

Imagery and Sport Performance

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### Abstract

The purpose of this paper is to explore imagery and sport performance by articulating various definitions of imagery in the sport performance context, presenting various imagery modalities that help the athlete, and exploring both external and internal perspectives. This paper presents the role of cognition in imagery and enhancing sport performance and offers various theories explaining how imagery works.

*Keywords:* imagery, sports performance, mental practice, mental rehearsal, mental training, elite athletes, hypnosis, injury prevention, injury rehabilitation, cognition

## Imagery and Sport Performance

“Sport is spiritual” Lynch, (2006)

The difference between first and second, the difference between making something physically difficult look easy, the difference between grace and faulty motion is the mind. For the athlete this is everything. Imagery is an important intervention to train the mind while the athlete trains his or her body. There is an emerging body of research on how imagery can in fact enhance sport performance.

According to Vealey and Forlenza (2013) “the key for athletes is to learn to use imagery in a productive and controlled manner to learn from performance mistakes and to program their minds and bodies to respond optimally” (p. 241). Trakhtenberg (2008) concurs and adds, “in the last decade, interest in the practice of mental imagery, and the role of the imagination in health and well being, has dramatically increased as mental imagery has become a popular approach for … enhancing sport performance” (p. 840).

### **Definitions**

Definitions are a good starting point and various modalities are presented by which athletes can experience imagery systematically. Hypnosis and injury prevention and rehabilitation are some of these. External and internal perspectives are next discussed with a short introduction to cognition and then brief explanations of important theories of how imagery can enhance sport performance.

## Imagery

Imagery has several definitions within the literature. Most of these describe imagery as multi-sensory as well as including emotions. These senses are visual, auditory, olfactory, gustatory, tactile, and kinesthetic (Hall, 2001). According to Rossman (2000), “imagery is a flow of thoughts you can see, hear, feel smell, or taste. Rossman (2000) states,

An image is an inner representation of your experience or your fantasies – a way your mind codes, stores, and expresses information. Imagery is the currency of dreams...memories and reminiscence; plans, projections, and possibilities. It is the language of the arts, the emotions, and most important, of the deeper self. (p. 13)

According to Vealey and Forlenza (2013) “the emotions associated with various sport experiences are also an important part of imagery. In using imagery to help control anxiety, anger, or pain, athletes must be able to re-create these emotions in their minds” (p. 241). For example,

Athletes could re-create their thoughts and feelings experienced during competition to understand how and why anxiety hurt their performance. In using imagery to re-create past outstanding performances, athletes should feel the emotions associated with those experiences such as elation, satisfaction, pride, and self-esteem. (p. 242)

For Wynd (2005), imagery is “a highly focused form of concentration that creates an alteration of sensations, awareness, and perceptions with the same biopsychological, integrative properties that allow people to process sensory information” (p. 246). “Athletes must use imagery in a systematic manner,” according to Vealey and Forlenza (2013), “for it to qualify for mental training” (p. 242). “Imagery, or the mental creation or re-creation of sensory experience in the mind,” is according to Vealey (2007), “the most popular mental training technique used by athletes as well as the most widely studied technique in the mental training literature” (p. 296).

For Liu, Chan, Lee, and Hui-Chan (2004),

Mental imagery is a process in which a function, a behavior, or a performance is rehearsed mentally, as if the person is actually performing it ... the mental imagery

technique is practiced by athletes to enhance their performance through mentally practicing the body movements required for particular bodily actions when field practice is not feasible. (p. 1403)

Hall (2001) suggests “imagery … [as] a psychological activity that is mostly inward, belonging to the class of ‘private events,’ whereas motor performance is more external and public in nature … imagery evokes the physical characteristics of an absent object that has been perceived in the past or may take place in the future” (p. 529).

Vealey and Forlenza (2013) posit imagery as “using one’s senses to re-create or create an experience in the mind (p. 240), and note “the power of imagery allows athletes to practice sport skills, strategies, and mental skills without physically being in the training or competitive environment” (p. 241). For these authors,

We can … use imagery to create new experiences in our minds. Although imagery is essentially a product of memory, our brain is able to put the pieces of the internal picture together in different ways. As designers of their own imagery programs, athletes can build images from whatever pieces of memory they choose. (p. 241)

“Athletes use imagery for many different reasons,” according to Vealey (2007), “including skill learning and practice, strategy development and rehearsal, competition preparation, including familiarization with venues and mental warm-ups, mental skill development and refinement, and coping with various sport stressors or obstacles, such as injuries, heavy training and distraction” (p. 296). For Hall (2001),

Athletes might use imagery to help improve performance … increase learning, or to serve as a readiness procedure … imagery might provide a means to improve self-efficacy … or it might function for all three of these purposes. When considering imagery use by athletes, it is often important to distinguish between the content of their images (i.e., what they image) and the function of their imagery (i.e. why they use imagery). (p. 531)

Finally, “Imagery,” according to Gardner & Moore (2007), “has been defined as procedures that encourage using all the senses to re-create an experience in the mind. Imagery is often used to prepare a[n athlete] to correctly execute a skill” (p. 22).

Hypnosis and both injury prevention and rehabilitation can be useful to the athlete. These modalities can help the athlete enhance their performance and are part of imagery.

### **Hypnosis**

Hypnosis is a form of imagery familiar with runners because the runner can go into a trance-like rhythmic state this can facilitate a kind of hypnosis. “Hypnosis, as a multimodal intervention strategy,” according to Vealey (2007), “incorporates imagery, relaxation, and self-talk triggers [and] has been shown to be effective in enhancing … performance” (p. 299).

Callen (1983) discovered that “over half of the [runners in his study] experience a trance-like state with wide variations in depth, along with increased receptivity to internal events, absorption, and vivid visual imagery, all hallmarks,” according to him, “of auto-hypnosis” (p. 30). Furthermore,

The techniques used to get into a trance are the same as those commonly employed in heterohypnosis; rhythmical deep breathing, imagery, eye fixation, and repetition of a sound or phrase. Many of the runners become more creative during these trance-like states, and some feel their athletic performance is enhanced. (p. 30)

For Callen (1983), “the minds of many runners are quite active and the mental processes include a rich variety of images, altered states of consciousness, and creative thinking (p. 34).

### **Injury Prevention/Rehabilitation**

A number of research studies demonstrate that imagery can be successfully used to prevent injury and an effective intervention for rehabilitation (Green, 1992; Monsma, Mensch & Carroll, 2009; Sordoni, Hall, & Forwell, 2000).

### **External and Internal Perspectives**

Cognitive focus is a term that describes how the brain prioritizes both information and stimuli in order to process and synthesize external and internal perspectives. During athletic competition the brain filters this information and determines what needs to be ignored, or not. This process of learning is a crucial element of the athlete's development because it focuses on both external and internal perspectives (Magness, 2014, p. 33).

"Athletes who use an external imagery perspective," according to Vealey and Forlenza (2013),

See the image from outside their bodies as if they are viewing themselves with a video camera from either behind, in front, or either side [and] when athletes use an internal imagery perspective, they see the image from inside their bodies the way their eyes normally see (p. 243).

According to the research conducted by Burhans, Richman, and Bergey, (1988), their findings "... indicate that external mental imagery benefits students' running performance when the specific skills and movements involved in a successful performance are the object of focus" (p. 33).

The athlete needs to be able to experience both external and an internal perspective to determine which one best suits his or her training styles and in a given segment of their training one may be better than the other. Both can and should be used for optimum performance. Evidence shows the benefits of using both with the more experienced ones switching between the two however kinesthetic imagery can only be experienced using an internal perspective according to Smith, Wright, Allsopp, and Westhead (2007).

### **Evidence of Effective Use of Imagery in Sport Performance**

Many researchers do not agree that imagery enhances sport performance. Others in the field differ in their observations.

According to Dean (1987) sport performance is “not affected by the use of mental imagery techniques” (p. x). Gardner and Moore (2007), differ when they state even though “imagery [is] considered to be a best-practices procedure within sport psychology [their] results, while consistent with numerous cautions, contrast with the way imagery is presented and valued as a performance enhancement tool” (p. 24). Critical of imagery as an effective scientifically tested intervention, Gardner and Moore (2006) earlier suggested “... [because] the criteria for formal empirical support require that at least two experiments of sufficient design demonstrate positive results, imagery must be categorized as an ‘experimental’ intervention for athletic performance enhancement” (p. 76).

Holmes and Calmels (2008) further state that “... several limitations related to imagery indicate the possibility that imagery may not be as efficacious as the literature would indicate [and] propose observation-based approaches to offer more valid and effective techniques in sport psychology and motor control” (p. 433).

For Eason (2013),

Imagery is used by athletes of varying kinds for a range of applications and, although it tends to get assumed that we’ll all benefit from using it, not everyone benefits using mental imagery techniques. The reason being that not everyone using mental imagery techniques uses them well or with enough persistence to gain the benefit. Research does show us that repeated, persistent use of mental imagery, used properly, will lead to impressive gains for athletes. (p. 217)

Vealey (2007), concurs and states “... research indicates that athletes believe in the efficacy of mental training, but most fail to use it systematically as part of their physical training regimen” (p. 295). It is lack of systematic use that may be a key factor in the efficacy of imagery enhancing sport performance.

It is the systematic, repetitive physical and mental practice that provides measurable benefits to performance improvement because in any sport, comprehensive reviews of mental

training literature support the effectiveness of mental training in enhancing the performance of athletes (Eason, 2013; Feltz & Landers, 1983; Gregg & Hall, 2006; Hall, 2001; Hodges, 2001; Lee, Chamberlin & Mattie, 2009; Nordin, Cumming, Vincent, & McGrory, 2006; Orlick & Partington, 1988; Padgett & Hill, 1989; Quintana, Rivera, De La Vega, & Ruiz, 2012; Short, Tenute, & Feltz, 2005; Thelwell & Greenlees, 2003; Vealey, 2007; Vealey & Forlenza, 2013; Williams & Cumming, 2011).

## **Sport Performance and Learning**

Vealey and Forlenza (2013) state that “... of primary importance to coaches and athletes is the effectiveness of imagery in enhancing athletes’ performance” (p. 243). Their research was divided into three sections: mental practice, mental rehearsal and imagery as part of multimodal programs.

### **Mental practice**

According to Vealey & Forlenza (2013), “a plethora of research has been conducted in this area, and comprehensive reviews have concluded that mental practice enhances performance and is better than no practice at all [and that] improvement across a wide range of sport skills has been documented through mental practice” (p. 244).

For Hall (2001), “some researchers have considered imagery and mental practice to be one and the same in the literature [and] that imagery should be considered the major component of mental practice” (p. 529). Mental practice is defined as “using imagery to perform a specific sport skill repetitively in the mind,” according to Vealey & Forlenza, (2013), and “occurs across a period of time in a intermittent learning style similar to a distributed physical practice schedule [where] it allows athletes to refine their sport skills without having to physically engage in the activity” (pp. 243-244).

Vealey and Forlenza (2013) state that “athletes must learn to control their imagery to use it effectively as a mental training tool” and furthermore that “the systematic practice and use [should engage] both “vivid and controllable polysensory images to enhance performance” (p. 242). These authors define vividness as “how clearly athletes can see an image and how detailed the image appears to them” and controllability as “the ability of athletes to imagine exactly what they intend to imagine, and also the ability to manipulate aspects of the images they wish to change” (p. 242).

### **Mental rehearsal**

According to Achterberg (2002), mental rehearsal “can be likened to the rituals of vividly imaging future movements that have been associated with subsequent peak performance in well-known athletes. “Through rehearsal,” she continues, “the body learns to respond in a superb and automatic fashion when it is time for the actual event. The athletes’ feelings of melding with a timeless cosmos during their finest moments, are spiritually charged experience’s (p. 91).

For Afremow (2013),

Mental imagery … is the process of using all your senses to help with learning and developing new sports skills and strategies as well as visualizing success. Creating or re-creating the whole or part of a sporting event accomplishes imagining optimal performance. This type of mental rehearsal can be likened to learning a physical skill. (p. 33)

Afremow (2013) further finds that “imagery works to enhance one’s performance by sharpening the mental blueprint and strengthening the muscle memory for the physical purpose at hand. This is why,” Afremow, continues, “imagery is used by virtually all Olympic athletes as a critical part of their training regimens. Imagery can be used to prepare for all athletic performance, regardless of the motor skills involved” (p. 34).

Vealey and Forlenza, (2013) further present that

Using imagery immediately before performance can help athletes perform better. Often, imagery is used just prior to performing to ‘psych up,’ calm down, or focus on the relevant aspects of the task ... .Imagery also has been shown to be an effective part of athletes’ preperformance routines, which involve a planned sequence of thoughts and behaviors that lead to automatic performance execution. (pp. 244-45)

“The physical effects of mental rehearsal,” according to Achterberg (2002), “have been well documented with athletes ... Kiester describes how runner James Robinson mentally rehearsed every split second of the 800 meters he would run in the Olympics, down to ‘the hiss of his breath and the crunch under his feet,’ hoping it would mean the difference between first and second place” (p. 108). According to Allami, Paulignan, Brovelli, and Boussaoud (2008), “sports psychology suggests that mental rehearsal facilitates physical practice” (p. 105). Burhans, et al., (1988), suggest, “athletes, coaches, and psychologists have come to recognize the importance of cognitive processes in competitive athletic performance. In particular, many athletes have begun to utilize cognitive rehearsal in preparation for such performances” (p. 26). According to Orlick (1986),

A basic precompetition plan, important for all sports, consists of an appropriate psychological warm-up combined with the physical warm-up and an appropriate prestart focus. Through your psychological warm-up and immediate prestart focus plan you are attempting to...strengthen the feeling of being prepared in order to solidify your confidence in that preparation in your yourself, avoid the intrusion of self-defeating thoughts...help yourself enter into a more desirable preventive feeling-state, activation level, and focus to set the stage for a superior performance. (p. 20)

### **Imagery as part of multimodal training program**

Gregg, Hall, McGowan, and Hall (2011), suggest “to assess imagery ability multiple methods of assessment must be used” (p. 129). Vealey and Forlenza (2013) mention “multiple mental training intervention studies across many types of sports have shown that performance may be enhanced using a multimodal intervention approach, including imagery” (p. 245).

According to Vealey (2007),

Multimodal interventions combine several mental training techniques into an integrated strategy that targets specific psychobehavioral outcomes of interest, such as performance improvement or mental skill enhancement. Multimodal interventions have enhanced athletes' attentional focus, energy management, anger management, productive thinking, and performance. (p. 299)

### **Thoughts and Emotions**

"In addition to helping athletes perform better, research findings indicate," according to Vealey and Forlenza (2013), "that imagery enhances the competition-related thoughts and emotions of athletes. This is important," they continue, "because a basic objective of sport psychology is to help athletes think better - to enable them to manage their thoughts and emotions effectively to create a productive competitive focus" (p. 245).

### **Successful Athletes Use Imagery More Extensively and Systematically**

According to Hall, Mack, Paivio, and Hausenblas (1998) "imagery serves two functions in athletic performance; athletes use imagery for both motivational (Hale, 2014) and cognitive purposes [and their] findings support this dual role" (p. 86). Successful elite athletes use imagery more extensively and systematically (Gregg & Hall, 2006; Hall, et. al., 1998; Hall, Rodgers & Barr, 1990; Mahoney & Avener, 1977; Mahoney, Gabriel & Perkins, 1987; Nordin, Cumming, Vincent & McGrory, 2006; Vealey & Forlenza 2013; Williams & Cumming, 2011). For example, Orlick and Partington (1988), discuss that of 235 Canadian Olympic athletes who participated in the 1984 Olympic games, 99% reported using imagery. Their study shows the frequency of these athletes using imagery in their preparation. Vealey and Forlenza (2013) also refer to

Several athletes who have at one time been the best in the world at their sport [advocating] the use of imagery [and go on to mention] Colleen Hacker, sport psychology consultant for the U.S. women's soccer team that won the 1996 and 2004 Olympic Games and the 1999 World Cup [who] created individualized audio and video imagery tapes...The tapes became a powerful source of team chemistry when the players ended up watching them as a group (p. 246)

For Vealey (2007), “imagery training using the audio- and videotapes engaged more functionally equivalent neural processes in relation to the actual execution … as compared to written scripts” (p. 297).

## Cognition

Many researchers articulate how cognitive, neurophysiological, and psychological state explanations and certain forms of mental imagery enhance sport performance (Mahoney & Avener, 1977; Padgett & Hill, 1989; Quintana, et al., 2012; Short, Tenute, & Feltz, 2005; Thelwell & Greenlees, 2003; Vealey, 2007). Cognitive explanations center on information processing, how information is acquired, stored, retrieved and used in the brain (Vealey, 2007) and this approach for both skill acquisition and motor control is in between imagery and action (Hall, 2001).

## Theories of Imagery in Sport Performance

Rossman (2000), states [imagery]

| Is the dominant language of the right brain and the human conscious … [and] gives the silent right brain a chance to bring its needs to light and to contribute its special qualities … [it] allows you to communicate with your own silent mind in its native tongue. It is a rich, symbolic, and highly personal language, and the more you observe and interact with your own image making brain, the more quickly and effectively you will use it to improve .... (p. 23)

There are several theories that help explain how imagery can enhance sport performance. These include but are not limited to psychoneuromuscular, psychological state, bioinformational, functional equivalence, the PETTLEP model, and symbolic explanations. Each will be briefly addressed.

### Psychoneuromuscular

This theory suggests that imaging and mentally rehearsing the activity creates a duplicate motor pattern that is believed to develop responses in the brain's motor cortex. This is what is meant by muscle memory as presented by Eason (2013).

### **Psychological State**

This theory focuses on motivation (Hale, 2014) and imagery. This theory is concerned with confidence and focus where imagery can recruit structures and processes in the brain without the physical activity (Vealey, 2007).

### **Bioinformational**

For Vealey and Forlenza (2013), this theory “indicates that individuals respond to imagery with response characteristics that create psychophysiological changes in the body that positively influence performance” (p. 264).

According to Vealey (2007) Bioinformational theory

Has been a popular cognitive theoretical explanation for how imagery enhances sport performance, due to its intuitive appeal and pragmatic implications for using imagery to create ‘mental blueprints for perfect responses.’ Athlete performance has been improved to a greater degree through imagery that emphasizes productive responses, as opposed to imagery that focuses just on stimulus characteristics of the situation. (p. 296)

### **Functional Equivalence**

Vealey and Forlenza (2013) suggest this theory as “based on the idea that imagery activates the same areas and processes in the brain as the actual physical execution of the movement” (p. 264). They further suggest this includes “important senses and feelings associated with competition, [and] is practiced in a posture similar to one’s performance posture, wearing performance clothes, holding performance implements, and in a similar environment to the performance environment, is timed at the same pace as the actual timing of the skill, [and] is internal in perspective” (p. 248).

### **PETTLEP Model**

“The PETTLEP acronym,” according to Smith, Wright, Allsopp, and Westhead (2007), relates to important practical components that should be considered when implementing motor-based imagery interventions, namely; **P**hysical, **E**nvironment, **T**ask, **T**iming, **L**earning, **E**motion and **P**erspective components” (p. 80). According to Smith, et al., (2007), “PETTLEP imagery aims to produce a realistic and more functionally equivalent imagery experience than traditional imagery methods through factors such as wearing the correct clothing or imaging in the correct environment” (p. 80) much like functional equivalence.

### **Symbolic**

For Eason (2013), “this theory suggests that imagery effects are actually more to do with the athlete having the opportunity to practice symbolic aspects of a motor activity rather than actually activating the muscles. This theory,” he continues, “suggests that the mental imagery forges a so-called ‘mental blueprint,’ which the athlete uses when performing” (p. 219).

### **Conclusions**

Because the most effective way for an athlete to use imagery is in a systematic way in tandem with his or her training and performance “research efforts should begin to examine how effective imagery is for athletes,” according to Vealey (2007), as packaged in different ways using specific strategies or models of intervention” (p. 297). Williams and Cumming (2011) concur adding, “imagery ability [differs] depending on imagery content” (p. 437).

Feltz and Landers (1983) suggest

Research efforts of those interested in mental practice” focus “toward an examination of the variables that may moderate or mediate the relations between mental practice and motor performance … to eventually help to verify if these determinants actually produce the suggested relations and thus move us toward a better theoretical understanding of mental practice. Only when this is done will sport psychologists be able to specify with confidence the exact type of mental practice that should be used for the specific

conditions confronting the performer. (p. 51)

For Vealey and Forlenza (2013),

Setting up a systematic imagery program involves four steps. First, athletes are introduced to imagery. Second, athletes evaluate their imagery abilities to understand their strengths and areas that need improvement. Third, athletes should engage in Basic Training to develop and enhance their imagery skills. Finally, imagery should be integrated into a systematic program of physical and mental training. (p. 265)

This systematic approach is similar to the hero's journey that Campbell ([YEAR](#)) articulates because, according to Lynch (2006), there is "the up-and-down, gain-and-loss odyssey of self-discovery as [the athlete becomes] dedicated to exploring the unlimited boundaries of [his or her] full potential in athletics" (p. i), and along this journey, according to Magness (2014), "the psychological and physiological are intricately linked, and we have much to [still] learn in these areas of study" (p. 109).

## References

- Achterberg, J. (2002). *Imaging in healing: Shamanism and modern medicine*. Boston, MA: Shambhala.
- Afremow, J. (2013). *The champion's mind: How great athletes think, train, and thrive*. New York, NY: Rodale.
- Allami, N., Paulignan, Y., & Brovelli, A. (2008). Visuo-motor learning with combination of different rates of motor imagery and physical practice. *Experimental Brain Research*, 184, 105-113. doi: 10.1007/s00221-007-1086-x
- Burhans, R. S., Richman, C. L., & Bergey, D. B. (1988). Mental imagery training: effects on running speed performance. *International Journal of Sport Psychology*, 19, 26-37.
- Callen, K. E. (1983). Auto-hypnosis in long distance runners. *American Journal of Clinical Hypnosis*, 26(1), 30-36, doi: 10.1080/00029157.1983.10404135
- Dean, J. A. (1987). *Effects of state anxiety, mental practice and imaging on athletic performance of women runners*. (Doctoral dissertation), Loa Angeles, CA: California School of Professional Psychology.
- Retrieved from ProQuest, UMI Dissertations Publishing. (8801227).
- Eason, A. (2013). *Hypnosis for running: Training your mind to maximize your running performance*. Dorset, UK: Awake Media Productions, Ltd.
- Feltz, D. L., & Landers, D. M. (1983). The effects of mental practice on motor skill learning and performance: a meta-analysis. *Journal of Sport Psychology*, 5, 25-57.
- Gardner, F., & Moore, Z. (2006). *Clinical sport psychology*. Champaign, IL: Human Kinetics.
- Gardner, F. L., & Moore, Z. E. (2007). *The psychology of enhancing human performance: the mindfulness-acceptance-commitment (MAC) approach*. New York, NY: Springer

Publishing Company.

Green, L. B. (1992). The use of imagery in the rehabilitation of injured athletes. *The Sport Psychologist*, 6, 416-428.

Gregg, M., & Hall, C. (2006). Measurement of motivational imagery abilities in sport. *Journal of Sports Sciences*, 24(9), 961-971, doi: 10.1080/02640410500386167

Gregg, M., Hall, C., McGowan, E., & Hall, N. (2011). The relationship between imagery ability and imagery use among athletes. *Journal of Applied Sport Psychology*, 23(2), 129-141, doi: 10.1080/10413200.2010.544279

Hale, T. D. (May, 2014). *Motivation and women marathoners*. Unpublished manuscript, Mind Body Medicine, MBM 5507, Saybrook University, San Francisco, California.

Hall, C. R. (2001). Imagery in sport and exercise. In R. N. Singer, H. A. Hausenblas, & C. M. Janelle (Eds.), *Handbook of sport psychology*. (2<sup>nd</sup> ed., 529-549). New York, NY: John Wiley.

Hall, C. R., Mack, D. E., Paivio, A., & Hausenblas, H.A. (1998). Imagery use by athletes: development of the sport imagery questionnaire. *International Journal of Sport Psychology*. 29, 73-89.

Hall, C. R., Rodgers, W. M., & Barr, K. A. (1990). The use of imagery by athletes in selected sports. *The Sport Psychologist*, 4, 1-10.

Holmes, P., & Calmels, C. (2008). A neuroscientific review of imagery and observation use in sport. *Journal of Motor Behavior*, 40(5), 433-445.

Lee, T. D., Chamberlin, C. J., & Hodges, N. J. (2001). Practice. In Singer, R. N., Hausenblas, H. A., & Janelle, C. M. (Eds.), *Handbook of sport psychology*. (2<sup>nd</sup> ed., 115-143). New York, NY: John Wiley.

- Liu, K. P., Chan, C. C., Lee, T. M., & Hui-Chan, C. W. (2004). Mental imagery for promoting relearning for people after stroke: a randomized controlled trial. *Archive of Physical and Medicinal Rehabilitation*, 85, 1403-8.
- Lynch, J. (2006). *The way of the champion: Lessons from Sun Tzu's the Art of War and other Tao wisdom for sports & life*. Rutland, VT: Tuttle Publishing.
- Magness, S. (2014). *The science of running: How to find your limit and train to maximize your performance*. Bellevue, WA: Sayenko Design.
- Mahoney, M. J., & Avener, M. (1977). Psychology of the elite athlete: an exploratory study. *Cognitive Therapy and Research*, 1(2), 135-141.
- Mahoney, M. J., Gabriel, T. J., & Perkins, T. S. (1987). Psychological skills and exceptional athletic performance. *The Sport Psychologist*, 1, 181-199.
- Mattie, P. (2009). *Examining the relationship between imagery use and mental toughness*. (Master's thesis). Windsor, Ontario, Canada: University of Windsor.  
Retrieved from <http://scholar.uwindsor.ca/etd>
- Monsma, E., Mensch, J., & Farroll, J. (2009). Keeping your head in the game: Sport-specific imagery and anxiety among injured athletes. *Journal of Athletic Training*, 44(4), 410-417.
- Nordin, S. M., Cumming, J., Vincent, J., & McGrory, S. (2006). Mental practice or spontaneous play? Examining which types of imagery constitute deliberate practice in sport. *Journal of Applied Sport Psychology*, 18(4), 345-362, doi: 10.1080/10413200600944124
- Orlick, T. (1986). *Psyching for sport: mental training for athletes*. Champaign, IL: Leisure Press.
- Orlick, T., & Partington, J. (1988). Mental links to excellence. *The Sport Psychologist*, 2, 105-

130.

Padgett, V. R., & Hill, A. K. (1989). Maximizing athletic performance in endurance events: A comparison of cognitive strategies. *Journal of Applied Social Psychology*, 19(4), 331-340.

Quintana, M., Rivera, O., De La Vega, R., & Ruiz, R. (2012). Mapping the runner's mind: A new methodology for real-time tracking of cognitions. *Psychology*, 3(8), 590-594.

Retrieved from <http://dx.doi.org/10.4236/psych.2012.38088>

Roszman, M. L. (2000). *Guided imagery for self-healing*. Tiburon, CA: New World Library.

Short, S. E., Tenute, A., & Feltz, D. L. (2005). Imagery use in sport: Meditational effects for efficacy. *Journal of Sports Sciences*, 23(9), 951-960.

Smith, D., Wright, C., Allsopp, A., & Westhead, H. (2007). It's all in the mind: PETTLEP-based imagery and sports performance. *Journal of Applied Sport Psychology*, 19(1), 80-92. doi: 10.1080/10413200600944132

Sordoni, C., Hall, C., & Forwell, L. (2000). The use of imagery by athletes during injury rehabilitation. *Journal of Sport Rehabilitation*, 9, 329-338.

Thelwell, R. C., & Greenless, I. A. (2003). Developing competitive endurance performance using mental skills training. *The Sports Psychologist*, 17, 318-337.

Trakhtenberg, E. C. (2008). The effects of guided imagery on the immune system: A critical review. *International Journal of Neuroscience*, 118, 839-855.

doi: 10.1080/00207450701792705

Vealey, R. S. (2007). Mental skills training in sport. In G. Tenenbaum, & R. C. Eklund (Eds.), *Handbook of sport psychology* (3<sup>rd</sup> ed., pp. 287-309). Hoboken, NJ: Wiley.

- Vealey, R. S., & Forlenza, S. T. (2013). Understanding and using imagery in sport. In J. M. Williams, & V. Krane, V. (Eds.), *Applied sport psychology: personal growth to peak performance* (7th ed., pp. 240-268). New York, NY: McGraw Hill Education.
- Williams, S. E., & Cumming, J. (2011). Measuring athletic imagery ability: The sport imagery ability questionnaire. *Journal of Sport and Exercise Psychology*, (33), 416-440.
- Wynd, C. A. (2005). Guided health imagery for smoking cessation and long-term abstinence. *Journal of Nursing Scholarship*, 37(3), 245-250.

## Appendix A - MBM Paper Grading Form

<b>Content (50%) 50 Points Possible</b>	<b>Points Earned</b>	<b>Comments:</b>
All key elements of the assignment are covered in a substantive way. Imagery for Health Research Paper. Identify a research question or topic of particular relevance and interest to you taking into account your anticipated application of imagery for healing in your own career. The paper should be 8-10 pages long for MS students and 10-12 pages long for PhD students, written in APA format, utilizing peer reviewed primary sources of information as much as possible. This paper is due at the end of week 6.	50	Terrel, Your content is exceptional. You demonstrate you have a command of the literature. I can tell you have delved into this topic and that is an important one for you, your academic and professional career. Content is comprehensive, accurate and persuasive. Paper exceeds the length requirements.
The content is comprehensive, accurate, and/or persuasive.		
Major points are stated clearly; are supported by specific details, examples, or analysis and are correctly referenced.		
<b>Organization (20%) 20 Points Possible</b>	<b>Points</b>	<b>Comments:</b>
Each topic logically follows the objective, and sentences are well-connected and meaningful. Transition sentences are used appropriately. There is a comprehensive introduction and a conclusion that summarizes the main points made in the paper. The paper is laid out with effective and correct use of headings.	18	Good organization. Each topic follows the objective. Good introduction and conclusions summarizing the main points. A few suggestions have been made in regards to Level 1, 2 and 3 headings.
<b>APA Format (10%) 10 Point Possible</b>	<b>Points</b>	<b>Comments:</b>
The paper, including the title page, headers and references follow APA guidelines for format. Citations of original works within the body of the paper follow APA guidelines. Headings are used effectively and properly formatted per APA standards. Reference list is in APA format. Paper meets length guidelines	7	Please review APA format for citing original works within the body of the text. A few suggestions on headings are made. Reference list is in good shape with only a few typos.
<b>Spelling, grammar and Punctuation (20%) 20 Points Possible</b>	<b>Points</b>	<b>Comments:</b>
Rules of grammar, usage, and punctuation are followed. Spelling is correct. Tone is	14	You frequently use run-on sentences that are

appropriate and clear. Sentences are well-constructed, with consistently strong, varied sentences and transitions are logical and maintain flow of paper.		confusing to the reader, particularly when you are quoting different authors within the same sentence. This is tricky even for experienced writers with many years of APA style writing. Please be careful to proof your paper as there are some misspellings and incorrect use of grammar and punctuation.
<b>Points Possible = 100</b>	<b>Total Points</b> 89	<b>Comments:</b>  Terrel,  A nice paper. I can tell how important this topic is for you and I'm glad to see you delve so deeply into imagery and sports performance. There are tremendous opportunities for dissertation and future career advancement. As I mentioned in your Reflections paper, learning APA style does take time. With practice you will become better. I suggest you re-read the APA Manual, 6 <sup>th</sup> Edition Chapter 3 (Writing Clearly and Concisely) and Chapter 4 (The Mechanics of Style).