Spring 2019

The Mediation of Affect on Imagery Use and Self-Efficacy in Collegiate Athletes

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THE MEDIATION OF AFFECT ON IMAGERY USE AND SELF-EFFICACY IN COLLEGIATE ATHLETES

by

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(Under the Direction of Brandonn Harris)

ABSTRACT

In the sports domain, research has become an essential part of how we understand the psychological factors that play a key role in maximizing performance. Previous research has suggested that an individual's performance can be highly influenced by the psychological variable of self-efficacy (e.g., Bandura, 1997; Calmels & Fournier, 2001). Self-efficacy has been used to describe individuals' perceived capability of achieving a certain level of performance in the domain of sport (Feltz, 1998). Previous research has also demonstrated that the tendency of athletes to interpret their imagery as either facilitative or debilitative affects specific constructs known to enhance or impede sport performance (Nordin & Cumming, 2005; Quinton et al., 2016; Short et al., 2002). As a result, this study aimed to evaluate imagery more broadly by including different types of involuntary imagery (i.e. spontaneous, intrusive). Affective states of individuals when performing an activity is one of the most important variables for determining general self-efficacy (Bandura, 1994). The relationship between self-efficacy and MG-M imagery has also been closely examined, which suggests that the use of MG-M imagery is beneficial for increasing athletes' self-efficacy levels (Martin et al., 1999; Moritz at al., 1996). The purpose of the present study was to examine the predictive relationship between imagery use (i.e., MG-M, spontaneous, and intrusive) and self-efficacy with affect as the mediator in collegiate athletes. It was hypothesized that affect would significantly mediate the

relationship between imagery use and self-efficacy in collegiate athletes. Results found that positive affect significantly mediates the relationship between MG-M imagery and self-efficacy. The present findings suggest that positive affect is an essential construct for how MG-M imagery use effects self-efficacy levels in collegiate athletes. The implementation of MG-M imagery-based interventions may be used as a way to effectively increase an athlete's self-efficacy perceptions.

INDEX WORDS: MG-M, Involuntary, Spontaneous, Intrusive, Sport, Performance

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by

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Bachelor of Science, Florida State University, 2017

A Thesis Proposal Submitted to the Graduate Faculty of Georgia Southern University in Partial Fulfillment of the Requirements for the Degree

MASTER OF SCIENCE

STATESBORO, GEORGIA

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Electronic Version Approved:
May 2019

DEDICATION

I dedicate this thesis to my family, friends, and mentors that supported me throughout this whole process. Specifically, I would like to thank everyone in the sport and exercise psychology program for their unconditional love and support. This journey would not have been the same without each and every one of you.

ACKNOWLEDGMENTS

I would like to acknowledge my mentor Dr. Brandonn Harris for believing in me every step of the way. I would also like to acknowledge Dr. Ron Snarr and Dr. Jody Langdon, for their constant guidance and support throughout my two years at Georgia Southern. A special thank you to Meredith Wekesser and Alesondra Colbert for being an incredible support system throughout this entire journey. Lastly, I would like to thank the athletic directors, coaches, and student-athletes that helped with my data collection.

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CHAPTER 1

INTRODUCTION

In the sports domain, research has become an essential part of how we understand the psychological factors that play a key role in maximizing performance (Lirgg & Feltz, 1989; Mamassis & Doganis, 2004; Vealey & Chase, 2008; Woodman & Hardy, 2003). Previous research has suggested that an individual's performance can be highly influenced by the psychological variable of self-efficacy (e.g., Bandura, 1997; Calmels & Fournier, 2001; Mckenzie & Howe, 1997; Short et al., 2002). Self-efficacy has been used to describe individuals' perceived capability of achieving a certain level of performance in the domain of sport (Feltz, 1998). Therefore, it is important to further investigate the variable of self-efficacy to better understand how to maximize student-athlete's performance.

According to Bandura (1997), self-efficacy is defined as "one's belief in his or her capabilities to establish and execute the courses of action required to produce given attainments". The self-efficacy theory bases its origins on the seminal work of Bandura (1986), which helps provide a better understanding of the factors that influence self-efficacy. According to this theory, several factors (i.e., verbal persuasion, vicarious experiences, previous accomplishments, and physiological and emotional states) affect self-efficacy, which then affect behavior (Bandura, 1997). Beyond this, Bandura (1997) proposed that voluntary imagery can be used to enhance an individual's self-efficacy.

Imagery refers to the cognitive process by which an individual can stimulate perceptual information in his or her mind while using various senses (Munzert, Lorey, & Zentgraf, 2009). Previous research has shown imagery to regulate arousal levels, manage

stress, increase self-confidence, and enhance sport performance and motivation (Martin, Moritz, & Hall, 1999). It is generally accepted that imagery use can have a positive effect on one's motor performance (e.g., Hall, 2001), as seen in sport. For example, imagery can be used to rehearse a specific skill or situation in one's mind (White & Hardy, 1998), which in turn helps athletes prepare for competition. Similarly, imagery has also been found to moderate performance by influencing athlete's self-efficacy perceptions (e.g. Calmels & Fournier, 2001; McKenzie & Howe, 1997; Short et al., 2002). Bandura (1997) proposed that having individuals image themselves executing activities skillfully raises their perceived efficacy on their ability to enhance their performance, which in turn improves their performance. However, the aforementioned research only considers voluntary forms of imagery without examining the effects that involuntary imagery can have on athletes' performance. Therefore, it was important to consider the variable of intention as involuntary imagery may also influence athletes' self-efficacy perceptions.

Imagery research in the domain of sport has stemmed from Paivio's (1985) analytical framework, which was later elaborated upon by Hall, Mack, Paivio, and Hausenblas (1998). Paivio's framework suggested that imagery can be used to influence motor behavior through cognitive and motivational functions. This framework identifies five imagery types that require athletes to visualize different images that would potentially serve different purposes (Martin, Moritz, & Hall, 1999). Previous research has supported motivational types of imagery to be more widely used and beneficial prior to competition than cognitive types of imagery (Martin et al., 1999). Motivational general-mastery (MG-M) imagery is the most widely used function of imagery to enhance self-efficacy and consists of feeling confident and mentally tough even in challenging

situations (Hall, 1998), as well as effective coping and mastery of challenging situations (Martin, 1999). Previous imagery research has suggested positive associations between MG-M imagery and self-efficacy (e.g., Beauchamp, Bray, & Albinson, 2002).

Athletes can benefit from using MG-M imagery during training situations by learning how to cope with setbacks and maintain a confident, positive attitude during challenging situations (Martin et al., 1999; Orlick, 1990). The applied model of imagery suggested that the use of MG-M imagery would maintain or increase levels of self-efficacy while engaging in training, rehabilitation, and competition (Martin et al., 1999). Furthermore, Moritz and colleagues (1996) found that more confident athletes tend to engage in MG-M imagery significantly more often than less confident athletes.

Similarly, Jones, Mace, Bray, MacRae, and Stockbridge (2002) found that adult novice climbers reported higher levels of climbing self-efficacy after using an imagery script comprised of both MG-M and motivational general-arousal images (MG-A). MG-A images include feelings of relaxation, stress, anxiety, and arousal (Martin et al., 1999). Moreover, O and colleagues (2014) found that individually tailored MG-M imagery scripts were effective in increasing youth squash players' self-efficacy perceptions. Similarly, a previous study examined imagery use and self-efficacy in adult individual sport athletes including wrestling, rowing, and track and field (Mills et al., 2001). Results indicated that athletes who had higher levels of self-efficacy in competitive situations tended to use more MG-M imagery than participants with lower self-efficacy. Furthermore, Munroe-Chandler, Hall, and Fishburne (2008) showed MG-M imagery to be a significant predictor of self-confidence and self-efficacy in young soccer players. MG-M accounted for 40-57% of variance for both self-confidence and self-efficacy.

Furthermore, an MG-M intervention was also found to help maintain youth gymnast perceptions of high self-efficacy during training (Parkerson, Harris, Langdon, & Czech, 2015). Based on these previous interventions and findings it is suggested that MG-M imagery should be emphasized if an athlete wants to increase his or her self-efficacy (Munroe-Chandler et al., 2008).

Although there are many benefits to voluntary forms of imagery, it can also occur involuntarily throughout the day. Even with the frequency of its occurrence, sport psychology research has made minimal progress in examining this form of imagery (Parker, Jones, & Lovell, 2017). The lack of a standardized definition for when imagery enters one's consciousness without volitional effort has led to the evolution of several terms such as 'spontaneous', 'intrusive', and 'involuntary' (Parker et al., 2017). In a recent study by Parker and colleagues (2017) involuntary imagery is defined as, "imagery that enters into awareness without the preceding intent to generate, maintain or transform such images (p. 22)". Research has explored various forms of involuntary cognition (i.e., thoughts, memories, images) and provided evidence that certain images contain worst case scenarios (Krans, Bree, & Moulds, 2015), therefore disrupting optimal levels of sport-specific focus. Athletes can personally attribute meaning to images which can influence the overall effect towards mood or performance (Cumming & Williams, 2013). Similarly, when an athlete interprets an image as either facilitative or debilitative, it affects specific constructs known to enhance or impede sport performance (Nordin & Cumming, 2005; Quinton et al., 2016; Short et al., 2002). Therefore, it is important to be aware of an athlete's involuntary forms of imagery, and the ways in which he or she interprets the images.

Involuntary imagery can also occur spontaneously throughout the day, with some images providing benefits (Kosslyn et al., 1990). Spontaneous imagery is described as being able to be experienced as unintentionally facilitative, positive, or neutral in valence (Parker et al., 2017). Highly automated tasks require minimal attentional resources, which seem to increase the likelihood of involuntary images to occur (Bradley, Moulin, & Kvavilashvili, 2013). This is consistent in sports, since skills competency requires individuals to gravitate towards automatic levels of skill execution (Poldrack et al., 2005). Furthermore, Murphy and colleagues (2008) suggested that spontaneous imagery may also have the ability to occupy an athlete's consciousness, which in turn can divert attention away from creating task specific images. This form of involuntary imagery is important to consider as it may occupy an athlete's mind while training or competition.

Involuntary imagery also consists of intrusive imagery, which is described as being associated with deleterious effects and negative valence (Parker et al., 2017). Substantial clinical evidence supports the idea that intrusive imagery is accompanied by heightened emotional reactivity and is predominantly vivid, repetitive, visual, distressing, and overwhelming (Brewin, Gregory, Lipton, & Burgess, 2010). Athletes' tendency to interpret imagery as either facilitative of debilitative affects specific markers known to enhance or hinder performance (Nordin & Cumming 2005; Quinton et al., 2016; Short et al., 2002). In previous research where both types of interpretation have been recorded, debilitative imagery has been shown to elicit a greater and more immediate change in outcomes (Nordin & Cumming, 2005). Therefore, it is important to consider an athlete's involuntary imagery, as it could be affecting their levels of self-efficacy due to the positive and negative affect associated with the images.

Bandura (1986) suggested that perceptions of personal agency (self-efficacy) are related to affect. Watson, Clark, and Tellegen (1988) proposed affect (experience of feeling or emotion) as being multidimensional (positive and negative). Positive affect reflects the extent to which an individual feels enthusiastic, energized, and alert (Watson et al., 1988). High positive affect is described as a state of high energy, complete focus and ability to enjoy life; whereas, low positive affect is defined by sadness and lack of energy (Watson et al., 1988). Alternatively, negative affect is described as a general dimension of subjective distress and unpleasurable engagement (Watson et al., 1988). High negative affect is expressed by negative mood states such as guilt, anger, disgust, and fear, whereas low negative affect is described by a sense of calmness and tranquility (Watson, 1988). Although negative and positive emotions seem to be in opposition to one another, they are independent as they lack a strong negative correlation between them (Diener, 1984; Larsen, McGraw, & Cacioppo, 2001; Watson, Wiese, Vaidya, & Tellegen, 1999). Individuals regularly experience positive and negative emotions alongside their imagined successes and failures (Paivio, 1985). For example, affective responses to behavior (i.e., pleasure/displeasure) are important determinants of similar future behavior (Kahneman, 1999; Cabanac, 1971, 1992), which explains why when individuals perform well they tend to continue participating in sport (McCarthy et al., 2008; McCarthy & Jones, 2007). Bandura (1997) hypothesized self-efficacy to have a reciprocal relationship with affect, which various studies have found to be representative of an important predictor of chronic physical activity behavior (e.g., Garcia & King, 1991; Lucidi et al., 2006; McAuley, 1991). Furthermore, the self-efficacy theory states that emotional states affect self-efficacy and therefore, behavior (Bandura, 1989). Similarly, Luthans (2002)

emphasized that positive emotional stimulation is a key component in the development of self-efficacy. Therefore, one of the most important determinants of self-efficacy is an individual's affective state (Ümmet, 2017).

According to Bandura (1994), when an individual begins to perform an action, having a positive affective state can enhance his or her self-perception. Similarly, Pajares (1996) explained that individuals with positive general affect have higher levels of general self-efficacy, which can be seen when initiating, maintaining, and persisting on a task. Moreover, previous studies have shown that positive affect can help broaden one's attention, improve an individual's analytical thinking skills, and increase awareness of the surrounding environment (Frederikson, 2000; Hefferon & Boniwell, 2014; Worth & Mackie, 1987).

Positive affective states can also be fostered by the use of MG-M imagery, for example by imaging being confident and focused during competition (Jones et al., 2002). A seminal work study involving three competitive youth swimmers explored the effect of a MG-M imagery intervention on affective responses (McCarthy, 2009). The results of this study showed significant increases in positive affect for all participants following the intervention phase, which supported the hypothesis that MG-M imagery could enhance competitive youth swimmers' positive affect (McCarthy, 2009).

In comparison to verbalizing imagery content, previous research has demonstrated imagery's capacity to enhance emotion (Holmes, Geddes, Colom, & Goodwin, 2008), with intrusive images often being associated with negative emotions (Holmes & Mathews, 2010; Lang, 1977). Intrusive images have also been found to be a known contributor to chronic distress due to the negative emotions such as anxiety that are

associated with it (Baum, 1990). A previous study by McCarthy-Jones and colleagues (2012) found negative affect to be positively correlated with levels of intrusive visual imagery. Therefore, it seems that an individual's emotional state is affected by the way in which they internally interpret the intrusive images.

Parker and colleagues' (2017) recent study found intrusive visual imagery to be a significant predictor of negative affect by accounting for 6.3% of the variance, and spontaneous imagery accounting for 5.8% in the variance of negative affect. These findings support the notion that intrusive images are more likely to be seen as debilitative if associated with negative affectivity (Parker et al., 2017). Although there is minimal support for a relationship between spontaneous imagery and affective states, there is limited research in the sport population (Parker et al., 2017). Therefore, spontaneous and intrusive imagery should continue to be explored as athletes may be engaging in them. Furthermore, previous research has shown self-efficacy to be highly influenced by affect. Therefore, it was also important to explore the influence that involuntary imagery has on self-efficacy.

Based on the previous findings it is suggested that imagery is an important variable that can account for both positive and negative affect. However, prior to a recent study by Parker and colleagues (2017), most research focuses on the relationship between imagery and affect when voluntary imagery processes have been implemented. These authors' study suggests that involuntary imagery, specifically intrusive imagery predicts athletes' affective states (Parker et al., 2017), thereby indicating the importance of examining voluntary and involuntary imagery simultaneously. Previous research has demonstrated that the tendency of athletes to interpret their imagery as either facilitative

or debilitative affects specific constructs known to enhance or impede sport performance (Nordin & Cumming, 2005; Quinton et al., 2016; Short et al., 2002). As a result, part of this present study aimed to evaluate imagery more broadly by including different types of involuntary imagery (i.e. spontaneous, intrusive) to determine the extent to which these imagery types contribute to collegiate athletes' positive and negative affective states.

Furthermore, affective states of individuals when performing an activity is one of the most important variables for determining general self-efficacy (Bandura, 1994). The relationship between self-efficacy and MG-M imagery has also been closely examined, which suggested that the use of MG-M imagery was beneficial for increasing athletes' self-efficacy levels (Martin et al., 1999; Moritz at al., 1996). Collegiate athletes' self-efficacy levels are important for the athletic individuals, coaches, athletic departments, and others associated with sports to be aware of, as it plays a pivotal role in performance.

Relationships among MG-M imagery and self-efficacy have been established, as well as MG-M imagery and affect. Intrusive and spontaneous imagery have also been found to have an influence on athletes' affective states. Though previous research has examined the varying associations among self-efficacy, imagery use (i.e., MG-M, intrusive, spontaneous) and affect independently, there has been a lack of studies examining these variables collectively. Further there has been very little examination with regards to involuntary imagery and affect, and involuntary imagery and self-efficacy among athletic populations.

More specifically, the purpose of this study was to examine the predictive relationship between imagery use (i.e., MG-M, spontaneous, and intrusive) and self-efficacy when accounting for the mediating effects of positive and negative affect in

collegiate athletes. Studies that integrate these variables can assist in understanding why affect was examined as the mediator between imagery use and self-efficacy in collegiate athletes. It was hypothesized that affect would significantly mediate the relationship between imagery use and self-efficacy in collegiate athletes (see Figure 1).

1. It was hypothesized that positive and negative affect would significantly mediate the relationship between MG-M imagery use and self-efficacy (e.g., Beauchamp et al., 2002., Mills et al., 2001; O et al., 2014)
    1a. It was hypothesized that increased levels of negative affect would significantly predict decreased levels of MG-M imagery use and lower levels of self-efficacy.
    1b. It was hypothesized that decreased levels of negative affect would significantly predict increased levels of MG-M imagery use and increased levels of self-efficacy.
    1c. It was hypothesized that increased levels of positive affect would significantly predict increased levels of MG-M imagery use and increased levels of self-efficacy.
    1d. It was hypothesized that decreased levels of positive affect would significantly predict decreased levels of MG-M imagery use and decreased levels of self-efficacy.
2. It was hypothesized that negative affect would significantly mediate the relationship between intrusive imagery use and self-efficacy (Parker et al., 2017).

2a. It was hypothesized that increased levels of negative affect would significantly predict increased levels of intrusive imagery use and decreased levels of self-efficacy.

2b. It was hypothesized that decreased levels of negative affect would significantly predict decreased levels of intrusive imagery use and increased levels of self-efficacy.

2c. It was anticipated that positive affect would not significantly mediate the relationship between intrusive imagery use and self-efficacy.

3. No predictions were anticipated as to how positive and negative affect would mediate the relationship between spontaneous imagery use and self-efficacy (Parker et al., 2017).

CHAPTER 2

METHODS

Participants

Initial recruitment of participants in the present study included 115 collegiate athletes from universities located in the southeastern United States between the ages of 18-25. However, 31 participants were removed from the data analysis due to incomplete data. Furthermore, normality assessment including skewness, kurtosis, histogram analyses, and Shapiro-Wilk testing for the independent (i.e., MG-M, SUIS, and IVI), mediator (i.e., PA and NA), and dependent variables (i.e., SEQ) indicated that MG-M, PA, NA, and SEQ were not normally distributed. Furthermore, individuals outside of three standard deviations, determined using box plots and histogram analysis were removed from the statistical analyses (*n*=6). The remaining 78 individuals were recruited from NCAA Division I (*n*=50), II (*n*=23), universities and collegiate club teams (*n*=5) located in the southeastern United States. Participants were from the following sports: basketball (*n*=2), bass angling (*n*=1), cheer (*n*=5), cross country (*n*=3), dance (*n*=1), football (*n*=4), golf (*n*=5), soccer (*n*=3), rowing (*n*=6), softball (*n*=18), tennis (*n*=7), track and field (*n*=7), volleyball (*n*=8), and 8 declining to answer. Races consisted of Caucasian (*n*=55), African American (*n*=11), Hispanic (*n*=4), Asian/ Pacific Islander (*n*=2), and 6 identifying as other. Participants ethnicities consisted of not Hispanic (*n*= 67), Hispanic (*n*= 5), and 6 declining to answer. Moreover, the sample was predominantly female (*n*=52) with fewer males (*n*= 26).

Instrumentation

Demographics. Information on participants' age, gender identity, race, ethnicity, sport, year in college, years of experience in sport, college division or club, current eligibility status to participate (i.e., academically and athletically eligible, and not suspended), and currently suffering from an injury that has restricted them from practice or competition was collected (see Appendix A).

Self-efficacy. Self-efficacy was assessed by using the Self-Efficacy Questionnaire (SEQ; see Appendix B), which is used to assess an individual's perceived general self-efficacy (Mills, Munroe, & Hall, 2001). The SEQ is scored by finding the mean of the items. The SEQ consists of five items which ask the participant to record the strength of their belief in their mental abilities based on a 100-point scale, ranging in 10-unit intervals from 0 (no confidence) to 100 (complete confidence). The mental abilities target factors such as being in control, mental toughness, and focus. The five items consist of: "I am confident I can work hard at every practice"; "I am confident that I can always be psyched up for practice"; " I am confident that I can stay positive at every practice "; "I am confident that with practice I can achieve my performance goals"; and "I am confident that I can successfully work through difficult situations" (see Appendix B). Previous studies have used a modified version of the SEQ with questions more specific to the sport of study such as soccer and squash (Munroe-Chandler et al., 2008; O et al., 2014). Munroe-Chandler and Hall (2005) and Munroe-Chandler and colleagues (2008) used the SEQ with youth soccer athletes to show an increase in self-efficacy levels. O and colleagues (2014) used the SEQ with youth squash players, where results indicated that for 3 out of the 5 athletes self-efficacy levels improved. The SEQ has been found to have

adequate internal consistencies with an alpha level of 0.86 with youth athletes (Munroe-Chandler, Hall, & Fishburne, 2008). In the present study Cronbach's alpha was found to be 0.76.

MG-M imagery. MG-M imagery was assessed by using the Sport Imagery Questionnaire (SIQ; Hall et al., 1998). The SIQ consists of 30 items comprising five subscales, which asks athletes to rate how frequently they image the different functions. Each subscale contains six items which are rated on a 7-point Likert-type scale (1= rarely to 7= often). The SIQ is scored by summing the item scores for each subscale and dividing by the number of items in the subscale. The SIQ has been recently shown to be reliable and valid in assessing imagery use in NCAA Division III athletes' imagery use (Jones, Polasek, Foley, & Lind, 2017). It has also been used in research assessing self-efficacy with MG-M interventions. For example, Munroe-Chandler and Hall (2005) found that MG-M imagery may help increase collective efficacy of youth soccer teams. In a more recent study, three out of five youth squash players self-efficacy was found to increase after an implementation of MG-M imagery (O et al., 2014). Furthermore, a strong correlation was found between MG-M imagery use and self-efficacy through convergent validity of $r = 0.61$ (Hall et al., 1998). The exploratory and confirmatory factor analyses have verified the five-factor structure of the SIQ and demonstrated acceptable internal reliabilities with alpha coefficients ranging from 0.70 to 0.89 (Hall et al. 1997, 1998). Principal components factor analysis has demonstrated the SIQ to have adequate structural validity (Hall et al., 1998), with items loading onto their respective imagery functions above the criterion level of 0.35 (Tabachnick & Fidell, 1989). For the purpose of the present study only the six items targeting MG-M imagery were included

(see Appendix C), with the subscale demonstrating to have adequate internal consistency (α =0 .78).

Spontaneous imagery. Spontaneous imagery use was assessed by using the Spontaneous Use of Imagery Scale (SUIS; see Appendix D; Reisberg et al., 2003). This measure has been used to assess undergraduate college athletes' spontaneous use of imagery (Parker et al., 2017). The SUIS consists of 12 items which asks participants to rate them on a 5-point Likert-type scale ranging from 1 (never appropriate) to 5 (always completely appropriate). Participants rate their tendency to spontaneously use or experience images from various everyday experiences such as: "If I catch a glance of a car that is partially hidden behind the bushes, I automatically 'complete it', seeing the entire car in my mind's eye". The summation of all 12 items is used to achieve a composite score. The reliability of the SUIS measure using high corrected item-total correlations record r = 0.98 or higher (Reisberg et al., 2003). It has also demonstrated acceptable internal reliabilities with an alpha coefficient of 0.70 (Parker et al., 2017). Correlations with various imagery questionnaires and the SUIS have provided evidence about convergent validity (Nelis, Holmes, Griffith, & Raes, 2014). The present study yielded an acceptable Cronbach's alpha for the SUIS (α = 0.74).

Intrusive imagery. Intrusive imagery was assessed by using the Intrusive Visual Imagery scale (IVI; see Appendix E; McCarthy-Jones, Knowles, & Rowse, 2012). The IVI was developed from the Thought Control Ability Questionnaire (Luciano et al., 2005) and White Bear Suppression Inventory (Wegner & Zanakos, 1994). This more recent measure assesses the global experience of intrusive imagery, rather than only measuring prospective imagery. The IVI has previously been used among university students

between the ages of 18 and 30 (McCarthy-Jones et al., 2012). Furthermore, this measure has been used to assess undergraduate college athletes' use of intrusive imagery (Parker et al., 2017). The IVI is a ten-item measure that is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Participants respond to questions/statements relative to their intrusive visual imagery. An example of the items includes: "There are images that keep jumping into my head". The summation of items represents a trait measure of intrusive visual imagery, with higher scores representing higher levels of intrusive visual imagery. McCarthy-Jones et al. (2012) have reported internal consistency values using Cronbach's alpha of 0.89, accompanied by a test-retest reliability score of (r = 0.70) recorded a month later. Convergent validity has been shown between intrusive visual imagery and intrusive verbal thoughts. The IVI has also been tested for multiple forms on validity (Luciano, Algarabel, Tomas, & Martinez, 2005; (Muris, Merckelbach, & Horselenberg, 1996). The present study examined Cronbach's alpha for IVI and was found to have good internal consistency (α = 0.86).

Affect. Positive and negative affect were assessed by using the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; see Appendix F). This measure consists of two independent ten-item subscales rated on a five-point Likert-type scale ranging from 1 (very slightly or not at all) to 5 (extremely). Participants rate items describing different feelings and emotions that are representative of both positive (e.g. determined, excited) and negative affect (e.g., afraid, distressed). Time directions require participants to 'indicate to what extent you feel this way during the past week'. By anchoring responses to feelings over a longer duration, it was anticipated more likely that a trait indicator of imagery's influence upon affect outside of a non-competitive setting

would emerge. Research on both positive and negative affect scales attests to having high internal consistency values using Cronbach's alpha ranging from 0.86 to 0.90 for positive affect and from 0.84 to 0.87 for negative affect, with adequate test-retest reliabilities for all time instructions (Watson et al., 1988). The PANAS has also demonstrated multiple forms of validity (Watson et al., 1988). McCarthy-Jones et al. (2012) have reported internal consistency values using Cronbach alpha of 0.89, accompanied by a test-retest reliability score of (r = 0.70) recorded a month later. Both subscales (i.e., PA and NA) are scored separately by adding up the 10 respective questions for each. The present study examined Cronbach's alpha for each subscale and found good internal consistency for PA (α = 0.86) and NA (α = 0.84).

Procedures

Athletic directors from NCAA teams and coaches from club level teams were contacted for permission to recruit athletes from their universities. Once permission was given, a letter of cooperation was requested and obtained in order to receive IRB approval. After IRB approval was received, a link to the survey on Qualtrics was provided to athletic directors and coaches, who disseminated the link to the student-athletes. The student-athletes then completed a passive informed consent, demographics questions, and five instrumentation questionnaires. The athletes' names were not recorded in order to keep identifying information confidential. Although the questionnaires utilized were originally developed to be administered in paper and pencil form, previous research has supported that electronic versions of assessments have yielded similar psychometric properties (Bonini Campos, Lucindo Zucoloto, Sampaio Bonafe, Jordani, & Maroco, 2011).

Data Analysis

Several steps were taken to analyze the data. First, the data was assessed to determine if statistical assumptions were met. Normality assessment, via skewness, kurtosis, histogram analyses, and Shapiro-Wilks testing for the independent (i.e., MG-M, SUIS, and IVI), mediator (i.e., PA and NA), and dependent variables (i.e., SEQ) indicated that MG-M, PA, NA, SIQ, and SEQ were deemed to not be normally distributed. Therefore, individuals outside of three standard deviations, determined via box plots and histogram analysis, were removed from the statistical analyses (n= 6). Once the outliers were removed, normality was reassessed, and all variables were determined to be parametric in nature. Furthermore, descriptive statistics were run to determine the means and standard deviations of each variable. A Pearson Product Moment correlation analysis was run to examine significant relationships between the variables. In order for the variables to be used within the mediation analysis, the following correlations must have occurred: a) predictor and mediators; b) mediators and outcome; and c) predictor and outcome. As recommended by Hayes (2012), the bootstrapping method was used in the mediation analysis. An alpha level of 0.05 was used to assess any significant mediations.

CHAPTER 3

RESULTS

Descriptive Statistics

Descriptive statistics are presented in Table 1. Consistent with previous studies, athletes reported higher positive affect than negative affect scores (e.g. Parker & Lovell, 2011; Parker, et al., 2017). As compared to normative data (Watson et al., 1988), this present study showed participants to have higher mean levels of positive affect and a lower SD. Furthermore, participants also presented higher mean levels of negative affect with a slightly lover SD as compared to normative data. The mean level of self-efficacy from the sample was shown to represent higher levels of confidence. The results indicated that from the sample of participants MG-M imagery showed the mean to be between sometimes engaging in this type of imagery and often engaging in it. Furthermore, the mean for IVI displayed participants as having increased levels of IVI. Similarly, the mean score for SUIS among this sample was shown to be in the higher levels.

Pearson Correlations

Pearson correlations are presented in Table 2. For the predictor variables, there were several significant correlations with either the mediator variables (i.e., PA and NA) or the outcome variable (i.e., self-efficacy). MG-M showed significant positive, moderate correlations with PA ($r = 0.41$, $p < 0.001$) and SEQ ($r = 0.52$, $p < 0.001$). There was no significant relationship between MG-M and NA ($r = -0.01$, $p = 0.905$). For IVI, there was a small, positive significant relationship with NA ($r = 0.38$, $p = 0.001$). However, there were no associations with PA ($r = -0.15$, $p = 0.194$) or SEQ ($r = -0.03$, $p = 0.77$). Further,

for SUIS a significantly small, positive relationship was only present with NA (r = 0.30, p = 0.01). There was no significant relationship between SUIS and PA (r = 0.07, p = 0.54) or SUIS and SEQ (r = -0.01, p = 0.910). For SEQ, there was a significantly positive, moderate correlation with PA (r = 0.55, $p < 0.001$) and a significantly negative, weak association with NA (r = -0.24, p = 0.037). Based on these results, the variables that showed the following significant relationships were entered into the mediation model: a) predictor and mediators; b) mediators and outcome; and c) predictor and outcome. This included MG-M, PA, and SEQ.

Mediation Analysis

A mediation analysis was run between the variables that demonstrated significant relationships based on the correlations stated above (see Figures 1 and 2). Figure 1 displays the model for the mediation analysis. MG-M was the only predictor variable assessed with PA as the mediator, and SEQ as the outcome variable.

Mediation between MG-M imagery and self-efficacy. A mediation analysis was used to determine the direct and indirect effects of MG-M imagery along with the mediating variable (i.e., PA) on self-efficacy. Results indicated that the overall mediation model was significant ($F(2,75) = 26.02$, $r^2 = 0.41$, $p < 0.001$). The direct ($c' = 0.544$, p = 0.002) and total effect ($c = 0.795$, $p < 0.001$) of MG-M imagery on self-efficacy were shown to be significant. Therefore, partial mediation occurred as there was not only a significant relationship between the mediator and self-efficacy, but also a direct relationship between MG-M and self-efficacy. Furthermore, in the mediation model PA had a significant effect ($b = 0.079$) on the model. Lastly, there was a significant

completely standardized indirect effect of MG-M imagery on self-efficacy through PA (*b* = 0.166, SE = 0.053, 95% BCa CI [0.070, 0.277]).

CHAPTER 4

DISCUSSION

The purpose of the present study was to examine if positive and negative affect mediated the relationship between imagery use (i.e., MG-M, spontaneous, and intrusive) and self-efficacy in collegiate athletes. It was hypothesized that affect would mediate the relationship between imagery use and self-efficacy. The hypothesis was partially supported, as MG-M imagery was the only imagery type that was utilized in the mediation model, due to it being the only predictor variable correlated to the mediator and the outcome variable. Spontaneous and intrusive imagery use were not included within the mediation model due to non-significant relationships with the mediating and outcome variables.

Regarding the direct effect between MG-M imagery use and self-efficacy, the results indicated that MG-M imagery positively predicted self-efficacy. Specifically, individuals that demonstrated higher levels of MG-M imagery use were more likely to have increased levels of self-efficacy. These results have been consistently supported in previous research (Beauchamp, Bray, & Albinson, 2002; Jones et al., 2002; Munroe-Chandler et al., 2008; O et al., 2014). For example, O and colleagues (2014) demonstrated that individually tailored MG-M imagery scripts were effective in increasing youth squash athlete's self-efficacy perceptions. Similarly, a previous study examined imagery use and self-efficacy in adult individual sport athletes including wrestling, rowing, and track and field (Mills et al., 2001). Results indicated that athletes who had higher levels of self-efficacy in competitive situations tended to use more MG-M imagery than participants with lower levels of self-efficacy. Furthermore, a study

consisting of collegiate golfers, found pre-competition MG-M imagery to be positively associated with increased levels of self-efficacy (Beauchamp, Bray, & Albinson, 2002)

After establishing significant relationships between MG-M imagery, SEQ, and the mediating variable (i.e., PA), a mediation model was performed. Results of the model suggested that PA significantly mediated the relationship between MG-M imagery use and self-efficacy, accounting for 41% of the variance (R^2 =0.41) between MG-M and self-efficacy. The completely standardized indirect effect of the mediator on the relationship between MG-M and self-efficacy indicated that PA (b =0.166) had a significant effect on the model.

The present study examined involuntary types of imagery use as many imagery measures only take into account voluntary forms of imagery. Although IVI and SUIS were not utilized in the mediation model, significant correlations were still demonstrated with NA. As supported by previous literature, negative affect was shown to have a positive correlation with intrusive and spontaneous imagery (e.g., Brewin et al., 2010; Parker et al., 2017). This present study is the first to have simultaneously examined self-efficacy, voluntary, and involuntary types of imagery.

Mediators Between MG-M Imagery Use and Self-Efficacy

The present results demonstrated that positive affect significantly influences the relationship between MG-M imagery use and self-efficacy. The results indicated that the more an athlete engaged in MG-M imagery, the more positive affect they exhibited. Furthermore, the more positive affect athletes exhibited, the higher their self-efficacy levels were. This was the first study to examine the mediation of positive affect on MG-M imagery use and self-efficacy in athletes. The present findings suggest that positive

affect is an essential construct for how MG-M imagery use effects self-efficacy levels in collegiate athletes. This is consistent with previous research stating that one of the most important determinants of self-efficacy is an individual's emotional state (Ümmet, 2017). Similarly, Luthans (2002) emphasized that positive emotional stimulation is a key component in the development of self-efficacy with MG-M imagery being shown to foster positive affective responses (Jones et al., 2002). Moreover McCarthy (2009), demonstrated that individually tailored MG-M imagery scripts enhanced competitive swimmers positive affect.

Limitations

It is important to note limitations of the present study. The sample consisted of predominately Caucasian females from Division I universities in the Southeast region of the United States, which could influence the generalizability of the results. Furthermore, since the student-athletes completed the survey via Qualtrics, counterbalancing was not used. The present study did not measure whether athletes were in or out of season in their respective sport which could affect the type of imagery used. For example, previous research has suggested that competitive events may evoke more intrusive visual imagery and negative affect (Parker et al., 2017). Such results are important to coaches, parents, athletic directors, athletes, and sport psychology professionals as pre-competitive levels of negative affect are known to influence performance and do change based on the proximity of competition (Swain & Jones, 1993; Woodman & Hardman, 2003). Lastly, the means and standard deviations of the predictor, mediating, and outcome variables suggest that this sample of participants may have experience with engaging in imagery.

This may affect the generalizability of this study with populations that may not have much exposure to the mental skill of imagery.

Practical Implications and Future Directions

Based on the results of the present study, there are several important practical implications to consider. First, sport psychology professionals may be able to implement MG-M imagery-based interventions as a way to effectively increase self-efficacy perceptions in collegiate athletes. As previously stated, athletes can use MG-M imagery during training situations by learning how to cope with setbacks and maintain a confident, positive attitude during challenging situations (Martin et al., 1999; Orlick, 1990). Moreover, if coaches, parents, athletic directors, and athletes are aware of this knowledge, it may enhance the importance of seeking services from mental performance professionals to learn how to increase or maintain self-efficacy levels with the use of MG-M imagery.

Results also underscore the significance in continuing to examine intrusive and spontaneous imagery across sport populations, given negative affect has been shown to be correlated with these types of involuntary imagery. Specifically, since intrusive imagery continues to demonstrate a positive relationship with negative affect among athletes which may lead to negative effects in sport performance (e.g., Brewin et al., 2010; Parker et al., 2017). Therefore, future investigations should explore the meaning that athletes allocate to their images to establish whether this influences the relationship between imagery uses and affective states. Lastly, sport psychology professionals should note that the findings of the current investigation demonstrate the importance of MG-M imagery use and affective states on self-efficacy levels. While the combination of

focusing on imagery and affective states is ideal for the practitioner and the athlete, time-constraints and other extraneous variables may leave limited time for a wider focus of constructs. Therefore, solely focusing on imagery, may be more beneficial for the athlete in certain situations.

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TABLES AND FIGURES

Table 1. Descriptive statistics and skewness values of MG-M, SUIS, IVI, PA, NA, and SEQ.

	Mean	SD	Skewness
MG-M	5.09	0.79	-0.41
SUIS	43.56	6.87	0.25
IVI	33.58	6.74	-0.18
PA	36.89	6.16	-0.28
NA	21.04	6.52	0.72
SEQ	9.34	1.21	-0.66

Table 2. Pearson correlations between the assessed variables

	1	2	3	4	5
1. MG-M					
2. SUIS	.177				
3. IVI	.119	.437**			
4. PA	.411**	.071	-.149		
5. NA	-.014	.298**	.381**	-.231*	
6. SEQ	.524**	-.013	-.033	.550**	-.236*

Note: * p <.05;** p <.01

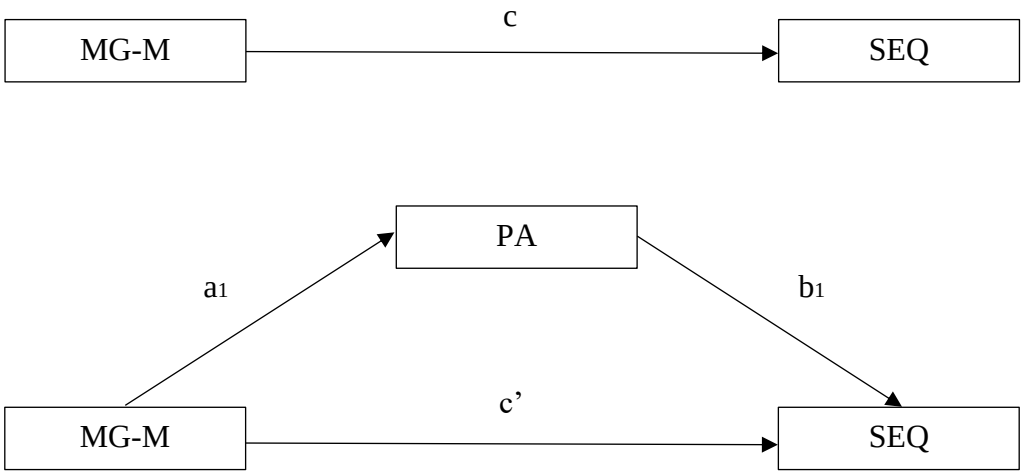

Figure 1. A sample mediation model showing paths a, b, c, and c'.

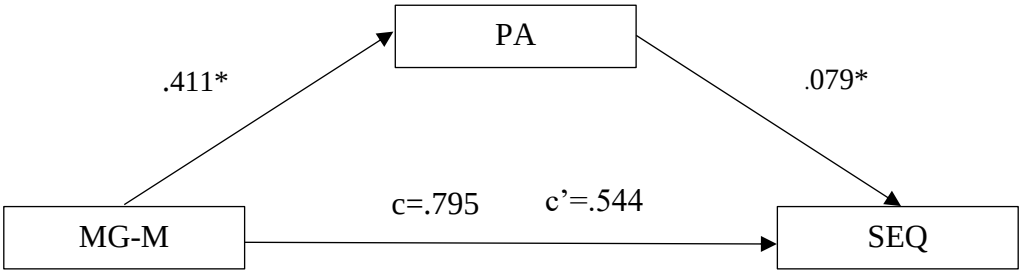

Figure 2. Beta coefficients representing the effect of MG-M and the mediating variable (PA) on Self-Efficacy (SEQ). Significant effects were found for the total effect of MG-M on SEQ (.795) t =5.369, SE= .148, $p < .001$, and the multiple mediator model, $F(2, 75) = 26.019$, $p < .001$, $R^2 = .41$, * $p < .01$

APPENDIX A

DEMOGRAPHICS QUESTIONNAIRE

Age: _____

Current sport involved in at your university: _____

Year in college:
- Freshmen
- Sophomore
- Junior
- Senior
- Other

Years of experience in your sport: _____

Competitive level that you compete in at your university:
- Division I
- Division II
- Division III
- Club

Race:
- African American
- Caucasian
- Hispanic
- Native American
- Asian/ Pacific Islander
- Other

Ethnicity:
- Hispanic, Latino, or Spanish Origin
- Not of Hispanic, Latino, or Spanish Origin

To which gender do you most identify with:
- Male
- Female
- Transgender (MTF) Male to Female
- Transgender (FTM) Female to Male
- Non-Binary/ Gender fluid/ Genderqueer
- Not sure
- Prefer not to say
- Other

Are you currently eligible to participate within your sport (i.e., academically and athletically eligible, and not suspended):
- Yes
- No

Have you currently sustained an injury that has restricted you from practice and competition during this time?
- Yes
- No

APPENDIX B

SELF-EFFICACY QUESTIONNAIRE

INSTRUCTIONS: This questionnaire concerns your confidence in practice. For each item, please choose a number (1-11) to indicate how confident you are using the 0 – 100% scale given below.

0%	**10**	**20**	**30**	**40**	**50**	**60**	**70**	**80**	**90**	**100%**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**

No confidence **Complete confidence**

1. I am confident that I can work hard at every practice. _____
2. I am confident that I can always be psyched up for practice. _____
3. I am confident that I can stay positive at every practice. _____
4. I am confident that with practice I can achieve my performance goals. _____
5. I am confident that I can successfully work through difficult situations. _____

APPENDIX C

SPORT IMAGERY QUESTIONNAIRE

IINSTRUCTIONS: Your ratings will be made on a seven-point scale, where **1** is ***rarely*** or never engage in that kind of imagery end of the scale and **7** is the ***often*** engage in that kind of imagery end of the scale. Statements that fall within these two extremes should be rated accordingly to the rest of the scale. Read each statement below and choose the appropriate number from the scale provided to indicate the degree to which the statement applies to you when you are practicing or competing in your sport.

I image giving 100%	____ 1.
I image myself appearing self-confident in front of my opponents.	____ 2.
I imagine myself being in control in difficult situations.	____ 3.
I image myself being mentally tough.	____ 4.
I image myself to be focused during a challenging situation.	____ 5.
I image myself working successfully through tough situations.	____ 6.

APPENDIX D

SPONTANEOUS USE OF IMAGERY SCALE

INSTRUCTIONS: Please read each of the following descriptions and indicate the degree to which each is appropriate for you. Do not spend a lot of time thinking about each one, but respond based on your thoughts about how you do or do not perform each activity. If a description is always completely appropriate, please write "5"; if it is never appropriate, write "1"; if it is appropriate about half of the time, write "3"; and use the other numbers accordingly.

____ 1. When going to a new place, I prefer directions that include detailed descriptions of landmarks (such as the size, shape and color of a gas station) in addition to their names.

____ 2. If I catch a glance of a car that is partially hidden behind bushes, I automatically "complete it," seeing the entire car in my mind's eye.

____ 3. If I am looking for new furniture in a store, I always visualize what the furniture would look like in particular places in my home.

____ 4. I prefer to read novels that lead me easily to visualize where the characters are and what they are doing instead of novels that are difficult to visualize.

____ 5. When I think about visiting a relative, I almost always have a clear mental picture of him or her.

____ 6. When relatively easy technical material is described clearly in a text, I find illustrations distracting because they interfere with my ability to visualize the material.

____ 7. If someone were to tell me two-digit numbers to add (e.g., 24 and 31), I would visualize them in order to add them.

____ 8. Before I get dressed to go out, I first visualize what I will look like if I wear different combinations of clothes.

____ 9. When I think about a series of errands I must do, I visualize the stores I will visit.

____ 10. When I first hear a friend's voice, a visual image of him or her almost always springs to mind.

____ 11. When I hear a radio announcer or DJ I've never actually seen, I usually find myself picturing what they might look like.

____ 12. If I saw a car accident, I would visualize what had happened when later trying to recall the details.

APPENDIX E

INTRUSIVE VISUAL IMAGERY SCALE

INSTRUCTIONS: The following questions all refer to images you have which take the form of pictures or scenes like a movie in your head. This is the experience of ‘‘seeing in your mind’s eye’’. For example, scenes from a holiday might randomly come into your head, or an image of a parent or partner. For the following statements please indicate how much each one applies to you.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1	2	3	4	5

1. There are images that come to mind that I cannot erase. ____
2. My thoughts frequently return to one image. ____
3. I have images in my mind that I cannot stop. ____
4. There are images that keep jumping into my head. ____
5. I find it hard to sleep as images keep coming into my head. ____
6. There are negative images from my past that keep coming to mind. ____
7. When I have had an argument with someone, I will keep seeing images from it.

   in my mind’s eye for the next few days, even though I do not want to. ____
8. I often picture images of things that will happen in the future, without meaning to. ____
9. There are some images that enter my head without me being able to avoid it. ____
10. I keep seeing events from my past in my mind’s eye, against my will. ____

APPENDIX F

POSITIVE AND NEGATIVE AFFECT SCHEDULE

INSTRUCTIONS: This scale consists of a number of words that describe different feelings and emotions. Read each item and then list the number from the scale below next to each word. Indicate the extent you have felt this way over the past week.

1	2	3	4	5
Very Slightly or Not At All	A Little	Moderately	Quite a Bit	Extremely

_____ 1. Interested

_____ 2. Distressed

_____ 3. Excited

_____ 4. Upset

_____ 5. Strong

_____ 6. Guilty

_____ 7. Scared

_____ 8. Hostile

_____ 9. Enthusiastic

_____ 10. Proud

_____ 11. Irritable

_____ 12. Alert

_____ 13. Ashamed

_____ 14. Inspired

_____ 15. Nervous

_____ 16. Determined

_____ 17. Attentive

_____ 18. Jittery

_____ 19. Active

_____ 20. Afraid

APPENDIX H

LITERATURE REVIEW

The present chapter aims to examine the relationship between self-efficacy, imagery use (i.e., motivational general-mastery (MG-M), spontaneous, and intrusive), and affect among athletes. It is essential to explore these key components in order to provide a better understanding of the relationship among them, and to add and expand on previous research to further establish significant relationships. Self-efficacy, imagery use, and affect will be examined by presenting their definitions, background, theoretical framework, and their significance regarding previous research. Additionally, the suggested assessment of self-efficacy, motivational general-mastery imagery, intrusive imagery, spontaneous imagery, and affect will be discussed. Furthermore, the associations between each of the key components based on previous studies, or gaps due to lack of previous research will also be addressed. Finally, a summary and direction for future research will be discussed.

Overall, the presentation of this information will help establish enough evidence to suggest that affect may mediate the relationship between different imagery uses (i.e., motivational general-mastery, intrusive, and spontaneous) and self-efficacy in athletes. Previous research has established the importance of these key components in the sport domain but there is a lack of literature when examining self-efficacy, imagery uses (i.e., MG-M, intrusive, and spontaneous) and affect collectively among athletes. Therefore, the purpose of this chapter is to establish an understanding of previous research on the associations between these key components in order to create a future direction to further examine the potential relationships among them.

In the sports domain, research has become an essential part of how we understand the psychological factors that play a key role in maximizing performance (Lirgg & Feltz, 1989; Mamassis & Doganis, 2004; Vealey & Chase, 2008; Woodman & Hardy, 2003). Previous research has suggested that an individual's performance can be highly influenced by the psychological variables of self-confidence (Feltz, 2007) and self-efficacy (e.g., Bandura, 1997; Calmels & Fournier, 2001; Mckenzie & Howe, 1997; Short et al., 2002). Self-confidence and self-efficacy have been used to describe individuals' perceived capability of achieving a certain level of performance in the domain of sport (Feltz, 1998).

Individuals with high self-confidence tend to be more skilled and effective in using cognitive resources necessary for successful performance (Hays, Thomas, Maynard, & Bawden, 2009). For example, Bandura and Wood (1989) found that confident individuals focus on process solutions to problems, while less confident individuals focus on their perceived inadequacies. Furthermore, athletes who possess high levels of confidence in their ability reported being able to perform at an optimal level under pressure and successfully cope with adversity during competition (Cresswell & Hodge, 2004). Therefore, it is important to further investigate the variables that may affect athlete's self-confidence and self-efficacy in order to help maximize their performance.

Self-Efficacy and Related Terms

Self-confidence. Bandura (1997) referred to self-confidence as, "the strength of belief in one's abilities". In other words, it is the degree of certainty individuals possess about their capability to be successful (Vealey, 1986). However, these individual's beliefs

are not specific to what the certainty is about (Bandura, 1997). Therefore, the term self-confidence can be thought of as a general term not pertaining to a specific experience or situation.

Sport confidence. Vealey (1986) created the theoretical model of sport confidence as a way to provide a definition of self-confidence specific to the sport domain. Self-confidence is defined as, "the belief of certainty individuals possess about their ability to be successful in sport". The construct of sport confidence is divided into two domains in order to differentiate between situation specific confidence (trait) and overall sport confidence (state).

Self-efficacy. Bandura (1997) defined self-efficacy as one's belief in his or her capabilities to establish and execute the courses of action required to produce given attainments. Therefore, the difference between self-confidence and self-efficacy is that the latter is situation specific. Self-efficacy can be distinguished from other self-perception constructs because it represents individuals' beliefs about what he or she can accomplish in achievement situations (Feltz & Chase, 1998).

Self-Efficacy Theory. The self-efficacy theory is based on the seminal work of Bandura (1986), which helps provide a better understanding of the factors that influence self-efficacy. According to this theory, verbal persuasion, vicarious experiences, previous accomplishments, physiological states, and emotional states affect self-efficacy which therefore affect behavior (Bandura, 1997). Individuals with high self-efficacy are motivated to perform a desirable action and to increase efforts to achieve their performance expectations (Bandura, 1977). An athlete with high self-efficacy is also more likely to seek challenging tasks and overcome obstacles by putting in considerable

effort. Previous studies have constructed self-efficacy measures specifically tailored to their study to assess self-efficacy levels over time (Feltz & Chase, 1998). For example, the self-efficacy questionnaire (SEQ) has been used in studies and has been modified for specific sport use (Mills et al., 2001; Munroe-Chandler et al., 2008; O et al., 2014).

Assessment. The Self-Efficacy Questionnaire (SEQ) is used in research to assess an individual's perceived general self-efficacy (Mills, Munroe, & Hall, 2001). Previous studies measuring self-efficacy have used a modified version of the SEQ with questions more specific to the sports such as soccer and squash. Munroe-Chandler & Hall (2005) and Munroe-Chandler and colleagues (2008) used this questionnaire with youth soccer athletes, which was used to show an increase in self-efficacy levels. O and colleagues (2014) used the SEQ with youth squash players, where results indicated that for 3 out of the 5 athletes self-efficacy levels improved. The SEQ consists of five items which ask the participant to record the strength of their belief in their mental abilities based on a 100-point scale, ranging in 10-umit intervals from 0 (no confidence) to 100 (complete confidence). The mental abilities target factors such as being in control, mental toughness, and focus. The five items consist of: "I am confident I can work through difficult situations"; "I am confident I can be mentally tough throughout a competition"; " I am confident I can be mentally tough throughout a competition"; "I am confident I can remain in control in challenging situations"; and, "I am confident I can appear confident in front of others," The SEQ has been found to have adequate internal consistencies with a Cronbach's alpha level of .86 with youth athletes (Munroe-Chandler, Hall, & Fishburne, 2008). According to Bandura's (1997) self-efficacy theory vicarious experience, including imagery can be used to enhance one's self-efficacy.

Imagery

Imagery refers to the cognitive process by which an individual can stimulate perceptual information in his or her mind while using various senses (Munzert, Lorey, & Zentgraf, 2009). Previous research has shown imagery to regulate arousal levels, manage stress, increase self-confidence, and enhance sport performance and motivation (Martin et al., 1999). It is generally accepted that imagery use can have a positive effect on one's motor performance (e.g., Hall, 2001), as seen in sports. For example, imagery can be used to reimage a specific skill or situation in one's mind (White & Hardy, 1998), which helps athletes prepare for competition. Similarly, imagery has also been found to moderate performance by influencing athlete's self-efficacy perceptions (e.g. Calmels & Fournier, 2001; McKenzie & Howe, 1997; Short et al., 2002).

Imagery research in the domain of sport has stemmed from Paivio's (1985) analytical framework, which was later elaborated upon by Hall, Mack, Paivio, and Hausenblas (1998). According to Paivio's framework, he suggests that imagery can be used to influence motor behavior through cognitive and motivational functions (Paivio, 1985). However, Martin and colleagues (1999) identify minimal limitations with Paivio's analytical framework. For example, they suggest that it does not include every type of imagery that athletes may engage in. However, the framework does not take situational or environmental factors into account, such as the individual's imagery ability or the context of the sport. Lastly, it lacks information on the types of imagery that lead to specific cognitive and motivational changes in athletes (Martin et al., 1999)

The applied model of imagery suggests that individuals use imagery for both cognitive and motivational functions, which operate at a general or specific level. This framework consists of five imagery types that require athletes to visualize different images to potentially serve different purposes (Martin, Moritz, & Hall, 1999): cognitive specific (CS; specific sport skill), cognitive general (CG; strategies associated with a competitive event), motivational specific (MS; specific goals), motivational general-arousal (MG-A; feelings of relaxation, stress, anxiety and arousal), and motivational general-mastery (MG-M; self-confidence, control, focus).

The applied model of imagery focuses on the type of imagery used as a determinant of cognitive, affective, and behavioral outcomes (Martin et al., 1999). An athlete's use of imagery is affected by his/her skill level within the sport. Novice athletes tend to use more cognitive types of imagery in order to enhance their acquisition of skills, while more experienced athletes use motivational types of imagery (Martin et al., 1999). Previous research has shown motivational types of imagery to be more widely used and beneficial prior to competition than cognitive types of imagery (Martin et al., 1999). Martin and colleagues (1999) highlight studies that reveal motivational-specific imagery to have a greater effect on effort and motivation than cognitive specific imagery. Therefore, MG-M imagery is the most widely used function of imagery to enhance self-efficacy, as it involves effective coping and mastery of challenging situations (Martin, 1999).

Motivational General-Mastery Imagery. MG-M imagery consists of feeling confident and mentally tough even in challenging situations (Hall, 1998). Athletes can benefit from using MG-M imagery during training situations by learning how to cope

with setbacks and maintain a confident, positive attitude during challenging situations (Martin et al., 1999; Orlick, 1990). Martin and colleagues (1999) also suggest that motivational types of imagery, such as MG-M, are most effective when used with athletes who have already learned necessary skills. For example, if an athlete is interested in increasing his or her self-confidence or self-efficacy, MG-M would be the most appropriate function to implement. According to Martin and colleagues (1999) the function of imagery should match the desired outcome behavior. These MG-M images could include images used to increase mental toughness, confidence, or feeling in control of performance situations.

Involuntary Imagery. Most imagery interventions instruct athletes to create images intentionally towards a general or specific goal (Cumming & Williams, 2013). For example, an intervention may ask an athlete to focus on a specific technique or to image overall performance. However, imagery also occurs spontaneously throughout the day, with some images offering unpredicted benefits, known as involuntary imagery (Kosslyn, Seger, Pani, & Hillger, 1990). Sport psychology research has made minimal progress in examining unintentional imagery or involuntary imagery (Parker, Jones, & Lovell, 2017). The lack of a standardized definition for when imagery enters one's consciousness without volitional effort has led to the evolution of several terms such as 'spontaneous', 'intrusive', and 'involuntary' (Parker et al., 2017). Parker and colleagues (2017) define involuntary imagery as, "imagery that enters into awareness without the preceding intent to generate, sustain or transform such images" (p. 22). Research has explored various forms of involuntary cognition (i.e., thoughts, memories, images) and provides evidence that certain images are of worst-case scenarios (Krans, Bree, &

Moulds, 2015), therefore disrupting optimal levels of sport specific focus. Athletes can personally attribute meaning to images which can influence the overall effect towards mood or performance (Cumming & Williams, 2013). Similarly, when an athlete interprets an image as either facilitative or debilitative, it affects specific constructs known to enhance or impede sport performance (Nordin & Cumming, 2005; Quinton et al., 2016; Short et al., 2002). Therefore, it is important to be aware of an athlete's involuntary forms of imagery, and the ways in which he or she interprets the images. Parker and colleagues (2017) also differentiate between two types of imagery known as spontaneous and intrusive imagery.

Spontaneous Imagery. Involuntary imagery can also occur spontaneously throughout the day, with some images providing benefits (Kosslyn et al., 1990). Spontaneous imagery is described as being able to be experienced as unintentionally facilitative, positive or neutral in valence (Parker et al., 2017). Highly automated tasks require minimal attentional resources, which seem to increase the likelihood of involuntary images to occur (Bradley, Moulin, & Kvavilashvili, 2013). This is consistent in sports, since skill competency requires individuals to gravitate towards automatic levels of skill execution (Poldrack et al., 2005). Furthermore, Murphy and colleagues (2008) suggested that spontaneous imagery may also occupy an athlete's consciousness, which in turn diverts attention away from creating task specific images.

Intrusive Imagery. Involuntary imagery also consists of intrusive imagery, which is described as being associated with deleterious effect and negative valence (Parker et al., 2017). Substantial clinical evidence supports the idea that intrusive imagery is accompanied by heightened emotional reactivity and is predominantly vivid, repetitive,

visual, distressing, and overwhelming (Brewin, Gregory, Lipton, & Burgess, 2010). Athletes' tendency to interpret imagery as either facilitative of debilitative affects specific markers known to enhance or hinder performance (Quinton et al., 2016; Nordin & Cumming 2005; Short et al., 2002). In previous research where both types of interpretation have been recorded, debilitative imagery has been shown to elicit a greater and more immediate change in outcomes (Nordin & Cumming, 2005). For example, if an athlete is experiencing intrusive imagery he/she could be taught to develop images to counter the perceived negative consequences. In order to provide an appropriate future direction for these imagery uses, it is essential to discuss how these constructs can be assessed. Three assessment tools used to measure MG-M, spontaneous, and intrusive imagery will be discussed.

Assessments

Sport Imagery Questionnaire (SIQ). Motivational general-mastery imagery has previously been assessed using the SIQ (Hall et al., 1998). The SIQ has been recently shown to be reliable and valid in assessing imagery use in NCAA Division III athletes' imagery use (Jones, Polasek, Foley, & Lind, 2017). It has also been used in previous research assessing self-efficacy with MG-M interventions. For example, Munroe-Chandler and Hall (2005) found that MG-M imagery may help increase collective efficacy of youth soccer teams. In a more recent study, three out of five youth squash players self-efficacy was found to increase after an implementation of MG-M imagery (O et al., 2014). Furthermore, a strong correlation was found between MG-M imagery use and self-efficacy through convergent validity of $r = .61$ (Hall et al., 1998). The SIQ consists of 30 items comprising five subscales, which asks athletes to rate how frequently

they image the different functions. Each subscale contains six items which are rated on a 7-point Likert-type scale (1=rarely to 7=often). Exploratory and confirmatory factor analyses have verified the five-factor structure of the SIQ and demonstrated acceptable internal reliabilities with alpha coefficients ranging from .70 to .89 (Hall et al., 1997, 1998). Principal components factor analysis has demonstrated the SIQ to have adequate structural validity (Hall et al., 1998), with items loading onto their respective imagery functions above the criterion level of .35 (Tabachnick & Fidell. 1989).

Intrusive Visual Imagery Scale (IVI). The IVI scale (McCarthy-Jones, Knowles, & Rowse, 2012) was developed from the Thought Control Ability Questionnaire (Luciano et al., 2005) and White Bear Suppression Inventory (Wegner & Zanakos, 1994). This more recent measure assesses the global experience of intrusive imagery, rather than measuring prospective imagery in isolation. The IVI has previously been used among university students between the ages of 18 and 30 (McCarthy-Jones et al., 2012). Furthermore, this measure has been used to assess undergraduate college athletes' use of intrusive imagery (Parker et al., 2017). The IVI is a ten-item measure that is rated on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). Participants respond to questions/statements relative to their intrusive visual imagery. An example of the items includes: "There are images that keep jumping into my head". The summation of items represents a trait measure of intrusive visual imagery, with higher scores representing higher levels of intrusive visual imagery. McCarthy-Jones et al. (2012) have reported internal consistency values using Cronbach's alpha of .89, accompanied by a test-retest reliability score of r = .70 recorded a month later. The

IVI has also been tested for multiple forms on validity (Luciano, Algarabel, Tomas, & Martinez, 2005; (Muris, Merckelbach, & Horselenberg, 1996).

Spontaneous Use of Imagery Scale (SUIS). Spontaneous imagery use in everyday life has been previously measured using the SUIS (Reisberg et al., 2003). This measure has been used to assess undergraduate college athletes' spontaneous use of imagery (Parker et al., 2017). The SUIS consists of 12 items which asks participants to rate them on a 5-point Likert-type scale ranging from 1 (never appropriate) to 5 (always completely appropriate). Participants rate their tendency to spontaneously use or experience images from various everyday experiences such as: "If I catch a glance of a car that is partially hidden behind the bushes, I automatically 'complete it', seeing the entire car in my mind's eye". The summation of all 12 items is required to achieve a composite score. The reliability of the SUIS measure using high corrected item-total correlations record $r = 0.98$ or higher (Reisberg et al., 2003). It has also demonstrated acceptable internal reliabilities with an alpha coefficient of .70 (Parker et al., 2017). Correlations with various imagery questionnaires and the SUIS have provided evidence about convergent validity (Nelis, Holmes, Griffith, & Raes, 2014).

Correlates of Imagery

Imagery and Self-Efficacy. Imagery has been found to impact performance by influencing athletes' self-efficacy perceptions (e.g., Calmels & Fournier, 2001; McKenzie & Howe, 1997; Short et al., 2002). For example, Bandura (1997) proposed that having individuals image themselves executing activities skillfully raises their perceived efficacy on their ability to enhance their performance, which in turn improves their performance. Using the applied model of imagery which consists of five functions,

Martin and colleagues (1999) suggested that the function of imagery should match the desired outcome. Bandura (1997) also proposed that vicarious experiences, which include imagery can elevate an individual's self-efficacy. If the goal of an athlete is to increase his or her self-efficacy, MG-M imagery is the recommended form of imagery to use (Martin et al., 1999; Moritz, Hall, Martin, & Vadocz, 1996).

Previous research has supported motivational types of imagery to be more widely used and beneficial prior to competition than cognitive types of imagery (Martin et al., 1999). Research has also suggested associations between MG-M imagery and cognitive outcomes such as self-efficacy (e.g., Beauchamp, Bray, & Albinson, 2002). Therefore, motivational general-mastery (MG-M) imagery is the most widely used function of imagery to enhance self-efficacy. These images can include images used to increase mental toughness, confidence, or feeling in control of performance situations. The applied model of imagery suggests that the use of MG-M imagery would maintain or increase levels of self-efficacy while engaging in training, rehabilitation, and competition (Martin et al., 1999). For example, Moritz and colleagues (1996) found that more confident athletes tend to engage in MG-M imagery significantly more often than less confident athletes. Furthermore, research conducted by Vadocz and colleagues (1997) supports the notion of a positive relationship between MG-M imagery and confidence.

Previous studies have also examined the relationship between MG-M imagery interventions and self-confidence. MG-M can help athletes perform skills they have already developed with more decisiveness and confidence (Martin et al., 1999). Athletes can also benefit from using MG-M imagery during training situations by learning how to cope with setbacks and maintain a confident, positive attitude during challenging

situations (Martin et al., 1999; Orlick, 1990). For example, one study individually implemented a MG-M imagery intervention on four high-level badminton players who were under eighteen years old (Callow, Hardy, & Hall, 2001). Results suggested that three of the four athletes experienced increases in mean self-confidence levels from baseline to post intervention (Callow et al., 2001). Similar results were found in a study on 12-15-year-olds' where MG-M imagery use predicted levels of self-confidence (Strachan & Munroe-Chandler, 2006). In another study, Jones and colleagues (2002) found that adult novice climbers using an imagery script comprised of both MG-M and MG-A images reported higher levels of climbing self-efficacy. Moreover, O (2014) found that individually tailored MG-M imagery scripts were effective in increasing youth squash players' self-efficacy perceptions.

A previous study examined imagery use and self-efficacy in adult individual sport athletes including wrestling, rowing, and track and field (Mills et al., 2001). Results indicated that athletes who were higher on self-efficacy in competition situations tended to use more MG-M imagery than participants with lower self-efficacy. In another study as hypothesized by Munroe-Chandler and colleagues (2008), MG-M imagery was shown to be a significant predictor of self-confidence and self-efficacy in young soccer players. MG-M accounted for 40-57% of variance for both self-efficacy and self-confidence. An MG-M intervention was also found to help maintain youth gymnast perceptions of high self-efficacy during training (Parkerson, Harris, Langdon, & Czech, 2015). Based on these previous findings it is suggested that MG-M imagery should be emphasized if an athlete wants to increase his or her self-confidence or self-efficacy (Munroe-Chandler et al., 2008).

Affect

Bandura (1986) suggests that perceptions of personal agency (self-efficacy) are related to affect. Watson, Clark, and Tellegen (1988) propose affect (experience of feeling or emotion) as being multidimensional (positive and negative). Positive affect reflects the extent to which an individual feels enthusiastic, energized, and alert (Watson et al., 1988). High positive affect is described as a state of high energy, complete focus and ability to enjoy life; whereas, low positive affect is defined by sadness and lack of energy (Watson et al., 1988). Alternatively, negative affect is described as a general dimension of subjective distress and displeasurable engagement (Watson et al., 1988). High negative affect is expressed by negative mood states such as guilt, anger, disgust, and fear, whereas low negative affect is described by a sense of calmness and tranquility (Watson, 1988). Although, negative and positive emotions seem to be in contrast to one another, they are independent as they lack a strong negative correlation between them (Diener, 1984; Larsen, McGraw, & Cacioppo, 2001; Watson, Wiese, Vaidya, & Tellegen, 1999).

Individuals regularly experience positive and negative emotions alongside their imagined successes and failures (Paivio, 1985). For example, affective responses to behavior (i.e., pleasure/displeasure) are important determinants of similar future behavior (Kahneman, 1999; Cabanac 1971,1992), which explains why when individuals perform well they tend to continue participating in sport (McCarthy et al., 2008; McCarthy & Jones, 2007). Similarly, previous research suggests that affective responses during physical activity can predict future exercise behavior (Williams et al., 2008; Williams, 2008). For example, if an individual is experiencing positive emotions alongside their

exercise behavior, he or she is more likely to continue engaging in that behavior. Bandura (1997) hypothesized self-efficacy to have a reciprocal relationship with affect, which various studies have found to be representative of an important predictor of chronic physical activity behavior (e.g., Garcia & King, 1991; Lucidi et al., 2006; McAuley, 1991). Positive affective responses are also indicative of sport enjoyment, which have a positive impact on sport commitment among youth athletes (Carpenter, Scanlan, Simons, & Lobel, 1993).

Assessment. In a previous study by McCarthy (2009), the Positive and Negative Affect Schedule (PANAS Watson et al., 1988) was used to assess three competitive youth swimmers positive and negative affect. The PANAS has also been used with 209 undergraduate students that engaged in sports at varying levels (Parker et al., 2017). This measure consists of two independent ten-item subscales rated on a five-point Likert-scale ranging from 1 (very slightly or not at all) to 5 (extremely). Participants rate items describing different feelings and emotions that are representative of both positive (e.g. determined, excited) and negative affect (e.g. afraid, distressed). Time directions require participants to 'indicate to what extent you feel this way during the past week'. By anchoring responses to feelings over a longer duration, it was anticipated more likely that a trait indicator of imagery's influence upon affect outside of a non-competitive setting would emerge. Research on both positive and negative affect scales attests to having high internal consistency values using Cronbach's alpha ranging from .86 to .90 for positive affect and from .84 to .87 for negative affect, with adequate test-retest reliabilities for all time instructions (Watson et al., 1988). Furthermore, the PANAS has also demonstrated multiple forms of validity (Watson et al., 1988).

Correlates of Affect

Affect and Self-Efficacy. The self-efficacy theory states that emotional states affect our self-efficacy and therefore, our behavior (Bandura, 1989). One of the most important determinants of self-efficacy is an individual's emotional state (Ümmet, 2017). Self-efficacy determines an individual's ability to initiate a behavior, put forth effort to achieve this behavior, and overcome challenges during the behavior. Previous research by Luthans (2002) emphasized that positive emotional stimulation is a key component in the development of self-efficacy. Larsen and Ketelaar (1991) explained that happy individuals have a sense of control over their lives and surroundings, which in turn increases their self-efficacy. Therefore, according to Bandura (1994) when an individual begins to perform an action, having a positive emotional state (affect) can enhance his or her perception. Individuals with positive general affect have higher levels of general self-efficacy, which can be seen when initiating, maintaining and persisting on a task (Pajares, 1996). Moreover, previous studies have shown that positive affect can help broaden one's attention, improve an individual's analytical thinking skills and increase awareness of the surrounding environment (Frederikson, 2000; Hefferon & Boniwell, 2014; Worth & Mackie, 1987). These explanations demonstrate the role of emotions in the self-efficacy perceptions of individuals.

Affect and Imagery. Paivio (1985) stated that people regularly experience positive and negative emotions alongside their imagined successes and failures. In the sport domain there are significant results of the association between imagery and affect, with research reporting both enhancing and detrimental outcomes dependent on the affective states valence (e.g. Guillot & Collet, 2008; Hanin, 2000)**.** When focusing on

positive affect, imagery has demonstrated to be advantageous in promoting affective and enjoyment responses beyond what would be expected post physical activity (Stanley & Cumming, 2010a). These results seem more likely to occur when the imagery content imitates the actual affective responses known post physical activity (Stanley & Cumming, 2010b). A previous study that asked participants to resolve imaged scenarios that resulted in a positive outcome improved positive affect scores (Holmes, Mathews, Dalgleish, & Mackintosh, 2006).

A seminal work study involving three competitive youth swimmers explored the effect of a MG-M imagery intervention on affective responses (McCarthy, 2009). Motivational general-mastery imagery focuses on coping and mastering challenges such as imaging being confident and focused during competition, which foster positive affective responses (Jones et al., 2002). The results of the above study showed significant increases in positive affect for all participants following the intervention phase, which supported the hypothesis that MG-M imagery could enhance competitive youth swimmers positive affect (McCarthy, 2009). A gap in the literature exists when examining the relationship between affective states and MG-M imagery specifically. This seminal study supported the conceptual proposal that motivational functions of imagery could enhance one's perception of ability and positive feelings (McCarthy, 2009).

In comparison to verbalizing imagery content, previous research has demonstrated imagery's capacity to enhance emotion (Holmes, Geddes, Colom, & Goodwin, 2008), with intrusive images often being associated with negative emotions (Holmes & Mathews, 2010; Lang, 1977). Intrusive images have also been found to be a known contributor to chronic distress due to the negative emotions such as anxiety that are

associated with it (Baum, 1990)**.** Brewin and colleagues (2010) have also reported a strong association between intrusive imagery and negative affect. A previous study by McCarthy-Jones and colleagues (2012) found negative affect to be positively correlated with levels of intrusive visual imagery. It seems that the way intrusive images are interpreted, this internally affects the individuals' emotional state. Parker and colleagues (2017) recent study found intrusive visual imagery to be a significant predictor in negative affect by accounting for 6.3% of the variance, as well as spontaneous imagery accounting for 5.8% in the variance of negative affect among athletes. These findings support the notion that intrusive images are more likely to be seen as debilitative if associated with negative affectivity (Parker et al., 2017). Therefore, it is essential for future studies and interventions to also examine involuntary imagery that athletes may be engaging in. Moreover, previous research has shown self-efficacy to be highly influenced by affect. Therefore, it is important to explore the influence that involuntary imagery has on self-efficacy perceptions.

Conclusion

The purpose of this chapter was to establish an understanding of previous research and to create a future direction to further examine the relationship between these key components. Previous research has closely examined the relationship between self-efficacy and MG-M imagery, which suggests that the use of MG-M imagery is beneficial for increasing athlete's self-efficacy levels. Previous studies have shown that one of the most important variables for determining general self-efficacy is the emotional state of an individual when performing an activity (Bandura, 1994). Based on the previous findings it is suggested that imagery is an important variable that can account for both positive and

negative affect. However, prior to a recent study by Parker and colleagues (2017), most research focuses on the relationship between imagery and affect when deliberate imagery processes have been implemented. This study suggests that involuntary (intrusive and spontaneous) imagery predicts athletes' affective states (Parker et al., 2017), therefore indicating the importance of examining voluntary and involuntary imagery simultaneously. Previous research has demonstrated that the tendency of athletes to interpret their imagery as either facilitative or debilitative affects specific constructs known to enhance or impede sport performance (Nordin & Cumming 2005; Quinton et al., 2016; Short et al., 2002). As a result, part of this present study aims to evaluate more broadly on different types of involuntary imagery (i.e., spontaneous, intrusive) to determine the extent to which these imagery uses contribute to athletes' positive and negative affective states.

Though previous research has examined the varying associations among self-efficacy, imagery use (i.e., MG-M, intrusive, spontaneous), and affect independently; there has been a lack of studies with examining these variables collectively. Further, there has been very little examination with regards to involuntary imagery and affect among athletes, and involuntary imagery and self-efficacy among athletes. Future research should further examine the influence that the mediator (affect) has on certain voluntary and involuntary imagery use and self-efficacy. More specifically, future studies should seek to determine if certain imagery uses are associated with athletes' levels of self-efficacy when accounting for the mediating effects of positive and negative affect.

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