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Positive motivational self-talk: the influence of gender on performance, perception of self-talk, and performance anxiety during a disc golf putting exercise before and after a self-talk intervention

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POSITIVE MOTIVATIONAL SELF-TALK: THE INFLUENCE OF GENDER ON
PERFORMANCE, PERCEPTION OF SELF-TALK, AND PERFORMANCE ANXIETY
DURING A DISC GOLF PUTTING EXERCISE BEFORE AND AFTER A SELF-TALK
INTERVENTION

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Chapter 1

Introduction

In sport, as in other areas of performance, individuals communicate with themselves to navigate a task. For athletes, this self-talk (ST) becomes magnified during high anxiety moments such as putting in disc golf. In such a quiet sport, when disc golfers have 30 seconds to line up and take their putt, the sound of their ST can feel deafening. Does ST have an impact on performance, specifically in the task of disc golf putting? Does gender play a role in impact of a ST intervention on performance or the perception of the use of ST? When men and women have shown no difference in performance of completing tasks; women used significantly more help seeking language where there was no gender difference in ability and performance (Thompson, 1999). When considering gender, is there a difference in performance of disc golf putting or the use of ST while putting? Does gender influence the impact that a ST intervention has on performance? Is there a difference in how genders perceive the use of ST after an intervention?

ST has been studied with athletes from many different sports and has shown to enhance performance; the sports that have been studied are badminton, basketball, cycling, dart throwing, dressage, golf, running, sit-ups, skiing, soccer, swimming, tennis, vertical jump, volleyball, and water polo (Van Raalte, Vincent, & Brewer, 2016). Disc golf athletes have not yet been studied when considering the impact of ST on performance. Disc golf is a relatively new sport. While the instinct to throw an object at a target and then try again until you succeed has always existed, disc golf as an organized sport was created in the 1960s (“Brief History of Disc Golf”, 2020). This is an important population to study as the results could be used to grow disc golf as a sport. Understanding if gender influences the impact of a ST intervention could result in coaches, athletes and sport psychologists creating ST trainings that are more specific to the athlete and

thus have a larger impact on performance. This study may lead to additional research in sport psychology interventions and techniques in reference to the influence on gender.

In a meta-analysis on the effects of ST conducted in 2011, 47 studies were analyzed, reporting 12% of the studies conducted with male only participants, 6% of the studies were conducted on female only participants, and 24% of the studies used a combination of male and female participants, all other studies did not report on gender (Tod, Hardy, & Oliver). This meta-analysis did not compare gender differences or lack of differences at any point. Another meta-analysis from 2011 reviewed 32 studies and determined that four factors may moderate the effectiveness of ST: the tasks that are used, the participants' characteristics, the specifics of ST, and the characteristics of the intervention (Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis). The characteristics of the participants did not reference gender. The review did however cover age, group involvement (i.e. students), and experience level.

Statement of the Problem

The purpose of this study was to examine the impact of a positive strategic motivational self-talk (MST) intervention on three major areas. These areas included (1) performance of 47-disc golfers performing a putting test before and after a MST intervention, (2) comparing the differences on perception of use of ST for men and women and (3) comparing the differences of the MST intervention between men and women on performance anxiety.

Hypothesis

Hypothesis 1: ST would have a statistically significant impact on performance for both men and women.

Hypothesis 2: The ST intervention would have a greater impact on perceived ST use for women compared to the men in the study.

Hypothesis 3: The women in the study would see a greater impact on competitive anxiety after the ST intervention compared to their male counterparts.

Limitations

A common limitation to ST research is the lack of focus on follow-up of the skills taught. In a case study conducted by Gilbert, Moore-Reed, and Clifton (2017) with a high school women's varsity soccer team that included a follow-up questionnaire to the participants on continued skills used four weeks after the conclusion of the study. This research showed 100% of the athletes were using the sport psychology skills during that four week time period (Gilbert, Moore-Reed, & Clifton, 2017). The study concluded at the end of the high school soccer season; most of the participants reported using the skills in other sports or other areas of their lives (Gilbert et al., 2017). The study listed above was an exception to this limitation and showed favorable results from the follow-up. Few studies have measured the degree to which athletes maintained the sport psychology skills after a follow-up period (Gilbert et al., 2017). This was a limitation with this study as well as there was not follow up with participants.

The length of the ST studies has ranged from a 20-minute intervention prior to performance to a 12-week training program. Research has shown evidence that extended trainings may be important to maximize the effectiveness of ST interventions, specifically for athletes in competitive situations (Hatzigeorgiadis, Galanis, Zourbanos, & Theodorakis, 2014). This was a limitation for this study as the intervention was created for the convenience sample. Lastly, social desirability bias potentially influenced responses on the questionnaires (Conroy & Metzler, 2004). Another major limitation to research conducted on ST is the absence of consideration of cultural background (Peters & Williams, 2006). This study asked participants

for ethnicity and this information was reported but not analyzed based on the hypothesis and measurement tools.

Chapter 2

Review of Literature

Early philosophers Socrates, Plato, and Aristotle, starting in 399 BC, began to explore the impact of one's thoughts and this ultimately led to the study of self-talk (ST) (Moore, 2015). Many studies emphasized the importance of ST as a mental skill that could contribute to an increase in focus and self-confidence, regulate effort, control cognitive and emotional reactions in sport, the workplace, and academic environments; and be used as a tool for those with emotional disorders with a special focus on anxiety (Hatzigeorgiadis, Zourbanos, Mpoumpaki, & Theodorakis, 2009; Latinjak, Hatzigeorgiadis, & Zourbanos, 2017).

ST is largely defined as a statement to oneself that is automatic or deliberate (Hardy, Begley, & Blanchfield, 2015). Other components that are recognized as part of a working definition of ST include verbalizing the statement or the use of internal monologue, consisting of interpretive elements of the content, being motivational or instructional, and being rational or primitive in nature (Blanchfield, Hardy, Majella De Morree, Staiano, & Marcora, 2014; Harding et al., 2015; Van Raalte, Vincent, & Brewer, 2016). The following is an in-depth study of the research that has been conducted on ST. This review covers theories of ST: the dual process theory, the cognitive theory of anxiety, self-determination theory and self-efficacy theory and automatic ST, as well as strategic ST. This section also covers the impact on performance and perception of the use of ST while considering gender, major limitations of ST studies and give suggestions for future research in ST.

Theories of Self-Talk

Dual Process Theory. It is important to understand the theories that have governed research on ST as a starting point. Around 1960 to 2000 the psychology of reasoning was

dominated with theories based around a dual process of thinking (Evans, 2012). This theory arose from traditional studies of deductive reasoning that now form a part of a general set of theories of higher cognition (Evans, 2012). This set of theories has been considered as explanation for human behavior, having been supported by Plato, Descartes, James, Freud, and others (Van Raalte et al., 2016).

In a review of ST that emphasized sport-specific models (2016), the authors concluded that sport psychology researchers have looked at ST through a dual process theory lens, although the specifics differ in form, the approach uses two distinct processing mechanisms that may lead to different outcomes (Van Raalte et al.). This review classified the two processing mechanisms as System 1 which represented intuition (automatic ST) and System 2 that represented reasoning (strategic ST) (Van Raalte et al., 2016). This theory supports the idea that ST allows for self-regulation as a new experience is articulated and redefined in terms of past experiences (Van Raalte et al., 2016)

Cognitive Theory of Anxiety. Just as dual process theory is a collection of supporting ideas, so is the cognitive theory of anxiety. These theories assert that ST lies at the core of anxiety (Conroy & Metzler, 2004). This can manifest through the use of negative ST in a cycle that can be perpetuated whereby the anxiety is a source of threat and a symptom of the emotional response to the perceived threat (Conroy & Metzler, 2004).

One theory used in sport that falls under the umbrella of cognitive theory of anxiety is the multidimensional theory of competitive anxiety. This theory subdivides competitive anxiety into two dimensions: cognitive anxiety and somatic anxiety, with a potential third dimension of self-confidence (de Sousa Fortes, Silva Lira, Ribeiro de Lima, Almeida, & Ferreira, 2016). In a study conducted with a group of 30 young swimmers competing at the state level, the use of an eight-

week mental training found evidence of reduced cognitive and somatic anxiety (de Sousa Fortes et al., 2016). Individuals that experience sport anxiety may be more likely to use negative ST compared to athletes who do not experience sport anxiety (Conroy & Metzler, 2004). The cognitive theory of anxiety explains the connection between anxiety and ST.

Self-determination Theory. The study of ST is the study of how one speaks to oneself. Deciding which words to use and who should establish these cues could determine the success of the intervention. The self-determination theory, established in 1985 by Deci and Ryan, proposes that individuals have three requirements (autonomy, competence, and relatedness) that need to be satisfied by social contexts in order for motivation to occur within that context (Domuschieva-Rogleva, 2015). Research on the self-determination theory within sport and physical education has been focused on self-determined forms of motivation, which has shown evidence of positive motivational outcomes (Domuschieva-Rogleva, 2015).

This theory applies specifically to ST research while considering the component of autonomy (Hatzigeorgiadis et al., 2014). Research suggests that in a naturalistic sport setting allowing athletes the opportunity to develop and use self-determined ST plans will maximize the motivational effects regarding the use of the strategy (Hatzigeorgiadis et al., 2014). In a 10-week self-determined ST study of 41 competitive young swimmers, results showed evidence that support the practice of involving athletes in the process of strategy development as it may further help enhance performance through the motivational gains (Hatzigeorgiadis et al., 2014). These theories, as well as the others covered in this section, show potential use and consideration among a disc golfer population with an emphasis on the future studies of self-determined motivational ST.

Self-efficacy Theory. Self-efficacy is one's belief in their ability to influence events that affect their lives. This is the foundation of motivation and performance accomplishments (Craighead & Nemeroff, 2004). The self-efficacy theory, created by Albert Bandura in the 1970s, is the framework used by many fields to understand and explain success and/or continued participation in a task (Propst & Koelser, 1998). In anxiety provoking situations, perceived self-efficacy influences choice of the activity as well as persistence of coping efforts (Feltz, 1982). This theory states that self-efficacy can be derived from four principal sources: performance accomplishments, vicarious experiences, verbal persuasion, and physiological arousal; with performance accomplishments providing the most dependable source of efficacy (Feltz, 1982).

The self-efficacy theory is a natural match for sport; athletes consistently find themselves in anxiety provoking performance situations where performance accomplishments can easily be measured. Bandura noted that the basic processes of self-efficacy is determined by thoughts, feelings, and behaviors (Cramer, Neal, & Brodsky, 2009). Research has shown that a ST intervention can improve self-efficacy. One study, conducted in 2013, showed a significant improvement in self-efficacy in college students learning a new swimming skill compared to a control group (Ay, Halaweh, & Al-Taieb, 2013).

Automatic Self-Talk

Early research on ST focused on automatic ST, or self-statements that come to mind effortlessly during an activity that are relevant contextual stimuli (Latinjak, Font-Llado, Zourbanos, & Hatzigeorgiadis, 2016; Latinjak, Hatzigeorgiadis, & Zourbanos, 2017). That is, these statements are not a part of an ST plan and come naturally to the athlete during competition and may be emotionally charged (Brewer, Van Raalte, Cornelius, & Copeskey, 2014). Automatic ST is synonymous with spontaneous ST as it is defined as one's natural inner voice with the

intended recipient being oneself that is not planned or directed by an outside source (Van Raalte et al., 2016). To eliminate confusion throughout this study the term automatic ST will be used exclusively.

Classifications of Automatic Self-Talk. Positive ST is one classification of automatic ST. Positive ST has been defined as congratulatory, affirming, and optimistic self-statements (Conroy & Metzler, 2004). This type of ST also includes observed behaviors such as fist pumps (Conroy & Metzler, 2004). The second classification of automatic ST is Negative ST. Negative ST is considered by researchers as observed behaviors such as ball abuse, laughing in irritation, other observable actions such as hitting oneself, general frustration, self-blame and vague negative self-statements (Conroy & Metzler, 2004). Research done on automatic ST typically includes both of these classifications.

An additional classification, goal-directed ST is a type of automatic ST, as the internal dialogue is neither rehearsed nor planned, that consists of statements deliberately used to solve a problem or make progress on a task (Latinjak et al., 2016). This classification of ST is relatively new to the study of sport (2010) and has been described using seven subtypes based on purpose (Latinjak et al., 2014). These subtypes include controlling cognitive reactions, activated states, and deactivated states, creating activated states and deactivating states, regulating cognition and behavior, and focusing on positive predictions (Latinjak et al., 2014). Motivational ST, which will be discussed later in this paper, employs cue words, which could be classified as goal-directed ST creating activated states (Latinjak et al., 2016). While motivational and goal-directed ST differs in many ways, motivational ST cues that are goal focused are synonymous with goal-directed ST.

Automatic ST has been linked to being emotionally charged and has been associated with social side effects such as perception of social support by team members and coaches. One such study on perception of 888 participants in a variety of sports presented evidence of a significant connection between the athletes' perception of support from the coach and the individual's automatic ST (Zourbanos, Hatzigeorgiadis, Goudas, Papaioannou, Chroni, & Theodorakis, 2011). This connection presented positive results for positive ST and negative results for negative ST (Zourbanos et al., 2011). Anxiety has been associated with negative ST and an athletes' perception of a coach's behavior, if perceived as blaming, attacking, or neglecting after a loss, could increase the individual's anxiety associated with failure (Conroy & Metzler, 2004; Pitt, Wolfson, & Moss, 2014).

Negative and positive ST, potentially being emotionally charged, may be difficult for athletes to moderate or control and may cause responses slow to logic or new information, potentially hindering performance (Van Raalte, 2016). Researchers have indicated that fear of failure has displayed evidence to be a statistically significant predictor of ST frequency and valence when losing (Pitt et al., 2014). Although recent evidence shows positive ST has been used as a coping strategy for fear of failure, as fear of failure increased, the frequency of ST decreased (Pitt et al., 2014). Understanding automatic ST and how it is emotionally charged may play a significant role in the use of ST strategies used by disc golfers when performing in high stress environments.

Strategic Self-Talk

The first studies to examine the use of ST cues in sport with the intention of performance enhancement, or strategic ST, began in the late 1980s (Hatzigeorgiadis, Zourbanos, Galanis, & Theodorakis, 2011). Strategic ST is rooted in the self-instructional training that was introduced

by psychotherapeutic approaches in the 1970s (Latinjak et al., 2016). This original work focused on using strategies of ST as an established plan to treat cognitive and emotional disorders (Latinjak et al., 2016). There has been ample evidence collected to support the use of ST in sport to enhance performance, so much so that Hatzigeorgiadis, Zourbanos, Galanis, and Theodorakis (2011) published a meta-analysis on the subject. This study identified an overall effect size of .48, indicating that ST can be meaningful in facilitating learning and enhancing performance (Hatzigeorgiadis et al., 2011).

Classifications of Strategic Self-Talk. Strategic ST refers to a plan used during practice or competition that is created prior to the action by the athlete, coach, or other outside source such as a sport psychologist (Latinjak et al., 2016). This research is based on the idea that focusing on a desired thought leads to the desired behavior (Hatzigeorgiadis et al., 2009). Within the study of sport there are two main categories of strategic ST: motivational and instructional. Motivational ST is intended to assist performance by increasing effort and energy expenditure, and improve mood and confidence therefore motivating the athlete (Edwards, Tod, & McGuigan, 2008). While instructional ST is used to help performance by triggering desired movement by correcting technique, focus and strategy execution and aiding in overall concentration on the task being performed (Edwards et al., 2008; Hardy, Begley, & Blanchfield, 2015). Field studies on positive and negative ST have been ambiguous thus recent research has moved toward the use of motivational and instructional ST interventions (Hanshaw & Sukal, 2016).

There have been many studies conducted that have compared motivational ST and instructional ST to better develop the potential use for each skill-set in hopes to better serve the athlete. One such study compared the two classifications among 40 Gaelic footballers during a shooting accuracy task (Hardy et al., 2015). The results of this study showed evidence that

motivational ST contributed more to focus of attention and helping performers adopt a more appropriate activation state immediately before task initiation compared to instructional ST (Hardy et al., 2015). Instructional ST did have a positive result in shooting accuracy but less than motivational ST (Hardy et al., 2015). This research contradicts previous thoughts of instructional ST causing a stronger reaction to tasks that require technique and focus specifically.

Through this comparison of strategic ST categories research provides evidence that motivational ST is beneficial in improving endurance capacity and higher-order cognitive function in the heat (95 degrees Fahrenheit) (Wallace, Coletta, Vlaar, Cheung, Taber, & Mckinlay, 2017). There is also evidence that shows that motivational ST improved time to exhaustion by 18% in an endurance test with cyclists (Blanchfield et al., 2014). Research has also shown evidence that motivational ST may influence performance and kinematics of explosive movements in experienced participants (Edwards et al., 2008). Other research showed evidence that motivational ST was associated with the reduction of interfering thoughts (Hanshaw & Sukal, 2016).

Evidence has been found that ST strategies (both motivational and instructional) can facilitate sport performance in the complex environment of competition (Hatzigeorgiadis, Galanis, Zourbanos, & Theodorakis, 2014). These studies with positive results using motivational ST in varying environments and skills could suggest additional research among a disc golfers population, as this populace could potentially benefit from increased performance in heat and complex environments (varying environments such as different courses), increased endurance and reduction of interfering thoughts (tournament play is typically longer than league or recreational play), and increased performance during explosive movements (driving).

Measuring Self-Talk

It has been made clear through previous research that recording and classifying the phenomenon of ST has its challenges. Researchers have used current or retrospective questionnaires, structured to unstructured procedures (asking participants to state all thoughts out loud to then be recorded), and used the Automatic Thoughts Questionnaire (ATQ), the Positive Automatic Thoughts Questionnaire (ATQ-P), the Self-Talk Inventory (STI), the Thought Occurrence Questionnaire, and the Automatic Self-Talk Questionnaire for Sports (ASTQS) (Zourbanos, Hatzigeorgiadis, Chroni, Theodorakis, & Papaioannou, 2009). The use of such questionnaires is limiting as the participant usually fills them out following the competition and thus ST is not measured in real time.

Other methods, such as asking participants to state all thoughts out loud may be distracting to participants and may not include all ST taking place. This form of measurement could also prove to be distracting as stating thoughts during task completion may not be common for the participant. Another limitation in measuring ST has been the similarity between motivational, goal-directed and positive ST. Researchers found categorizing ST into such similar areas can be so challenging that in some cases the two categories were merged in the results section (Van Raalte et al., 2016). Similarly, there are limitations in audio or transcripts of ST being acceptable methods of categorizing ST (Van Raalte et al., 2016).

Motivational Self-Talk and Competitive Anxiety

As discussed earlier in this paper, research suggests that automatic ST, specifically negative ST, has been associated with emotions such as anxiety. The initial symptoms of anxiety can distract individuals from performance-relevant cues and potentially induce the feeling of being out of control of the current situation (Conroy & Metzler, 2004). Not only has research

suggested that motivational ST cues have had a larger impact on effort compared to instructional ST, the same research suggests that motivational ST was more effective in reducing anxiety as opposed to instructional ST (Hatzigeorgiadis & Biddle, 2008). Goal-directed cues, which can also be classified as motivational ST cues (Latinjak et al., 2016), have shown evidence that participants will more easily target one's own weakness in anxiety-eliciting situations than others' discriminatory behavior in anger-eliciting situations (Latinjak et al., 2017). A recent study results indicated that more statements were classified as goal-directed in the anxiety-eliciting situations than in the anger-eliciting ones (Latinjak et al., 2017).

A study conducted by Hatzigeorgiadis, Zourbanos, Mpoumpaki, and Theodorakis (2009) of 72 tennis players showed empirical evidence for motivational ST on confidence, a positive effect on task performance and reduced cognitive anxiety. This study links the reduction of cognitive anxiety as a result of increased self-confidence (Hatzigeorgiadis et al., 2009). Other research suggests through empirical data that the use of ST during periods of perceived declining performance also reduced anxiety and increased performance (Miles & Neil, 2013). However, research suggests that the continual reemphasis of technical information (instructional ST) may increase anxiety especially in sports that require stoppages or breaks in performance (i.e., golf or football) (Miles & Neil, 2013).

Self-Talk and Gender

A systematic review conducted by David Tod, James Hardy, and Emily Oliver analyzed 47 studies to examine the relationship between ST and performance. The results showed a beneficial effect of positive, instructional, and motivational ST on performance. This review consisted of a total sample size of 2,113 participants (1,146 male, 715 female, and 252 not specified) and half of the studies used samples that comprised both males and females (Tod,

Hardy, & Oliver, 2011). This study did not, however, examine the difference in performance results between men and women or the perception of effectiveness that a ST intervention has when considering gender. This is common in research for ST in sport.

This lack of research in sport is noteworthy as several studies have been conducted on ST and gender. One such study 71 preschoolers were asked to solve difficult puzzles and their automatic ST was recorded with the categories: knowledge, difficulty of puzzle, progress/ability, and requests for help or information (Thompson, 1999). This study showed no differences in ability in puzzle solving but some differences in ST. Girls used more help seeking talk. The boys in this study showed an increase in help seeking talk as their solving time increased. Boys in general tended to have a higher level of task related talk compared to girls (Thompson, 1999). A similar study was done with 103 preschool children (53 boys and 50 girls) to examine collaborate talk. Girls were nearly exclusive users of collaborative speech. Those who used collaborative speech initiated more verbal turns, used more help-eliciting and self-disclosing speech and did not differ in performance of the task (Thompson & Moore, 2000).

Research on ST and types of speech used while completing a task has shown significant differences between genders. Research conducted in 2019 by Ada, Comoutos, Karamitrou, and Kazak on 648 secondary students examined dispositional flow, motivational climate, and ST, however, found no significant differences between boys and girls for the negative self-talk dimension of somatic fatigue, $t(646) = 1.82, p = .069$, and for the positive self-talk dimensions of psych up, $t(646) = -1.61, p = .107$; anxiety control, $t(646) = -.54, p = .590$.

As stated above, anxiety is a major topic of study when researching ST and performance. One study found that gender had an effect on test anxiety. Males exhibited a higher test anxiety score than their female counterparts (Bettis Britton, 1999). Another study found that women

rated their cognitive anxiety higher than their male counterparts. However, researchers could not verify any significant gender differences in coping style. (Kurimay, Pope-Rhodium, & Kondric, 2017).

There have been several studies reporting on sport performance and gender. One such study analyzed 82 Olympic events considering world records exploring the influence of gender. This study suggests that the gap in sport performance has been stable since 1983 and is clearly in favor of men (Thibault, Guillaume, Berthelot, El Helou, Schaal, Guinnquis, Nassif, Tafflet, Escolano, Hermine, & Toussaint, 2010). Thibault, et al, state that while both men and women are improving in these different events, they are now improving at the same rate indicating that the gap between genders may be fixed (2010). Physiologically men are typically stronger, faster, and taller, have lower body fat percentages, have higher testosterone levels that result in higher muscle mass, greater aerobic capacity, and have greater flexibility in the shoulders and trunk areas. Women, on the other hand, typically have better balance, more flexibility in the lower limbs, and better fatigue resistance in low to moderate intensity loads for aerobic endurance (Altavilla, Di Tore, Reila, & D'Isanto, 2017). These differences play a role in many areas of sport including disc golf putting.

Suggested Future Research

There are a variety of demands in different sports, academics, and the workplace that ST could potentially positively impact. Future research on ST that is matched to the constraints and challenges of a particular sport context could lead to the development of effective sport-specific, task specific ST interventions (Van Raalte et al., 2016). Additional research is needed to determine specific ST interventions that also consider activation and time related categories; this

line of study should also focus on grammatical effects (Van Raalte et al., 2016). Comparing the impact between men and women also still requires further research.

It is important for future research to focus on the effects of self-determined motivational ST specifically in competition (Blanchfield et al., 2014). The unexpected phenomenon of “choking” under pressure is not sufficiently understood (Tenenbaum, Edmonds, & Eccles, 2008). This phenomenon is inherently present in competition and when an athlete feels competent and confident in executing the complex task, these feelings are used to self-regulate the emotional state and prevent choking despite elevated stress appraisal (Tenenbaum et al., 2008). Future research on ST in competition could benefit athletes specifically in this scenario as well as others.

Conclusion

This section is an in-depth study of the research that has been conducted on ST. This review covered automatic ST, strategic ST, and theories of ST: the dual process theory, the cognitive theory of anxiety, self-determination theory and self-efficacy theory. This study also covered the impact on performance and perception of the use of ST while considering gender; major limitations of ST research and gave suggestions for future research on ST. The information presented clarifies the potential for motivational self-selected ST training over an extended period of time to be beneficial to athletic performance, specifically in regard to situation-specific performance anxiety (Tod, Hardy, & Oliver, 2011; Conroy & Metzler, 2004). This type of training could prove helpful to a disc golf population as part of training for competition.

Chapter 3

Methods

This chapter covers participants, procedure of the study, collecting and storing data, data analysis, instruments, and study setting.

Participants

This study consisted of a convenience sample of 47-disc golfers, 31 male and 16 female. Participants were between 18-70 years of age. Disc golfers identified as White or Caucasian (91.5%), Asian or Asian American (4.3%), Black or African American (2.1%), or Hispanic or Latino (2.1%). Participants ranged from 0-1 to over 16 years of playing experience. All participants regardless of experience consider themselves disc golfers. Of the participants 40.4% were members of at least one of the following Facebook groups: Discgolf4women.com, Inland Northwest Flyerz, and Spokane Disc Golf Club and 57.4% follow the Professional Disc Golf Association (PDGA) social media posts or read articles posted on the PDGA website. Informed consent was obtained and ethical approval was granted from the university prior to data-collection.

Procedure

Participants of the recreational disc golf groups on Facebook listed above saw five posts on the group's page introducing the study and recruiting volunteers in this quasi-experimental pretest – posttest design experiment with a MST intervention. The PDGA advertised the study through a social media blast on several platforms (Facebook, Instagram, and Twitter). The PDGA also posted a “Member Spotlight” article about the researcher with information on how to participate in the study. Participants sent an email to improveyourputt@gmail.com to join this study. They were sent an electronic informed consent form. When the participant returned the

completed form by email they were sent instructions and a list of required materials to complete the study. This email included a link to SurveyMonkey where participants, after gathering needed supplies, could start the study. The participants were required to communicate through one email and use that same email on the survey as a way to verify that each participant completed an informed consent form.

Participants were sent a reminder email requesting the completion of the consent form and completion of the survey throughout the data collection period. The required materials that the participant must have in order to partake in the study included: two putters of the same weight, make and mold, a practice disc golf basket or PDGA standard disc golf basket, a mini marker, a measuring tape at least 20 feet long, a device to video record their putting tests, and a device to time their practices putting.

The survey included four videos. Video one was instructions on each step of the study. Video two was instructions on required materials and how to set up the putting test. Video Three was instructions on how to complete the putting test. Video four was the MST intervention. The videos were embedded on Vimeo. The videos were set to private so only the researcher and participants had access to view them.

The videos included in the survey were presented and to be watched in order from one to three. The survey was set so that participants could not to move on to the next part of the survey until the video was played. The putting test required each participant to putt 10 times in a row from 20 feet from the basket and record his or her scores. Individuals were expected to stand with one foot behind a mini marker consistent with PDGA putting rules. Following the instructional video, participants had five minutes to practice putt. Participants were only allowed

to use the two practice putters confirmed at the start of their putting test video throughout this study, even during the practice putting times.

Each participant completed putting test one. Participants were required to submit a video of this test. The researcher reviewed the video to ensure that participants completed the putting test as described in the instructional video. The researcher recorded each person's email address and putting test scores. Directly following the putting tests, the participant completed the first set of survey questions. When the questions were complete, the participant remained in the same survey and watched video four. Participants recorded their putting test score in the first set of survey questions. They showed their putters at the beginning of their video to confirm that they were the same make and mold.

Video four consisted of a 10-minute MST intervention created by the researcher. After the intervention, participants had five minutes of practice putting time. Following this practice time, they completed the putting test for the second time. This test was also video recorded by the participant. Participants completed the second putting test and completed the same survey questions. They recorded their scores from the second putting test to conclude the survey. The researcher recorded the scores of participants for the second putting test. When the survey was submitted the participants responded to the instructional email with two attachments that were their putting test one and two videos for review. Many participants found the video size to be too large to send and granted the researcher permission to view the video through Google Drive or YouTube.

Collecting and Storing Data

After the completion of the experiment, the researcher stored all test videos on a USB that was placed in a South Main Hardware Lockable Steel Security Filing Box. Survey results

were stored on a separate USB and placed in the same locked security-filing box along with the logins and passwords for SurveyMonkey, Vimeo, and the Gmail account created for this study with the key stored separately. The box was stored in the researcher's locked office inside Sutton Hall on the Eastern Washington University campus. The office is located in the Financial Aid and Scholarship Department that is closed to the public.

Data Analysis

This study is a quasi-experimental pretest – posttest design, as the same dependent variable was measured before and after the intervention. A paired samples t-test was used to compare pre and post putting test scores. A paired samples t-test was also be used to compare pre and post scores created by the first and second survey. A one-way ANOVA was used to compare genders for putting test 1. A one-way ANOVA was used to compare gender and each measurement tool subscale. This test was conducted to determine if there was a difference between genders in each area. Putting test one and survey one questions were used to conclude if any difference existed in these areas prior to the intervention. A Shapiro Wilk's Test was used to measure normal distribution and used an alpha value of 0.05. Cronhach's alpha was used when analyzing data from the survey as both measurement tools utilized a Likert scale. A Levene's Test was used to test homogeneity of variance, as the sample sizes were unequal when using one-way ANOVAs.

Instruments

MST Intervention. The intervention was a recorded PowerPoint with a voiceover. The intervention informed participants on strategic self-talk, the benefits of motivational self-talk on performance and how to create a plan to use self-talk. The intervention also used rational

emotive behavioral therapy (REBT) techniques to identify irrational beliefs and substitute them for rational beliefs (Turner & Barker, 2013).

Survey. The survey used for this study consisted of two validated instruments. The Functions of Self-Talk Questionnaire (FSTQ) measured perception of Self-Talk use (see Appendix A). This questionnaire enhances understanding regarding the use and effectiveness of ST (Theodorakis, Hatzigeorgiadis, & Chroni, 2008). The FSTQ uses a 7-point Likert scale consisting of 24 questions.

Competitive State Anxiety Inventory-2 (CSAI-2) evaluated participants self-reported cognitive anxiety, somatic anxiety, and self-confidence to sport performance (Fernandes, Nunes, Raposo, Fernandes, & Brustad, 2013; Hatzigeorgiadis, Zourbanos, Mpoumpaki, & Theodorakis, 2009). This instrument consists of 26 items on a 7-point Likert scale (see Appendix C). The reliability coefficient scores between 0.79 and 0.90, which suggests the inventory has a high degree of internal consistency (Loupos, Tsalis, Barkoukis, Semoglou, & Mougios, 2004).

Performance. The number of putts made during putting test one and putting test two was used to measure performance. Participants recorded their performance on the putting tests on the survey. They also submitted videos confirming their performance. Researchers watched the videos to corroborate the scores reported on the survey for each participant for both putting tests. Researchers updated putting tests results that did not match the survey submission for the participant. In the case of survey responses for the putting tests not matching, the researcher watched the putting test video three times to confirm the score. Three surveys were updated in this process. The survey included the participant's email address and the same email address was used to submit the videos.

Study Setting

This study was held at the location of the participant's choosing. The study required a disc golf basket. Many recreational and competitive disc golfers have a practice basket at their home or have access to a standard basket at a local course. Many participants completed the study at home (basement, yard, garage, or barn), at a local course, or in the workplace (high school gym or warehouse with a disc golf basket). The Facebook groups where this study was advertised were created for players in the Inland Northwest and also target recreational and competitive disc golfers in the United States but do not limit global participants. The PDGA targets a national disc golf crowd and also reaches a global audience. The study materials were only offered in English to participants.

Chapter 4

Results

This chapter will provide a summary of the findings for the Shapiro Wilk's test, Levene's Test, and Cronbach's alpha. The one-way ANOVA findings will be reviewed. The outcome of the paired samples *t*-tests will also be summarized. Male and female data was tested separately per the results of the one-way ANOVA conducted on putting test one considering gender. This test showed a statistically significant difference in performance based on gender. These results led to a review of all survey measurements bearing in mind gender difference. All tests were also completed on the full sample size.

Shapiro Wilk's Test

A Shapiro Wilk's test was performed on the total sample to determine non-normality. Results revealed no evidence of non-normality ($p = .051$) using the $\alpha < .05$.

Cronbach's Alpha Test

Cronbach's alpha was used to investigate the internal consistency or reliability of the FSTQ and the CSAI-2. Cronbach's alpha scores of $>.70$ are generally deemed to represent an adequate level of internal consistency (Cronbach, 1970). All subscales for the CSAI-2 met this standard (see Table 8). Two of the five FSTQ subscales met this standard (see Table 9). Automaticity ($\alpha = .658$), Attention ($\alpha = .589$), and Confidence ($\alpha = .695$) did not meet the standard. Nunnally and Bernstein determined that a small subscale of five or less might alter the results of this test (Nunnally, Bernstein, 1994). The FSTQ uses subscales of five or less, thus researchers will assume internal consistency for the FSTQ as the results are near the common value of $.70$ as affected by the subscale size.

Gender Differences

A one-way ANOVA was used to assess if gender differences were present on putting performance. Males in this study had significantly higher scores on putting test one ($M = 7.16$, $SD = 1.635$) than females ($M = 5.25$, $SD = 2.176$), $F(45) = 11.474$, $p = .001$.

A similar one-way ANOVA assessing gender differences was completed on FSTQ and CSAI-2 subscales. Results revealed a non-significant effect on gender on the FSTQ (Effort $p = .861$, Automaticity $p = .789$, Cognitive Emotional Control $p = .508$, Attention $p = .721$, and Confidence $p = .863$), using an alpha of $< .05$. The CSAI-2 rendered similar results exposing a non-significant effect on gender in each subscale (Somatic Anxiety $p = .240$, Cognitive Anxiety $p = .542$, and Self Confidence $p = .973$), also using an alpha of $< .05$.

The gender results for the one-way ANOVAs on the CSAI-2 and the FSTQ were non-significant. Thus, the total sample was retained for subsequent analyses to assess the influence of the intervention on putting test performance, FSTQ, and CSAI-2 scores. However, to more specifically evaluate the gender related hypotheses in this study we also ran pre and post-tests on the effects of the intervention putting test performance, FSTQ and CSAI-2 scores by gender.

Putting Test *t*-test Results

A putting test with a potential score of 0-10 was completed before and after the MST intervention. The score represents the number of completed baskets made. A paired samples *t*-test was completed on the total sample. Disc golfers displayed a nearly significant increase in putting test results between putting test one ($M = 6.46$, $SD = 2.051$) and putting test two ($M = 6.85$, $SD = 1.851$), $t(40) = -1.816$, $p = .077$. A paired samples *t*-test was performed to compare putting test scores for male participants before and after the MST intervention. Male disc golfers did not show a significant difference in putting test scores between putting test one ($M = 7.17$,

SD= 1.605) and putting test two ($M = 7.38$, $SD = 1.46$), $t(28) = -.812$, $p = .424$. A paired samples t -test was also performed to compare putting test scores for female participants before and after the MST intervention. Female disc golfers, however, showed a nearly significant increase in putting test scores between putting test one ($M = 4.75$, $SD = 2.050$) and putting test two ($M = 5.58$, $SD = 2.065$), $t(11) = -2.159$, $p = .054$.

Total Sample Results for the CSAI-2 t -tests. A paired samples t -test was completed on the three subscales of the CSAI-2 for the total sample in this study. Disc golfers exhibited a significant decrease in somatic anxiety scores between survey one ($M = 2.544$, $SD = .605$) and survey two ($M = 2.370$, $SD = .682$), $t(38) = 2.143$, $p = .039$. Disc golfers also showed a significant decrease in cognitive anxiety scores between survey one ($M = 1.894$, $SD = .448$) and survey two ($M = 1.795$, $SD = .422$), $t(38) = 2.196$, $p = .034$. There was no significant difference in self confidence scores for disc golfers between survey one ($M = 2.214$, $SD = .676$) and survey two ($M = 2.121$, $SD = .700$), $t(38) = 1.394$, $p = .171$.

Male Results for the CSAI-2 t -tests. Male disc golfers displayed no significant difference in all three subscales of the CSAI-2.

Female Results for the CSAI-2 t -tests. Female disc golfers exhibited a significant decrease in somatic anxiety scores between survey one ($M = 2.731$, $SD = .669$) and survey two ($M = 2.444$, $SD = .848$), $t(11) = 2.270$, $p = .044$. There was a significant decrease in cognitive anxiety for female disc golfers between survey one ($M = 1.879$, $SD = .486$) and survey two ($M = 1.740$, $SD = .422$), $t(11) = 2.264$, $p = .045$. Female disc golfers did not, however, show a significant difference in self-confidence scores between survey one ($M = 2.281$, $SD = .826$) and survey two ($M = 2.187$), $t(11) = .649$, $p = .530$.

Total Sample Results for the FSTQ *t*-tests. A paired sample *t*-test was performed on each of the subscales of the FSTQ comparing scores before and after the MST intervention for the total sample in this study. There were two subscales that presented a significant increase in scores: cognitive and emotional control and confidence. All other subscales showed no significant difference. Disc golfers exhibited a significant increase in cognitive and emotional control scores between survey one ($M = 4.6900$, $SD = 1.181$) and survey two ($M = 5.050$, $SD = 1.113$), $t(39) = -2.513$, $p = .016$. Participants also displayed a significant increase in confidence scores between survey one ($M = 4.475$, $SD = 1.089$) and survey two ($M = 4.860$, $SD = 1.163$), $t(39) = -2.235$, $p = .031$.

Male and Female Results for the FSTQ *t*-tests. A paired sample *t*-test was performed on each of the subscales of the FSTQ comparing scores before and after the MST intervention for the male and female data set separately. Male disc golfers showed no significant difference in scores in all five subscales. Female disc golfers also presented no significant difference in scores in all five subscales.

Chapter 5

Discussion

This study investigated the impact of a positive strategic MST intervention on three major areas. These areas include (1) the performance of 47-disc golfers completing a putting test before and after a MST intervention, (2) comparing the differences of perception of ST use before and after the MST intervention between male and female participants and (3) comparing the differences of impact of the MST intervention between males and females on performance anxiety. This chapter will cover the three hypotheses of this study, implications for practice, limitations of the study, recommendations for future research and conclusions.

Hypotheses

Hypothesis 1: ST would have a statistically significant impact on performance for both males and females. Performance was measured by completed putts during putting test one and test two that were completed pre and post MST intervention. A one-way ANOVA compared the means of the male and female scores of putting test one to see if there was a significant difference in performance by gender prior to the intervention. The male disc golfers in this study had significantly higher putting test scores compared to their female counter parts with a mean difference of 1.91. This is congruent with the sport performance studies conducted by Altavilla and others comparing genders (Atavilla, et al., 2017). This difference, along with the hypotheses, encouraged researchers to review all data by gender.

While the one-way ANOVA results on performance were consistent with previous research on gender, the results of the paired samples *t*-tests were not as definitive as earlier studies completed on self-talk. There was not a significant increase in putting scores between putting test one and putting test two for both male and female participants. The female p value

for the paired samples *t*-test comparing female pre and post putting test scores was practically significant ($p = .054$) and exhibited a near significant increase in putting scores after the intervention. This near significance is similar to the results of Glanis, Hatzigeorgiadis, Comoutos, Charachousi, and Sanchez, who studied 2 female college basketball teams where the ST group ($M = 64.64$, $SE = 4.59$) performed better than the control group ($M = 49.15$, $SE = 4.22$) while completing free throws (2018). More closely related, Johnson, Hrycailo, Johanson, and Halas completed a study with female youth soccer players measuring performance of a ball handling skill drill, pre and post intervention, and showed significant increase in performance after the ST intervention with two-thirds of the participants improving their scores (2004).

These two examples, along with other previous research, indicate female athletes have experienced a significant increase in performance following a MST intervention although previous research did not compare genders and male participants have also experienced an increase in performance following a ST intervention. Thus, the near significant improvement in putting scores for females is notable. Male results were not consistent with previous outcomes including the study conducted by Edwards, Todd, and McGuigan on 24 male rugby union players. This study found that MST resulted in significantly greater hip displacement ($p = .001$) and hip velocity ($p = .002$) compared to instructional ST and no intervention (Edwards, Todd, & McGuigan, 2008). Studies with male only participants as well as those with both male and female participants have concluded that MST improves performance in sport (Hatzigeorgiadis, et al., 2011). This could be a reflection of male disc golfers, the sample, or the quality of the intervention including its brevity.

The total sample *t*-test comparing pre and post MST intervention performance results also indicated a near significant increase in putting scores following the MST intervention ($p = .077$).

This is in agreement with previous ST research completed in sport displaying an improvement in performance following a MST intervention as stated above. A study worth noting was conducted with 55 athletes who suffered a meniscal tear and had recovered six months post surgery also showed a significant increase in performance on a balance test post MST intervention (Beneka, Malliou, Gioftsidou, Koftolis, Kokka, Mayromoustakos, & Godolias, 2013). This study included both genders and is consistent with previous research. The major differences in the aforementioned study and this study are population (athletes from a variety of sports recovering from surgery and disc golfers), and the sample. The sample size was similar (55 participants compared to 47 in the current study but Beneka, et al. had a higher percentage of female participants. The MST intervention was also not self-assigned as in our current study. This is not consistent with Self-Efficacy Theory research (Bandura, 1977; Craighead & Nemeroff, 2004). We cannot confirm our first hypothesis but researchers note the near significance of the increase in putting scores for female participants and the total sample following the intervention.

Hypothesis 2: The ST intervention would have a greater impact on perceived ST use for women compared to the men in the study. The FSTQ was used pre and post intervention directly after completing both putting test one and putting test two. This questionnaire was used to measure participant perception of ST use using five subscales. The paired samples *t*-tests completed on male and female data separately showed no significant change in FSTQ scores pre and post intervention. One-way ANOVA's were run comparing male and female data pre and post intervention to see if there was a difference in FSTQ scores. There was not a significant difference FSTQ scores in all five subscales. Thus, researchers can conclude that there is no significant difference between genders in the perception of use of ST for this sample pre or post intervention.

The paired samples *t*-test for the total sample, however, showed a significant difference in two of the five subscales: cognitive and emotional control and confidence. Cognitive and emotional control saw an increase in scores with a *p* value of .016. Researchers can conclude that the intervention significantly increased the perception of cognitive and emotional control through the use of ST. Confidence also showed a significant increase in scores post intervention with a *p* value of .031. It can be inferred that the intervention increased the perception of participant's confidence while completing the putting test. No research has found this specific combination of increases post intervention for these specific subscales. Zetou, Vernadakis, Bebtos, and Liadakis completed a study in 2014 that found an increase in all five subscales following a ST intervention with novice Tae-Kwon-Do athletes (Zetou, Vernadakis, Bebtos, & Liadakis, 2014). Research by Hatzigeorgiadis, Zourbanos, Theodorkis, the top leaders in the perception of ST use, in 2007, found that a group of 21 female swimmers being tested on a precision water polo task also found all five subscales significantly increased after a ST intervention, however, automaticity being increased the least (Hatzigeorgiadis, Zourbanos, Theodorkis, 2017). This study saw the subscale effort increase the least, *p* = .536 and automaticity was second, *p* = .386. This shows a near consistency with previous research.

Researchers expected to see an increase in all subscales post intervention for the total sample based off of previous research, such as the studies cited here. Researchers were exploring the potential difference in scores based on gender. We cannot confirm our second hypothesis, as the intervention did not have a greater impact on female's perception of the use of ST compared to males in the study, there was no significant difference in genders, and both genders separately did not experience a significant impact. However, it is worth noting that the intervention did positively impact the total sample of participants by increasing ST use scores in two of the five

subscales (cognitive and emotional control and confidence). This is evidence that the ST intervention did have a positive impact on the total sample in perception of cognitive and emotional control and confidence as consistent with previous research.

Hypothesis 3: The women in the study would see a greater impact on competitive anxiety after the ST intervention compared to their male counterparts. The CSAI-2 was used to measure competitive anxiety. Paired samples *t*-tests were completed on pre and post intervention CSAI-2 scores for both genders separately on each subscale. There was no significant difference in CSAI-2 scores for male participants following the MST intervention in all three subscales. Female participants did demonstrate a significant decrease in scores in two of the three subscales (somatic anxiety $p = .044$ and cognitive anxiety $p = .045$). It can be concluded that the MST intervention decreased female disc golfers somatic and cognitive anxiety scores. One-way ANOVA's were run comparing male and female data pre and post intervention to see if there was a difference in CSAI-2 scores. There was not a significant difference the CSAI-2 scores in all three subscales. Thus, researchers can conclude that there is no significant difference between genders in competitive anxiety for this sample; however, female disc golfers experienced a significant decrease in somatic and cognitive anxiety scores where their male counterparts did not.

Paired samples *t*-tests were also used to compare the total sample CSAI-2 scores pre and post intervention. The total sample results indicated that there was also a significant decrease in somatic anxiety ($p = .039$) and cognitive anxiety scores ($p = .034$). There was no significant change in confidence scores for the total sample. These findings were similar to the research conducted by Hatzigeorgiadis, Zourbanos, Mpoumaki, and Theodorakis on 72 co-ed youth

competitive tennis players which found an increase in confidence and reduction of cognitive anxiety following a ST intervention (Hatzigeorgiadis, et al., 2009).

Thus, it can be concluded that researchers can only partially accept this hypothesis based on the decrease female disc golfers exhibited with somatic and cognitive anxiety. It is worth noting that the results for the FSTQ showed an increase in confidence scores where the CSAI-2's measurement of confidence showed no change. This population showed an increase in perception of confidence in performance through the FSTQ, while the CSAI-2 was measuring anxiety levels around confidence. An example of the FSTQ questions on confidence is, "I feel more confident about my abilities", where an example of the CSAI-2 questions on confidence is, "I am concerned that I may not do as well in this competition as I could". This population showed an increase in the FSTQ confidence measurements but did not see a change in CSAI-2 questions referencing anxiety around confidence. Please see the Limitations of this Study section of this chapter for researchers' thoughts on anxiety levels during a global pandemic.

Implications for Practice

This study examined MST on performance, perception of ST use, and performance anxiety while considering gender. This research and future research could be used to create more specific MST trainings for disc golf athletes as well as athletes competing in other sports. ST may not vary in use based on gender for disc golfers. Athletes and coaches are encouraged to use this information when training athletes of both genders. Disc golfers may find MST training to be useful when perception of low confidence is a hindrance on performance. Including MST training to improve cognitive and emotional control may also be affective with this population, specifically female disc golfers. It may be effective to use MST training for female disc golfers to address performance anxiety and may be less important to include this type of training for

their male counterparts. Coaches and sport psychologist working with disc golfers should consider using a MST intervention to increase performance and decrease anxiety when putting.

Limitations of the Study

The present study, like all studies, had several limitations that will be acknowledged in this section. The first is the number of participants, specifically female participants. Researchers received 242 emails of interest, and 126 completed consent forms from those emails. This ultimately resulted in 47 participants in the study, 16 of which answered female on the survey. To calculate a robust Cronbach's alpha, 30 participants is the recommended minimum (Vaske, Beaman, & Sponarski, 2017), which was not met with the small sample size of 16 females. Per research conducted in 2013 by J.C.F. de Winter, the sizes used for the paired samples *t*-tests did not meet the qualifications of an extremely small sample size ($N < 5$). Even in extreme samples sizes using *t*-tests; researchers found no fundamental objection to using these tests (Vaske, et al., 20017). A larger sample sized suggests that confidence intervals are narrower and that conclusions on the population are more reliable (de Winter, 2013). Thus, the small sample size is a limitation in this study.

Data collection was open from October 16, 2021 to January 31, 2022. Collecting data during a global pandemic may have influenced anxiety scores. The pandemic may have impacted anxiety levels by increasing overall anxiety or by minimizing performance anxiety as a putting test, even with the added pressure of being filmed, may seem less significant compared to other life and/or world events. Participants were not tested or asked about COVID-19 as each participant completed the survey virtually and was able to select the location of the putting tests, many choosing the safety of their own homes. If a participant was ill or recovering from COVID-19 this could have impacted performance and answers on the survey. The global

pandemic could have influenced participation in the study as well. Researchers were not approved for in person data collection, which put more work on the participant, which could have been a deterrent. Lastly, conducting research during a pandemic could have impacted participation as the study could have seemed like too much work in addition to the additional stress and measures taken at this time to complete even easy tasks such as grocery shopping. For those that lost their job during the pandemic, participating in a study may have felt like searching for employment, finding access to community resources and spending time with loved ones as more important and could have prevented participation.

Participants were able to complete the survey at a time of their choosing and were not monitored based on how soon after the intervention they completed the putting test or how long after the putting test they completed the survey. This is a limitation as participants could have had an issue with compliance. Lastly, the measurement tools used in this study were self-reporting surveys. The disc golfers could have answered the questionnaires with a bias created by social-desirability.

Recommendations of Future Research

Future research should include in person data collection where the researcher sets up the putting test space, times the warm-up portion of the study, and gives in person instruction on how to complete the putting test to insure participant compliance. Additionally, future research should use a larger sample size and similar studies should be conducted with a variety of sports, not just disc golf. A similar intervention should be studied in a competitive environment as well. Future research should expand gender-based research to other sport psychology interventions to see if the findings vary by gender.

Lastly, the averages for the female disc golfers putting scores were lower compared to the male group. The mode for both male and female groups was 2-5 years of experience (5 females and 16 males). This does not however reference competitive or skill level like the PDGA rating would provide. This rating was not asked for during the survey, as researchers did not want to limit participation to PDGA members only as membership has an annual cost. Tournament divisions were also not used as competitors are allowed to select any division, other than those that are age protected, regardless of skill. Tournament play also has a cost and would have limited participation. Future research should look to compare athletes of the same skill levels in the same type of study.

Conclusion

The objective of this study was to examine the impact of a positive strategic MST intervention on the performance of disc golfers completing a putting test before and after a MST intervention, comparing performance, the differences of perception of use of ST between men and women as well as competitive anxiety. Although researchers could not confirm the hypotheses, the results from this study suggest that a MST intervention will have a positive practical influence on male and female disc golf putting. A MST intervention will increase perception of cognitive and emotional control for disc golfers in reference to putting and will increase the perception of confidence in this population. Disc golfers could expect a decrease in somatic and cognitive anxiety following a MST intervention in reference to putting. Female disc golfers with competitive anxiety should consider a MST practice to help reduce anxiety around putting more so than their male counterparts. More research needs to be conducted that includes larger samples sizes, not conducted during a global pandemic, and with a variety of sports.

Future research will make gender-based ST training approaches more specific for athletes, coaches, and sport psychologists.

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Table 1

Characteristics of Sample: Gender

Variable	n	%
Gender		
Male	31	66
Female	16	34

Table 2

Characteristics of Sample: Age

Variable	n	%
Age		
18-29	9	20.94
30-39	10	23.25
40-49	10	23.25
50-59	8	18.60
61-69	5	11.63
70	1	2.33

Table 3

Characteristics of Sample: Ethnicity

Variable	n	%
Ethnicity		
White or Caucasian	43	91.5
Black or African American	1	2.1
Hispanic or Latino	1	2.1
Asian or Asian American	2	4.3
American Indian or Alaska Native		
Native Hawaiian or other Pacifica Islander		
Other		

Table 4

Characteristics of Sample: Years of Experience

Variable	n	%
Experience		
0-1	7	14.9
2-5	21	44.7
6-10	8	17
11-15	5	10.6
16+	6	12.8

Table 5

ANOVA Results comparing Male and Female Putting Test 1

	Mean	SD	df	F	Sig.
Males	7.16	1.635	45	11.474	.001*
Females	5.25	2.176			

Note. *p < .05

Table 6

t-test Results Comparing Putting Test 1 and Putting Test 2 Total Sample

	M	SD	<i>t</i> -Value	df	p-Value
Putting Test 1	6.46	2.051	-1.816	40	.077
Putting Test 2	6.85	1.851			

Table 7

t-test Results Comparing Putting Test 1 and Putting Test 2 by Gender

Male	M	SD	<i>t</i> -Value	df	p-Value
Putting Test 1	7.17	1.605	-.812	28	.424
Putting Test 2	7.38	1.498			
Female	M	SD	<i>t</i> -Value	df	p-Value
Putting Test 1	4.75	2.050	-2.159	11	.054
Putting Test 2	5.58	2.065			

Table 8

t-test Results Comparing Competitive State Anxiety Inventory-2 Pre and Post Total Sample

	M	SD	α	<i>t</i> -Value	df	p-Value
Somatic Anxiety						
Test 1	2.544	.605	.818	2.143	38	.039*
Test 2	2.370	.682				
Cognitive Anxiety						
Test 1	1.894	.448	.881	2.196	38	.034*
Test 2	1.795	.422				
Self Confidence						
Test 1	2.214	.676	.889	1.394	38	.171
Test 2	2.121	.700				

Note. *p < .05

Table 9

t-test Results Comparing Functions of Self-Talk Questionnaire Pre and Post Total Sample

	M	SD	α	<i>t</i> -Value	df	p-Value
Effort						
Test 1	5.250	.949	.804	.625	39	.536
Test 2	5.162	1.219				
Automaticity						
Test 1	3.815	1.051	.658	-.876	39	.386
Test 2	3.970	1.164				
Cognitive and Emotional Control						
Test 1	4.690	1.181	.816	-2.513	39	.016*
Test 2	5.050	1.113				
Attention						
Test 1	5.505	.730	.589	-1.345	39	.186
Test 2	5.695	.915				
Confidence						
Test 1	4.475	1.089	.695	-2.235	39	.031*
Test 2	4.860	1.163				

Note. *p < .05

Appendix A

Functions of Self-Talk Questionnaire

(FSTQ; Theodorakis, et al., 2008)

Directions: Please read the following statements referring to how you talk to yourself when you play disc golf. Rate how often you personally agree or disagree with the statements. Use the scale below.

Likert Scale:

1= Not at all 2= Rarely 3= Sometimes but infrequently 4= Neutral 5= Sometimes
6= Usually 7=Very much

Effort

I try harder
I make my efforts more intense
I increase effort
I maintain effort to high levels

Automaticity

I execute as if on an automatic pilot
The execution is spontaneous
I execute automatically
The execution comes automatic
I execute impulsively

Cognitive and Emotional Control

I reduce my nervousness
I let go of my anxiety
I feel more relaxed
I interrupt negative thoughts
I stay calm

Attention

I concentrate better on the execution
I concentrate on what I have to do
I direct my attention efficiently
I stay focused
I concentrate on what I'm doing at the moment

Confidence

I boost my confidence

I feel more certain for myself

I feel stronger

I psych-up myself

I feel more confident in my abilities

Appendix B

Competitive State Anxiety Inventory-2

Directions: A number of statements that athletes have used to describe their feelings before competition are given below. The questionnaire is divided into two sections. In section 1 please read each statement and then circle the appropriate number to the right of the statement to indicate how you feel right now. There are no right or wrong answers. Do not spend too much time on any one statement, but choose the answer that describes your feelings right now I am concerned about this competition.

Likert Scale:

1= Not at all 2= Somewhat 3=Moderately so 4= Very much so

1. I feel nervous.
2. I feel at ease.
3. I have self-doubts.
4. I feel jittery.
5. I feel comfortable.
6. I am concerned that I may not do as well in this competition as I could.
7. My body feels tense.
8. I feel self-confident.
9. I am concerned about losing.
10. I feel tense in my stomach.
11. I feel secure.
12. I am concerned about choking under pressure.
13. My body feels relaxed.

14. I am confident I can meet the challenge.
15. I am concerned about performing poorly.
16. My heart is racing.
17. I'm confident about performing well.
18. I'm concerned about reaching my goal.
19. I feel my stomach sinking.
20. I feel mentally relaxed.
21. I am concerned that others will be disappointed with my performance.
22. My hands are clammy.
23. I'm confident because I mentally picture myself reaching my goal.
24. I'm concerned I won't be able to concentrate.
25. My body feels tight.
26. I'm confident of coming through under pressure.

Somatic Anxiety: 5,8,11,17,20,23,26,2,14

Cognitive Anxiety: 7,10,13,16,22,1,4,19,25

Self-Confidence: 9,15,18,24,3,6,12,21

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