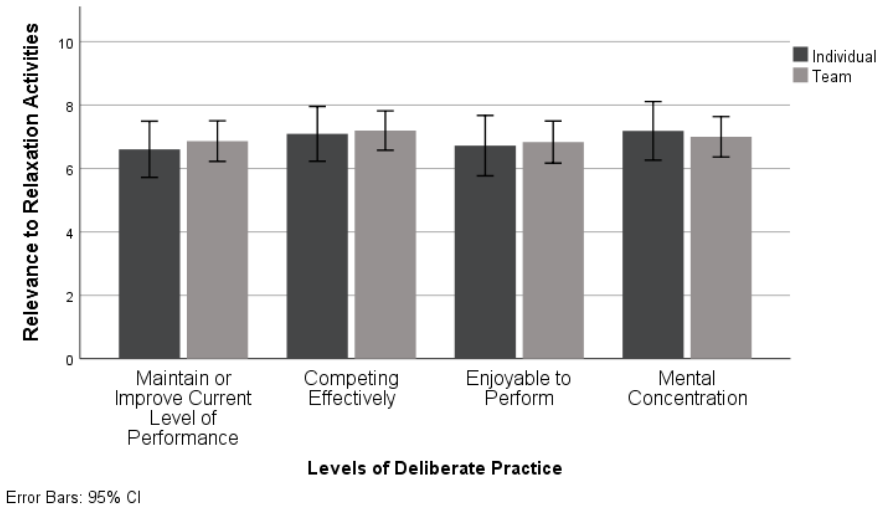
Differences by sport type

A MANOVA examined differences between the levels of deliberate practice of relaxation activities by sport type. This analysis included 43 individual and 66 team-sport athletes (*N* =109). Hypothesis three was accepted as there was not a statistically significant difference found in levels of deliberate practice based upon an individual's sport type, *F (*4, 102) = .517, *p* = .723. Team sport athletes (*M* = 6.68, *SD* = 2.60) and individual-sport athletes (*M* = 6.60, *SD* = 2.88) were similar in the relevance of relaxation activities for sports performance. For the relevance of relaxation skills to competing effectively, individual-sport athletes (*M* = 7.09, *SD* = 3.09) and team-sport athletes (*M* = 7.20, *SD* = 2.52) gave a moderately high rating. Individual sport athletes on average rated the relevance of relaxation skills to be enjoyable as 6.72 (*SD* = 3.09), and team-sport athletes on average gave a score of 6.83 (*SD* = 2.69). Lastly,

for the relevancy of relaxation skills for mental concentration, individual-sport athletes gave an average rating of 7.19 (*SD* = 3.00), and for team-sport athletes, 7.00 (*SD* = 2.59). These results indicated athletes found relaxation activities somewhere between moderately and highly relevant to each of these four aspects of deliberate practice. Results can be seen in Figure 5.

Figure 5

Differences in the Level of Deliberate Practice of Relaxation Activities by Sport Type

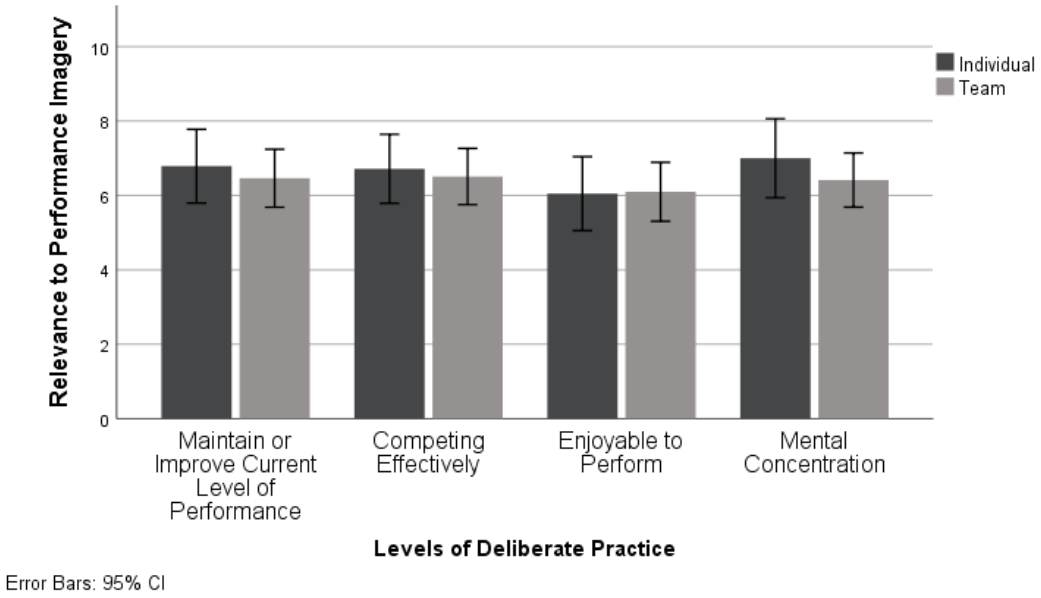


A MANOVA was used to investigate differences in the levels of deliberate practice of performance imagery by sport type. This analysis included 42 individual and 63 team-sport athletes (*N* = 105). Again, hypothesis three was accepted as no significant differences were found between the levels of deliberate practice of imagery by sport type, *F (*4, 98) = .325, *p* = .860. The average scores given by sport types for each level, they are very similar. When asked if using performance imagery is relevant to maintaining a current level of performance, individual *(M*= 6.79, *SD* = 3.18) and team-sport athletes *(M*= 6.45, *SD* = 3.08) were very similar with rating the relevance to be moderate. Similarly, individual *(M*= 6.71, *SD* = 2.97) and team-sport athletes *(M*= 6.51, *SD* = 3.00) used performance imagery to help them compete effectively in a similar manner, both scoring the relevancy was moderately high. Results also demonstrate

both sport types felt that imagery activities were moderately enjoyable to perform (Individual: M= 6.05, *SD* = 3.19, Team: M= 6.10, *SD* = 3.14). Lastly, both individual *(M*= 7.00, *SD* = 3.40) and team-sport athletes *(M*= 6.41, *SD* = 2.88) said they were moderately concentrated when they were undertaking imagery. These results can be seen in Figure 6.

Figure 6

Differences in the Levels of Deliberate Practice of Performance Imagery by Sport Type



Differences When Relaxation Activities and Performance Imagery are Being Used

To answer research question three, participants were asked to rate the extent of their engagement in relaxation activities at different time points (i.e., practice, competition, outside of practice and competition) on a scale from 0 (never) to 4 (always). The scale is as follows: 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always.

Athletes used relaxation activities often during competition *(M* = 2.48, *SD* = 1.2), followed by using these activities sometimes outside of practice and competition *(M*= 1.95, *SD* = 1.11), and sometimes during practice *(M*= 1.82, *SD* = 1.13). Similar to relaxation activities, athletes used performance imagery most often during competition *(M*= 2.44, *SD* = 1.09), and

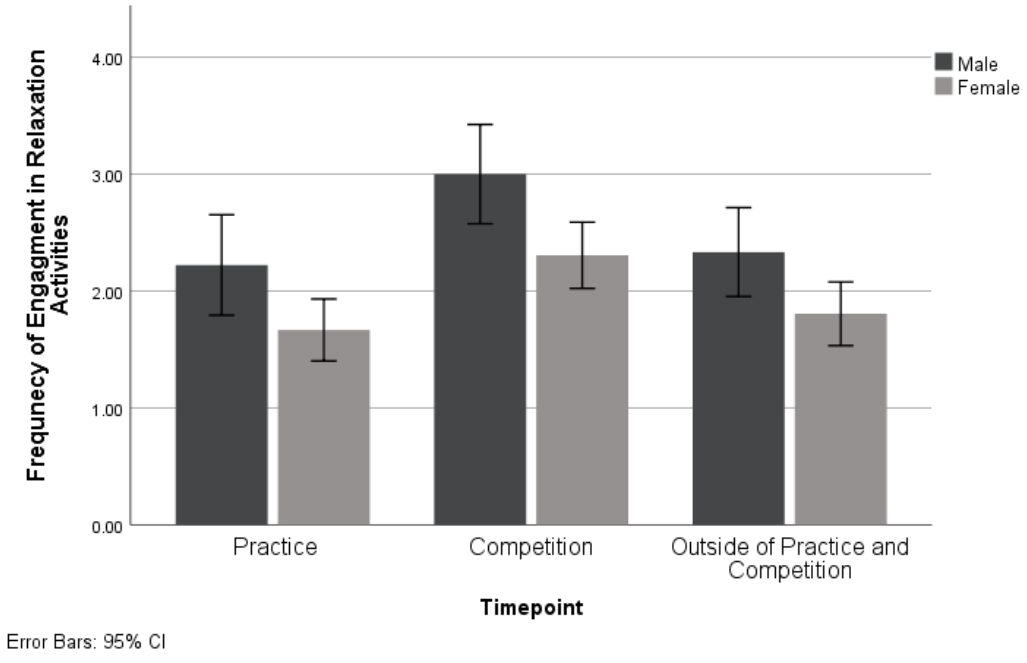
only rarely or sometimes during practice *(M*= 1.72, *SD* = 1.11) and outside of practice and competition *(M*= 1.63, *SD* = 1.09).

Differences by gender

A MANOVA was used to examine if there was a difference when males and females used relaxation skills. This analysis included 27 males and 72 females (*N* = 99). Hypothesis six was rejected as no significant differences were found between genders when relaxation skills were used, *F (*3, 94) = .108, *p* = .955. Both males *(M* = 2.22, *SD* = 1.08) and females *(M* = 1.67, *SD* = 1.11) used relaxation during practice rarely or sometimes. However, both males *(M* = 3.00, *SD* = 1.07) and females *(M* = 2.29, *SD* = 1.19) used relaxation activities sometimes or often during competition. Lastly, outside of practice, males *(M* = 2.33, *SD* = .96) and females *(M* = 1.81, *SD* = 1.14) used relaxation skills rarely or sometimes. Results can be seen below in Figure 7.

Figure 7

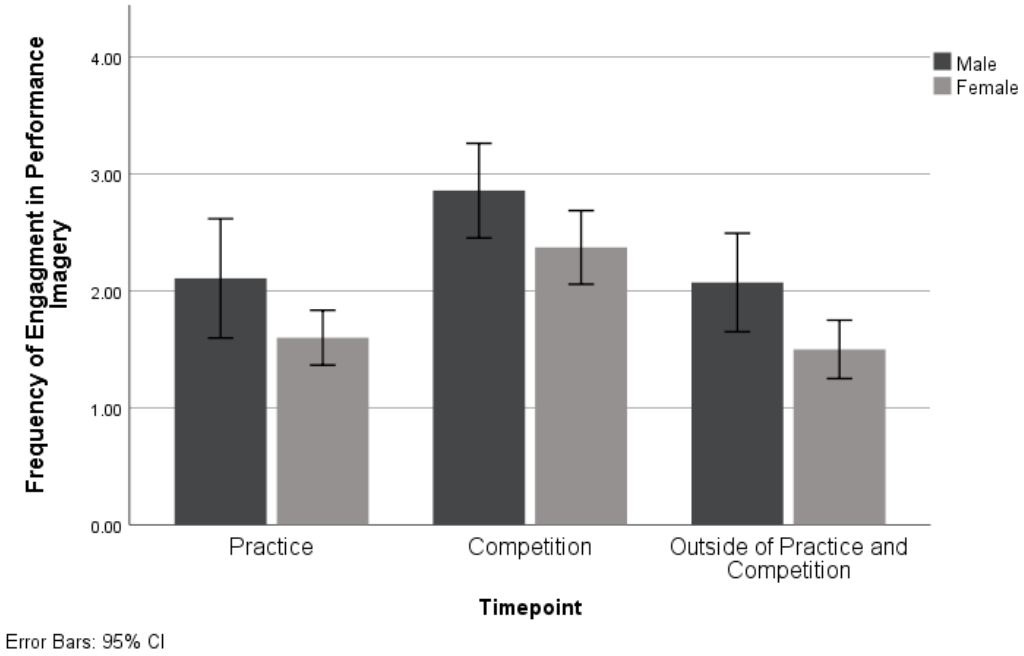
Differences When Relaxation Skills Are Being Used by Gender



A MANOVA was used to determine differences when males and females used performance imagery, including 28 males and 70 females ($N = 98$). No significant differences were found between genders when performance imagery was used, $F(3, 92) = 1.990$, $p = .121$, therefore hypothesis four was rejected. Across all time points, males and females used performance imagery in similar ways. During practice, males ($M = 2.10$, $SD = 1.31$) and females ($M = 1.57$, $SD = .99$) used performance imagery rarely or sometimes. Use during competition was the highest for both males ($M = 2.85$, $SD = 1.04$) and females ($M = 2.28$, $SD = 1.34$), with athletes using it sometimes or often. Like use in practice, males ($M = 2.07$, $SD = 1.08$) and females ($M = 1.46$, $SD = 1.05$) used performance imagery rarely or sometimes outside of practice and competition. Results can be seen in Figure 8.

Figure 8

Differences When Performance Imagery is Being Used by Gender

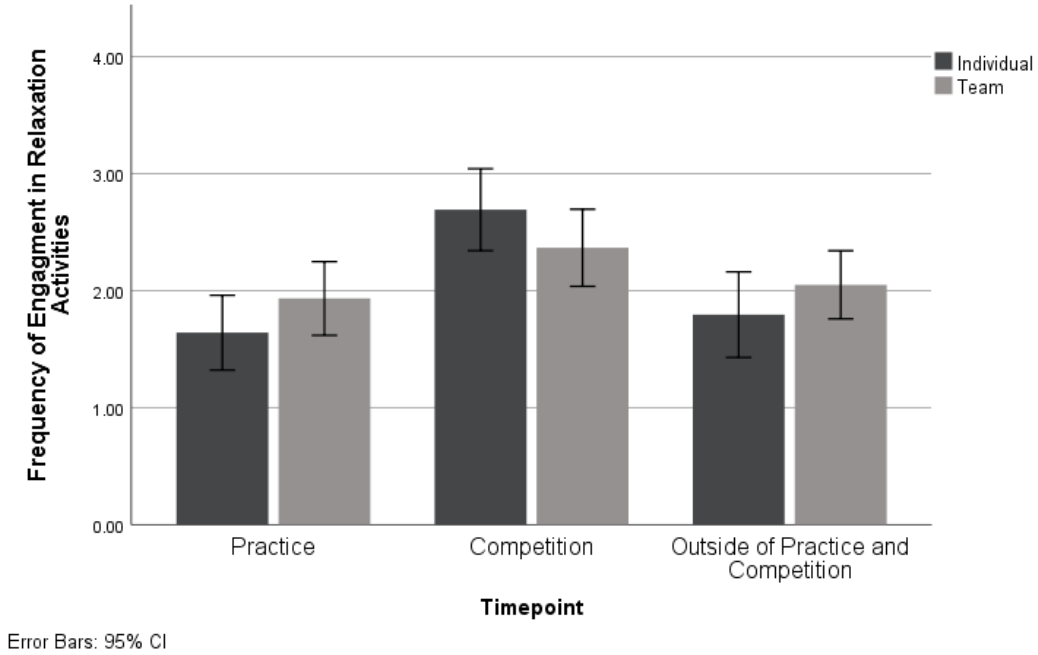


Differences by sport type

A MANOVA was used to examine differences in when relaxation activities were used (i.e., practice, competition, outside) by sport type (i.e., individual and team). This analysis examined 39 individual and 60 team-sport athletes ($N = 99$). Hypothesis five was rejected as no significant differences were found between individual and team sports when they used relaxation skills, $F(3, 94) = .638$, $p = .592$. Both individual- ($M = 1.65$, $SD = .975$) and team-sport athletes ($M = 1.93$, $SD = 1.21$) only used relaxation skills rarely or sometimes at practice. Individual- ($M = 2.65$, $SD = 1.08$) and team-sport athletes ($M = 2.36$, $SD = 1.26$) used relaxation skills sometimes or often at competition. Lastly, relaxation skills were used rarely or sometimes outside of practice and competition by both individual- ($M = 1.80$, $SD = 1.11$) and team-sport athletes ($M = 2.04$, $SD = 1.11$). Results can be seen in Figure 9.

Figure 9

Differences When Relaxation is Being Used by Sport Type

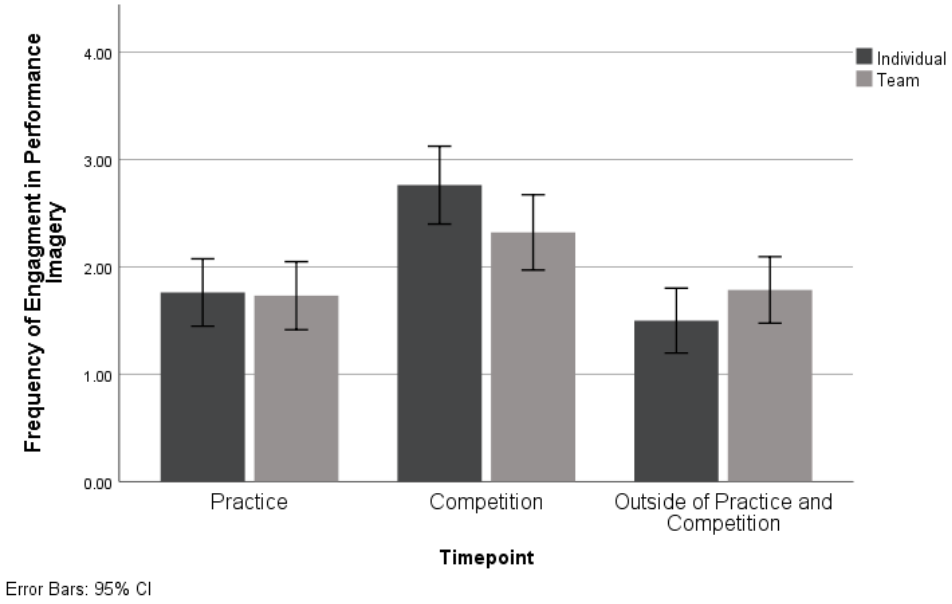


A MANOVA was used to examine differences between sport types in when they used performance imagery. This analysis included 42 individual- and 56 team-sport athletes ($N = 98$).

No significant differences were found between sport types when performance imagery was being used, $F(3, 92) = 1.401$, $p = .248$. Again, hypothesis five was rejected. Competition was the time point when both individual- ($M = 2.76$, $SD = 1.16$) and team-sport athletes ($M = 2.21$, $SD = 1.34$) used performance imagery most often. Ratings of use at practice and outside were similar. Individual- ($M = 1.76$, $SD = 1.00$) and team-sport ($M = 1.70$, $SD = 1.19$) athletes used performance imagery only rarely or sometimes during practice. Likewise, performance imagery was only used rarely or sometimes outside of practice and competition by both individual- ($M = 1.50$, $SD = .969$) and team-sport athletes ($M = 1.72$, $SD = 1.17$). Results can be seen in Figure 10.

Figure 10

Differences When Performance Imagery is Being Used by Sport Type



Differences in the Functions of Relaxation Activities and Performance Imagery

To investigate research question four, participants were asked to rate the extent they engage in relaxation activities and performance imagery for different purposes (i.e., coping with anxiety, everyday psychological stress, physical recovery, etc.) on a scale from 0 (never) to 4 (always). The scale is as follows: 0 = never, 1 = rarely, 2 = sometimes, 3 = often, 4 = always.

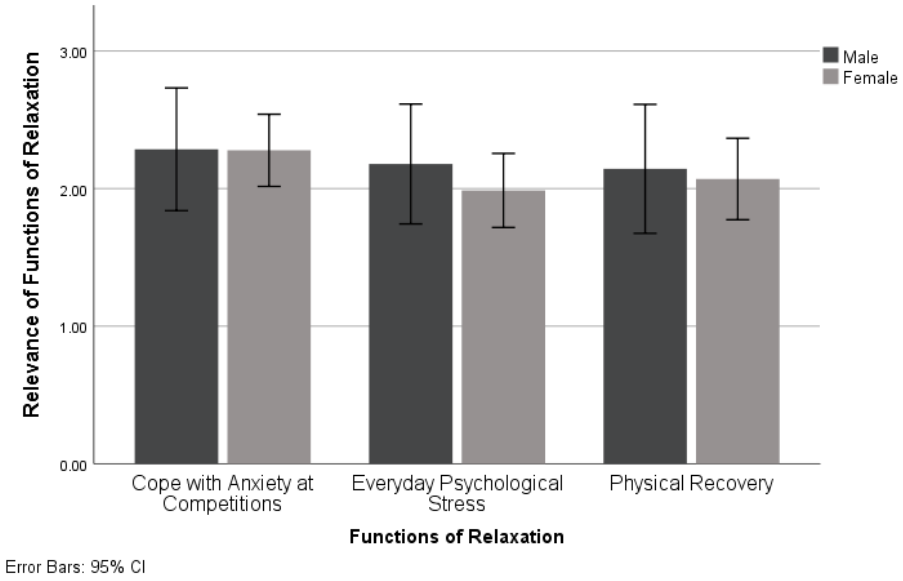
Athletes used relaxation skills very similarly for each of the three inquired functions: coping with anxiety *(M*= 2.24, *SD* = 1.12), dealing with everyday psychological stress *(M*= 2.01, *SD* = 1.14), and physical recovery *(M*= 2.09, *SD* = 1.23). These average scores around two represent that athletes are using relaxation for these purposes sometimes. Athletes used performance imagery for each of these functions in a similar manner, with mental focus scoring the highest *(M* = 2.13, *SD* = 1.26). Athletes used performance imagery to learn and practice skills *(M* = 1.95, *SD* = 1.09), correct mistakes *(M* = 2.09, *SD* = 1.15), learn strategies *(M* = 1.90, *SD* = 1.09), pre-performance routines *(M* = 1.94, *SD* = 1.16), and enhance mental skills *(M* + 1.99, *SD* = 1.12) just sometimes in their sport. Performance imagery for physical recovery had the lowest score *(M* = 1.60, *SD* = 1.17), demonstrating, athletes on average used performance imagery for this function the least.

Differences by gender

A MANOVA was run to examine relaxation skill function differences between genders. This analysis examined 28 males and 72 females (*N* = 100). Hypothesis eight was rejected, as no significant differences were found between the functions of relaxation skills because of an individual's gender, *F (*3, 94) = .108, *p* = .955. Males *(M* = 2.28, *SD* = 1.15) and females *(M* = 2.24, *SD* = 1.12) on average used relaxation to cope with anxiety sometimes, with average scores very close together. For the function of dealing with everyday psychological stress, males *(M*= 2.17, *SD* = 1.12) and females *(M* = 1.95, *SD* = 1.15) are on average only used relaxation rarely or sometimes in their sport. Lastly, for physical recovery, males *(M*= 2.14, *SD* = 1.20) and females *(M*= 2.06, *SD* = 1.25) used relaxation skills for this function sometimes. Results can be seen in Figure 11.

Figure 11

Differences in the Functions of Relaxation Activities by Gender

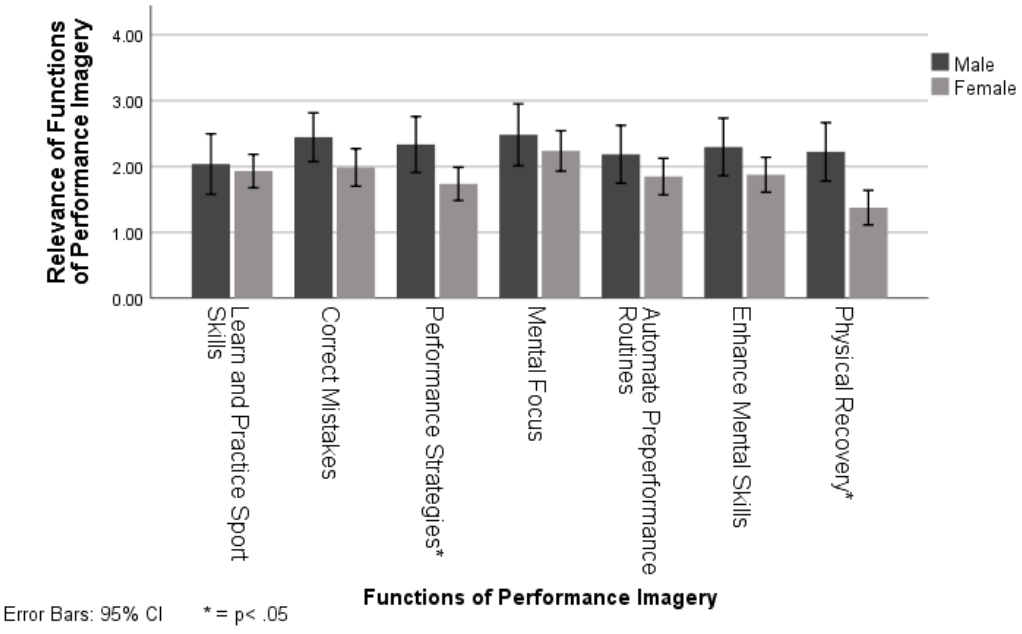


A MANOVA was used to examine differences in the functions of performance imagery by gender, which included 27 males and 72 females ($N = 99$). Results revealed a statistically significant difference in the functions of performance imagery based on gender, $F(7, 89) = 2.378$, $p = .028$, Wilks' Lambda = .842, Partial eta squared = .158. Further analysis revealed gender had a significant impact on performance imagery used for performance strategies ($p = .029$), and for physical recovery ($p = .002$), therefore rejecting hypothesis eight. When examining the descriptives for the breakdown in use by gender, males consistently had higher average scores for each function, compared to females. This demonstrated that males were using performance imagery for each function more often than females. When using performance imagery for learning and practicing skills, males ($M = 2.03$, $SD = 1.15$) and females ($M = 1.19$, $SD = 1.07$) used this similarly. Males ($M = 2.44$, $SD = .933$) tended to use performance imagery to correct mistakes more often than females ($M = 1.97$, $SD = 1.97$). When using performance imagery to learn strategies, a larger gap was seen between males ($M = 2.33$, $SD = 1.07$) and

females *(M* = 1.73, *SD* =. 1.06), where males tended to use imagery to learn strategies sometimes, and females used it rarely. Both males *(M* = 2.48, *SD* = 1.18) and females *(M* = 2.24, *SD* = 1.29) used performance imagery for mental focus sometimes or often. For the function of automating pre-performance routines, males used this sometimes *(M* = 2.18, *SD* = 1.10) and females used it rarely or sometimes *(M* = 1.84, *SD* = 1.11). Lastly, for both the functions of enhancing mental skills *(M*ales: M = 2.29, *SD* = 1.10, female: M = 1.87, *SD* = 1.11) and to promote physical recovery *(M*ales: M = 2.22, *SD* = 1.12, females: M = 1.37, *SD* = 1.11), males rated the extent of their engagement as sometimes, and females tended to engage in these functions rarely. Results can be seen graphically in Figure 12.

Figure 12

Differences in the Functions of Performance Imagery by Gender



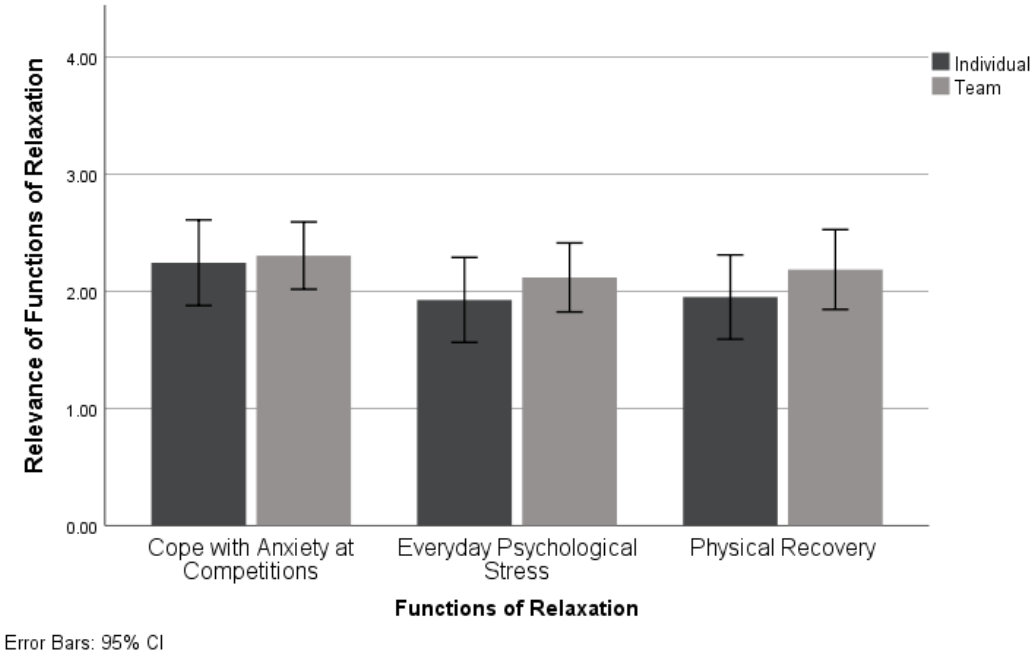
Differences by sport type

A MANOVA was used to investigate differences in the functions of relaxation activities by sport type. This analysis included 41 individual- and 59 team-sport athletes (*N* = 100). No

significant differences were found in the differences in functions of relaxation skills by sport type, therefore rejecting hypothesis seven, F (3, 94) = .638, p = .592. Individual- (M = 2.23, SD = 1.14) and team-sport (M = 2.26, SD = 1.12) athletes sometimes used relaxation skills to cope with anxiety. Similarly, relaxation skills were used sometimes for the function of dealing with everyday psychological stress with both individual- (M = 1.92, SD = 1.13) and team-sport (M = 2.08, SD = 1.15) athletes. Again, relaxation skills were only being used sometimes for physical recovery in both sport types (individual: M = 1.95, SD = 1.13, team: M = 2.13, SD = 1.30). Results can be seen in Figure 13.

Figure 13

Differences in the Functions of Relaxation Activities by Sport Type

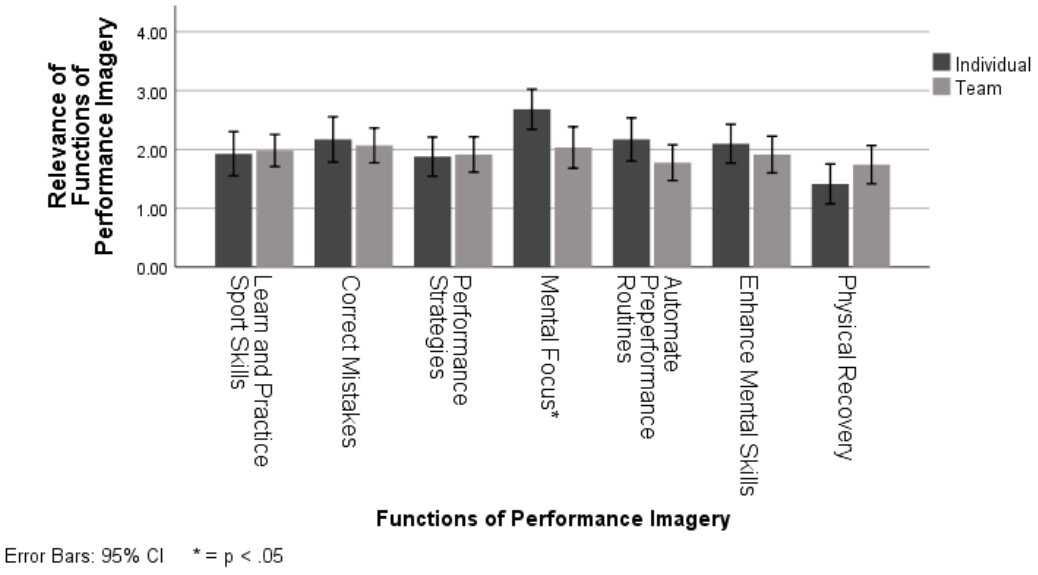


A MANOVA was used to examine differences in the functions of performance imagery by sport type. This analysis examined 41 individual and 58 team-sport athletes (N = 99). MANOVA analysis revealed sport type had a significant effect on the function of performance imagery, F (7, 89) = 2.732, p = .013, Wilks' Lambda = .823, partial eta squared = .177.

Specifically, sport type had a significant effect on performance imagery when used for mental focus (p = .031). Hypothesis seven was rejected as the significant differences were found within different functions of performance imagery. Examining the descriptive breakdown, individual- *(M* = 1.92, *SD* = 1.19) and team-sport athletes *(M* = 1.96, *SD* = 1.03) used imagery to learn and practice skills rarely or sometimes. To correct mistakes, individual- *(M* = 2.17, *SD* = 1.22) and team-sport athletes *(M* = 2.05, *SD* = 1.11) used performance imagery for this function sometimes. Similarly, individual- *(M* = 1.87, *SD* = 1.05) and team-sport athletes *(M* = 1.91, *SD* = 1.13) used performance imagery to learn strategies rarely or sometimes. Individual-sport *(M* = 2.68, *SD* = 1.08) athletes used performance imagery more often for mental focus than team-sport athletes *(M* = 2.05, *SD* = 1.33). Likewise, individual-sport *(M* = 2.17, *SD* = 1.15) athletes used performance imagery more often for pre-performance routines than team-sport athletes *(M* = 1.77, *SD* = 1.14). Again, individual-sport athletes *(M* = 2.09, *SD* = 1.04) used performance imagery to enhance their mental skills more often than team-sport athletes *(M* = 1.19, *SD* = 1.17). Lastly, performance imagery was used rarely for physical recovery by both individual- *(M* = 1.41, *SD* = 1.07) and team-sport athletes *(M* = 1.74, *SD* = 1.23). Results can be seen in Figure 14.

Figure 14

Differences in Functions of Performance Imagery by Sport Type



Differences in the Use of Various Types of Coping Strategies

For research question five, participants were asked to answer a variety of questions based on a situation given to them, on a scale of 1 to 4. The scale is as follows: 1 (I usually don't do this at all), 2 (I usually do this a little bit), 3 (I usually do this a medium amount), and 4 (I usually do this a lot). The responses to these questions were then grouped according to the appropriate subscale (i.e., problem-focused, emotion-focused, avoidant). Examining the whole sample, athletes tended to use problem-focused coping strategies *(M* = 2.91, *SD* = .522) to deal with stressful events in their life. Next, emotion-focused coping strategies were most popular *(M* = 2.51, *SD* = .475), and then avoidant-coping strategies *(M* = 1.74, *SD* = .388).

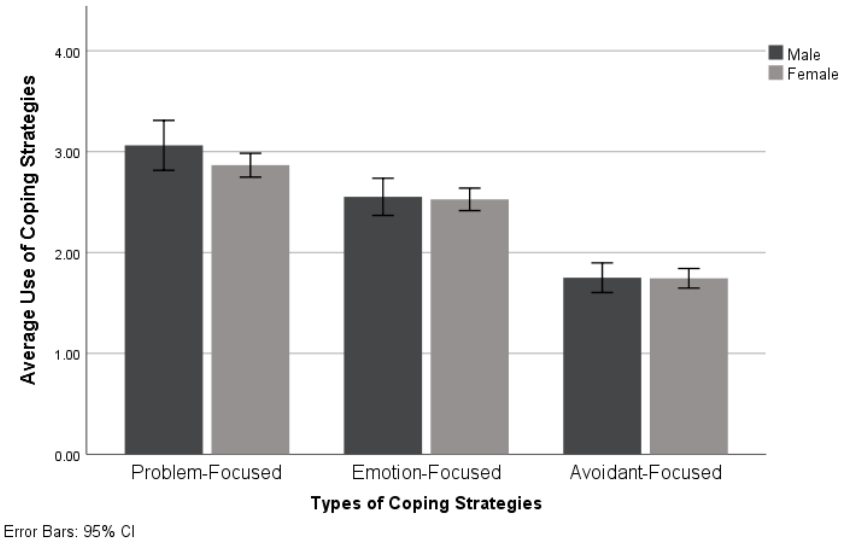
Differences by gender

A MANOVA was used to examine differences between genders in the use of different coping strategies. This analysis included 24 males and 69 females (*N* = 93). No significant

differences between genders in the use of type of coping strategy was found, and therefore hypothesis ten was rejected, $F(3, 87) = .690$, $p = .561$. We saw a similar use of all coping strategies by gender. Males used problem-focused ($M = 3.06$, $SD = .586$) a medium amount compared to females ($M = 2.86$, $SD = .492$). Males ($M = 2.49$, $SD = .518$) and females ($M = 2.52$, $SD = .463$) used emotion-focused coping strategies very similarly in something they do a little bit. Similarly, males ($M = 1.73$, $SD = .348$) and females ($M = 1.74$, $SD = .404$) used avoidant coping strategies very much alike, both in something they don't do a lot or a little bit. Results can be seen in Figure 15.

Figure 15

Differences in the Use of Coping Strategies by Gender



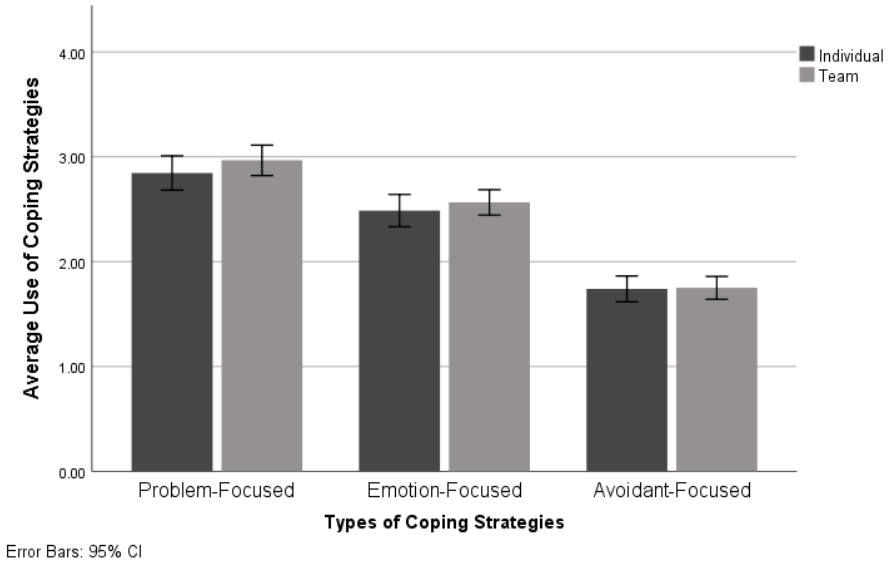
Differences by sport type

A MANOVA was used to examine differences between sport types in the use of different coping strategies, including 38 individual and 55 team-sport athletes ($N = 93$). No significant differences between sport types were found, rejecting hypothesis ten, $F(3, 87) = 1.371$, $p = .257$. Individual- and team-sport athletes used these coping strategies almost

identically. For problem-focused, individua-l *(M* = 2.84, *SD* = .499) and team-sport athletes *(M* = 2.96, *SD* = .536) used this coping strategy a medium amount. Individual- *(M* = 2.45, *SD* = .512) and team-sport athletes *(M* = 2.56, *SD* = .446) used emotion-focused coping strategies somewhere between a little bit and a medium amount. Lastly, avoidant focused was used the least for both individual- *(M* = 1.73, *SD* = .374) and team-sport athletes *(M* = 1.75, *SD* = .401). Results can be seen in Figure 16.

Figure 16

Differences in the Use of Coping Strategies by Sport Type



Exploratory Questions

How athletes learned relaxation activities

Participants were asked to rate on a scale of 0 (strongly disagree) to 4 (strongly agree), the extent to which they agreed with questions asking about the method that they learned relaxation activities through. An option to select "N/A" was offered in case the method did not apply to them, or they did not use relaxation activities. The results were scattered evenly across all three questions: taught the activities by a professional *(M* = 1.95, *SD* = .866), taught myself

the activities *(M* = 1.56, *SD* = .858), and taught by trying things out (*M* = 1.82, *SD* = .899). These responses all varied from disagree (1) to agree (2), which means there may be another method of learning that was left out.

How athletes learned performance imagery activities

Participants were asked to rate on a scale of 0 (strongly disagree) to 4 (strongly agree), the extent to which they agreed with questions asking about the method that they learned performance imagery through. An option to select "N/A" was offered in case the method did not apply to them, or they did not use performance imagery. The method participants agreed the most was being taught performance imagery by a professional *(M* = 2.01, *SD* = .857). Teaching myself *(M* = 1.50, *SD* = .930) and teaching by trying things out (*M* = 1.73, *SD* = .915) both fell on average between disagree (1) and agree (2).

Engagement in relaxation activities over athletic career

Participants were asked to use a sliding scale to choose a number between 0 and 20 to represent how many years they have been using relaxation activities over their athletic career. On average, participants have been using these skills for about four years *(M* = 4.24, *SD* = 3.26).

Engagement in performance imagery over athletic career

Participants were asked to use a sliding scale to choose a number between 0 and 20 to represent how many years they have been using performance imagery over their athletic career. On average, participants have been using these skills for about four years *(M* = 4.24, *SD* = 2.92). Because this number is the same as the relaxation question above, this may indicate that individuals are learning these skills at the same time.

Chapter 5: Discussion

Previous studies have focused in a broad sense on how athletes use psychological skills in their performances (Hagan et al., 2017; Keilani et al., 2016; Lee et al., 2015; Mozen, 1999; Ortega et al., 2018). However, there is limited research on how athletes are using these psychological techniques in their sport, how they learned imagery and relaxation, and what these skills offer for their performances. Additionally, there is conflicting research on whether or not there is a difference between the populations in terms of gender and team type. The present study investigated these differences, as well as how DI collegiate athletes are learning and using these skills in their sport.

The first aim of this study was to examine the specific relaxation and imagery techniques that participants use. Stretching is the most popular relaxation activity for athletes, followed by deep breathing. Stretching is something that every athlete knows, as it is an essential part of a proper warm-up (Melo et al., 2010). Because of the calm nature of stretching, this may be an easy time for athletes to find some relaxation. Additionally, deep breathing is something that anyone can utilize and has immediate physiological impacts on heart rate (Ortega et al., 2018). Participants used autogenic relaxation the least, which could be due to the more advanced nature of the activity. This type of relaxation is not as easily learned on your own, requires a quieter space and more prolonged period to go through the exercise (Thazhakkattu et al., 2020). Also, it cannot be used easily during competition. Athletes spend on average about 28 minutes per week in performance imagery, which shows they are using it regularly. The results support the idea that DI collegiate athletes use relaxation and imagery skills in their sport. However, they may lean towards exercises that can be used quickly and in a public space.

Males spent significantly more time in autogenic relaxation, deep breathing, eastern relaxation, meditation, relaxation imagery, and stretching activities compared to females. These

findings do not support the hypothesis that females will use these skills more often than males. Researchers do not understand why males are spending more time in each of these activities. However, one possibility is that because males have a stronger physiological reaction to acute stressors (McLean & Anderson, 2009), they may be more self-aware of their reaction to stress and feel the need to use these activities more often. More research is needed to further understand why males spend more time in relaxation activities than females. Males and females were very similar in their use of performance imagery, along with previous findings (Hall, 2001; Liu et al., 2019; Munroe et al., 2000; Whitehead & Basson, 2006); however, the large standard deviation (*SD* = 30.71) shows that there is a wide range in how much athletes are using performance imagery.

Team-sport athletes use muscle relaxation, eastern relaxation, and stretching activities more often than individual-sport athletes. This may be because if one athlete on the team is doing a relaxation activity, it is likely the rest of the team will follow suit. In an individual sport, it is up to the athlete on their own to decide if they want to partake in that activity or not. However, more research is needed on this subject to fully understand why team-sport athletes are using relaxation more often. Again, both sport types spend a similar amount of time in performance imagery, which could be due to the basic nature of collegiate sports and the high demands of any sport. This contradicts previous findings (Adegbesan, 2009; Short & Short, 2005; Short et al., 2005) stating that team-sport athletes use imagery more frequently than those in individual sports. These results do not support the hypothesis that individual-sport athletes will use relaxation and imagery more frequently than team-sport athletes. Overall, researchers should be aware both gender and sport type could have an impact on how much time an athlete is likely to spend using relaxation during the week. More research is needed to fully understand

this interaction since data analysis did not find a significant effect for just gender or sport type on the time spent in relaxation activities.

A second aim of the present study was to investigate how individual- and team-sport athletes, as well as males and females, use these skills differently and the frequency with which they are using them. Beginning with deliberate practice, we examine the relevance that relaxation and performance imagery have on sport performance, competing effectively, enjoyability, and mental concentration (Cumming & Hall, 2002; Ericsson et al., 1993; Kudlackova, 2011). Deliberate practice is practicing a skill solely for the purpose of enhancing performance instead of for fun or because it feels good. Ericcson and his colleagues' (1993) opinion is that this way of practice is the only way to increase one's performance and requires full concentration during an activity. This is what separates elite athletes from other athletes. Results indicated that athletes are using relaxation in a deliberate way, with all scores around the moderate relevance rating. Additionally, deliberate practice is enjoyable as well, which is in align with previous research (Cumming & Hall, 2002; Kudlackova, 2011). However, this contradicts the original deliberate practice framework (Ericcson et al., 1993). Because these scores are not on the higher end, this could indicate that they are not always using relaxation in a deliberate manner for these four purposes. Across gender and sport type, relaxation and performance imagery were used in similar manners, demonstrating a moderate use of deliberate practice, which does not support the study's hypotheses. It is important for athletes to use both skills in a deliberate manner so that they may reap the benefits for their performances and can increase their self-awareness (Kudlackova, 2011). Without deliberate practice, athletes may just be going through the motions of these activities and not understanding the purpose behind them for their sport.

In addition to understanding the purpose behind these activities, athletes must also use them consistently across sport to fully master them. Athletes are most commonly using relaxation and performance imagery during competition, regardless of gender or sport type. This is something seen commonly, as athletes only deploy psychological skills during high-stress scenarios. From previous research, (Kudlackova, 2011) we know that the more athletes use psychological skills, there are more benefits seen, such as developing mental toughness. Just like physical skills, both imagery and relaxation skills require consistent practice to truly master and gain benefits. The more that athletes use psychological skills prior to competition, the more likely they are to see themselves as successful (Frey et al., 2003). Coaches need to encourage use during practice, competition, and outside of practice and competition, as well, to increase the quality of performance during practice and competition (Hagan et al., 2017b). As mentioned previously, individuals that only deploy relaxation and imagery skills during catastrophic or high-stress events without practice are not going to experience successful or their desired results (Wadey & Hanton, 2008). More education needs to be done by SP professionals to emphasize the importance of practicing psychological skills during all times of the sport, just like physical skills.

Due to the versatile nature of relaxation and performance imagery, athletes may use them for a variety of reasons, including coping with stressors from their sport or everyday life, enhancing physical recovery, or helping with mental focus. Because women have been reported to experience more fear on average and are more likely to develop anxiety disorders in comparison to men (Arrindell, 2000; Bourdon et al., 1998; Davey, 1994; Weissman & Merikangas, 1986), researchers hypothesized that women would use these skills for different reasons than men. However, there was not a significant difference between why males and females used relaxation and performance imagery. Much of the literature around female's

perception of fear is older, which may not reflect current patterns or perceptions. Both genders and sport types rated each of the functions for relaxation as "sometimes" which could indicate there were functions that athletes are currently utilizing that may have been left out on the survey. However, gender did have a significant effect on the reasons athletes used performance imagery, specifically for physical recovery and performance strategies. Males used performance imagery more often for both functions in comparison to females. Sport type also had a significant impact on the function of performance imagery, as well as for mental focus. Individual-sport athletes tended to use performance imagery more often for this function compared to team-sport athletes. While previous research has investigated sport type differences concerning frequency (Adegbesan, 2009; Short & Short, 2005) or capabilities of performance imagery (Di Corrado et al., 2019), there is still more research looking into the functions of performance imagery. One explanation of this finding is that individual sports tend to require much more concentration for longer periods of time due to the absence of team dynamics with group sports such as soccer or football. With sports like golf or swimming, the individual may require more mental focus on one's abilities due to few interruptions of the sport.

Finally, the last aim was to understand differences in the use of coping strategies. Athletes used problem-focused coping strategies most frequently. However, emotion-focused was close to problem-focused coping. This may because athletes often use a variety of coping strategies to deal with one stressor (Holt & Hogg, 2002; Poczwardowski & Conroy, 2002). When thinking of sports, most situations that athletes face are multi-faceted, which explains why athletes may choose to actively respond to the stressor through problem-focused strategies, as well as try and lower their stress response through emotion-focused strategies. These emotion-focused strategies include relaxation and performance imagery activities (Dale, 2000), showing the importance of psychological skills in sport. These results indicate that athletes are

using such skills to actively deal with their stressors and are a key technique in reducing arousal and stress levels. Individual- and team-sport athletes use coping strategies very similarly, which contradicts previous findings that teammates may impact stress appraisal in team sports (Kerdijk et al., 2016). Both males and females use coping strategies very similarly, which is supported by previous literature (Hammermeister & Burton, 2004), but does not support this study's hypothesis. However, because there is still a large amount of conflicting literature (Yoo, 2001) around differing uses of coping strategies by gender, further research is still needed to find conclusive evidence. Much of the literature surrounding females' perceptions of the environments is outdated and needs to be currently reviewed. Males and females may be using the same type of coping strategies, which could lead to the conclusion that they have the same perception of their surroundings and situations.

While no hypotheses were made, this study aimed to explore how athletes learn relaxation and performance imagery activities, as well as their engagement in those activities over their athletic career. An even mix of answers was given for how athletes learned relaxation activities between being taught by a professional, teaching themselves, and taught by trial and error. This demonstrates athletes are learning relaxation techniques through a variety of ways. This may be dependent on the skill they are learning, as deep breathing and stretching are very intuitive or basic, while autogenic or progressive muscular relaxation is more advanced. However, for performance imagery, most athletes learned this skill from a professional. Performance imagery is a complex task to learn, and many people have not heard of it until they work with someone in the field of sport psychology. The SP professional can help the athlete to develop the proper techniques along with how and when to use this skill as well, whereas without their help, athletes may struggle with knowing how to use imagery for performance benefits. On average, athletes had been participating in relaxation and performance imagery for

four years, indicating that many of them had learned these skills at the same time. Some types of imagery can be used as relaxation technique (Pineschi & Di Pietro, 2013), so many athletes may have learned this skill as a result of learning relaxation skills. The natural progression would be to learn more types of imagery, such as performance, during this time as well. While some techniques are easier to learn by oneself than others, it is important for professionals to teach athletes these skills in order to help them understand the proper uses, the correct techniques, and different strategies for when to use them in their sport. Athletes may be teaching themselves these skills and not actually getting any benefits from them because of improper use. Out of the 117 participants, only 24 responded they work with the SP professional, 67 did not work with one but their school has one, and 23 said that they did not work with one and their school does not have the SP professional. It is interesting to note that most athletes in this study do not work with the SP professional, though they have access to one. This could be due to the continued stigma of mental health problems that many associate with seeing the SP professional. If the school has the SP professional, it is important for the coaches to encourage utilization of their services.

Limitations

Several limitations to the present study are worth mentioning. First, all measures were self-reports; therefore, the data that was collected only reflects the perceptions of the athletes taking the survey. This data may not be entirely accurate as participants may respond to the survey according to what they think is socially desirable or what their coach may think. The study could be improved by incorporating journals and observations that would allow researchers to collect more in-depth data. Additionally, incorporating interviews with coaches, SP professionals, parents, or trainers, could provide more information about the athletes' activities.

While it was the goal of the study to balance gender and sport type groups evenly, more females were included than males, and more team-sport athletes than individual-sport athletes. This could impact the results as an even distribution in each group was lacking. Males may have hesitated to participate in this study for different reasons. Coaches of male teams may be more protective of their athletes in allowing them to share their performance strategies. Additionally, females are typically more inclined to share how they deal with stress and acknowledge that they use strategies to help deal with stressful situations. Males may be less inclined to admit that they deal with stress in their sport or that they use stress-relieving techniques. Furthermore, team-sport athletes represented a larger number in this study, as it may be likely that if one or two people on the team decided to take the survey, this could influence other teammates to take the survey due to the underlying social dynamic. In individual sports, there are often fewer teammates, opportunities to interact with their team, or opportunities to share their activities.

While 151 total responses were collected, only 117 responses were able to be used for data analysis. A decision was made to include any responses from those who completed at least one section of the survey, since many athletes stopped after the first page of the survey and did not continue with their responses. This could be because many athletes thought that the survey was only one page, and did not continue, or because of a Qualtrics error that did not display the arrow to continue the survey properly. Furthermore, the lack of participation could be due to COVID-19, as many athletes and coaches may be feeling overwhelmed due to the demands that this pandemic has placed on them and did not have time to participate. Therefore, data results, especially in the first section concerning engagement in relaxation and performance imagery, may have been different if all responses had been included.

Future Research

This study is a step in adding to the literature of how DI collegiate athletes are using psychological skills in their sport. Research continues to support the benefits of relaxation and performance imagery in sports as ways to enhance performance (Callow et al., 2017; Mistretta et al., 2017). However, the results of this study supports some research but contradicts other findings. Until there is enough research done to have conclusive evidence, research should continue to focus on understanding if there are any differences between gender and sport types in their use of relaxation, imagery, and coping skills. If there are truly no differences, as this study is suggesting, then researchers should investigate what has changed since previous research done in the 1990s, possibly pointing to changes in cultural and social influences of society, and improved knowledge. Additionally, another area of research should focus on why athletes are not utilizing the SP professional if their school has one.

Practical Implications

College athletics, especially at the DI level, is incredibly stressful due to the amount of attention they receive, as well as being treated like professional sports, not to mention the added responsibilities of being a full-time student. It is important that professionals understand how to best help athletes manage this stress in order to achieve peak performance. This information can help assist SP professionals to correctly advise athletes on how they might want to incorporate psychological skills into their routines. From previous research, SP professionals may have been advising different types of skills to males and females because of the notion that females have higher perceptions of fear and anxiety. However, from the findings of this study, males and females should be using psychological skills in the same way, since there were no differences found. Additionally, many had believed before that athletes used emotion-focused coping strategies during their sport (Crocker, 1992; Park, 2000). However, the findings of this study indicate that athletes are using problem-focused coping strategies most often and may possibly

be using many different types of coping strategies during sport, in line with the thought that coping is a dynamic process (Holt & Hogg, 2002; Poczwardowski & Conroy, 2002). These findings suggest that SP professionals should be teaching athletes a variety of coping strategies, to help prepare them for stressful situations, while possibly focusing more on problem-focused strategies. Lastly, from these findings SP professionals should be using interventions with different sport types (individual and team) in similar manners when implementing psychological skills. It is thought that team sports have a different dynamic, typically with the social aspects as well as the dispersion of blame when something goes wrong on the field. Previous research had reported that teammates really had an impact on the appraisal of stress and coping in team sports (Kerdijk et al., 2016). However, the current study found different results. Different sport types are more similar than we thought.

Conclusion

The present study has provided insight into how collegiate athletes use psychological skills to cope with the demands of their sport and how similarly males and females, as well as individual- and team-sport athletes, are in the way they use these relaxation and imagery. While this area of sport psychology has been examined in the past, it has been a while. We see that changes have occurred over the course of the last 20 or so years, and new research needs to be reviewed to understand how current athletes are using these skills. Relaxation and performance imagery are both powerful skills that can reduce anxiety, increase peak performance opportunities, achieve optimal focus, and allow the athlete to enjoy their sport and performance once again. More athletes are using sport psychology techniques to harness the mental side of their sport, both the positive and negative aspects. It is the responsibility of the SP professional to make sure they are ensuring athletes are using these skills correctly, and in the best way possible to match the demands of their sport.

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Appendix A

The Deliberate Relaxation for Sport Survey

Deliberate Relaxation for Sport Survey

It is often proposed that relaxing and the ability to relax are important for athletes however, there are few studies of athletes' use of relaxation for reasons related to their sport. Your participation in this study will reveal important information about this topic; information that could help future athletes.

By relaxation activities I do **NOT** mean "every day" leisure activities; e.g., watching TV, reading books, taking a bath, etc.

What I mean by relaxation activities are "routines", "techniques", or "skills" that involve specific thoughts (e.g., saying "relax" to yourself) and/or actions (e.g. breathing deeply) that you do for **reasons related to your sport.** These might include: 1) coping with anxiety at competitions, 2) coping with the general "everyday" stress related to your sport (e.g., worrying about being selected to play), and 3) promoting *physical* recovery and healing, needed given the physical demands of training and competition.

In this survey, I will also ask you how much you use imagery for your sport. Imagery can be used as a performance benefit, as well as for relaxation. I will be asking you about both in this survey. The distinction between these two is that performance imagery is used to help an athlete visualize their skills and tasks in their sport, for better performance outcomes. Imagery relaxation is used to picture calming scenes to lower the level of anxiety or stress that an athlete may feel.

I am interested here how much you, as an athlete, undertake any relaxation or imagery activities for reasons related to your sport. If you don't undertake any such activities, that's fine; I'll simply ask you to tell me that you don't undertake any such activities.

Part II- How much you engage in types of relaxation and performance imagery activities

I'd like to find out here how much you engage in relaxation activities for reasons related to your sport.

To help me find this out, I'd like you to try to "match" any relaxation activities you engage in relation to your sport into one of the 7 "types" of relaxation activity outlined below. In other words, I think these types of relaxation activities can capture the most relaxation activities athletes might engage in.

For example, let's say you deliberately take time after hard practice sessions o lie on your bed

with your eyes closed--- not so as to sleep-- but to "slow things down" that you can mentally "de-stress." The closest match to this activity in the list of activity types below would be a "meditation activity."

Now, consider each type of relaxation activity that you deliberately engage in (if any). Then, think which type of relaxation activity comes closest to "matching" yours, even if the match is not perfect.

Also, if one of your activities belongs to more than one type of relaxation activity, choose the one that seems to match your activity best. For example, let's say you deliberately deep breathe, while also doing little stretching, in an attempt to reduce unwanted feelings of anxiety immediately after competing. I suggest you consider this a deep breathing activity.

So, please now read about the following 7 types of relaxation activities and think about the best "match" for each one of your relaxation activities, should you engage in any.

Muscle relaxation activities: This type of relaxation activity involves teaching tensing and then relaxing muscles within your body. One specific type of this activity often taught in relaxation classes, is called progressive muscle relaxation (PMR).

Autogenic relaxation activities: This type of activity involves focusing attention on various regions of your body while imagining that the region feels heavy and/or warm.

Deep breathing activities: These activities involve paying attention to inhaling and exhaling. During these activities, breathing is often purposefully slowed and deepened, and the eyes are sometimes closed.

Eastern relaxation activities: These activities, which include for example yoga and Tai chi, involve positioning your limbs into specific postures and poses, often in an attempt to increase awareness and control over your body and mind. Important: I am **not** concerned here with eastern relaxation activities you do for leisure or warm-up/cool-down for physical activity but rather with eastern relaxation activities done only and deliberately to release you from stress and tension related to your sport.

Stretching activities: These activities involve extending your muscles to their full length to relax them. Important: I am **not** concerned here with stretching you do for warm-up/cool-down from physical activity but rather with stretching done only and deliberately to release you from stress and tension related to your sport.

Meditation activities: These activities involve attempts to get beyond the "thinking" mind into a deeper state of relaxation or awareness. An example includes lying on a bed and trying not to think about anything.

Imagery relaxation activities: This type of relaxation activity is usually performed with your eyes closed and involves focusing on various images in your mind that evoke feelings of ease or relief. Important: I am **not** concerned here with images you might form that involve rehearsing your skills or strategies of play but rather with imagery done only and deliberately to release you from stress and tension related to your sport.

Lastly, I will also be asking how much you engage in performance imagery for reasons related to your sport. For your purposes, please read the following explanation of performance imagery.

Performance Imagery: This type of imagery is usually performed with your eyes closed and involves focusing on images in your mind that are related to skills you may perform, routines or plays that you go through during your sport or any image related to the performance of your sport. This imagery is concerned with practicing these skills mentally to help increase confidence and practice time, for enhanced performance outcomes. Important: I am not concerned here with images that you may form that evoke feelings of relaxation or are done for the purpose of stress management, but rather deliberate practice of performances.

Part II continued- How much you engage in types of relaxation activities

I will ask you here about the time you spend on each of your relaxation activities (if you engage in any). Remember, please consider each type of relaxation activity (if any) that you deliberately engage in for reasons related to your sport and then find the best "match" from the list of types of activities.

Then, please attempt to estimate the time you spend on each relaxation activity in a current typical week of your training cycle.

For example, if you spend 5 minutes before each training session relaxing by "thinking about nothing" in a quiet place and you train 5 times per week (e.g., 25 minutes total), you would select the "16-30" numbers against the "meditation activities" type.

If you also engage in Tai chi for 30 minutes two times a week (e.g., 60 minutes total) to help you relax generally from the everyday stressors of being an athlete, you would also select the "45-60" numbers against the "Eastern relaxation activities" type.

If you do not undertake a particular type of relaxation activity (e.g., deep breathing activities), please select "0".

	0	1-15	16-30	31-45	46-60	61-75	76-90	91-105	106-120	>120
Muscle relaxation activities	○	○	○	○	○	○	○	○	○	○
Autogenic relaxation activities	○	○	○	○	○	○	○	○	○	○
Deep breathing activities	○	○	○	○	○	○	○	○	○	○
Eastern relaxation activities	○	○	○	○	○	○	○	○	○	○
Stretching activities	○	○	○	○	○	○	○	○	○	○
Meditation activities	○	○	○	○	○	○	○	○	○	○
Imagery relaxation	○	○	○	○	○	○	○	○	○	○
Performance Imagery	○	○	○	○	○	○	○	○	○	○

Part III(a)- The relevance to performance, enjoyment, and effort associated with your relaxation activities Please answer the following questions related to your relaxation activities in general on a scale from 0 (not at all) to 10 (highly). Answer each question by selecting a number.

	0	1	2	3	4	5	6	7	8	9	10
To what extent are the relaxation activities you engage in relevant to maintaining and/or improving your current level of sports performance?	○	○	○	○	○	○	○	○	○	○	○
To what extent are the relaxation activities you engage in relevant to you competing effectively?	○	○	○	○	○	○	○	○	○	○	○
To what extent are the relaxation activities you engage in enjoyable to perform (while you are doing them)?	○	○	○	○	○	○	○	○	○	○	○
How mentally concentrated are you when you undertake the relaxation activities you engage in?	○	○	○	○	○	○	○	○	○	○	○

Part III(b)- The relevance to performance, enjoyment, and effort associated with your performance imagery activities. Please answer the following questions related to your imagery activities in general on a scale from 0 (not at all) to 10 (highly). Answer each question by selecting a number.

	0	1	2	3	4	5	6	7	8	9	10
To what extent are the imagery activities you engage in relevant to maintaining and/or improving your current level of sports performance?	○	○	○	○	○	○	○	○	○	○	○
To what extent are the imagery activities you engage in relevant to you competing effectively?	○	○	○	○	○	○	○	○	○	○	○
To what extent are the imagery activities you engage in enjoyable to perform (while you are doing them)?	○	○	○	○	○	○	○	○	○	○	○
How mentally concentrated are you when you undertake the imagery activities you engage in?	○	○	○	○	○	○	○	○	○	○	○

Part IV(a)- Your engagement in relaxation activities during, and outside of practice competition

I am interested here in the extent to which you engage in relaxation activities during practice and competition as well as outside of practice and competition. Please answer (by selecting a number) each of the following 3 questions.

	Never	Rarely	Sometimes	Often	Always
	0	1	2	3	4
To what extent do you engage in relaxation activities immediately before or during <u>PRACTICE</u>?					
To what extent do you engage in relaxation activities before or during <u>COMPETITION</u>?					
To what extent do you engage in relaxation activities <u>OUTSIDE of practice and competition</u>?					

Part IV(b)- Your engagement in performance imagery activities during, and outside of practice competition

I am interested here in the extent to which you engage in relaxation activities during practice and competition as well as outside of practice and competition. Please answer (by selecting a number) each of the following 3 questions.

	Never	Rarely	Sometimes	Often	Always
	0	1	2	3	4
To what extent do you engage in imagery activities immediately before or during <u>PRACTICE</u>?					
To what extent do you engage in imagery activities before or during <u>COMPETITION</u>?					
To what extent do you engage in imagery activities <u>OUTSIDE of practice and competition</u>?					

Part IV(c)- Reasons why you engage in relaxation activities

The purpose of this section is to find out why you engage in your relaxation activities. Please answer (by selecting a number) each of the following questions.

	Never	Rarely	Sometimes	Often	Always
	0	1	2	3	4
To what extent do you engage in relaxation activities to cope with anxiety at competitive events?					
To what extent do you engage in relaxation activities to cope with the everyday psychological stress associated with being an athlete (e.g. stress from the media, your coach, traveling, team environment)?					
To what extent do you engage in relaxation activities to promote *physical* recovery and healing, needed given the physical demands of training and competition?					

Part IV(d)- Reasons why you engage in performance imagery activities

The purpose of this section is to find out why you engage in your relaxation activities. Please answer (by selecting a number) each of the following questions.

Never	Rarely	Sometimes	Often	Always

	0 1 2 3 4
To what extent do you engage in performance imagery activities to learn and practice sport skills?	
To what extent do you engage in performance imagery activities to correct mistakes?	
To what extent do you engage in performance imagery activities to learn and practice performance strategies?	
To what extent do you engage in performance imagery activities to prepare mental focus for competition?	
To what extent do you engage in performance imagery activities to automate preperformance routines?	
To what extent do you engage in performance imagery activities to build and enhance mental skills?	
To what extent do you engage in performance imagery activities to promote physical recovery and healing, needed given the physical demands of training and competition?	

Part V(a)- How you learned your relaxation activities

Please indicate the extent to which you agree (by selecting a number) with the following statements about how you learned your relaxation activities in general.

How did you learn the relaxation activities you engage in, in relation to your sport?

Strongly Disagree	Disagree	Agree	Strongly Agree	Not Applicable
0	1	2	3	

I was taught the relaxation activities (e.g., from a sport psychology professional/mental performance coach, coach, other athletes, etc.)	
I taught myself the relaxation activities by obtaining information about these activities (e.g., from a book, the internet, etc.)	
I taught myself the relaxation activities by trying out ways to relax on myself and seeing what worked	

Part V(b)- How you learned your performance imagery activities

Please indicate the extent to which you agree (by selecting a number) with the following statements about how you learned your performance imagery activities in general.

How did you learn the performance imagery activities you engage in, in relation to your sport?

	Strongly Disagree	Disagree	Agree	Strongly Agree	Not Applicable
	0	1	2	3	
I was taught the relaxation activities (e.g., from a sport psychologist professional coach/mental performance coach, other athletes, etc.)					
I taught myself the relaxation activities by obtaining information about these activities (e.g., from a book, the internet, etc.)					
I taught myself the relaxation activities by trying out ways to relax on myself and seeing what worked					

Part VI(a)- How much you have engaged in relaxation activities over your athletic career

I am interested here in how much you have engaged in relaxation activities for reasons related to your sport over the years you have been an athlete.

Please select a number that best describes how many years you have been using relaxation skills for:

Not Applicable

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Number of years of relaxation skill use	

Part VI(b)- How much you have engaged in performance imagery activities over your athletic career

I am interested here in how much you have engaged in performance imagery activities for reasons related to your sport over the years you have been an athlete.

Please select a number that best describes how many years you have been using performance imagery for:

Not Applicable

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Number of years of performance imagery skill use	

If you use performance imagery, please describe in a couple of sentences an example of the details of what you image. For example, include the viewpoint you image from, the scenario you go through, details you include (sounds, tastes, smells, colors, etc.) and anything else you would like to add.

_____

_____

_____

_____

_____

If you do NOT use relaxation and imagery, are you inclined to learn more about this area or start to use these skills in your own practice?

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Appendix B

The Brief Cope

The Brief Cope

The following items deal with ways you usually deal with a stressful event that may occur during your sport (ex. injury, big competition, work-recovery balance, etc.) There are many ways to try to deal with problems. These items ask you what you usually do to cope with this stress. Obviously, different people deal with things in different ways, but I'm interested in how you usually deal with it. Each item says something about a particular way of coping. I want to know to what extent you usually do what the item says. How much or how frequently. Don't answer on the basis of whether it seems to be working or not-- just whether or not you usually do it. Use these response choices. Try to rate each item separately in your mind from the others. Make your answers as true FOR YOU as you can. **Remember to answer according to how you usually deal with the anxiety associated with a stressful event that may occur during your sport.**

Answer each of the following questions with a response based on a scale from 1-4:
1= I usually don't do this at all
2= I usually do this a little bit
3= I usually do this a medium amount
4= I usually do this a lot

Answer each of the following questions with a response based on a scale from 1-4:
1= I usually don't do this at all
2= I usually do this a little bit
3= I usually do this a medium amount
4= I usually do this a lot

Remember to answer according to how you usually deal with the anxiety associated with **a stressful event that may occur during your sport.**

	1	2	3	4
I turn to work or other activities to take my mind off things	○	○	○	○
I concentrate my efforts on doing something about the situation I'm in	○	○	○	○
I say to myself "this isn't real"	○	○	○	○
I use alcohol or other drugs to make myself feel better	○	○	○	○
I get emotional support from others	○	○	○	○
I give up trying to deal with it	○	○	○	○
I take action to try to make the situation better	○	○	○	○

Answer each of the following questions with a response based on a scale from 1-4:

1= I usually don't do this at all
2= I usually do this a little bit
3= I usually do this a medium amount
4= I usually do this a lot

Remember to answer according to how you usually deal with the anxiety associated with **a stressful event that may occur during your sport.**

	1	2	3	4
I refuse to believe that it may happen	○	○	○	○
I say things to let my unpleasant feelings escape	○	○	○	○
I get help and advice from other people	○	○	○	○
I use alcohol or other drugs to help me get through it	○	○	○	○
I try to see it in a different light, to make it seem more positive	○	○	○	○
I criticize myself	○	○	○	○
I try to come up with a strategy about what to do	○	○	○	○

Answer each of the following questions with a response based on a scale from 1-4:

1= I usually don't do this at all
2= I usually do this a little bit
3= I usually do this a medium amount
4= I usually do this a lot

Remember to answer according to how you usually deal with the anxiety associated with **a stressful event that may occur in your sport.**

	1	2	3	4
I get comfort and understanding from someone	○	○	○	○
I give up the attempt to cope	○	○	○	○
I look for something good in what is happening	○	○	○	○
I make jokes about it	○	○	○	○
I do something to think about it less, such as going to movies, watching TV, reading, daydreaming, sleeping, or shopping	○	○	○	○
I accept the reality of the fact that it may happen	○	○	○	○
I express my negative feelings	○	○	○	○

Answer each of the following questions with a response based on a scale from 1-4:

1= I usually don't do this at all
2= I usually do this a little bit
3= I usually do this a medium amount
4= I usually do this a lot

Remember to answer according to how you usually deal with the anxiety associated with **a stressful event that may occur in your sport.**

	1	2	3	4
I try to find comfort in my religion or spiritual beliefs	○	○	○	○
I try to get advice or help from other people about what to do	○	○	○	○
I learn to live with it	○	○	○	○
I think hard about what steps to take	○	○	○	○
I blame myself for things that may happen	○	○	○	○
I pray or meditate	○	○	○	○
I make fun of the situation	○	○	○	○

Appendix C

IRB Approval

TCU Institutional Review Board
147 Jarvis Hall
Fort Worth, Texas 76129

DATE: September 8, 2021

TO: Elizabeth Warfield and Robyn Trocchio

FROM: TCU Institutional Review Board

RE: Expedited Approval of Protocol

IRB#: 2021-157

Dear study team:

In accordance with applicable federal law governing the use of human subjects in research, the TCU Institutional Review Board ("IRB") has reviewed and approved your proposed project entitled "Differences in Relaxation and Imagery Strategies Among Gender and Sport". Your study is considered minimal risk and was reviewed through the expedited process, category 7. Please know that the IRB has not evaluated your project for scientific merit, except to weigh the risk to the human participants and the risk/benefit ratio (i.e. do benefits outweigh risk). This approval does not replace any other approvals that may be required.

Please note, all indoor interaction with human subjects in research studies must adhere to the current TCU COVID guidelines in place at the time of the interaction."

Your IRB approval is effective on September 8, 2021. Continuing Review is not required; however, an Annual Check-in Report is required. You must submit the Annual Check-in Report to the IRB before each anniversary of your approval date every year until this study is closed. Once your research is complete, you must submit a Project Closure and Final Report form to the IRB to close this study.

The approved consent form(s) is included as part of your research approval notice. You may only use this version of the consent form(s) to recruit research participants.

Remember that you are responsible for ensuring that your study is conducted in an ethical manner and in accordance with applicable law and TCU policies and procedures. You must submit required reports, as well as any proposed modifications to the IRB for review. No changes to your protocol may be implemented without prior IRB approval. Also, you are required to promptly report unanticipated problems and adverse events.

Your study may be selected for a Post-Approval Monitoring ("PAM"). You will be notified if your study has been chosen for a PAM. A PAM investigator may request to observe your data collection procedures, including the consent process. All active projects are subject to PAM.

Please contact Research Compliance at research@tcu.edu or (817) 257-5070, if you need any additional information.

Sincerely,
TCU Institutional Review Board

ABSTRACT

DIFFERENCES IN RELAXATION, IMAGERY, AND COPING STRATEGIES AMONG GENDER AND SPORT TYPES

by Elizabeth Warfield, M.S. 2022
Department of Kinesiology
Texas Christian University

Thesis Advisor: Dr. Robyn, Trocchio, PhD, CMPC

Athletes use psychological skills such as imagery and relaxation to decrease stress, cope with competitive anxiety, and achieve an optimal state of arousal (Hagan & Schack, 2019). There is conflicting literature around how both sport types and different genders use these skills in their sport (Adegbesan, 2009; Di et al., 2019). The current study analyzed sport type and gender differences in the use of relaxation and imagery in 117 NCAA Division I (DI) athletes. Participants completed The Deliberate Relaxation for Sport Survey (Kudlackova, 2011) through Qualtrics. Results found no differences in how males and females use relaxation or imagery in their sport. Additionally, sport type had a significant effect on the reason for using performance imagery ($p = .012$), specifically for mental focus for competition. This study supports the use of individualized intervention programs to best help athletes use relaxation and imagery in the most effective ways for their performances.