



5-2010

A Phenomenological Investigation of Gymnasts' Lived Experience of Imagery

Phillip G. Post

University of Tennessee - Knoxville, ppost@nmsu.edu

Recommended Citation

Post, Phillip G., "A Phenomenological Investigation of Gymnasts' Lived Experience of Imagery." PhD diss., University of Tennessee, 2010.

https://trace.tennessee.edu/utk_graddiss/739

This Dissertation is brought to you for free and open access by the Graduate School at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Doctoral Dissertations by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.

To the Graduate Council:

I am submitting herewith a dissertation written by Phillip G. Post entitled "A Phenomenological Investigation of Gymnasts' Lived Experience of Imagery." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Exercise and Sport Sciences.

Craig A. Wisberg, Major Professor

We have read this dissertation and recommend its acceptance:

Jeffrey T. Fairbrother, Sandra P. Thomas, Joe Whitney

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

To the Graduate Council:

I am submitting herewith a dissertation written by Phillip Guy Post entitled "A Phenomenological Investigation of Gymnasts' Lived Experience of Imagery." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Exercise and Sport Sciences.

Craig A. Wrisberg, Major Professor

We have read this dissertation
and recommend its acceptance:

Jeffrey T. Fairbrother

Sandra P. Thomas

Joe Whitney

Accepted for the Council:

Carolyn R. Hodges
Vice Provost and Dean of the
Graduate School

(Original signatures are on file with official student records.)

A Phenomenological Investigation of Gymnasts' Lived Experience of Imagery

A Dissertation
Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Phillip Guy Post
May 2010

Copyright © 2010 by Phillip Guy Post
All rights reserved.

Dedication

In loving memory of my brother and best friend, Daniel Post, who by his example taught me what it truly means to be strong in the face of adversity, and to persevere.

Acknowledgements

I would like to acknowledge all the people who have helped me with this undertaking, especially my committee members. I owe them endless thanks. Dr. Craig Wrisberg provided constant guidance throughout the project. His mentoring, critiques, suggestions, and support have not only helped me to develop as a professional, but as a person. Dr. Jeffrey Fairbrother consistently challenged me to look at issues from a different perspective; his suggestions have made this manuscript stronger. Dr. Sandra Thomas opened my eyes to phenomenology; her guidance helped to make this project a reality. Dr. Joe Whitney pushed me to think outside the box, and his continuous encouragement gave me confidence. I would like to express appreciation to the Interpretive Research Group for their suggestions, thoughts, and support throughout the entire research process. I would also like to acknowledge the contribution of the 10 participants who made this research and manuscript possible. Their willingness to share their time and to discuss their experiences brought this project to life. My thanks also go to my fellow graduate students who were always willing to share their opinions and to give me feedback.

None of this work would have been possible without my family and friends. I owe them all my deepest gratitude. My parents, Anthony and Gloria Post, encouraged and supported my educational endeavors. My mother-in-law, Nancy Garcia-Ganan, reviewed the manuscript countless times and offered edits and suggestions; she was unstinting with both her time and her advice. Finally, I owe my most profound thanks to my wife, Aine Garcia-Post. Without her encouragement, love, and belief in me, this work would not have been possible. Her steadfast support has made all the difference in this endeavor...and in my life.

Abstract

Imagery is a mental skill that has been researched extensively over the last 40 years (Weinberg, 2008). Experimental and applied investigations have demonstrated that imagery positively affects sport performance as well as a number of psychological characteristics of athletes (Feltz & Landers, 1983; Morris, Spittle, & Watt, 2005). Studies have also revealed that athletes use imagery for multiple functions (both cognitive and motivational) in a variety of sports (both open and closed) and in and out of competition (Hall, Mack, Paivio, & Hausenblas, 1998; Munroe, Giacobbi, Hall, & Weinberg, 2000). Prior to the present study, however, research had not examined athletes' experience of imagery in depth. Therefore, the purpose of this study was to explore athletes' lived experience of using imagery in their sport. To accomplish this goal phenomenological interviews were conducted with ten female collegiate gymnasts (M age = 22.2 yr). After a brief period of introductory conversation each participant was asked to respond to the following open-ended statement: "Think of a time when you have used imagery in your sport and describe that to me as fully as possible." Follow-up questions were asked only to gain further clarification or to obtain additional details to gymnasts' comments. All interviews were audio recorded and transcribed verbatim. Qualitative analysis of the transcripts revealed a total of 693 meaning units, which were then grouped into sub-themes and major themes. A final thematic structure revealed five major dimensions that characterized these gymnasts' experience of using imagery: *preparing for movement, mentally preparing, feeling the skill, controlling perspective/speed/effort, and time and place*. The most significant findings of the present study were that these gymnasts (a) varied the speed of their imagery (real and slow time), (b) used imagery during a performance bout as well as in preparation for performance, (c) combined

physical motion with their imagery to increase the feel of the skill, and (d) felt a persistent need to make their imagery perfect. These results extend the findings of previous imagery research and offer several implications for coaches and practitioners interested in using imagery with gymnasts.

Table of Contents

Chapter 1	1
Introduction	1
Statement of the Problem	8
Purpose	8
Significance	8
Limitations.....	9
Delimitations.....	9
Chapter 2	10
Review of Literature	10
Imagery Theories	10
Early theories	11
Cognitive theories	12
Functional equivalence theory	13
The Influence of Imagery on Performance.....	15
Performance	15
Psychological variables	17
Mediating Factors in Imagery Interventions	19
Sport environment.....	19
Imagery modality	22
Imagery perspective	24
Possible Functions and Usage of Imagery.....	26
Descriptive methods describing athletes' imagery use.	27
Qualitative methods describing athletes' imagery use.....	30
Summary.....	32
Chapter 3	35
Method	35
Procedures	36
Exploring Researcher Bias	36
Bracketing interview	36
Selecting Participants	38
Data Collection	39
Pilot interview.....	39
Interviews	39
Analyzing the Data.....	41
Interpretive research	42
Confirming the Thematic Structure	43
Issues of validity and reliability	44
Chapter 4	45
Results	45
Participants	45
The Thematic Structure	45
Preparing for Movement.....	50

Rehearsing body movements	50
Making it perfect	52
Focusing on critical areas	54
Making mistakes and correcting them.....	55
Dealing with injury.....	57
Mentally Preparing.....	58
Calming nerves	59
Building confidence	61
Going over the meet	63
Feeling the Skill	67
Body movements.....	67
Feeling the movements.....	70
Controlling Perspective/Speed/Effort	73
Perspective.....	73
Image speed	79
Level of effort	85
Time and Place.....	89
In competition	89
Outside of competition	92
Chapter 5	95
Discussion.....	95
Major Findings.....	96
Connections to Previous Research.....	100
Practical Applications	103
Future Research Directions	106
Conclusions.....	107
References	109
Appendix	122
Appendix A	123
Appendix B.....	124
Appendix C.....	125
Appendix D	126
Vita.....	127

Chapter 1

Introduction

“The night before a game, I lie down, close my eyes, relax my body, and prepare myself for the game. I go through the entire lineup of the other team, one batter at a time. I visualize exactly how I am going to pitch to each hitter and I see and feel myself throwing exactly the pitches I want to throw. Before I ever begin to warm up at the ballpark, I’ve faced all of the opposition’s hitters four times and I’ve gotten my body ready for exactly what it is I want to do.”

Nolan Ryan (cited in Mack and Casstevens, 2001, p. 158)

This quote from former Major League pitcher Nolan Ryan exemplifies how an athlete might engage in imagery to enhance performance. Ryan’s detailed description portrays a dynamic experience, which appeared to assist him in preparing to pitch. Given anecdotal reports such as this, it should not be surprising that imagery has achieved considerable attention from both researchers and sport practitioners over the last forty years (Weinberg, 2008). Imagery is an activity that an increasing number of athletes and coaches are using more frequently at all levels of competition (Hall, Rodgers, & Barr, 1990; Jedlic, Hall, Munroe-Chandler, & Hall, 2007; Munroe, Giacobbi, Hall, & Weinberg, 2000; Munroe-Chandler, Hall, Fishburne, & Strachan, 2007). It is generally agreed that imagery involves the re-creation of a lived experience using the five senses: olfaction, vision, audition, taste, and proprioception (Vealey & Greenleaf, 2010). In an attempt to understand this phenomenon a variety of research approaches have been utilized including experimental designs, single-subject designs, descriptive studies and qualitative semi-structured interviewing (Morris, Spittle, & Watt, 2005; Weinberg, 2008).

One of the major aims of previous research using these approaches has been to determine what effects, if any, imagery has on sport performance. Collectively, the findings of experimental and single-subject designs have established that imagery facilitates the performance

of sport tasks requiring a range of cognitive and motor demands (Driskell, Copper, & Moran, 1994; Feltz & Landers, 1983; Isaac, 1992; Jordet, 2005; Post, Wrisberg, & Mullins, 2010).

Imagery has consistently been shown to improve athletic performance to a greater extent than no practice, but not to the same extent as overt physical practice (Denis, 1985; Feltz & Landers, 1983; Grouios, 1992b; Rushall & Lippman, 1998). In addition to facilitating sport performance, there is experimental evidence to suggest that imagery also has a positive mediating affect on psychological variables associated with successful athletic performance such as increased self-efficacy, confidence, motivation, and reduced competitive sport anxiety (Callow, Hardy, & Hall, 2001; Feltz & Riessinger, 1990; Hale & Whitehouse, 1998; Martin & Hall, 1995). Furthermore, qualitative studies with high-level athletes suggest that imagery is a useful strategy for improving various aspects of athletic performance (Munroe et al., 2000; Orlick & Partington, 1988).

In addition to the research examining imagery's impact on sport performance, some studies have concentrated on the ways in which athletes use imagery. Perhaps most significant is the work of Hall, Mack, Paivio, and Hausenblas (1998) who identified possible functions of imagery while constructing the Sport Imagery Questionnaire (SIQ). The questionnaire was based on Paivio's (1985) analytic model of imagery which posited that sport imagery serves motivational and cognitive functions. This research indicated that imagery is used for five functions. The first imagery function, *Motivational-Specific* (MS), represents specific goals and goal oriented behaviors, such as winning a competition. The second, *Motivational General-Mastery* (MG-M), deals with effective coping behaviors and the mastery of challenging situations, such as being confident, focused, and mentally tough. The *Motivational General-Arousal* (MG-A) function embodies feelings of relaxation, stress, arousal and anxiety regulation,

such as being calm and relaxed before an event. The fourth function, *Cognitive Specific (CS)*, involves the rehearsal of a specific sport skill, such as the basketball free throw. Finally, the *Cognitive General (CG)* function emphasizes strategies associated with successful sport performance, such as a race plan in track or swimming. Hall et al. (1998) considered these five functions to be orthogonal and thus capable of being used by athletes both simultaneously and in a variety of ways. For example, one athlete might image game strategies (CG), another might image being confident (MG-M), while still another might combine several imagery functions, such as feeling calm (MG-A), rehearsing a race plan (CG), and being confident (MG-M) in order to achieve a desired outcome (Hall et al., 1998; Martin, Moritz, & Hall, 1999).

Considerable research examining these five imagery functions has been conducted over the last 12 years (Morris et al., 2005; Weinberg, 2008). In most cases researchers have attempted to quantify how, when, and where athletes employ these proposed functions. To accomplish this purpose investigators have generally used the SIQ (Hall et al., 1998) and the Imagery Use Questionnaire (IUQ; Hall et al., 1990). Generally speaking, the results of these studies have indicated how athletes of various sports use imagery (Munroe, Hall, Simms, & Weinberg, 1998), that athletes employ multiple functions of imagery (i.e., both cognitive and motivational) (Hall et al., 1998), that athletes use imagery in a variety of settings (e.g., during competition, prior to competing, off the field, and during training) (Weinberg, Butt, Knight, Burke, & Jackson, 2003), that athletes incorporate both internal and external imagery perspectives (Hall et al., 1990), that higher skilled athletes use it more frequently than lower skilled athletes (Salmon, Hall, & Haslam, 1994), and that athletes also use imagery for non-performance purposes, such as during injury rehabilitation (Sordoni, Hall, & Forwell, 2000).

While previous descriptive studies have revealed what and where high-level athletes employ the five functions of imagery, they have not provided a complete picture of athletes' overall imagery experience. One of the few attempts to examine athletes' imagery in more detail was a qualitative study by Munroe et al. (2000). These investigators interviewed fourteen highly skilled athletes from the sports of golf, softball, swimming, tennis, track, volleyball, and wrestling regarding *where*, *when*, *why*, and for *what* reasons they used imagery. A semi-structured interview guide based on the components of Paivio's (1985) model of imagery was employed to assess how these athletes used imagery during competition and in practice settings. For example, one cognitive imagery question asked, "Could you describe your use of imagery to rehearse and execute strategies of play?"(p.125). Not surprisingly, the results revealed that athletes used imagery in training and competition and described imagery functions consistent with the ones proposed by Hall et al. (1998). In addition participants mentioned aspects of their imagery experience that had not been discovered in previous studies. For example, they reported that their imagery could be either positive or negative (imagery of success and mistakes), that it was multisensory (vision, audition, taste, and proprioception), and that it included aspects of their performance surroundings. Some athletes commented on the speed of their images; for example, one tennis player said, "I'll just be lying there in bed visualizing and the images will be really slow. It's not quick at all" (Munroe et al. 2000, p. 131).

More recent qualitative investigations have deepened our understanding of the nature of high-level athlete's imagery use. In two studies, MacIntyre and Moran (2007a, 2007b) examined the meta-imagery process (i.e., athletes' beliefs about the nature and regulation of their imagery skills) underlying high-level athletes' use of imagery. Participants included athletes from the

sports of rugby, fencing, golf, auto racing, and slalom canoeing. Although the researchers employed an interview guide containing questions that were based on Hall et al.'s (1998) proposed imagery functions, they obtained a much more complex description of sport imagery than had been revealed in earlier qualitative research. For example, participants described using creativity imagery (e.g., developing creative play) as well as imagery of various types of performance (e.g., poor, typical, and ideal). They also reported using debilitating and facilitative imagery that contained "what-if" components (e.g., what they would do to correct problems or respond to mistakes) and other indicators of imagery flexibility. For example, a racecar driver reported: "I would use (imagery) sometimes if a car wasn't handling right. In my imagery I would say 'it's under-steering' ...so I would imagine how to drive around the problem..." (MacIntyre & Moran, 2007b, p. 12).

Taken together, previous experimental, descriptive and qualitative research has offered helpful insights into athletes' use of imagery and the effects of imagery on sport performance. While there is sufficient evidence to suggest that imagery facilitates various aspects of athletic performance (Isaac, 1992; Post et al. 2010; Smith, Wright, & Cantwell, 2008; Weinberg, 2008), the results of recent qualitative research indicates that there is more to be learned about the ways in which athletes use and engage in imagery. Additionally, there are several limitations to prior research that have described athletes' imagery. First, the considerable information obtained in these studies has been limited by the parameters of standardized survey instruments or semi-structured interviews based on existing conceptual frameworks. These restrictive approaches may have constrained athletes' depictions of their overall imagery experience. Second, with one exception (MacIntyre & Moran, 2007a), most of the qualitative studies have interviewed high-

level athletes across a variety of sports (MacIntyre & Moran, 2007b; Munroe et al., 2000). While this research offers general trends in high-level athletes' imagery across different sports, it reveals little about the possible intricacies of imagery use in specific sports. Third, qualitative imagery research has not adequately addressed athletes' experiences of imagery. That is, it has focused on *describing* the characteristics of athletes' imagery rather than on *understanding* their imagery experiences.

In order to achieve a richer depiction of the depth and breadth of high-level athletes' imagery experiences, a more flexible research approach is needed. Over the past 20 years there has been an increasing call for open-ended qualitative studies that would enhance our understanding of the various aspects of athletes' sport participation (Dale, 1996; Martens, 1987). However relatively few qualitative investigations of this nature have been attempted. The exceptions include examinations of athletes' use of mental training (Gould, Eklund, & Jackson, 1992), their experience of peak performance (Cohn, 1991; Ravizza, 1977), sources of stress (Scanlan, Stein, & Ravizza, 1991), and of being coached (Johnson, 1998).

One qualitative research approach with the potential to uncover the richness and complexity of high-level athletes' imagery experience is the existential phenomenological interview (Dale, 1996; Valle & Halling, 1989). In this approach participants are asked to respond to a single open-ended question. Follow-up questions are used only to evoke additional clarification and details of the athlete's responses. The existential phenomenological interview places the athlete at the center of the research process. To avoid biasing athletes' interpretations of their experiences, the researcher participates in a bracketing interview that seeks to determine any biases or a priori assumptions he or she might have about the athlete's experiences (Dale,

1996; Valle & Halling, 1989). Any biases are noted and resisted during subsequent interviews in order to achieve a description of the athlete's experience that is "unfiltered" by the researcher. The existential phenomenological approach has been used in studies to examine high-level athletes' experiences of the decathlon event in track and field (Dale, 2000) to explore the nature of pre-performance routines used in golf (Cotterill, Sanders, & Collins, 2010) and golfers' experiences of coping with stress (Nicholas, Holt, & Polman, 2005). Dale (1996) contended that phenomenological interviewing is an excellent way of obtaining knowledge about a wide array of aspects of sport participants' experiences that may not be observable or adequately examined using traditional research designs. Thus, it appears that such an approach would be well suited to examine high-level athletes' experience of imagery.

When using a phenomenological approach, it is essential that researchers select participants who have firsthand experience with the phenomenon of interest (Dale, 1996; Thomas & Pollio, 2002). Previous research suggests that higher-level athletes use imagery more extensively and possess better imagery skills than novice athletes (Hall, 1985; Hall et al., 1998; Hall et al., 1990; Isaac, 1992). Furthermore, recent qualitative research suggests that experienced athletes are able to articulate their imagery use effectively (MacIntyre & Moran, 2007a, 2007b; Munroe et al., 2000).

One group of athletes that appears to engage in frequent imagery use is gymnasts (Calmels, D'Arripe-Longueville, Fournier, & Soulard, 2003; Hall et al., 1990; White & Hardy, 1998). For example, a recent study revealed that junior-level gymnasts use imagery as a tool for dealing with fear of injury in their sport (Chase, Magyar, & Drake, 2005). In an earlier study, White and Hardy (1998) found that three high-level gymnasts used imagery in diverse situations

(training and competition), for different functions (cognitive and motivational), to reinforce automatic skills, to maintain existing skills, to enhance concentration, and to review past performances. The athletes also reported that environmental constraints influenced the way they used imagery. For example, the gymnasts engaged in imagery the day before competition rather than the day of the competition because of the limited amount of time available during the meet. Of particular significance was the finding that the imagery experience of these gymnasts was *unique* to each individual in spite of the fact that they all responded to the same list of questions. These findings indicate, that gymnasts would be good candidates to explore athletes' use of imagery in an in-depth fashion.

Statement of the Problem

Most previous research describing athletes' imagery use has been limited by the parameters of standardized survey instruments or semi-structured interviews based on existing conceptual frameworks. Moreover, this research has focused on imagery use across sports, which has prevented the examination of the sport specific intricacies of imagery use.

Purpose

The purpose of this study was to examine high-level gymnasts' experiences of using imagery in their sport. To accomplish this objective, in-depth phenomenological interviews were conducted with current and former collegiate gymnasts.

Significance

Exploring high-level gymnasts' experiences of imagery will potentially provide practitioners and researchers with a better understanding of the complexity and richness of

athletes' imagery use. In addition the interview process might also assist participants in understanding and expanding their own imagery experiences.

Limitations

There are two principal limitations to the present study. First, it is possible that participants were not completely honest and/or accurate when recalling and discussing their experiences of using imagery for their sport. Second, the results were limited to the experiences of female collegiate gymnasts.

Delimitations

There are several delimitations in this study. First, participants were restricted to current and former (less than two years from competing) gymnasts who competed at the National Collegiate Athletic Association (NCAA) Division I level or above. Previous research has indicated that higher-skilled gymnasts use imagery in their sport more frequently than those of lower-skilled gymnasts (Hall et al., 1990; Weinberg et al., 2003; White & Hardy, 1998). Second, due to the importance of language in phenomenological research and the fact that the researcher's first language is English, participants were restricted to native English speakers. Third, recruitment of participants was restricted to gymnasts in North America (i.e., Canada and the United States).

Chapter 2

Review of Literature

Imagery is a popular psychological skill that an increasing number of athletes are using in competition and training (Hall et al., 1998; Hall et al., 1990; Munroe et al., 2000). It has been defined as the re-creation or creation of an experience in the mind that includes the multiple senses of vision, proprioception, taste, smell, and audition (Vealey & Greenleaf, 2010). Over the last forty years, scholars have examined several facets of imagery, but their research has primarily focused on answering four questions: “How does imagery influence sport performance?”; “Does imagery work?”; “What mediating factors influence an imagery intervention?”; and “What are the possible functions and usage of imagery?” In this chapter, each of these questions is addressed by examining existing research on the following topics: (a) imagery theories; (b) the influence of imagery on athletic performance; (c) mediating factors influencing imagery interventions; and (d) possible functions and uses of imagery. At the end of the chapter, general trends in imagery research are summarized and an alternative method for understanding athletes’ experiences of imagery is suggested.

Imagery Theories

Although imagery techniques have been widely used in sport settings, imagery’s underlying mechanisms are still not well understood. Several theories have been advanced to explain how imagery might enhance performance. These theories can be divided into three distinct categories: (a) early theories, (b) cognitive theories, and (c) the functional equivalence theory.

Early theories. In the 1930s, two imagery theories were purposed. They consisted of Sackett's (1934) symbolic learning theory and Jacobson's (1932) psychoneuromuscular theory. According to symbolic learning theory, mental imagery is a way of rehearsing the cognitive components of a motor task (Sackett, 1934). Sackett further suggested that imagery is most effective when participants are learning motor tasks that are sequential in nature and contain cognitive components. Mentally rehearsing the sequence provides a person with a blueprint for future actions. To test this theory, Minas (1980) compared the performance of four groups: a physical practice group (PP), a mental practice group (MP), a mental practice with feedback group (MPF), and a control no practice group. Participants performed a motor task that involved throwing a ball into a number of bins in a pre-defined sequence. The results on a posttest indicated that the sequencing of the MPF group was significantly more accurate than that of all the other groups. Minas suggested that the superiority of the MPF group could be attributed to more effective mental rehearsal of the correct sequence. The results of this study supported Sackett's (1934) notion that imagery benefits performance of tasks that are sequential in nature.

Psychoneuromuscular theory represented an alternative to symbolic learning theory. According to this theory, imagery improves motor performance by activating the motor components involved in the physical performance of a task. Jacobson (1932) proposed that minute levels of EMG activity occur during imagery and hypothesized that this activity is identical, albeit reduced in magnitude, to the EMG activity generated when the movement is actually performed. To test his hypothesis, Jacobson conducted a study in which participants imagined flexing their right arms in the absence of actual movement. The results revealed observable EMG activity in each of the participants' right arms as they imaged the movement.

He interpreted this finding by positing that the EMG activity that occurred during imagery transferred to the motor component of the task when it was physically produced (Jacobson, 1932). Support for this notion was obtained 40 years later when EMG activity was observed in the same muscle groups of a downhill skier when imaging and actually performing jumps and turns (Suinn, 1972).

Cognitive theories. In the 1970s two cognitive theories were proposed to explain the beneficial effects of imagery: bio-informational theory (Lang, 1977, 1979) and dual-code theory (Paivio, 1975). According to bio-informational theory (Lang, 1977, 1979) an organized set of propositions are stored in the brain's long-term memory whenever a person performs a movement. During subsequent imagery of the movement, this information is retrieved from long-term memory and provides the conditions as well as the behavioral, psychological, and physiological responses for producing the movement in a particular situation. According to the theory, imagery activates a stimulus proposition that describes the content of the image (e.g., the situation and environment) and a response proposition that describes the specifics of the response for that particular situation. For example, a downhill skier's imagery might involve a stimulus proposition (i.e., the situation's surroundings) such as the feel of the skis on the snow, the wind in the skier's face, the course layout, and the sound of the crowd. The skier's response propositions (how the athlete should respond to the event) might include coordinated muscle contractions in the legs and hands, increased perspiration, and the feeling of accomplishment following successful execution. The theory predicts that for imagery to facilitate sport performance, response propositions must be activated so they can be modified and strengthened.

Paivio's (1975) dual-code theory shares a similar cognitive framework as that of Lang's bio-informational theory. The theory proposes that imagery facilitates learning because it generates two distinct memory codes that can be recalled later during actual performance. For example, when mentally rehearsing the activity a skier might store both the word "skiing" and an image of skiing in long-term memory. Then later, when the information is needed to produce the skiing movement, the skier can recall the correct action by using verbal cues or imagery. The theory suggests that recalled information (either via imagery or verbal cues) provides a reminder of how to perform the skill successfully. For example, a gymnast might be reminded of how to produce an effective routine by recalling a verbal cue or by imagining the routine. Furthermore, Paivio suggested that these two memory codes (verbal and visual) are independent of each other. Therefore, if an athlete has difficulty remembering a verbal cue he or she could recall the visual image, or vice versa.

Functional equivalence theory. More recently, Holmes and Collins (2001) proposed a functional equivalence model of imagery. In essence the model suggests that imagery shares the same neural mechanisms as overt movement. Holmes and Collins contend that the brain stores memories in the form of a central representation that is accessed during preparation and execution of a task, whether the task is physically performed or imagined. Support for this framework comes from EMG and fMRI data showing similarities in the motor and neural activity accompanying overt and imaged movements. For example, Pascual-Leone et al. (1995) found similar neural activity in the primary motor cortex when participants imaged and actually performed a motor task. Other studies have also reported similar activity in the prefrontal areas, supplementary motor area, cerebellum and basal ganglia when participants image and actually

perform various motor skills (Decety & Ingvar, 1990; Decety, Sjöholm, Ryding, Stenberg, & Ingvar, 1990; Ingvar & Philipson, 1977). Since imagery and overt movement share similar neural patterns, Holmes and Collins (2001) suggested that effective imagery interventions should include seven components (i.e., physical, environmental, task, timing, learning, emotional, and perspective known as PETTTLEP) that should match the athlete's actual performance.

Smith, Wright, Allsopp, and Westhead (2007) compared the effectiveness of the PETTTLEP model to traditional imagery interventions, physical practice, and control conditions. In the first experiment, 48 varsity field hockey players were randomly assigned to one of four groups: sport specific imagery (PETTTLEP), clothing imagery, traditional imagery, or a control group. Post-intervention testing revealed that the imagery groups produced significantly more accurate penalty flicks than the control condition. In addition, the sport specific imagery group significantly outperformed the other two imagery conditions. In a second experiment, 40 junior-level female gymnasts were randomly assigned to one of four groups: PETTTLEP imagery group, stimulus-response imagery group, physical practice group, and control group. The results of posttests revealed that the PETTTLEP and physical practice groups significantly outperformed the other two groups on a jump skill performed on the beam. The authors concluded that interventions based on the PETTTLEP imagery model worked because they more closely approximated the conditions of actual performance than those based on other imagery models.

The exact underlying mechanisms producing positive imagery affects on sport performance remain uncertain. Although some evidence supports Jacobson's (1932) psychoneuromuscular theory, reviews by Feltz and Landers (1983) and Grouios (1992b) suggested possible methodological flaws with this research. For example, Feltz and Landers

(1983) stated that the EMG activity observed in Jacobson's (1932) participants did not appear to be localized in the imaged limb. It appears that the more plausible explanations of the underlying mechanism involved in imagery are Lang's (1977, 1979) bio-informational theory and Holmes and Collins' (2001) functional equivalence theory. Imagery interventions based on these theories have consistently produced improved sport performance (Bakker, Boschker, & Chung, 1996; Smith, Holmes, Whitmore, Collins, & Devonport, 2001; Smith et al., 2007). Furthermore there is evidence suggesting that imagery shares similar neural mechanisms of overt movements and that the brain stores memories in the form of central representations that are accessed during preparation and execution of a task, regardless of whether it is overtly performed or imagined (Decety & Ingvar, 1990; Decety et al., 1990).

The Influence of Imagery on Performance

A considerable amount of previous research has investigated the question, "Does imagery work?" Prior studies have examined the impact of imagery on both skill execution and on athletic performance (Weinberg, 2008). Imagery has also been shown to influence psychological variables associated with successful athletic performance (Callow et al., 2001; Garza & Feltz, 1998; Page, Sime, & Nordell, 1999).

Performance. One major reason an increased number of athletes and coaches are using imagery is the belief that it can have a positive impact on sport performance (Weinberg, 2008). Previous research supporting this assumption has demonstrated that imagery benefits performance of a number of different sport tasks varying in cognitive and motor demands. Experimental and applied research has revealed beneficial effects of imagery on basketball free throw shooting (Hall & Erffmeyer, 1983; Post et al., 2010), basketball defensive skills (Kendall,

Hrycaiko, Martin, & Kendall, 1990), karate (Weinberg, Seabourne, & Jackson, 1981), figure skating (Garza & Feltz, 1998), high jumping (Olsson, Jonsson, & Nyberg, 2008), and perceptual training in soccer (Jordet, 2005).

Grouios (1992a) conducted one of the first studies suggesting that imagery may have a beneficial effect on sport performance. In this study, a physical practice (PP) group performed a backward dive 10 times a day for 21 days, a mental imagery (MI) group imaged the backward dive in a soundproof room 10 times a day for 21 days, and a control group completed a crossword puzzle for the same amount of time over the same number of days. Although the results indicated that the PP group significantly outperformed the MI group, they also revealed that the MI group significantly outperformed the control group. Thus, Grouios suggested that imagery might be a powerful tool for practicing a motor skill outside of the physical practice setting.

In addition to experimental studies supporting the possible benefits of imagery, a number of review papers and meta-analyses have revealed that imagery benefits athletic performance to a greater extent than no practice at all (Driskell et al., 1994; Feltz & Landers, 1983; Martin et al., 1999; Rushall & Lippman, 1998; Weinberg, 2008). Furthermore the results of qualitative investigations with professional and Olympic athletes have suggested that imagery is a powerful strategy for improving sport performance (Orlick & Partington, 1988). While imagery has not been shown to be superior to physical practice (Driskell et al., 1994; Feltz & Landers, 1983; Grouios, 1992a; Martin et al. 1999), the available evidence suggests that when the necessary equipment, environment, opponent, practice time, and support are not available or when athletes are injured, imagery may serve as a useful substitute. Although imagery alone has been shown to

increase performance, the greatest benefits of imagery may be achieved by combining the intervention with physical practice (Coelho, De Campos, Da Silva, Okazaki, & Keller, 2007; Driskell et al., 1994; Maring 1990, Wrisberg, 2007).

Maring (1990) provided original support for this idea by comparing the performance of a physical practice only group (PP) with a physical practice combined with mental practice group (PP + MP) on a novel task, which involved tossing a ping pong into a cup. The amount of physical practice provided to each group was equivalent, but mental practice was added to the PP + MP group. When the performance of the two groups was compared, the PP + MP group learned the skill significantly faster than the PP group. More recently, the combination of physical practice and imagery has improved sport performance in golf pitching from the bunker (Smith et al. 2008), tennis serving (Coelho et al., 2007), high jumping (Olsson et al. 2008), and trampoline skills (Isaac, 1992). These previous findings suggest that imagery may be best implement with athletes' technical and tactical training.

Psychological variables. In addition to examining imagery's effect on sport performance, researchers have also explored the influence of imagery interventions on several psychological variables associated with effective sport performance. Psychological variables that have been examined include: self-efficacy (Feltz & Riessinger, 1990), confidence (Callow & Hardy, 2001), motivation (Martin & Hall, 1995), and competitive state-anxiety (Hale & Whitehouse, 1998). Bandura (1997) proposed that stronger self-efficacy beliefs should have a positive influence on performance through the mediating effect of imagery. He further suggested that the relationship between self-efficacy and imagery was bi-directional; that is, higher self-efficacy fosters images of successful performance and images of successful performance enhance self-efficacy.

One of the first studies to explore the relationship between imagery and self-efficacy was conducted by Feltz and Riessinger (1990). Specifically, they examined the possible influence of motivational-general mastery imagery (MG-M) and performance feedback on participants' self-efficacy and performance on a competitive muscular endurance task. Participants were assigned to one of three conditions: mastery imagery plus feedback (MFB), feedback alone (FB), and a no performance or feedback group (NPF). The results revealed significant increases in muscular endurance and self-efficacy in the MFB group when compared to NPF group. More recently, Beauchamp, Bray, and Albinson (2002) examined the relationship of MG-M imagery to self-efficacy and golfing performance. It was hypothesized that self-efficacy would be positively related to MG-M imagery use and to successful golf performance. The results indicated that athletes who had higher self-efficacy made more frequent use of MG-M imagery than did athletes who had lower self-efficacy (Beauchamp et al., 2002). Additionally, athletes with higher self-efficacy ratings also demonstrated superior golfing performance than players who reported lower levels of self-efficacy. These results suggest that imagery might be an effective cognitive strategy for increasing athletes' self-efficacy.

It also appears that imagery has a positive mediating influence on confidence, motivation, and the reduction of competitive anxiety. For example, mastery imagery and game strategy imagery have been shown to be associated with higher confidence levels in netball players (Callow & Hardy, 2001), MG-M imagery to be effective in increasing sport confidence in junior badminton players (Callow et al., 2001), and kinesthetic imagery to increasing confidence flat race horse jockeys (Callow & Waters, 2005). Imagery has also been found to increase golfers' motivation to practice longer compared to a no imagery control condition (Martin & Hall, 1995)

and decrease the competitive anxiety of athletes in soccer (Hale & Whitehouse, 1998), basketball (Carter & Kelly, 1997) and swimming (Page et al., 1999).

Overall, prior research suggests that imagery can benefit both sport performance and a number of psychological variables associated with effective performance. While imagery has not been shown to be as advantageous as overt physical practice, it does appear to be a useful substitute when the necessary resources for physical rehearsal are not available (e.g., practice equipment, opponents, fields, etc.).

Mediating Factors in Imagery Interventions

Although there is sufficient evidence that imagery positively influences both sport performance and psychological variables related to successful athletic performance, there also appears to be a number of variables that mitigate the effectiveness of imagery. These include (a) sport environment (b) imagery modality, and (c) imagery perspective.

Sport environment. Motor skills performed by athletes are executed in either open or closed environments. Closed skills are performed in relatively predictable and stable environments, while open skills are performed in changing, moving, and unpredictable environments (Wrisberg, 2007). Some authors have argued that imagery may be more effective for the performance of closed skills produced in predictable environments (e.g., golf swing) because athletes are able to plan their movements in advance (Coelho et al. 2007; Lidor & Singer, 1994; Vealey & Greenleaf, 2010). There appears to be preliminary support for this argument. For example, imagery has been found to improve performance in basketball free throw shooting performance (Post et al., 2010), diving (Grouios, 1992a), trampoline (Isaac, 1992), and tennis serving (Coelho et al., 2007; Malouff, McGee, Halford, & Rooke, 2008).

In one of the first applied studies examining the effects of imagery in an intact athletic setting, Hall and Erffmeyer (1983) randomly assigned 10 collegiate women's basketball players to one of two groups, a visuo-motor behavior rehearsal (VMBR involves a combination of imagery and relaxation) plus video modeling group or an imagery plus relaxation only group. After obtaining baseline free throw percentages (number of shots made out of twenty free throws), the researchers introduced the respective interventions for a period of two weeks. The VMBR plus modeling group watched an expert model for two minutes then used the VMBR technique to image their perfect free throw shot for an additional 20 minutes. The imagery plus relaxation group first relaxed then imaged shooting free throws for 20 minutes. The results of a posttest revealed that the VMBR plus modeling group produced a significantly higher free throw percentage compared to the imagery plus relaxation group. These findings suggested that imagery in combination with observation of an expert model could be effective for improving a closed skill performed in environments that are predictable and allow performers to plan their movements in advance.

While subsequent research has generally shown that imagery improves free throw shooting performance as well as the execution of several other closed skill (e.g. diving and gymnastics) (Grouios, 1992a; Isaac, 1992), the results of other research has not been as clear. For example, equivocal results have been obtained in studies examining imagery effects with tasks such as dart throwing (Cumming, Nordin, Horton, & Reynolds, 2006; Epstein, 1980) and golf putting (Ploszay, Gentner, Skinner, & Wrisberg, 2006; Taylor & Shaw, 2002). The inconsistency of these results, however, may be due to the various ways imagery interventions were designed and implemented in these studies. For example, imagery manipulations have included outcome

imagery (positive vs. negative) (Nordin & Cumming, 2005; Taylor & Shaw, 2002), positive self-talk (Cumming et al., 2006), different imagery functions (motivational vs. cognitive) (Short et al., 2002), different imagery perspectives (external vs. internal) (Epstein, 1980) and polysensory imagery combined with overt physical rehearsal (Ploszay et al., 2006).

In contrast to numerous imagery studies with closed skills, relatively little research has examined the impact of imagery interventions on skills performed in open environments. However, the studies that have been conducted suggest that imagery may benefit the performance of these types of tasks as well. For example, Jordet (2005) examined the effects of an imagery intervention on high-level soccer players' decisions about future actions during league soccer games. The study included three male European midfield professional soccer players and employed a single-subject design to assess the efficacy of the imagery intervention. Performance measures included the player's visual searches without the ball (examining open space in the defense), visual searches with the ball (looking for space and teammates), and performance with the ball (ability to penetrate the defense or make appropriate passes). After baseline performance of these behaviors was established, the imagery intervention was implemented. The intervention lasted 10 to 14 weeks and included imagery of various game situations. The results revealed that two out of the three players improved their overall soccer performance following the intervention and the one player who did not, had little room for improvement due to a high level of baseline performance. All three participants rated the imagery training to be very helpful, which provided social validity for the intervention. In addition to improving perceptual components in soccer, imagery has also been found to benefit other skills performed in open environments, including karate sparring (Weinberg et al., 1981),

skiing (Grouios, Kouthouris, & Bagiatis, 1993), volleyball passing (Roure et al., 1999) and defensive skills in basketball (Kendall et al. (1990).

Taken together, the results of previous research suggest that imagery might benefit the performance of closed and open tasks equally. Descriptive studies with high-level athletes particularly seem to support this notion. One study examined the psychological strategies used by high-level wrestlers (open skill sport) and springboard divers (closed skill sport), the results revealed that both types of athletes employed imagery on a consistent basis (Highlen & Bennett, 1983). Other survey research suggests that high-level athletes in the sports of football, ice hockey, soccer, squash, gymnastics, figure skating, and golf all use imagery to enhance performance (Hall et al., 1990).

Imagery modality. Another factor that may mediate the effectiveness of an imagery intervention is imagery modality (Morris et al., 2005; White & Hardy, 1995). While imagery is often multisensory, imagery modality has generally been conceptualized as being either visual or kinesthetic. Visual imagery relates to what athletes see that is associated with performing a certain task (Morris et al., 2005). For example, a batter using visual imagery might “see” the pitcher’s motion and the approaching ball. In contrast, kinesthetic imagery refers to the feel associated with coordinated movements during the skill (Morris et al., 2005). For example, the same batter might use kinesthetic imagery to “feel” the movements associated with swinging the bat.

There have been relatively few studies examining the effects of imagery modality on sport performance. The studies that have been conducted have largely examined imagery modality on learner’s skill acquisition. For example, Féry and Morizot (2000) examined the

effect of different imagery modalities on tennis serving. Thirty-two male participants were randomly assigned to one of four groups: visual imagery plus visual model, kinesthetic imagery plus kinesthetic model, visual model only, or kinesthetic model only. The study consisted of three experimental phases. Prior to the first phase baseline serving performance was assessed (i.e., accuracy, form, and speed). In the first phase, participants were exposed to their respective model six times. The visual model groups watched an expert model perform the task, while the kinesthetic model groups were blindfolded and manually guided through the correct serving form. In the second phase the imagery groups imaged according to their respective instructions (i.e., visually or kinesthetically), while the model only groups performed a distraction task. In the third phase, participants' performed 10 tennis serves. The results revealed that both imagery groups significantly outperformed the model only groups on form, accuracy, and speed. Furthermore, the kinesthetic imagery group significantly outperformed the visual imagery group on form and speed. Thus, Féry and Morizot suggested that kinesthetic imagery might be more effective than visual imagery in achieving the proprioceptive feel and timing parameters associated with serving performance.

In a subsequent study, Farahat, Ille, and Thon (2004) compared the effects of visual and kinesthetic imagery on the learning of drawing of a graphic design pattern using a stylus. Participants were assigned to one of four conditions: visual model plus visual imagery, kinesthetic model plus kinesthetic imagery, visual model only, and kinesthetic model only. The models consisted of visual depictions of the pattern or passive movement of the participant's limb over the pattern. The experiment consisted of a pretest, the experimental treatments, a posttest, and a retention test (one week following the posttest). The results revealed a significant

reduction in drawing errors for the imagery groups compared to the model only groups.

Furthermore, on the retention test the visual imagery group demonstrated significantly less error than the kinesthetic imagery group. Thus the authors suggested that visual imagery might have a greater benefit on tasks in which a visual representation of a movement pattern is important.

Taken together, the minimal research conducted on imagery modality suggests that visual imagery benefits the performance of tasks in which movement pattern is important, whereas kinesthetic imagery benefits the performance of tasks requiring sensitivity to the proprioceptive feel and timing of the movement. Some support for this notion was suggested in a study in which figure skaters and gymnasts (athletes in sports for which proprioceptive cues and timing are important) reported more frequent use of kinesthetic imagery than did soccer, football, and squash players (Hall et al., 1990). However, more research is needed to determine the relative efficacy of visual and kinesthetic imagery on different types of sport performance.

Imagery perspective. The final factor that may influence the effectiveness of an imagery intervention is imagery perspective. Previous research has established that athletes use two imagery perspectives: internal and external. Mahoney and Avener (1977) defined internal imagery as “an approximation of the real-life phenomenon such that the person actually imagines being inside his or her body and experiences those sensations which might be expected in the actual situation” (p. 137). In contrast, external imagery is tantamount to watching one’s performance on a television screen. Mahoney and Avener defined this imagery perspective as one in which the performer “views himself from the perspective of an external observer (much like in home movies)” (p. 137). Some researchers have argued that an internal perspective is more beneficial for tasks in which precise spatial location, environmental conditions, and

movement timing are important (White & Hardy, 1995) and that an external perspective is more beneficial for the acquisition and performance of skills that depend on the production of a defined movement form or specific mechanics (Morris et al., 2005). To date, only a few studies have been conducted to systematically test these predictions.

White and Hardy (1995) examined the effects of imagery perspective on two different tasks that depended either on form or on perceptual information in the environment. In the first task participants negotiated a modified slalom course with a wheelchair and were instructed to execute the task as quickly as possible without making errors (hitting or going outside of cones). In the second task participants were required to learn and accurately execute a sequence of arm and club positions using rhythmic gymnastics clubs. The results for the first task revealed that the internal imagery condition had significantly fewer errors than the external imagery condition; however, the external perspective condition had significantly faster times. The results for the second task indicated that the external imagery group was significantly more accurate than the internal imagery condition. These results suggest that an internal perspective is preferable for tasks that require perceptual information, but that both internal and external perspectives have merit for task requiring the execution of correct form.

More recently, Hardy and Callow (1999) found that external perspective was superior to an internal perspective for performing tasks such as kata movements (karate sequence of movements) and a simple floor routine in gymnastics. The latter finding conflicted with earlier research by Mahoney and Avener (1977) that indicated US Olympic all-around qualifying male gymnasts utilized an internal perspective more frequently than an external perspective. One possible explanation for this discrepancy is that some gymnastics events place more emphasis on

form while others demand accurate processing of perceptual information. If so, it would seem reasonable to presume that gymnasts use the imagery perspective that is most beneficial for particular events.

Finally, it should be noted that some studies have found no clear preference of imagery perspective on tasks such as rock climbing (Hardy & Callow, 1999) and cricket pitching (Gordon, Weinberg, & Jackson, 1994) while others have revealed some athletes use both perspectives interchangeably (Hall et al., 1990; Weinberg et al., 2003). Thus, it remains unclear whether a single imagery perspective is always preferable for the performance of any particular sport task.

In summary, there appear to be several variables (e.g. sport environment, imagery modality, and imagery perspective) that influence the ways athletes use imagery and that might mediate the effectiveness of an imagery intervention. Clearly, the available evidence indicates that imagery benefits sport tasks that are performed in either open or closed environments, or some combination of the two. However, the limited amount of research on imagery modality (vision and kinesthetic) and perspective (internal and external) makes interpretation of the possible effects of these dimensions on performance tenuous. The existing research suggests that high-level athletes, irrespective of the sport they participate in, use both modalities and perspectives equally or at least to some extent.

Possible Functions and Usage of Imagery

In addition to understanding imagery's effect on sport performance, researchers have also devoted considerable attention to the ways in which athletes use imagery. Previous research has

utilized descriptive and qualitative designs to describe and understand athlete's imagery use (Hall et al., 1998; Munroe et al., 2000; Munroe et al., 1998).

Descriptive methods describing athletes' imagery use. In an attempt to describe athletes use of imagery, Paivio (1985) developed the analytic framework of imagery effects. Essentially the framework suggested that imagery could be used for both cognitive and motivational purposes, with each function having the capability of directing athletes' attention or effort towards specific or general goals. For example, a soccer player might image the technique of striking a ball (cognitive specific) or the execution of a game strategy (cognitive general).

Hall et al. (1998) used the analytic framework, literature reviews, and previous imagery questionnaires in the development of the Sport Imagery Questionnaire (SIQ). The purpose of this research was to develop an instrument to assess athletes' imagery use in accordance to the functions described by Paivio (1985). Three experiments were designed to validate the content and construct properties of the SIQ. Experiments 1 and 2 validated that items on the SIQ were separate distinct factors (i.e., cognitive and motivational). Experiment 3 was designed to assess construct and predictive validity in a sample of 271 high school, varsity, or national athletes competing in the sports of track and field and ice hockey. The results indicated that athletes use imagery for five functions: *Motivational-Specific (MS)* (i.e., to represent specific goals and goal oriented behaviors), *Motivational General-Mastery (MG-M)* (i.e., to represent effective coping and mastery of challenging situations); *Motivational General-Arousal (MG-A)* (i.e., to manage relaxation, stress, arousal, and anxiety regulation); *Cognitive Specific (CS)* (i.e., specific skill and technique); and *Cognitive General (CG)* (i.e., to represent mega-strategies associated with a sport). The results of the study suggest that team (i.e., hockey) and individual athletes' (i.e., track

and field) imagery use was largely consistent with Paivio's (1985) original framework in that athletes' imagery served motivational and cognitive functions.

Subsequent research employing the SIQ has examined differences in imagery functions of high-level and novice athletes (Arvinen-Barrow, Weigand, Thomas, Hemmings, & Walley, 2007) as well as high and low-confidence athletes (Short & Short, 2005), and assessed athletes' use of imagery in the off-season (Cumming & Hall, 2002). One of the first studies to implement the SIQ was conducted by Munroe et al. (1998). The investigation examined whether time of season (early vs. late) or type of sport (team vs. individual) influenced an athlete's use of the five functions of imagery. In that study, 350 Canadian university athletes from 10 different sports (badminton, basketball, field hockey, fencing, football, ice hockey, rugby, soccer, volleyball, and wrestling) completed the SIQ at the beginning and end of their seasons. Analysis of SIQ scores revealed several differences in the functions of athletes' imagery at those two points in the season and for athletes in different sports. For example, CS imagery increased significantly from the beginning to the end of the season for athletes in fencing, field hockey, soccer, and wrestling while MS, MG-M, and MG-A imagery increased from the beginning to the end of season for athletes in rugby, soccer, and wrestling. Interestingly, CG imagery increased from beginning to end of the season for all athletes except those participating in badminton. No differences in imagery function were found between athletes in team and individual sports.

Another questionnaire that has been developed to describe athletes' imagery is the Imagery Use Questionnaire (IUQ; Hall et al., 1990). The IUQ allows researchers to not only assess when, where, and how athletes use imagery, but also their imagery perspective (e.g., internal or external), imagery control, and kinesthetic imagery. Hall et al. validated the IUQ by

examining the use of imagery by 381 athletes in the sports of football, ice hockey, soccer, squash, gymnastics, and figure skating. An item analysis revealed that the athletes used imagery more in conjunction with competition than practice. All participants reported using imagery extensively, but considered the motivational function of imagery to be the most important. In addition they appeared to use both an internal and external imagery perspective equally. There was, however, a slight trend that athletes differed in regards to imagery modality (i.e., visual or kinesthetic). Athletes in closed sports (i.e., figure skating and gymnastics) used kinesthetic imagery slightly more than did open sport athletes (i.e., football, soccer, and squash), but the difference was not significant. A finding consistent with most imagery research was that higher-level athletes used imagery more frequently than did lower-level athletes.

While most studies have used either the SIQ or the IUQ inventories, some have incorporated both to describe when and where athletes use imagery for the various functions. For example, Weinberg et al. (2003) used the SIQ, IUQ, and several open-ended questions to explore the relationship between athletes' imagery use and perceptions of imagery effectiveness. A total of 523 college athletes from the sports of volleyball, basketball, cross-country, diving, wrestling, track and field, golf, tennis, soccer, baseball, softball, skating, and swimming completed the questionnaires and two open-ended questions that asked them to describe what type of imagery they used and when they used it. Perhaps not surprisingly, the analysis revealed that the more frequently athletes used imagery for a particular function (e.g., CS, CG, MS, MG-A, MG-M) the more effective they perceived the imagery to be. Athletes' responses to the open-ended questions revealed that they used both internal and external imagery perspectives, used imagery in a

variety of settings, and most often employed imagery before competition or for “tough/difficult” situations.

Qualitative methods describing athletes’ imagery use. Qualitative research approaches have also been used to understand the various ways in which athletes use imagery. With these methods, researchers have been able to obtain more detailed information about athletes’ use of imagery in their sport (MacIntyre & Moran, 2007a, 2007b; Munroe et al., 2000; White & Hardy, 1998). In most studies of this nature, researchers have used a semi-structured interview guide containing specific questions to which athletes provide their responses.

White and Hardy (1998) conducted one of the first qualitative investigations into athletes’ imagery use. The authors implemented a semi-structured interview guide to ascertain how high-level slalom canoeists and artistic gymnasts used imagery in various settings. Questions on their interview guide were designed to obtain information about athletes’ general imagery use, use of imagery in training and competition, and perceptions of overall effectiveness of imagery. Throughout the interviews White and Hardy used follow-up probes to obtain additional details and clarification of athletes’ answers. The results indicated that athletes used imagery in different situations (training and competition), for different functions (cognitive and motivational), and to reinforce automatic skills, maintain existing skills, and to enhance concentration. Participants also reported that environmental constraints influenced the way they used imagery. For example, if time was going to be limited at the competition site, artistic gymnasts engaged in imagery the day before the competition. Of particular significance, however, was the finding that the imagery experience of athletes was *unique* to each individual in spite of the fact that all participants responded to the same list of structured questions.

Perhaps the most detailed description of athletes' imagery use was obtained in a study conducted by Munroe et al. (2000). Fourteen athletes from the sports of golf, softball, swimming, tennis, track, volleyball, and wrestling were interviewed to determine *where*, *when*, *why*, and for *what* reasons they used imagery. Semi-structured interview questions based on the components of Paivio's (1985) conceptual framework were used to assess how these athletes engaged in imagery during competition and in practice settings. For example, one motivational imagery question was "Could you describe your use of imagery to control arousal and stress?" (p. 125). The results revealed that athletes used imagery for both cognitive and motivational purposes and did so outside of practice, during practice, prior to competition, and following competition. In addition, however, participants described a more in-depth imagery experience than had been depicted by athletes in previous studies. For example, the athletes indicated that their imagery could be either positive or negative (imagery of success or mistakes), that it was multi-sensory (vision, audition, taste, and proprioception), and that the images included aspects of their performance surroundings. One interesting finding was athletes' comments on the speed of their imagery. For example one tennis player commented, "I'll just be lying there in bed visualizing and the images will be really slow... It's not quick at all" (Munroe et al. 2000, p. 131).

More recently, MacIntyre and Moran (2007a, 2007b) examined the meta-imagery process underlying high-level athletes' imagery (i.e., athletes' beliefs about the nature and regulation of their imagery skills). Their participants included athletes from the sports of rugby, fencing, golf, auto racing, and slalom canoeing. Although the researchers utilized an interview guide containing questions based on the Hall et al. (1998) five functions of imagery, they discovered a much more complex description of sport imagery than had been revealed in earlier qualitative

research. For example, participants described using creativity imagery (e.g., developing creative play), imagery of a variety of performances (e.g., poor, typical, and ideal), and imagery as an adjunct to physical rehabilitation of an injury. They also reported using debilitating and facilitative imagery that contained “what-if” components (e.g., the rehearsal of what they would do to correct problems or respond to mistakes) and other indicators of flexibility. For example, a racecar driver reported: “I would use (imagery) sometimes if a car wasn’t handling right. In my imagery I would say ‘it’s under-steering’...so I would imagine how to drive around the problem...” (MacInytre & Moran, 2007b, p. 12).

In summary, previous research has largely used descriptive approaches to describe and understand athletes’ imagery use. These approaches have implemented questionnaires such as the SIQ and IUQ. The results of descriptive research suggest that athletes’ imagery serves multiple functions (i.e., cognitive and motivational) (Callow & Hardy, 2001; Cumming & Hall, 2002; Hall et al., 1998; Weinberg et al., 2003). More recently researchers have used a qualitative approach to explore athletes’ imagery experience in greater detail (Munroe et al., 2000; White & Hardy, 1998). Among the more important outcomes of the latter studies is that the nature of high-level athletes’ imagery appears to be complex and *unique* to each individual athlete.

Summary

As mentioned at the beginning of this chapter, prior imagery studies have attempted to address four primary questions “How does imagery influence sport performance?” “Does imagery work?” “What mediating factors influence an imagery intervention?” and “What are the possible functions and uses of imagery?” While the answers obtained in a number of studies have added to our understanding of sport imagery, they also suggest that more remains to be

discovered. For example the answer to the first question is still somewhat unclear, however, existing research suggest that imagery influences sport performance through accessing and rehearsing central representations of the movements to be performed (Lang, 1977, 1979).

In response to the second and third questions, prior research has largely utilized experimental and descriptive approaches to determine the effects of imagery on sport performance and on a various psychological states supportive of performance. Generally speaking, these investigations have shown that imagery can have a positive impact on a variety of sport tasks and various psychological variables (Driskell et al., 1994; Garza & Feltz, 1998; Weinberg, 2008). Although less clear are the benefits of imagery in various sport environments (open versus closed), the relative efficacy of different imagery perspectives (internal and external), and the importance of imagery modality (visual and kinesthetic) to the effectiveness of imagery interventions.

In addressing the last question researchers have utilized descriptive and qualitative approaches. Descriptive designs have described athletes' functions, the content, and where they use imagery. While only a few qualitative investigations have been conducted, these studies provided more in depth data regarding the *where*, *when*, *why*, and *what* of high-level athletes' imagery (MacIntyre & Moran, 2007a, 2007b; Munroe et al., 2000). In addition, the fact that these researchers have employed a semi-structured interview guide approach, make it likely additional features of athletes' imagery experience remain to be discovered.

A potentially fruitful alternative to the semi-structured approach is open-ended phenomenological interviewing (Dale, 1996; Martens, 1987). As noted in the previous section, qualitative research has demonstrated considerable individual differences in athletes' imagery

experiences and that their imagery may be more complex than previously postulated (MacIntyre & Moran, 2007a, 2007b; White & Hardy, 1998). If so, perhaps the most accurate answer to the possible functions and way athletes use imagery is “it depends.”

Therefore the primary purpose of the present investigation was to explore athletes’ imagery experience by allowing participants to dictate what *they* chose to share about their experience. In order to accomplish this purpose, existential phenomenological interviews (Dale, 1996; Valle & Halling, 1989) were conducted with high-level, female collegiate gymnasts. It was anticipated that their stories would extend what we presently know about sport imagery, contribute potentially important “missing pieces” to the current imagery puzzle, and perhaps contribute some necessary “fine-tuning” to contemporary conceptual models.

Chapter 3

Method

Existential phenomenology has been defined as “a combination of two philosophies, one concerned with a certain perspective on human existence and the other with a certain mode of investigating that existence” (Pollio, Henley, & Thompson, 1997, p. 4). The first component “existentialism” is a philosophy developed by Soren Kierkegard in the nineteenth-century (Valle & Halling, 1989). This philosophy explores the depth of the human existence such as who we are and how we live the authentic life (Thomas & Pollio, 2002). The second component “phenomenology” is a systematic method for studying the human experience, which was developed by philosophers Edmund Husserl (1931) and Martin Heidegger (1962). In contrast to traditional scientific methods that attempt to understand a phenomenon through objective means, existential phenomenology strives to elucidate, through dialogue, human experiences that are not easily observable (Thomas & Pollio, 2002; Valle & Halling, 1989). The existential phenomenological approach also differs from other qualitative methodologies by trying to capture the participant’s personal experience instead of providing descriptive accounts of the individual’s actions or behaviors (Polkinghorne, 1989).

When examining a phenomenon using a traditional scientific approach, three criteria must be met “(a) it must be observable, (b) it must be measurable, and (c) it must be possible for other observers to agree on its existence and characteristics” (Valle & Halling, 1989, p. 4). Given that the phenomenon of sport imagery does not satisfy these criteria, an alternative method for addressing the purpose of the present study, which was to understand high-level gymnasts’ experiences of using imagery in their sport, was used. That method was the existential

phenomenological interview and the purpose of this chapter is to provide an overview of the procedures that were used.

Procedures

While different phenomenological methods exist, this study employed the Tennessee Model outlined by Thomas and Pollio (2002). The Tennessee Model includes specific procedures for *exploring research bias, selecting participants, data collection, data analysis, and developing/confirming the thematic structure.*

Exploring Researcher Bias

Ihde (1986) suggested that it is essential for the researcher to attend to the phenomenon as it is. This implies that researchers suspend any previous assumptions regarding beliefs, prejudices, or theories about the phenomenon they are studying. Thus the first step in phenomenological research is exploring the researcher's preconceived notions and biases about the topic of interest. This is accomplished through what is known as a bracketing interview. Valle and Halling (1989) suggested that bracketing and re-bracketing allow the researcher to "move from the *natural attitude* toward the *transcendental attitude*" (p. 11). The *natural attitude* refers to prior beliefs that an individual espouses from the natural science perspective and the *transcendental attitude* refers to the realm of the phenomenon itself, which in the present study is the gymnast's experience of imagery.

Bracketing interview. For the purposes of this study, the primary researcher participated in a bracketing interview conducted by an individual who had extensive background and expertise in phenomenological interviewing. During this interview the researcher discussed his experiences and perceptions about sport imagery. The goal of the interview was to increase the

researcher's awareness about his preconceived beliefs and assumptions regarding sport imagery. The interview was transcribed and thematized. The researcher then made written notation of the themes/biases and made every effort to "bracket" them (i.e., avoid imposing them) during subsequent interviews with participants or when thematizing the interview transcripts (Merleau-Ponty, 1962; Thomas & Pollio, 2002). The themes that emerged from the bracketing interview included the assumptions that participants would talk about how imagery positively impacted their sport performance; that they would say they used imagery to improve the technical as well as mental (e.g. confidence and anxiety) aspects of their performance; and that the functions of their imagery would conform to the functions postulated in existing conceptual frameworks (Hall et al., 1998), including Motivational Specific, Motivational General-Mastery, Motivational General-Arousal, Cognitive General, and Cognitive Specific.

It should also be noted that bracketing was not a one-time event but was rather a consistent aspect of the research process throughout the course of study. Pollio et al. (1997) suggested that continuation of bracketing throughout an investigation allows the researcher to be "attuned to their presuppositions about the nature and meaning of the present phenomenon and thereby sensitize them to any potential demands they may impose on their co-participants either during the interview or in its subsequent interpretation" (p. 48). One technique the researcher used to continue bracketing during the interview process was to record field notes after each interview. In these notes the researcher described the physical setting, unusual events, verbal communication, and salient aspects of his and the participant's reactions during the interview (Thomas & Pollio, 2002).

Selecting Participants

The second feature of the Tennessee Model is the selection of appropriate participants. To be considered for phenomenological research prospective participants must meet two criteria: (a) they must have experience with the phenomenon of interest and (b) they must possess the willingness and ability to describe the experience (Dale, 1996; Thomas & Pollio, 2002). Given the intended purpose of this study, three criteria were considered necessary for participation. First, the gymnasts had to have competed at National Collegiate Athletic Association (NCAA) Division I level or above (e.g., professional & Olympic athletes). Second, they must have had experience using imagery in relation to their sport performance. Third, gymnasts had to be willing and able to provide rich and detailed descriptions of their experiences (Polkinghorne, 1989). The first criterion was considered necessary because previous research indicated that high-level athletes typically have a more extensive imagery experience than do novices (Hall et al., 1998; Hall et al., 1990) and that these athletes are able to articulate their imagery experience in a detailed fashion (MacIntyre & Moran, 2007a, 2007b).

Upon obtaining approval from the University of Tennessee Institutional Review Board, a variety of recruitment tactics were used to enlist high-level gymnasts for participation. They included referrals from professional colleagues of the researcher (i.e., fellow sport psychology consultants), referrals from individuals in the larger sport community (i.e., collegiate athletic departments) and referrals by other athletes (i.e., snowball sampling). Contact was made with potential participants via email to provide them with information about the study and to establish their interest in participating. The email included a brief description of the purposes, procedures, and criteria for inclusion (See Appendix A). Interviews were then scheduled at a time and place

that was convenient for the participants. The most appropriate and convenient format was also determined (e.g. face to face, phone, or video conferencing).

The final number of participants was determined by data saturation. Saturation occurs when interview data becomes redundant and no new information or themes emerge (Valle & Halling, 1989). After each interview the audio record was transcribed and initially thematized by the primary researcher. Between interviews eight and nine it was apparent that no new information or themes were emerging. The tenth interview confirmed that data saturation had been reached and therefore no further interviews were conducted. A description of each of the participants in the final sample is given in Chapter 4.

Data Collection

Pilot interview. Prior to data collection the researcher conducted a pilot interview with one female collegiate athlete from the sport of track and field. The purpose of the interview was to determine whether the question was appropriate for examining the research topic and to provide the researcher with an opportunity to refine his interviewing skills. Feedback provided by the pilot participant was used to refine the question and the researcher's interviewing skills. After completing the pilot interview, interviews with the other participants were scheduled.

Interviews. Interviews were conducted either face-to-face, over the phone, or through video conferencing. Of the ten interviews, three were conducted face to face, three were via video conferencing, and four were conducted over the phone. However, regardless of the format used, the interview structure remained consistent across all interviews. The duration of the interviews differed from participant to participant and ranged from approximately 20 minutes to 70 minutes. Prior to each interview, participants were given a full explanation of the nature of the

study and asked to provide written informed consent (See Appendix B). They were told that their responses would remain confidential and were advised of their right to discontinue participation at any time without penalty or prejudice. Participation was completely voluntary and participants were informed that no payment would be received for taking part in the study. Additionally, each participant was asked to select a pseudonym, which would later be used to identify her responses and maintain confidentiality during analysis procedures. All interviews were recorded using a digital voice recorder and all recordings were kept in a secure location until the digital files were transcribed. After transcription was completed the digital files were destroyed.

Following a brief period of informal discussion the interview was commenced. Thomas & Pollio (2002) suggest that the opening question should be worded to “allow for a broad range of descriptive responses from each participant” (p. 32). A major goal of phenomenological research is not to lead participants in certain directions, but to help them elaborate on various aspects of their personal experience (Thomas & Pollio, 2002). Therefore, for the purpose of this study, participants were asked to respond to the following open-ended question: “Think of a time when you used imagery in your sport and describe it to me as fully as possible.” Follow-up questions were asked only to assist the participant in unfolding themes or in clarifying details regarding their experience (Thomas & Pollio, 2002; Valle & Halling, 1989). To ensure that every aspect of the athlete’s imagery experience was covered, the researcher concluded the questioning by asking the gymnast if she had anything else to share about her imagery experience. At the end of each interview the researcher summarized the main points and asked for validation or any corrections the participant might have. He also obtained demographic information (e.g. age, years in gymnastics, and level of expertise) and any other details participants wished to share

regarding their imagery use (e.g. frequency and location of imagery use, length of an average session, etc.) (See Appendix C). The researcher then thanked the participant and concluded the interview.

After the participant departed or the phone conversation ended the researcher immediately recorded field notes (See Appendix D), which were used later to contextualize the interviews and provide additional information during the data analysis process.

Analyzing the Data

After each interview was completed the audio record was transcribed verbatim; at which point the emphasis shifted to deriving meaning from the written text. One major aim of phenomenological research is not to infer from the text, but rather interpret the text. Hans-Georg Gadamer (1975) developed an approach to studying human existence through text know as *hermeneutics*. Palmer (1969) described hermeneutics as “the study of understanding, especially the task of understanding text” (p. 9). An important aspect of hermeneutics is keeping in mind the contextual factors in the text. For example, a person shouting at a sporting event could be interpreted as excitement, however the same shouting in a quiet restaurant may be interpreted as anger. The context helps bring meaning to the text and must be considered by the researcher. To ensure that text interpretation is conducted using a meticulous process, several steps were taken.

First, the researcher read the transcript several times in order to get a sense of the whole (Dale, 1996). Then the participant was invited to read the transcript for clarity and accuracy and allowed to make any changes (Thomas & Pollio, 2002; Valle & Halling, 1989). Seven of the ten participants confirmed that the text accurately capture their experience while the other three did not reply to the initial or follow-up emails. Thus, it was assumed that they were satisfied with the

accuracy of their transcripts as well. However, it should be noted that because these participants resided at various locations around the United States it was difficult logistically to gain follow-up access, especially when gymnasts were in training for the upcoming season.

After this initial step the researcher began identifying statements from the text that stood out as well as patterns that appeared to reoccur. The passages and statements that were identified constituted meaning units. Thomas and Pollio (2002) note that “interpretation is rooted in a continuous process of relating a part of some text to the whole of the text, and any and all passages are always understood in terms of their relationship to the larger whole” (p. 35). Therefore, to ensure that the identified meaning units were supported by the text, the researcher sought the assistance of an interpretive research group.

Interpretive research group. The researcher shared four transcripts with an interpretive research group at the University of Tennessee. Each transcript was read aloud with one group member reading the participant’s statements and another reading the statements of the researcher (Thomas & Pollio, 2002). Throughout the readings the group stopped frequently to discuss possible themes emerging from the text. Two professors with expertise in existential phenomenology led the group discussions, but all group members representing a variety of disciplines (e.g. nursing, counseling, psychology, and sport psychology) shared their opinions on the transcript. While the text was being read group members wrote down comments and opinions on their individual copies of the transcript. The researcher used the notes he took during the discussion as well as those obtained from the group members to assist him throughout data analysis. Since this was the same group that had read and interpreted the primary researcher’s biases from his bracketing interview, they were able to identify any of his presuppositions that

might have appeared during interviews with the participants. This reflective process required the primary researcher to account for his interpretations of the text and respond to any questions or challenges by the group regarding his original analysis of the text (Thomas & Pollio, 2002). Once the researcher was comfortable with the interpretative process he independently analyzed the remaining texts. The entire analysis resulted in the development of a thematic structure. This involved connecting smaller meaning units and searching for metaphors in the interview transcripts that described the imagery experience of the gymnasts. To ensure accuracy, all the themes and meaning units were continually cross-referenced with the original transcripts (Dale, 1996). The thematic structure was developed and refined several times until a final structure emerged and consensus was achieved between the researcher and the interpretative research group. The final thematic structure representing the major themes and their relationships emerging from the gymnasts' experience of imagery is depicted in Figure 1.

Confirming the Thematic Structure

The final step of the phenomenological research process is to obtain feedback from the participants in order to determine whether the thematic structure accurately reflects their personal experience of sport imagery (Dale, 1996; Thomas & Pollio, 2002). To facilitate the highest degree of validity, participants words are used to describe the phenomenon in question (Dale, 1996; Thomas & Pollio, 2002). Dale (1996) suggested that using participant's words in the final thematic structure keeps the interpretation close to their personal experience.

All participants received copies of the final thematic structure to review and seven of the ten provided feedback. All respondents indicated that the thematic structure accurately reflected their experiences of using imagery in their sport and offered no further feedback. The following

response by one gymnast (Renee) is representative of most replies, “I looked over your image and read your breakdown and it all sounds very accurate. It’s a very specific breakdown of what I described to you, so I think it looks great. I couldn’t have explained it better.”

Issues of validity and reliability. Thomas and Pollio (2002) suggest that while phenomenological research is disparate from ordinary science, it does share similar standards, including “systematic gathering of relevant information, disciplined interpretation, and empirically derived results that are stable, consistent with data, and open to public scrutiny” (p. 39). Phenomenological research is deemed valid if logical steps are taken to produce thematic structures that are supported by the data and accurately represent participants’ experience of the phenomenon of interest. According to Polkinghorne (1989) “the degree of validity of the findings of a phenomenological research project, then, depends on the power of its presentation to convince the reader that its findings are accurate” (p. 57).

With respect to the issue of reliability it is important to note that while no two interviews or experiences are ever alike, the structure of the different experiences can contain some similar features (Thomas & Pollio, 2002). Giorgi (1975) stated that phenomenological reliability is achieved “if a reader, adopting the same viewpoint as articulated by the researcher, can also see what the researcher saw, whether or not he agrees with it” (p. 93).

In the present study, the reliability of the findings was determined by gaining the consensus of the interpretative research group that the textual presentation and thematic structure captured the essence of the phenomenon of interest (i.e., gymnasts’ experience of imagery in their sport). Thus, it was assumed that sufficient supporting evidence was provided to support the researcher’s interpretations (Pollio et al. 1997; Thomas & Pollio, 2002).

Chapter 4

Results

The purpose of this study was to explore high-level gymnasts' experiences of using imagery in their sport. To accomplish this goal, in-depth phenomenological interviews were conducted with 10 former and current gymnasts. In this chapter, a description of each participant is provided followed by a presentation of the thematic structure that emerged from the interviews. In addition to the general themes and sub-themes, a sampling of quotes is presented to illustrate how the participants' remarks support the themes.

Participants

The final sample of participants was comprised of ten female gymnasts from North America. Participants ranged in age from 19 – 25 years ($M = 22.2$ yrs). The sample included participants who had competed within the past two years or were currently competing at the NCAA Division I level. Demographic information for each participant (including the pseudonym selected by the participant) is presented in Table 1.

The Thematic Structure

Qualitative analysis of the transcripts revealed a total of 693 meaning units, which were further grouped into sub-themes and general themes. Meaning unit consisted of a simple word or group of words that reflected a particular meaning. For example, "perfect" was a meaning unit consisting of a single word that was mentioned by several participants in the present investigation. A visual depiction of the final thematic structure and interactions between the different dimensions is shown in Figure 1. The thematic structure revealed five major themes that comprised these gymnasts' experiences of using imagery in their sport (See Table 2).

Table 1.

Descriptions of Participants

Pseudonym	Age	Current/Former Gymnast	Years of Experience	Events	Interview Time in mins:secs
Renee	23	Former	19	B, F, V	79:16
Vanessa	25	Former	18	AA	53:18
Kelly	22	Current	15	AA	54:30
Rebecca	21	Current	14	AA	40:26
Jessica	21	Current	16	AA	20:27
Kerry	24	Former	17	AA	43:54
Mary	22	Former	19	AA	47:08
Michelle	23	Former	11	AA	43:50
Natasha	22	Former	19	AA	56:28
Valerie	19	Current	13	B, F, V	28:52
<i>(N = 10)</i>		<i>(M = 22.2)</i>		<i>(M = 16.1)</i>	<i>(M = 47:00)</i>

Key *

AA = All-Around

B = Beam

F = Floor

V = Vault

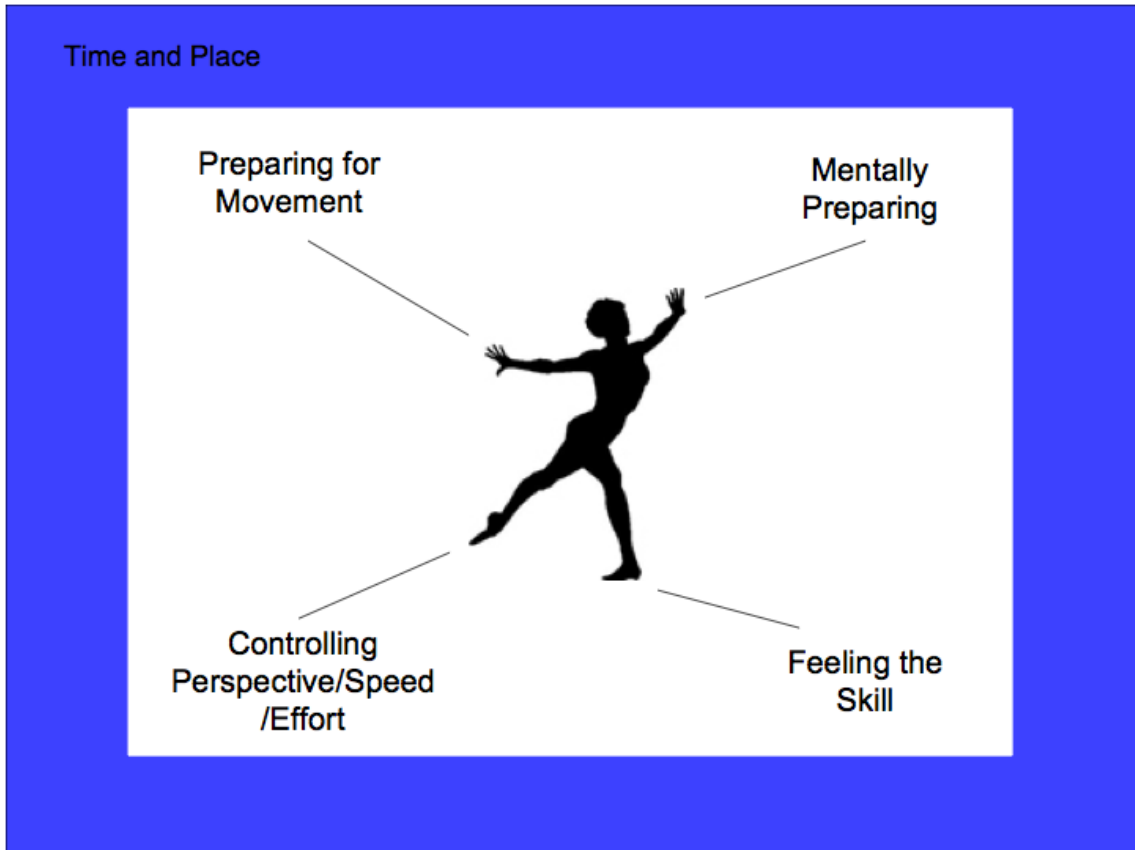


Figure 1. Diagram of Gymnasts' Experiences of Imagery

Table 2.

Major Themes and Sub-Themes

Major Themes	Sub-Themes
Preparing for Movement	Rehearsing Body Movements Making it Perfect Focusing on Critical Areas Making Mistakes and Correcting Them Dealing with Injury
Mentally Preparing	Calming Nerves Building Confidence Going Over the Meet
Feeling the Skill	Body Movements Feeling the Movements
Controlling Perspective/ Speed/Effort	Perspective Image Speed Level of Effort
Time and Place Outside Competition	In Competition

The themes included *preparing for movement, mentally preparing, feeling the skill, controlling perspective/speed/effort, and time and place.*

Existential-phenomenology holds that human existence emerges against one of the four major grounds of *World, Body, Time, or Others* (Merleau-Ponty, 2002; Thomas & Pollio, 2002). Essentially what is figural in a person's experience appears against one of these four grounds. According to Thomas & Pollio (2002) an important relationship exists between the figure and the ground, "figure and ground co-create each other in human experience" (p. 18). Therefore, if something is figural it stands out and is meaningful within an individual's experience. In the present study, *time and place* represented the primary ground against which the gymnasts experienced using imagery in their sport. The ground of *time and place* encompassed the figural themes of *preparing for movement, mentally preparing, feeling the skill, and controlling perspective/speed/effort.* In essence, these four themes co-existed against the background of *time and place.*

Many of the themes are verbs because for the gymnasts in the present study imagery was an active process. This active process served to assist the gymnasts in *preparing for movement, mentally preparing, and feeling the skill.* The gymnasts' imagery encompassed several *controlling perspective/speed/effort* and occurred within the context of *time and place.* It is important for the reader to consider that although these themes are presented as separate entities they are interrelated within these gymnasts' experiences and cannot be understood in isolation. In the following sections, all of the major themes and their respective sub-themes are discussed in detail. To illustrate and support each theme, representative quotes from the gymnasts' interviews

are provided. Pseudonyms have been placed after each quote to indicate which participant made the statement.

Preparing for Movement

Preparing for movement emerged as one of the four major figural themes of gymnasts' experience of imagery. Essentially this theme was comprised of gymnasts' descriptions of using imagery to prepare for the movement involved in performing gymnastics skills/routines (e.g. bars, beam, floor, and vault). Five sub-dimensions supported this theme and constituted the various ways in which these gymnasts used imagery to prepare for their movement: *rehearsing body movements, making it perfect, focusing on critical areas, making mistakes and correcting them, and dealing with injury.*

Rehearsing body movements was the most prominent sub-theme of *preparing for movement*. All of the gymnasts described imaging body movements associated with various gymnastics skills/routines that they performed. While not all of the gymnasts imaged every skill/routine, most described using imagery for all of their events. *Rehearsing body movements* associated with various skills/routines afforded these gymnasts the opportunity to practice skills/routines prior to performing them. Renee described how imaging prior to her vault gave her more confidence that she would execute it correctly when subsequently performing her vault:

For me (um) visualizing my vault and the different movements from start to finish (um) basically made me feel like there was less room for error when I was performing my vault...almost as if my like success for the vault was dependent on how well I visualized it. Therefore since I did know what my body was supposed

to be doing and I could picture in my head what it was supposed to look like, it was easy for me to then actually (um) put into the move when I did it.

Valerie indicated how *rehearsing body movements* assisted her in preparing for performance, “When I actually take the time to visualize the movements and know what I want to do on the events, I listen to my mind and it helps me do the routine the way I want to do it.” When describing what body movements they actually imaged, these gymnasts provided detailed descriptions of going through whole routines. For example, Rebecca described imaging the body movements associated with her beam routine:

With beam I kind of just go through and just - most of it's dance, but I'll start out going through my dance, and then when I get to a skill, I kind of visualize how you know, almost what I feel and like what I would think it would look like, and just go step by step through, okay, I set up for a backhand spring layout, and I go. I can see my arms swinging down, going backwards, moving up over my head and just when I lay in the layout just staying straight, keeping my hips straight and walking through. (Um) just going through more dance and just my jumps and the way, how I would set them so that I'm not a little bit off the beam and I'm more squared so that I'm able to complete it. And then (um) you know, there's just more jumps in there that's almost the same thing, just making sure I set it right, and then just finishing my routine and sticking my dismount.

When asked a followed up question regarding this experience Rebecca's response indicated that imaging skills/routines helps her to get ready to compete. “I've competed so much it's kind of

almost a practice in my head, I'm not actually doing it, but kind of just going through the motions helps get my body ready." Another gymnast described imaging her entire bar routine:

I close my eyes and do kip, cast, clear hip, Shaposhnikova, swing back, feet over, kip, lean forward, cast, handstand, toe shoot. And like I just do everything in my head, and then I picture the giant, the full twisting release move and the dismount stuck in. (Natasha)

Most of the gymnasts described imaging body movements associated with a full routine, although participants also reported imaging parts of their routines. For example Jessica talked about going through the skill parts associated with her floor routine:

I mainly image the skill parts of my floor...like for the tumbling, for jumps and leaps and stuff. So I would kind of like picture my dancing but it is not really you know... perfect and then I would go into a certain pass or go into a certain jump.

Another current gymnast described imaging parts of her vault routine:

I usually go through the vault you know a couple of times in my head... So, a lot of times I would do, I would picture the vault you know maybe not even with the whole run... just the actual – hitting the springboard, pushing off the vault, landing on my feet, that whole thing. (Kelly)

According to these gymnasts imaging body movements associated with their routines assisted them in preparing for their performance.

Making it perfect represented another major sub-theme of *preparing for movement*. As with any performance one's maximal potential is only achieved when it is performed correctly. All of the gymnasts indicated that it was important for them to imagine skills/routines perfectly.

Furthermore, according to these gymnasts *making it perfect* built good physical habits, which they believed would ultimately transfer to their actual performance:

And whenever I – I trained mentally, I wanted to make sure that at least at that point, I was able to make it perfect, so that in real life, I had a better chance, if I knew what exactly it looked like in my head. (Kerry)

Some of the gymnasts worried that if they did not imagine their skills/routines perfectly, the imperfection could transfer to their actual performance. One gymnast commented:

Well, because when I wobble – when I imagine it, I feel like if I imagine it that way, then that’s how I’m gonna perform it. So if I can make it perfect in my head... then I will make it perfect on the beam. (Valerie)

There were times when the gymnasts’ imagery was not perfect, but when this occurred the majority of the gymnasts re-imagined the skills/routines. Renee described this process by saying “If I was visualizing something and something in my process didn’t go right, like okay I messed up that step in my mind. I would have to start over.” In addition to imagining their routines perfectly, these gymnasts also indicated that they imaged themselves going through entire meets perfectly. “I would always have to go through a whole meet in my head (um) my routines perfectly” (Renee). To these gymnasts making it perfect in their head reinforced the proper mechanics associated with high scoring routines. The more they were able to image perfectly, the more likely their actual routine would resemble that image. One gymnast stated:

I would visualize myself doing it correctly (bar routine) and the more I could visualize it...the more I could think about it... so it was like kind of creating a

habit within myself and like when I would actually go. I could almost tell like the habit was being built. (Jessica)

Similarly, Vanessa commented:

I would make my mind go through the right way of doing it so that it is even more, you know that's the greatest, you know more frequent path traveled and you know reinforcing that brain connection.

Focusing on critical areas was additional sub-theme of *preparing for performance*.

These gymnasts would focus their imagery on designated critical areas of the movements that they were about to perform. These areas were typically important for effective execution or represented potential trouble spots. One gymnast described using imagery to focus on critical aspects of her vault routine:

The one of the really big things that I really emphasized in my visualization on was (um) when I would be leaving the vault for my hands to do my twist part. (Um) because that's basically kind of what sets you up for a good landing. (Renee)

Focusing on critical areas also served as a reminder of the important technical aspects the skill.

One gymnast remarked:

For some forward tumbling you know...(um) I knew there were some technical points in the skills that I had to REALLY focus on and remember to do (um) in order to you know make that skill happen when I actually competed. (Vanessa)

In addition to focusing on areas that were critical to making certain skills happen these gymnasts also reported using imagery to focus on possible problem areas. Troubles spots were those

aspects of their routines that gave the gymnasts difficulty when they were actually performing the skill. One gymnast described a trouble spot by stating that “I always had an issue on vault where I didn’t push through my fingertips enough, and it would affect the rest of the vault, so in my imageries, I had a really like exaggerated that push” (Kerry). These gymnasts indicated that it was important to image correction execution in the trouble spots:

For example, I do a skill, and it’s a round-off layout onto the beam. And I know in my head I always had trouble with this part of my routine. So I imagine that’s the most flawless skill in that routine. (Natasha)

One gymnast added that she focused on critical areas that her coach pointed out:

Coaches would tell me during practice like make sure that you’re setting or keeping your chin in, so in my imagery I would focus on... I would watch myself keep my chin in a neutral position as I took off for my skill or I would... we always worked on landings and I had quite a bit of trouble with that (um) so watching myself really absorb the landing...imagery helped me with those areas I need to work on. (Michelle)

Making mistakes and correcting them emerged as another sub-theme for these gymnasts in *preparing for movement*. That is, they sometimes used imagery to fix mistakes they had made while physically executing the skill. For example, Kelly described using imagery to correct a rare mistake in a skill she had successfully performed several times:

I started to struggle with...a skill that I had done many, many times...I had competed it many, many times. It was a dismount off of bars.... Well what started happening is that I started for some reason (um) releasing the bar a little

too early. (Um) kind of like arching back before I was supposed to... so I thought that...that (visualization) would be a good way for me to kind of get over this, maybe take a step back and (um) think through the mechanics of it again and try to sort of retrain my thoughts and then hopefully, translate that into action. So, I would... basically just close my eyes and imagine that part of my routine.

Other gymnasts reported comparing their actual performance with the way they had imaged it. Doing so afforded these gymnasts the opportunity to see where they were making mistakes, which served as a reminder for future performances. One gymnast said:

(Um) if when I did the vault something didn't go right, like if I landed funny or wasn't high enough, or was too close to the vault (um) if my legs were bent, or you know something went wrong I could usually figure out what it was based on what my body did from my visualization like what was different between how I thought before I went and how I actually did after I did the actual vault. So that was a way for me to make corrections for future vaults. (Renee)

In addition to using imagery to correct physical mistakes made, these gymnasts at times would use mistakes they imaged as reminders of what they needed to do in an upcoming performance. Mary described how a mistake made during imagery benefited her actual performance. "I just missed that cast handstand on the high bar (in her imagery) so I need to make sure for the actual meet that I do that better." One gymnast provided a metaphor to describe how an imaged mistake helped in preparing for an upcoming performance:

I know that once I've made that mistake I kind of can pick up on it and be like the next day at the meet, know that okay, in my head, I made that mistake last night,

that...let's not do that again... almost like, almost like if you take a quiz you do, do a problem wrong, you know you're not gonna make that same mistake on the test, because you've already made it once. (Rebecca)

Dealing with injury represented the final sub-theme of *preparing for movement*. Several gymnasts described how injuries had limited their ability to physically practice. In these situations the gymnasts used imagery as a substitute for overt practice. Using imagery while injured helped these gymnasts prepare for when they would actually perform again. One gymnast commented on this:

I was injured (uh) for quite a bit of my college career, so (um) the idea of repetitiveness that's so important in gymnastics, I was able to (um)... if I wasn't able to put in the numbers during a practice, that I could, you know, close my eyes and visualize myself doing a skill or routine, and I could get lots of numbers in (um) so that kind of muscle memory that I wouldn't be able to get during a practice (uh) because I was unable to do the skills, I used my brain for it (um)... and I think that that helped... helped especially when I was able to get right back into it faster than if I wouldn't have been able to (uh) visualize myself doing that. (Michelle)

Kerry also stated that imaging skills while injured helped to prepare her for upcoming performances:

But I found that even if I didn't have the opportunity to practice my skills, if I visualized when I was able to come back into the – the gym, I was right back where I left off because of the...the practice that I done in my head...So I...I was

really successful in being able to compete at, you know, the level that I wanted to with very, very minimal physical practice because I had a lot of that mental practice to back it up.

Jessica summarized the importance of using imagery while injured “there is a lot of injury in gymnastics...I mean...I have been injured quite a lot throughout my career and sometimes I would just sit there and visualize my routines when I could not physically do them.” Imaging to deal with injuries was an important aspect of *preparing for movement* for these gymnasts.

In summary one of the major figural themes of gymnasts *imagery* was *preparing for movement*. These images were comprised of *rehearsing body movements, making it perfect, focusing on critical areas, making mistakes and correcting them, and dealing with injury*. One gymnast summarized the importance of using imagery in preparing for movement in the following comment. “I mean you can physically do something but it will never be done correctly if you cannot do it mentally. So if you are practicing your skills mentally over and over, it is so much easier physically” (Jessica).

Mentally Preparing

While the participants in this study used imagery in *preparing for movement*, they concurrently used imagery for *mentally preparing* in other ways. Often times they reported being nervous or needing confidence and imagery was a technique they employed to deal with these feelings. The theme of *mentally preparing* was comprised of three sub-themes including *calming nerves, building confidence, and going over the meet*.

Calming nerves was the most prominent sub-theme of *mentally preparing*. The gymnasts described using imagery to deal with any anticipatory anxiety or fears they had about performing. When Vanessa was asked to share what stood out for her in her imagery use, she replied, “Well, I just think that it makes things less overwhelming.” Kerry responded similarly saying, “I used it as a tool to kind of make me calm um, right before... before the skill and you know, collect my thoughts to focusing on... focusing on whatever I was doing.” When nervous gymnasts used this type of imagery to remind themselves that they were capable of performing the skills/routines successfully. They realized that if they could image the skills/routines successfully then there was nothing to be nervous about. This realization was indicated in Vanessa’s response to a follow up question asking her to explain how imagery makes things less overwhelming. “For example I would just like see myself vault and land and salute and you know like see myself having already done that, so no problem. It was nothing to get nervous about, just go do it now...you know.” Valerie indicated that imagery calmed her down in competition by allowing her to focus on what she needed to do rather than on the possible negative outcomes that could occur:

When I – for any competition, if I – I’m always nervous, but sometimes, if I’m really nervous, I have to tell myself to take a deep breath and visualize my routine. Then it calms me down because I visualized what I need to go do on the beam and I know what I need to think about and not distract my mind and think about “oh, what if I fall?” I just need to think about what I just visualized.

Interestingly, Mary also described how imagery allowed her to stop worrying:

It also calmed my nerves because like I would see myself doing it and that reminded me of like...stop worrying about like what could happen but like living in the moment of that routine and that skill and like enjoying it and not making it business like...but like have fun with it.

While a majority of the gymnasts described the *calming nerves* experience just prior to competing in an event, some gymnasts experienced imagery's calming effects when imaging the night before a competition. Rebecca commented on how imagery calmed her nerves the night before a competition by stating, "So if in my head the night before...if I can pretend that it's a meet and go up and practice it as if it were a meet, come time, you know, of the meet, I'm not as nervous." In addition to experiencing a calming effect, these gymnasts described using imagery as a way to reduce their worry and fear. Gymnastics is a dangerous sport and injuries are commonplace. As Jessica disclosed "in the sport that I do...I mean, focus is serious like if you are not focusing on what you are doing, you can kill yourself." Imagery was one way these gymnasts dealt with these fears. Mary said, "I would do it like if I was worried about a skill or scared about doing the skill." In response to a follow up question Mary talked about how she used imagery to deal with the worry of trying a new skill:

Like I – I would not try a new skill until I could perfectly tell in my head what exactly was gonna happen, and where my body was supposed to be and that helped a lot for me with fear.

Kelly provided another example of how imagery helped her overcome a fear associated with a skill she was struggling with:

I just started changing mechanics a little bit and then it made me – the reason that I was afraid is because I – it felt different and I... like I said it was kind of that – it gives me that sensation of like pinging off the bar instead of being in control. So, it was a skill that I had already trained in and done properly for a long time. I started having this problem with it that I started changing something for some reason and so I had to take a step back, almost like (um) like I was learning the skill again. (Um) so I trained back in the belt and then I did visualization when I was not training to try and retrain my brain properly.

For these gymnasts imagery acted as calming mechanism when they were afraid or nervous.

Michelle may have summed up this theme the best when she stated “I would have been a basket case I think, to be honest without (um)... without doing that visualization.”

Building confidence was another sub-theme of *mentally preparing*. All of the gymnasts acknowledged that imagery allowed them to experience a greater sense of confidence.

Confidence was often a by-product of imaging correct performances or rehearsing skills repetitively. One gymnast remarked:

The more I did it (imagery) and the more I was successful, the more confidence I had in not only like my – my ability to perform, but my ability to – to do it just by seeing it go right in my head...like if I... fell a hundred times in my warm up, it didn't bother me because when I did it in my head, it was perfect, and I knew I could do it. So just as I – I gained more confidence in my routines and my skills like my mental aspects, really, really grew, and it made me the most confident for sure. (Kerry)

While a majority of gymnasts discussed having had experiences of using perfect imagery to assist with confidence, one gymnast indicated that putting in the repetitions mentally had the same effect. “Putting in those numbers and just kind of getting comfortable with getting ready for the routine really helped me (uh) to put myself in the right mind frame to get up and compete” (Michelle). A large number of the gymnasts talked about using imagery for confidence right before performing a routine. Valerie provided an example of how imagery enhanced her confidence before her beam routine. “I can see myself doing it, I believe in myself that I can actually do it, so it just makes me more confident that I saw myself doing it, so I know I can do it no matter what.” In addition to enhancing confidence prior to performing skills, these gymnasts also provided accounts of using imagery to build confidence for skills they struggled with outside of competition. For example, Kelly made the following statement about using imagery to regain confidence on the balance beam. “But it wasn’t (imagery) really for that reason (technique) so much as it was for me to try to be confident again on beam.” Another gymnast, who experienced several injuries throughout her career, talked about how imagery gave her confidence when she began training again. “It (imagery) also helped me be more confident when I started redoing skills” (Kerry). Natasha described the relationship between imagery and confidence when she stated:

(Um) if – if you’re using imagery, you’re going to be prepared mentally for that success -- to be successful. And that confidence, it’s going to come naturally because you’ve done it over and over and over. And, I mean you have to put in the work, but imagining it the way you trained it, that confidence is going to click.

Going over the meet was the final sub-theme of *mentally preparing*. This sub-theme focused on things that were going to happen at the meet, the atmosphere of competition, and the possible adversity that the gymnasts might face during competition. For these participants *going over the meet* helped them mentally prepare for an upcoming competition. One gymnast expressed:

When I imagine things, it's like I have to put myself in that competition situation, and much of the time like I don't want to do it. I – I have – I have to. I have to prepare my mind mentally for the meet. (Natasha)

In response to a follow-up question regarding what it was like to “put herself in a competition situation” Natasha described the following experience with her bar routine:

I'm imagining me presenting to the judge, and my heart rate's going up, and I'm really nervous, but at the same time I'm confident, and I know I can do what I do in my practice... And, so, the crowd's there, and I got a floor routine in the background with the music coming on. It – you know, it's a quad meet, and it's loud, and people are yelling and cheering and clapping, and people are cheering and I see myself going through my routine in those conditions.

The gymnasts also described imaging the meet surroundings and feelings associated with competition. Imaging meet like conditions allowed these gymnasts the opportunity to experience what the meet was going to be like. One gymnast explained that imaging the pressure associated with competing was beneficial to her performance:

I would try and not just picture myself at practice but picture myself actually nervous at a meet, actually knowing I had made the mistake the last two

competitions, actually knowing that my teammates were counting on me that they, you know, that they wanted me to start the team off right, but also all of those thoughts because I knew that they were... that was reality that existed...I couldn't just pretend they didn't (um) so instead, I practiced...I visualized (um) with those thoughts with that kind of extra pressure (um) and then you know, I come out successful in visualizing the routines, so then they... when I got to a competition, a lot of times it felt like, okay well, I already kind of know what this feels like. I already... you know, I can accept that there is this extra pressure and I've sort of been through it before. (Kelly)

In addition to creating a competition-like atmosphere many of these gymnasts talked about using imagery the night before to go over the meet the next day. Mary typically imaged the order of events the night before a competition. "So if I knew ahead of time the rotation order, I would do my best to like visualize my routines in that order." All of the gymnasts described going through each of their routines to get ready for an upcoming competition. The following is an example.

And so I'd would image all four events in the order that I knew I'd be competing them because it changes, depending on like the week and the location and etc., etc. So usually, we knew the night before at least like which order we'd be competing in, so I would start on whatever event I knew we'd be starting on, and visualize that routine, and then move to the next event, and start visualizing that one. So I'd do all four events, and then go through them again, and again until I felt like I was ready. (Kerry)

Another gymnast indicated that imaging the atmosphere and upcoming competition made her feel more comfortable with possible differences in arenas.

I try to visualize my surroundings to get... to have some kind of (uh) comfortability level and to acknowledge that there were differences in things that I wouldn't be used to so I would visualize them to get comfortable. I visualize my surroundings, I visualize the other competitors, the venue itself whether you know, maybe the floor was purple or red (uh) I would imagine myself on that floor. I'd imagine the noise and acknowledge that there would be noise. I would imagine the crowd whether I would imagine maybe a crowd was more rude than the average. So, I guess I would get comfortable with acknowledging that things would be different and (uh)... than our home... our home floor especially, and I would even do this at home meets as well and just visualize the surroundings so that I could get comfortable with my ability to compete at my best and (um)... so I used that to practice mental toughness. (Michelle)

Going over the meet not only included imaging the details of meet surroundings and possible competition situations but, some gymnasts also talked about imaging things that might go wrong.

Natasha said, "For me imagery was a way for me to practice that and prepare myself for when things went wrong." When asked a follow up question to provide more detail to this comment,

Natasha responded:

(Um) at the (name of college) meet the bars, like they were really stiff, and our bars when we train are like a little bit more springier, and they have a little bit of being to it. And at (name of college) there was no spring at all, and my whole

routine is all about timing. It's not like big tricks. It's big tricks, but it's like my angles and my release moves are like, you know, different, like — I had to change it real fast, and once I swung around the bars I had to imagine me letting go a little bit later (uh) because there's no spring. So I had to imagine getting my toes over a little faster and had to (um) reinvent a little bit of my gymnastics. But for that instance imagery allowed me to be prepared before I went up and competed. I mean, I – I've done my routine at all different angles, all different settings, imagining just everything. Like it really, really, really does work.

One gymnast provided a metaphor to describe using imagery to prepare for the unpredictable in competition.

It (imagery) just kind of prepares you for anything possible that could happen in the meet. (Um) to get kind off like sports wise...like if I was going to go speak to like a school or a class or something, I would like envision that and then have this little girl being totally obnoxious and like, image how I would handle that and, you know, what would I say? So it is just kind of like in different areas like that, it could just totally prepare me for what might happen in the meet. (Jessica)

For several gymnasts *going over the meet* was a way to mentally prepare for a competition.

In summary, these gymnasts described imagery experiences that assisted them in *mentally preparing* for their performance. This theme included the sub-themes of *calming nerves*, *building confidence*, and *going over the meet*.

Feeling the Skill

Feeling the skill emerged as another major figural theme of gymnasts' experience of using imagery. Essentially this theme was comprised of descriptions that enabled the gymnasts to feel their skills/routines. *Feeling the skill* during their imagery reminded these gymnasts of what the skill should feel like during its execution or delivery. This theme contained two sub-themes including *body movements* and *feeling the movements*.

Body movements emerged as the most prominent sub-theme of *feeling the skill*. A majority of the gymnasts indicated that they incorporated various body movements (e.g. hand movements, tensing muscles, and positioning their bodies) while imaging many of their routines. According to these gymnasts, incorporating actual body movements into their imagery facilitated the actual feel of the skills/routines. One gymnast described what this experience is like by sharing "At the same time I'm imaging...I'm feeling the motions like a little bit with my body, and moving according to how my body would move during the skills" (Kerry). Another gymnast indicated that incorporating physical motion into her imagery helped her replicate what she was going to be doing.

I would picture myself running, I wouldn't do any movements but then as I would picture myself doing the vault, I would actually like put myself in those body positions. I wish you could see me because then I could show you what I am talking about, but like you know you are pushing on the horse, so I might have...I even put my hands up my head to feel that body position and then (um) you know squeeze my muscles and then actually like do a half twist standing there as if I was doing it in the skill. So, it was kind of like putting myself in the correct body

position but I was really just standing there while also visualizing the skill... (Um) and so that would kind of help me with feeling the positioning during my imagery. Then I would get into the position like I had just landed it like I had just stuck the vault. (Kelly)

While most of the gymnasts described actually moving their bodies during imagery, others discussed tensing certain muscles groups associated with the imaged skills/routines. One gymnast stated:

I would kind of feel and flex the muscles that (um) I needed to, you know, to keep my leg straight in my leaps. I would flex my quad and...if I was sitting doing that or standing, I would usually point my toes or I would think about squeezing something (um) squeezing the muscle that needed to be squeezed during that skill. (Michelle)

Interestingly, other gymnasts talked about combining body movements and engaging muscles associated with the skills/routines. As Mary expressed:

I was sitting like in a pike position with my like toes pointed and my knees were straight as they could be, so just so I was actively engaging those muscles and moving my body when I would do my imagery.

A majority of these participants also indicated that using body movements facilitated their imagery experience. Vanessa described how she incorporated body movements when imaging her vault routine. “A good example is when I’m imagining pushing off the vault I would stretch out my arms the way they would be when I actually did the vault. That combination helped me

with my imagery.” Other gymnasts indicated that using body movements with imagery made the experience more real. One gymnast stated:

I especially if I had my muscle felt like active... So I am like putting my body in position I was supposed to be and also feeling my muscles like squeezing my muscles like they were active, like they were doing the skill. (Um)... for me, that just made it more real. (Kelly)

While some gymnasts simultaneously imaged while moving their body, others provided accounts of physically doing part of the routine then stopping and imaging difficult sections. The following quote contains a detailed description of such an experience.

I would, you know, go through the motion on the beam...well on my pretend beam, you know, the line that I would be on the mat. I would (um) do like a really...really light version of going through my entire routine. You know, just a little bit of (um), you know, like a really tiny leap or focusing on and (um) completely---not like an exhausted version of my real program not anything close what an actual leap would be in regards to amplitude and the power that comes for the leap, but I would basically see myself do that. But I would just do a little mini guy (jump) and (um) in terms of like the flipping skills that I did in beam I would focus on, like say for the take off, I would pretty much practice that because that is probably the most crucial part of the skill. But I would like do the take off and, see myself in my mind do the skill and then I would again practice the landing like...like, you know, I landed it and (um) I'm centered and, you know, I just keep going kinda deal or for some back hand springs (um) in my

routine I would just focus on seeing my feet come down on the beam and extending my hips and arms and my knees, you know. I would kinda practice that (um) that...that part of coming out of the back hand spring in order to go for the next skill because that would be the most crucial part of the...of the connection and so I would (um) on the line kinda imagine myself and go through let's say coming out of the first skill placing my body the way that, you know, with the good technique that I need to do it with and (um), you know, and then placing it, you know, in the proper take off for the next skill and then in my mind you basically finish the rest of the skill and then I would imitate the landing of it, you know, like the way it is supposed to happen. (Vanessa)

According to these gymnasts incorporating body movements into their imagery assisted them in *feeling the skill* and made the imagery experience more real.

Feeling the movements was another sub-dimension of *feeling the skill*. While all the gymnasts discussed experiences of feeling the skill through physical motion, many of these gymnasts also described experiences of feeling the movement in the absence of actually moving. As Mary indicated, “really think about how my body is supposed to feel when I do it (um) and...I felt like I was literally actually doing the routine when I imaged... I could feel my body.” Kerry provided the following description of what it was like to feel the movement during her imagery. “It’s like feeling how it feels to do the...the movement.” When asked a follow-up question about this comment, Kerry said:

It was every event, and I always just kind of either closed my eyes or not, but just zoom in on whatever it was I was trying to visualize, and my body - kind of feel it go through the motions - as I was visualizing it.

Natasha described what it was like to feel the movements associated with her bar routine.

I could feel... I could feel when I'm supposed to release the bar and when I'm supposed to catch it. Like I... I know what that feels like, and I... like when I land, I feel myself push through it.

Some gymnasts said that they only experienced feeling the skill when they imaged it from an internal perspective (i.e., the way it would look and feel if they were actually doing it). "So, when I would do that one where I was actually doing the routine, it felt like I was actually going through each motion, each skill, and (um)... I could feel each skill" (Mary). However, others were able to feel the movement by imaging it from an external perspective (i.e., the way the skill would appear to a judge or to spectators). One gymnast talked about this feeling in detail:

And just when you've done that turn and you've switched your hands, kind of where your body position should be, and just like full extension kind of and just how a position, whereas, you know, I can feel that and see it at the same time from the side view. (Rebecca)

In addition to feeling the body movements associated with their imagery these gymnasts also felt various aspects of the environment and the equipment. Rebecca described this feeling when imaging her vault routine.

I can kind of feel, you know, the wind... the air resistance kind of against you when you're running down the, the runway and (um) just getting my skills, how

they should feel one by one, step by step rather than like I said the finished products, how breaking it down skill by skill. Then just feeling my arms just go back behind my head and just how they block off the horse, you know, feels, and then once I do that, it's, like I said, if I've set it up well, I can feel myself in the air exactly how I want to be.

Michelle indicated that because she has completed the skill so many times she intuitively knows what her skills feel like. "I've done that skill so many times, I could feel myself go through those motions just through (um) my visualization, and it would almost feel like I was actually doing it even though (uh) I wasn't... physically doing it." Feeling the movements allowed this gymnast to experience what the skills/routines were supposed to feel like from the standpoint of their rhythm and timing. One gymnast commented on how feeling the skill helped with her rhythm and timing on floor.

You just know like when you are going to hit that skill you really do and that is just like the feeling and the technique and the momentum and the timing that I basically make myself re-experience that right before I'm supposed to go and I really could just basically feel that (um) rhythm of the skill and... and a in real time allotted timing so just like tightening and punching when I'm suppose to at the right times. (Vanessa)

In summary, *feeling the skill* referred to these gymnasts' experiences of using their body during their imagery and feeling the movements in the absence of physical motion. For them, *feeling the skill* helped in replicating the feel of the actual movements, made their imagery experience more real, and assisted them with rhythm and timing. Irrespective of whether these

gymnasts incorporated body motion or not, *feeling the skill* was an integral part of their overall imagery experience.

Controlling Perspective/Speed/Effort

Controlling perspective/speed/effort was another prominent aspect of these gymnasts' experiences of imagery and entailed the characteristics of the athletes' image (e.g. perspective and speed). Three sub-themes of *controlling perspective/speed/effort* emerged: *perspective*, *image speed*, and *level of effort*.

Perspective was the most notable aspect of *controlling perspective/speed/effort*. Irrespective to the specific function of the imagery (i.e., *preparing for movement*, *mentally preparing*, and *feeling the skill*) these gymnasts experienced two distinct imagery perspectives, *internal* and *external*. While a majority of the participants discussed using both of these perspectives separately they also described experiences of switching perspectives while imaging certain skills/routines. It is also important to note that the imagery perspective these gymnasts used appeared to be based on individual preferences. For example, when imaging the bar routine some indicated that they used both perspectives while others said they used only one (i.e., either *internal* or *external*).

Internal perspective emerged as one sub-dimension of *perspective*. When adopting an *internal* perspective these gymnasts imaged the sights, sounds, and feel of their skills as they would if they were actually performing them. In the following example one gymnast provided a metaphor for what it is like to image the beam routine from an *internal* perspective.

Like from my own (um)... almost like (um) when you're like playing those car games where you're driving cars like at the arcade that's the type of imagery I

would use for the beam... and you see like the top of the steering wheel in the screen to make it be like you're actually in a car. (Renee)

Mary also described the experience of imaging the bar routine from an *internal* perspective.

When I was actually doing it... I would see different things that I would see like if I was getting ready to do my dismount. I have certain trigger places that I look just for like the (um) technique of a skill and that's what I would see when I was actually like doing the routine per se... where I would actually look if I was doing the skill or routine.

In response to a follow up question regarding this experience, Mary stated:

I would see myself like looking for my toes before I go or (um) when you're doing like a mount on bars, when you're running to jump on the floor before you mount like you're looking at the board and then you're quickly looking at the high bar to get to that to make sure that you catch it... I would always see the low bar and so I would make sure that I saw... and always see the low bar. I have to see the low bar, but then after that like my head was always just positioned where it naturally would go and I just got accustomed to seeing like kind of everything going around me because it's like you're going in the circle... I would look to see where I was going, but I couldn't ever have my head every which way, so I pick certain specific places or I like an orientation of where it needed to be.

All of the gymnasts indicated that there were certain routines that they preferred to image from within their own body (i.e., internally). For example Vanessa stated, "For something like beam I would see myself like through my eyes...(um) like I was doing the skill myself." In response to a

follow-up question about this comment, Vanessa said, “I would always be first person because I would always just you know, I have to like, when I'm mentally practicing it you know I'm...I'm really focusing on going through and hitting those like really technical aspects.” Rebecca also preferred an internal perspective for the vault. “For vault I'm more in that experience... like I'm doing the skill myself.” Kelly expressed a preference for the internal perspective for her floor routine. “For floor I visualized that like I was performing, like I was doing the routine... (um)... yeah, more often than the other.” Interestingly, one gymnast said she imaged from within her body to work on technique. “But where as like all the technique that I would practice, that would all be in first person you know... I would image me spotting key points” (Vanessa). Normally, gymnasts image technique from the perspective of judges (i.e., external) who would be evaluating their technique. These participants described experiences of imagery from an *internal* perspective. Each gymnast indicated that there were certain events that they preferred to image from within their own body.

External perspective represented the other sub-dimension of *perspective*. In contrast to the *internal* perspective the *external* perspective is one an outsider (e.g., judge, spectator, coach, etc.) would have if observing a gymnast's performance. Many of these participants described this experience as being similar to that of watching a video of themselves. “It's like if I was watching a recording of myself” (Kelly). One gymnast explained the external perspective she used in the following way.

See it from the side. It was more like when we would go over and watch if I ever watched a video like we watch after a competition, our team would watch the videos and like so I'd actually see my routine. So, like when I would visualize

from the side, it was from pre-existing knowledge of me seeing myself like on a video screen. (Mary)

Some gymnasts described the external perspective as seeing themselves from a coaching standpoint. “There was times where I would visualize things from like (um) like a coaching standpoint, like watching from the side and like seeing the vault as a whole” (Renee). When describing this perspective many of the gymnasts talked about having a fixed angle. For example Kerry said:

I also definitely did like the... the videotaping from the side perspective. And it was always... always from the same angle on the side, it was weird. Like if I was on floor, it wasn't like a stationary video camera. It was whatever I was doing. The image that I saw in my head was like exactly perpendicular from where I was standing. So if I was going in like a straight line, the... the image that I saw in my head would be from the perpendicular angle. (Kerry)

While some gymnasts described this fixed perpendicular view others indicated that they could view their performance from several angles. For example Jessica stated, “I can see the whole... like as if I am watching it on a video camera. I am watching myself do it and like, I mean, I could watch it from the side... and I could watch it from the back.” When asked to elaborate on this experience Jessica said:

Say if I was standing behind the bars, I could see it from that angle or if I was standing in front of the bars, I could see it from that angle or from either side, or... I could see from above... really whatever I wanted to look at.

Once again some gymnasts indicated that they preferred to use the external perspective for certain skills/routines. Vanessa stated, “that is interesting because for the vault I would actually be seeing myself doing it as another person watching me.” Another gymnast said that it was important to image her bar routine from the side.

Bars... I visualize it more like standing to the side and watching myself, because those are like cast handstands. I mean, you can feel sometimes that you hit a cast, but just thinking from the side that if you actually hit that one hundred and eighty, you know, that height up... right-up handstands, it's more so that's up to someone else's view. (Rebecca)

Others indicated that it was important to visualize the floor routine from the external perspective. For example, Michelle commented, “I was visualizing, I would always do my dance and I would watch myself from the side.” Similarly Valerie explained “With my floor routine...I see myself doing the tumbling from an outside perspective... like I’m watching myself.” Two gymnasts commented that using the external perspective was also important for gaining confidence. “The side view was more of... like this is me like building confidence like seeing what it looks like or seeing the end result” (Mary). Vanessa echoed this idea saying, “Usually seeing it from the side and seeing the end results would be for confidence.” In summary, these gymnasts described imagery experiences that consisted of viewing themselves performing events from an external perspective.

Imagery perspective was not always a dichotomous experience for these participants. Most of them acknowledged using both perspectives for some events. For example, Rebecca explained how she experienced the beam from both perspectives. “It’s both. When I’m doing

visualization for the beam I can visualize both me in the routine and like standing on the side and watching it.” Another gymnast remarked that:

The way I see vault is similar to other events. And you know like I said, I could do it as if I am running, like if I am watching from the end of the runway, watching it that way from behind the vault, or on the side. So I can do it like all three ways. So it kind of just depends on whatever is going on and whatever (perspective) I thought would help out the best at that time. (Jessica)

Vanessa said that she would switch perspectives just prior to competing on vault. “I would try to play that in my mind... you know from the first person perspective, but then you know right before going I would see it from the third person perspective.” The gymnasts also acknowledged switching perspectives while imaging. As the following gymnast stated, switching her imagery perspective during her floor routine was a vital component to her imagery.

Sometimes I had a bird’s-eye view so I would watch myself doing the entire floor routine from up above and occasionally, I would switch and I would maybe be the camera itself so I would be doing the routine and I wouldn’t see myself, but I can see the floor and see the surroundings and try to focus in on... on what I was doing (um), or sometimes the camera angle would be on either side of me (um), for instance I would start a tumbling pass and the camera would be behind me and I’d watch myself take off and start the tumbling pass, and then my camera angle would flip (um) and I would watch myself land (um) so working on different ways and the things that I needed to focus on to complete the skill. (Michelle)

Additionally, Kerry described switching perspectives during her vault routine.

In my mental imagery what it was like to... to actually be standing at the end of the runway, and running towards the vault. (Um) but then after the running portion, I always had to zoom out to be like the... the spectator perspective because it's so fast that you really... I don't know, you don't see much first person. So... but I knew what it looked like, and I knew it was supposed to look like, so I was able to... to visualize from an outsider's perspective.

An essential aspect of these gymnasts' experiences of imagery was *perspective*. The gymnasts described using two different perspectives: *internal* and *external*. Imagery perspective was highly individualized and some gymnasts talked about using certain perspectives for specific events or during specific times. Despite these individual differences all gymnasts described a dynamic process of using both perspectives and at times switching perspectives during their imagery experience.

Image speed emerged as the second most prominent aspect of the figural theme, *controlling perspective/speed/effort*. A majority of these gymnasts described manipulating the speed of their imagery. At times they experienced imagery at real time speed (i.e., the actual speed of the movement), while at other times they slowed down or paused their imagery. Two sub-dimensions emerged from the speed aspect of imaging, *real time* and *slow time* imagery.

According to the gymnasts imaging in *real time* was a way to experience their performances the way it would occur when they were actually executing the skill. Kerry offered some insight to this idea in response to a follow-up question regarding a statement she made about fast imagery.

What I mean by fast... well that would be real time (um) because gymnastics typically is a very, very fast skill kind of sport. (Um) so whenever I would go fast, it would be just regular speed that you would watch somebody perform.

Several gymnasts explained that they would image their routines twice the night before a competition, once in *slow time* and then once in *real time*. Vanessa acknowledged this after describing her use of *slow time* imagery the night before a competition. “Then I would see myself basically do the (um)... do the routine or skill in real time.” In a similar vein, Mary stated, “the second time it would be more like... I’m doing the routine. I just do it like I was actually competing and now is my one chance to compete it and then I would like go to sleep.”

When asked a follow-up question about this experience Mary responded:

I did the really in depth part to focus on things I needed to do to be successful and then (uh)... like the cruise through routine that I go through after that one would just be like I’d just be doing it and it was like that one opportunity that you have and I just have to go through it as if I was actually doing it; not in slow motion, but in actual like play mode.

Some of the gymnasts indicated that the time available to do imagery was sometimes a factor in their decision to image in *real time*. For example, Rebecca noted that just prior to an event there was not enough time to image slowly. “In that moment when I don’t have as much time and there’s you know, more going on around me that I kind of just go through it like as if I’m doing the routine... like in real time speed.” Another gymnast described using *real time* imagery just prior to performing as a way to calm down.

“I’ll go through it... just like the fast pace mode... the actual like play and one (um)... without any pausing I would just go through my routine or if there is like certain skills I would just want to focus on, set a routine to calm myself down and I would use it like right before I got up on that event. (Mary)

Real time speed was also used as a way to practice the timing and rhythm of certain skills/routines. One gymnast said:

I mean, my dance I wouldn't really, like my dance beam and on floor, I wouldn't really have to do that in slow-mo, because I didn't need to really pick that apart so that would be in real time... I think my floor routine, visualizing my floor routine was in real time, just because I had the music in my head and I was trying focus on the rhythm. (Um) so I'm not going to slow down the music in my head. (Renee)

The gymnasts sometimes used real time imagery to practice the timing of new skills. One gymnast described doing this as follows:

So if I'm actually, if I'm learning a skill and I'm about to go for it, you know I basically practice the timing like it's supposed to happen... and I mean that would be quicker than the drill or you know that would be like real... real time timing in my mind. (Vanessa)

While the majority of these gymnasts imaged in *real time* they sometimes differed with respect to how and when they did so. For example, some gymnasts used *real time* imagery just prior to competing, others the night before a competition, and still others in both situations. Regardless of

where they used *real time* imaging, these gymnasts did so as a way of experiencing the actual speed, timing, and rhythm of their skills/routines.

Slow time was the other major aspect of *image speed*. In addition to imaging in *real time* these gymnasts also experienced imagery in *slow time*. Some described this experience as “slow-mo,” while others talked about pausing parts of their imagery. *Slow time* imagery appeared to be a way for these gymnasts to break down their skills/routines in order to focus on certain aspects. In describing this experience Rebecca stated, “when I’m breaking my skill down... I'm seeing kind of a slow down version... instead of the whole thing.” When asked a follow-up question about this comment, Rebecca responded:

It's if the, you know, the vault takes ten seconds, It's more like a 20-second, 30-second process in my head, taking it step by step. Okay, this is how the round off, should look, you know, almost if you had a slow play, like you recorded something and put it in slow motion. (Rebecca)

Another gymnast used the metaphor of a TiVo machine to describe her *slow time* imagery.

So you could tape your vault and then when you're done go over to the TiVo and break down your fault and freeze frame specific parts so you could really see, you know, why you landed on your face on that last vault. Oh well, I didn't push off the vault and I was super close to the vault when I hit the beat board, so that made me lose all my speed (um) and as a result you know I wasn't high enough and landed flat on my face, you know? So it's almost like in a sense like in my head it was like a TiVo, you know. (Renee)

While some of the gymnasts talked about slowing down their imagery, others indicated that they would sometimes hit the “pause button” while imaging. One gymnast described the pause by saying, “It’s like pressing the pause button and going through increment by increment” (Natasha). Kerry also described the pause as “almost like freeze frame in my head. So I would do a small movement, and then kind of the video in my head would freeze, and I would just kind of try and memorize that image, and then go to the next frame and do the same thing.” *Slow time* imagery helped these gymnasts focus on certain aspects of their skills/routines. One gymnast described this experience in the following way:

I could rewind it and start my skills again, and sometimes it was... I would rewind it, you know, the middle of my back handspring, so I was upside down, but I could... I would stop it and pause it and (um) pause my visualization and put my... I would think about putting my body in the right position so that I could you know, stay on the beam for instance. So I would square up my hips if they needed to be. (Michelle)

Michelle also indicated that the pause approach to imagery allowed her to focus on key parts of her routines. “So, I often put my camera in slow-mo when I was visualizing during those key points.” Focusing on key parts was especially important for movements that had to be executed at high speeds. One gymnast described this use of the slow-mo technique in the following way:

Slow mo was just breaking it down, so that every... every piece of my body was moving perfectly kind of because when it’s fast motion, you miss a lot of details, of course... so on vault running, definitely, it has a huge impact on the vault that’s gonna result. Like if the run’s a little off, then it’s gonna be... not a good thing,

so I would really focus on, you know, making sure my elbows were in, so that my momentum was going like strictly forward, and I wasn't losing any speed out to the sides, and that my approach was smooth, and elbows are straight. And it's it's... easy to miss that kind of stuff in real-time speed, so I like to slow it down a notch. And for all the other events too like I did a lot of slow motion visualization.

(Kerry)

Renee also described slowing down the imagery of aspects of her vault routine because of the speed involved in executing the entire sequence.

For vault It was easier to see specifics like that rather than okay here's my seven second vault and it was a big blur and I don't really know what I'm supposed to be looking for. So the snap shot visualization was a way to slow things down... like slow mo imagery for that event and it allowed me to really focus on the things I needed to do for that event. (Renee)

Once again, it is important to note that individual differences existed in the skills/routines that different gymnasts imaged in *slow time*. However, regardless of what event *slow time* imagery was used for, this type of imagery was a major component of *image speed*.

In summary all of these gymnasts manipulated the speed of their imagery for a variety of reasons. They described using both *real time* imagery and *slow time* imagery. Kerry summed up the experience of variations in imagery speed when she stated, "I'd do it over and over in fast, slow, medium just until I felt like it was kind of fluid, and I knew exactly where all of my body parts should be at that particular point in the skill."

Level of effort was the final sub-theme of the figural theme *controlling perspective/speed/effort*. Imagery was sometimes automatic and effortless. As Michelle described, “I’ve done so many repetitive numbers on say a double back, which was my first tumbling pass on floor (um)... I’ve done so many repetitions of that... I can easily visualize it.” Renee also reported a similar sentiment when explaining that “because it was really easy for me to visualize... there’s some things that even now still come completely natural to me just sitting here thinking about it.” Consistent with these comments, Rebecca described imagery as a natural automatic process that “just happens.”

I may not even think I’m doing it, but I’ve done it for so long that it’s kind of like a natural thing that’s you know... your body just knows how to do it, so I’ve just done it for so long that it’s like, it just another thing in my head that’s like I don’t really have to think about doing it... It just happens.

Some participants mentioned that their “easy images” were often very detailed and vivid. For example Natasha commented, “I could vividly see everything, what color the gym is, the judges’ table, where my teammates are standing... it was easy for me to see those things.” Additionally Jessica shared that “my imagery is pretty detailed... I can see everything related to my performance.” One gymnast indicated that at times her imagery was an almost unconscious process, “It was just kind of like a subconscious thing where I would start thinking about the next day’s competition or the... the competition next week and... and then I would slip into doing some imagery.” (Kerry)

In addition to describing imagery experiences that appeared to be controlled “automatically,” these gymnasts also talked about images that required a more effortful and

purposive form of control. Examples of this more intentional form of imagery included gymnasts' attempts to make their imagery perfect, to carefully rehearse the body movements of some of their routines, to slow down their imagery to attend to specific components of skills, to image in real-time to experience the speed and rhythm of their movements, and to intentionally subject themselves to the pressure of competition environment. For the most part, then, intentional control was devoted to the creation of specific images and to address the demands of targeted situations.

Somewhat unexpectedly these gymnasts also talked about imagery experiences that surprised them. One said that occasionally she made unintentional mistakes in her imagery, as illustrated in the following quote.

So I didn't really ever have any like major breakdown issues like that, but like sometimes I'd be (imaging myself) on the beam, and instead of landing it perfectly like I knew it was supposed to look like in my head, it would be a wobble, and I'd be like no, no, not acceptable in my mental imagery. (Kerry)

Several gymnasts described scenarios in which the mistakes they visualized in their imagery were often the same mistakes they physically made during a practice or competition. As one gymnast put it:

When I make a mistake and normally it is a realistic mistake that I have made when I physically performed the skill... so when this happens I would have to like say oh no, no, that's not what I want to do... and redo it. (Mary)

Rebecca said that at times she would image her hands slipping on her beam routine. "Sometimes on beam I've seen my hands slipping and I kind of just know like my hands aren't in the right

place.” While some of the gymnasts experienced making minor mistakes other described falling in their imagery. For example, one gymnast shared that she might imagine herself falling if a teammate performing ahead of her actually fell.

When I get really nervous, um, the negative thoughts start to pile up like if somebody falls in front of me... and then I'm like, okay, well, now if I fall, like, oh, man, and I... I imagine... I sometimes like have... It just sometimes gets in my head and I imagine me falling. And that feeling is just overwhelming... I just see myself falling. (Natasha)

Responding to a follow-up question to this statement, Natasha went on to explain that she always corrected the imaged mistake before moving on. “When I picture myself falling... then I cover it up, and I'm like, no, no, no, no, like I redo it again, and I do it right.” Other gymnasts also expressed the need to re-image their skills/routines after experiencing a fall or a mistake during their imagery. Vanessa indicated that “at times I would see myself mess up so I would (um) you know... (um) I would kinda just have to start over” (Vanessa).

The previous comments illustrate the importance these gymnasts put on immediately replacing an unintentional incorrect image with one that was correct. However, Kelly indicated she sometimes had difficulty erasing a mistake by stating, “it was kind of hard because sometimes I would imagine doing it with the mistakes that I was trying to get rid of.” Another gymnast experienced a similar struggle overcoming a negative image.

I think it is normally like it is something you necessarily struggle with kind of constantly, your mind might be used to... you like struggling with that or you are worried about it or you are scared that's going to happen and instead you just kind of like, oh well, I was focusing more on that I have chance of falling over on a kip cast handstand on bars than I am making it... so it is kind of like what your focus is. (Jessica)

Several gymnasts expressed frustration over making mistakes during their imagery because they felt it was something they should be able to avoid. One gymnast said:

I felt like it wasn't easy to visualize because like I said, sometimes I would make mistakes and I would get kind of like angry. Why am I... I am visualizing, this is not even real life. I should be able to do it perfectly with my mind yet I would (um) I would make mistakes. So, it took mental energy to... for me to not make those mistakes in my head but also like I said, it was more difficult for me to (um) get myself into that internal state rather than watching myself... feeling of watching myself. (Kelly)

Overall the figural theme of *controlling perspective/speed/effort* included characteristics of control that appeared to be individualized for certain skills and purposes (e.g., working on perfecting technique or for improving confidence). They were a fundamental aspect of all participants' imagery experiences.

Time and Place

Time and place emerged as the ground of these gymnasts' experiences of imagery. This theme provided the context in which these gymnasts used imagery. Two dimensions comprised this theme, *in competition* and *out of competition*.

In competition represented the most pronounced dimension of *time and place*. All of these gymnasts indicated that they experienced using imagery during competition. Most of the time they used it just prior to competing, as Michelle indicated, "I always visualized right prior to (uh) getting on to the floor." Later in the interview Michelle also acknowledged using imagery prior to performing her beam routine. "I would probably... a couple girls prior to my going on the beam to compete, I would stand off to the side and I would go through (um) a dance in my head." Several of the gymnasts indicated that they engaged in imagery while teammates were performing ahead of them. As one gymnast indicated:

So whenever I would imagine exactly what I am doing, I would do it like right before I went, like while the girl was going right before me... I will do it while she is going and then I would salute and then go. (Jessica)

Kerry also provided the following detailed description of using imagery prior to competing in her floor routine.

The person who performs before me there's usually like 30 seconds or 40 seconds between them finishing and me beginning. So whenever the person before me was finished, I'd be kind of waiting on the, you know, outside the floor boundaries, and waiting for the judge to salute me, and kind of zone out from the world for a second. And see my three tumbling passes, and a quick little, you

know, the shoulders move when I twist type of thing, and then I was ready to rock.

These gymnasts indicated that they engaged in imagery prior to performing as a way of *mentally preparing*, “I would also do it right before I was up on an event that would like help calm myself down” (Mary), *preparing for movement*, “Basically like during the competition I would...(um) basically like do a couple of... before... a couple of run-throughs before I was actually up” (Vanessa), and *feeling the skill*, “Before I go up on bars I imagine with my hand motions... to get a feel for the skill” (Natasha). It appeared the objective of these athletes imagery prior to competing was based on what they felt they needed most, as indicated by Vanessa in response to a follow-up question regarding her use of imagery prior to competing. “It just depended on what I needed... did I need confidence, did I need to focus on a skill that I was working on or both... you know just whatever.” While the majority of the participants described using imagery just prior to competing in an event, several mentioned using imagery while actually competing. Michelle described the following experience when competing on floor.

I used it especially on (um), on floor right before a tumbling pass and I would stand in the corner and close my eyes really quickly and I would watch myself set for my double back. I would watch my chin stay in.

Another gymnast provided an example of using imagery during her beam routine.

For the beam... I think maybe that was more of a visualizing as I got to each skill. Because beam's a lot, the pace is a lot different in comparison to something like floor, or vault or bars. (Um) I mean you're always moving and you're always doing something, but it's expected or it's normal that before you do, you know, a

combination or a series or a flip or a leap or whatever, that you're going to take a few seconds to think about what you're doing. (Renee)

In response to a follow-up question regarding what this imagery was like, Renee provided the following description.

So when I was on the beam getting ready to do my back handspring layout, you know you would think in your head just like your cue words and you would think of like where you would want your body to be... (um) if you're standing on the beam and you're going to be doing a flip on the beam (um) you need to stay obviously over top of the beam. If you go a little bit off to the left or the right, you're going to fall off, which obviously you want to avoid. So... visualize your body before you're doing this back handspring as "staying over the top of the beam." So you would almost want to picture like (um) and I try to tell this to, this is really weird now that I'm thinking about this. Some... teach little kids like dance or gymnastics and when I'm teaching them their cartwheels... so it's almost the same thing when I'm on the beam. You want to imagine there are these two walls beside you and if you kick them not only are you going to hit the wall, but you're going to fall off.

Another gymnast described using imagery during her bar routine in the following way.

This is while I'm competing... sometimes I either say the skill that's coming up next in my head, or I can kind of picture my routine skill by skill in my head. So once I've done a skill, I can think in my head, okay, this is how this skill should look and kind of you know, like I said, saying that skill and just as soon as I've

finished that one skill before in my head, that next skill's coming up. This is what it should look like. This is what this should look like, and trying to get my body and kind of manipulate my body to almost how... it needs to look like. (Rebecca)

The only event the participants did not mention using imagery for while competing was the vault. When describing their experiences of imaging during the other events, the gymnasts often mentioned using snapshots that appeared to serve as reminders for upcoming movements. For the most part, then, these gymnasts' experiences of using imagery in competition consisted of imagery just prior to competing and the use of snap shot imagery while actually competing.

Outside of competition was the final sub-dimension of *time and place*. The participants reported imaging at various times and locations outside of competition. The majority said they did it the night before a competition. Several indicated that they would go through each routine for the next day. One said, "before bed I would visualize and think of each routine" (Valerie). Mary also indicated, "before I would go to bed, you know, the night before the competition, I had... for my own well being, I had to do mental imagery for every routine." Another gymnast described going through each routine perfectly the night before a competition to be prepared for the next day. She said:

Before I would go to sleep and then I would think okay, I'll see if I can go through each one of my routines in my head, you know, one time successfully or something. Then I go through each of them in the order that we would be competing it in the next day and (um) and then try and go to sleep after that (um) I just felt like it helped me prepare for the next day. (Kelly)

Michelle also said she imaged her skills and routines the night before a competition to work out any mistakes.

I always visualized, you know, the night before a competition... So, I use it the night before competition to kind of workout and... workout if I made a mistake to go back and forth and (uh) and so like a skill like... or the routine to place where I felt comfortable to go do it the next day.

While engaging in imagery the night before a competition appeared to be the primary time and place these gymnasts imaged *outside of competition*, it wasn't the only time or place. Some used imagery during practice. As one put it, "I would do it (imagery) a lot on the uneven bars in practice" (Natasha). Another participant explained that "in practice we had to show our beam routines to our whole team and so I visualized my routine before I went (to practice)" (Valerie). One gymnast said she engaged in imagery in between her turns during a training session.

In between turns while I was waiting to use the bar, sometimes I would visualize this quickly... I do not feel like when I did it during practice or that it was like the same full experience as trying to do it when I was outside of the gym but, yes, I did it both places. (Kelly)

All of these gymnasts used imagery in and out of competition. *Outside of competition*, they primarily engaged in imagery the night before a competition in order to prepare for their performance. Additionally, they used imagery during practice in order to prepare for or work on certain skills.

Time and place served as the ground of these gymnasts' experiences of using imagery.

The ground represented the context in which imagery happened for these participants. The nature

of their imagery within these contexts largely depended on what the gymnasts felt they needed at that time. However, all described experiences in and out of competition that incorporated *preparing for movement, mentally preparing, feeling the skill and controlling perspective/speed/effort.*

Chapter 5

Discussion

The sport of competitive gymnastics consists of considerable physical and psychological demands. Physically, gymnasts must perform with strength, flexibility, agility, coordination, and balance while at the same time producing graceful and elegant-looking movements. Psychologically, gymnasts must cope with the expectation of flawless performance of routines on demanding apparatuses and with the perpetual risk of serious injury. The slightest error can make the difference between finishing at the top or the bottom of the standings, not to mention the possibility of debilitating injury. Previous research has identified imagery to be one mental skill gymnasts use to manage both the physical and psychological demands of their sport (Calmels et al., 2003; Chase et al., 2005; Hall et al. 1990; White & Hardy, 1998). However, researchers have typically utilized questionnaires or semi-structured interview approaches to describe gymnasts' use of imagery (Chase et al., 2005; Hall et al. 1990; White & Hardy, 1998). While these studies have provided several insights into gymnasts' use of imagery, they have also constrained athletes' depictions of their overall imagery experience by limiting their responses to questions included in the interview guide.

In the present study an attempt was made to expand on previous research by examining gymnasts' experiences of imagery in their sport by means of existential phenomenological interviews. By focusing on gymnasts' perspectives of imagery in an open-ended fashion, as opposed to examining a priori assumptions about the situations/functions of their imagery use, this study offered the potential for a more comprehensive picture of these athletes' imagery experience. In this chapter, the results are discussed under the following headings: *major*

findings, connections to previous research, practical applications, future research directions, and conclusions.

Major Findings

The results of in-depth phenomenological interviews with former and current high-level gymnasts revealed five major dimensions of their experience of imagery. The dimensions included: *preparing for movement, mentally preparing, feeling the skill, controlling perspective/speed/effort*, and *time and place*. A visual depiction of the thematic structure and interaction between the various dimensions is presented in Figure 1.

Perhaps the most significant finding of this study is the intricate *relationships* that existed among the five dimensions. These gymnasts' imagery was an active process and encompassed several characteristics. The theme *controlling perspective/speed/effort* represented a dynamic process that included different imagery perspectives (internal and external) and two speeds of imaging (slow and real time). Participants employed this active imagery process in *preparing for movement, mentally preparing, and feeling the skill* within the context of *time and place*. The thematic structure, shown in Figure 1, illustrates the meaning of imagery for these gymnasts. While the themes are presented as separate entities, they are also interrelated in many ways within these gymnasts' experiences and therefore cannot be understood in isolation. For example, imagery of a perfect routine just prior to competing on bars might serve the simultaneous functions of preparing the movement(s) for correct execution and providing the confidence necessary to execute the routine successfully.

Although these gymnasts' experiences shared a similar thematic structure, individual differences in their imagery were also evident. For example, within the major theme of

controlling perspective/speed/effort, participants described the way they experienced the sub-dimensions of *perspective* and *image speed* in different ways. In terms of the preferred perspective for a particular event, some gymnasts preferred to image internally, others externally, and still others by utilizing both perspectives. Individual differences were also evident with respect to imagery speed. While all the participants in this study experienced imaging in both *real* and *slow time* speeds, they differed in the way they experienced *slow time* imagery. Some experienced *slow time* imagery as “slow-mo,” which entailed going through increments of movements slowly, while others experienced it as “pressing the pause button,” which included pausing the image at various spots in the movement or event. These subtle differences suggest that imagery is, in an important sense, *unique* to each individual athlete.

The finding that imagery speed was significant to these gymnasts is noteworthy in and of itself. Relatively little previous research has examined the in-depth experience of athletes’ slowing down their imagery speed, although it has been mentioned by athletes in one previous qualitative research (Munroe et al., 2000), and experimental research has compared the relationship between high-level athletes’ actual and imaged movements (Calmels & Fournier, 2001; Calmels, Holmes, Lopez, & Naman, 2006). For example, Calmels and colleagues (2001, 2006) compared the duration of high-level gymnasts’ actual and imagined movements during performance on the floor exercise and during vault routines. The results revealed that gymnasts imaged their floor routines in a shorter duration (i.e., faster) than they actually performed them, while they imaged and performed their vaults in essentially the same time frame. One possible explanation for the former finding is that floor routines typically consist of a number of passes (i.e., running or stepping movements) that may vary in length yet are not of sufficient difficulty

for gymnasts to include in their imagery. Another interesting finding emerging from the previous studies was that gymnasts appeared to spend extra time imaging more complex aspects of their routines than the more simple movements. These results are consistent with the findings of the current study that revealed gymnasts slowed down their imagery when focusing on the key parts of a routine or aspects of routines they normally performed at a high velocity. For example, some gymnasts described slowing down their vaulting sequences because it was too difficult to experience all of the components in real time.

Another significant finding of the present study concerned the way these gymnasts used imagery to physically prepare for movement. While there were several sub-dimensions to the major theme *preparing for movement*, the sub-dimension of *making it perfect* provided some interesting insight into these athletes' imagery use. In order to receive maximum scores, a gymnast must execute a routine flawlessly. This expectation of perfection was evident in participants' imagery of a number of their routines. For example, Kerry stated, "I wanted to make sure that at least at that point, I was able to make it perfect, so that in real life, I had a better chance, if I know what exactly it looked like in my head." For these gymnasts *making it perfect* enhanced the possibility that the ideal image would transfer to their physical execution of the skill/routine, which would assist them in achieving a higher score. The need to "make it perfect" seemed to be a compulsory aspect of participants' imagery, in that if a gymnast made any type of mistake while imaging, she would stop and re-image that particular skill/routine again.

In addition to using imagery to manage the physical demands associated their sport, these athletes also talked about the role of imagery in helping them cope with the psychological demands. The theme *mentally preparing* depicted ways in which these gymnasts used imagery

for coping with mental challenges (i.e. fear of injury, competitive anxiety, lack of confidence, etc.). While the sub-dimensions of *calming nerves* and *building confidence* were consistent with the findings of previous imagery research (Calmels et al., 2003; Chase et al., 2005; Hall et al., 1998), an additional aspect that surfaced in this study concerned the way these gymnasts used imagery to mentally prepare for environmental aspects of upcoming meets. The sub-dimension *going over the meet* pertained to gymnasts' imagery of performance atmospheres, detailed aspects of a competitor's gym, the events the gymnasts would be competing in, the presence of competitors, and other pressures associated with performing in front of judges, teammates, and audiences. For several gymnasts *going over the meet* provided them with the opportunity to get comfortable with the upcoming competition environment. By experiencing the competition beforehand they were more comfortable with the actual situation when they encountered it. The participants also used imagery to practice dealing with unpredictable performance circumstances they might have to encounter. Examples of possible circumstances ranged from dealing with differences in equipment to recovering from a mistake during a routine. This finding is consistent with previous qualitative accounts with other high level athletes (MacIntyre & Moran, 2007b) who reported using variable imagery that involved "what if" components. However, the findings in the present study describe a more detailed depiction of the ways high-level gymnasts use imagery to deal with the psychological demands of their sport than reported in previous research.

Another important finding that emerged from the interviews in this study was a sub-dimension of the major theme *feeling the skill*, which dealt with incorporation of kinesthetic sensations into gymnasts' imagery. While previous research has indicated that high-level athletes use kinesthetic imagery (Hall et al., 1990; Munroe et al., 2000), the results of the present study

revealed that these gymnasts sometimes combined overt body movements with their mental imaging. Adding abbreviated body movements to imagery seemed to accentuate the feel of the skill and made the imagery experiences more realistic.

A final important discovery of the present study was the complexity associated with the dimension of *time and place*. *Time and place* pertained to the sites and moments where these gymnasts engaged in imagery. Consistent with previous research, the present study revealed that athletes use imagery both during competition and outside of competition (Hall et al., 1990; Munroe et al., 2000; White & Hardy, 1998). However, an extension to previous results was the finding that some of these participants used imagery *while competing*. Several participants described the experience of “snap-shot” imagery during the performance of some routines. In most cases this entailed a brief “snap shot” of a skill they were about to perform. It appeared gymnasts used “snap-shot” imagery like this as a reminder of subsequent movements or to prepare for a shift of focus to the next component of the routine.

Connections to Previous Research

Prior imagery research has predominately focused on two lines of inquiry. In one, researchers have attempted to determine the effects of imagery has on sport performance, while in the other they have tried to identify the ways in which athletes use imagery (Hall et al., 1990; Weinberg, 2008). Collectively, the results of previous studies exploring the effects of imagery have provided ample evidence that imagery benefits the performance of sport tasks requiring a range of cognitive and motor demands and that it facilitates psychological states associated with effective athletic performance (Driskell et al., 1994; Feltz & Landers, 1983). Research examining the ways athletes employ imagery has effectively described *where, when, why, and for what*

reasons athletes image (Hall et al., 1998; Hall et al., 1990; Munroe et al., 2000). Generally, the results of this research have suggested that athletes use imagery in a variety of settings, for multiple functions, from either of two perspectives (internal and external), and that it incorporates multiple senses. In an attempt to describe the purpose of athletes' imagery, Hall et al. (1998) suggested that imagery serves five functions: motivational-specific (MS), motivational general-mastery (MG-M), motivational general-arousal (MG-A), cognitive-specific (CS), and cognitive-general (CG)).

To a considerable extent, the themes that emerged in the present study support the findings of previous research and are consistent with the imagery functions advanced by Hall et al. (1998). For example, their model suggests that athletes use imagery for both cognitive and motivational purposes, which was supported by the major themes of *preparing for movement* and *mentally preparing* that were identified in the present study. In addition, Hall et al. define CS imagery as imagery that focuses on the rehearsal of a specific sport skill, which was evident in the present study in the sub-dimensions of *rehearsing body movements*, *focusing on critical areas*, and *making mistakes and correcting them*. However, the participants in this study did not report using CG imagery, which may not be surprising because CG imagery emphasizes strategies associated with successful sport performance like imaging a race plan in track or swimming. In gymnastics the emphasis appears to be on skill execution rather than on strategic planning. Thus, it is possible that CG imagery is less relevant for gymnasts' competition preparation.

Hall et al. also proposed that athletes use motivational general mastery (MG-M) imagery to cope with/master challenging situations and employ motivational general arousal (MG-A)

imagery to manage their emotions (e.g., nervousness). The results of the present study suggest some support for both of these motivational functions of imagery. The major theme of *mentally preparing* encompassed the sub-dimensions of *calming nerves* and *building confidence*.

However, the participants in this study did not describe experiences of using motivational-specific (MS) imagery, which represents images of specific goals and goal orientated behaviors. While they reported using perfect imagery of their routines, the function appeared to be one of transferring the mental picture to their physical performance rather than of focusing on specific goals they aspired to achieve.

While the results of this study generally support facets of the model proposed by Hall et al. they also indicate that certain functions were more useful to gymnasts than others. For example, images that emphasize strategy (MG) did not appear to be as important as images that focus on rehearsing skills (CS). Taken together, the present findings suggest the possibility that the imagery of athletes in any given sport---in this case gymnastics---may be share similarities to the conceptual framework advanced by Hall et al., but that their imagery may be more complex and intricate to that sport.

The results of the present study are also consistent with a number of those emanating from prior descriptive and qualitative research. As in previous studies (Hall et al., 1990), the present participants reported using imagery in training and competition. Qualitative imagery research investigations of the meta-imagery process underlying high-level athletes (MacIntyre & Moran, 2007a, 2007b) suggest that imagery can be creative and include a variety of performances (i.e. poor, ideal, etc.); these findings were consistent in the result of the present study as well. Another prominent theme of previous research (Driediger, Hall, & Callow, 2006;

Sordoni et al., 2000) and the present study is athletes' use of imagery while recovering from injuries. One prominent sub-dimension of *preparing for movement* in this study was *dealing with injury*. This sub-dimension represented gymnasts' use of imagery when injured, primarily for the purpose of mental rehearsal of skills while their bodies were healing. Taken together, results of this study and previous research suggest that imagery may be an effective substitute when athletes are unable to physically practice their skills.

The findings of the present study also substantiate and extend those of previous imagery research with gymnasts (Calmels et al., 2003; Chase et al., 2005; White & Hardy, 1998). As in the case of prior studies, this investigation indicates that gymnasts use imagery in training and competition, the night before a competition and just prior to competing, for different functions, for maintenance of existing skills, to deal with the fear of injury, to decrease anxiety, and to increase confidence. The participants in this study corroborate previous findings by describing experiences of using imagery to correct mistakes, to decrease anxiety and fear, and to build confidence. However, the present findings extended prior research by offering a more nuanced account of gymnasts' imagery. Perhaps the most dramatic examples concerned the ways these gymnasts manipulated the speed of their images, used both internal and external imagery perspectives, re-imaged mistakes immediately after imaging them, imaged their routines twice once in slow and real time the night before a competition, used imagery while performing a routine in competition, and occasionally combined body movements with their imagery.

Practical Applications

The present results suggest several practical applications for gymnasts, coaches, and sporty psychology practitioners. For gymnasts the findings suggest that imagery is a mental skill

that can be used in a variety of settings to cope with the physical (i.e. preparing for movement) and psychological demands of their sport (i.e. fear and anxiety). The findings also indicate that gymnasts are able to enhance their overall imagery experience by physically executing parts of their skill/routine while imaging. Imagery may also be a skill that gymnasts can use to maintain performance while recovering from an injury. Finally, very brief bouts of imagery maybe incorporated during, as well as prior to, skill performance.

For coaches and sport psychology practitioners the results suggest several ways of enhancing athletes' overall imagery experience. Previous research has established that imagery is multisensory (Hall et al., 1990; Munroe et al., 2000) and such seemed to be the case in this study. Thus, coaches should encourage athletes to utilize as much sensory information as possible when imaging. Prior to the present study little evidence suggested that supplementing mental imagery with actual movements might enhance the vividness of images. In the present study, gymnasts occasionally incorporated body movements into their imagery as a way of making the experience more authentic. Thus, coaches and practitioners might consider advising athletes to explore ways of incorporating movements or parts of movements required for their performance into their imagery in order to increase the vividness of their overall imagery experience.

A second application of the present findings for coaches and sport psychology practitioners is the *uniqueness* of athletes' imagery experience. It is likely that the most effective imagery interventions are those tailored to the preferences and needs of individual athletes. Previous research has largely implemented generic imagery scripts for use with groups of athletes (Grouios, 1992a; Isaac, 1992). While such scripts may be useful in introducing some of the basic components of imagery, the results of the present study suggest that it is also important

for practitioners and coaches to assist athletes in individualizing their own imagery scenarios. Individualized scenarios or scripts would likely be of greater relevance to athletes than would generic scripts and would provide them with a useful tool for meeting the demands of training and competition.

Related to the notion of individualized imagery was the finding that gymnasts used imagery for multiple purposes and in various locations. For example, participants said they engaged in imagery the night before a competition to review and prepare for the next day's meet as well as just prior to competing in order to review their routines or enhance confidence. The type of imagery gymnasts used largely depended on their perceptions of what was needed most at that moment. As Vanessa emphasized, "It (imagery activity) really depended on what I needed at that moment... did I need confidence or did I need to practice my performance." This finding suggests that coaches and sport psychologists should encourage athletes to use imagery at various times and locations based on the athlete's needs at that moment, whether it be for rehearsing a routine, building confidence, decreasing anxiety, or energizing the feeling of the skill. Of primary importance is the need for athletes to be encouraged to use imagery in order to become familiar with its various applications.

A final potential implication of the present findings for coaches was gymnasts' use of imagery to correct skills they were struggling with. This result suggests that coaches might include imagery as an instructional tool for influencing athletes' behavior alone or in combination with verbal feedback, physical guidance, or video demonstrations.

Future Research Directions

The purpose of this study was to explore gymnasts' experiences of using imagery completely from their own perspective. Besides offering additional details about athletes' imagery experience, the present results suggest several possibilities for future research. First and foremost, it appears that existential phenomenological interviewing is a viable method for understanding athletes' experience of imagery and a fruitful approach for examining athletes' imagery in other sports representing different physical and psychological demands. More specific questions might also be examined using an existential phenomenology approach. For example, the concept of *slow-time* imaging, which emerged in the present study, might be examined qualitatively or in descriptive research in order to determine how athletes in other sports use this type of imagery to enhance their performance. The gymnasts in the present study said they used *slow-time* imagery to slow down or pause critical parts of a routine/skill or to slow down extremely fast movements in order to focus on subtle aspects of their technique.

Subsequent descriptive research may want to incorporate the present findings to modify items on a questionnaire. For instance, items could be developed or added to inquire about athletes' use of in-performance imagery, speed of imagery, and abbreviated use of body movements during imagery. Future experimental research might also be conducted to examine imagery interventions comprised of various components that emerged in the present study. For example, a few gymnasts described brief moments where they imaged while performing. These brief imagery bouts appeared to be a quick "snap-shot" of upcoming skills in a routine. While it is possible that snap-shot imagery functions in a fashion similar to imagery performed just prior

to competing, additional research is needed to determine the influences of “in performance” imagery on the skill execution of athletes in other sports.

Finally, future research might examine the effects, if any, of incorporating body movements during imagery on athletes’ performance or imagery skill. In the present study athletes described three types of experiences that involved combining body movements and imagery. These included actual movements of the body while imaging (e.g., arms outstretched when imaging preparation for a back handspring on the balance beam), tensing of muscles associated with the movement they were imaging (e.g., arm and shoulder muscles during a vaulting movement), and going back and forth between physical practice and imagery of complex parts of a routine (e.g., physically rehearse one pass of a floor exercise and then image the next tumbling pass). The participants indicated that combining body movements and imagery made the imagery experience more realistic and allowed them to “feel” the movements associated with the skills they were performing. Thus future research might examine the effects of an imagery intervention in conjunction with physical rehearsal on athletes’ performance or development of kinesthetic imagery ability.

Conclusions

The results of this study suggest the following conclusions regarding these gymnasts’ experience of imagery:

1. Imagery is a highly individualized process that serves multiple functions depending on the gymnast’s needs.
2. Both internal and external perspectives may be adopted when imaging movements or aspects of competitive situations.

3. Imagery of some movements or components of movements occurs in slow time, particularly when imaging movements produced at high speeds during actual performance.
4. Occasionally, imagery is combined with or interspersed between overt movements in order to enhance the kinesthetic feel of the desired action.
5. Imagery sometimes occurs during the execution of a gymnastics routine and is experienced as a “snap-shot” of an upcoming component in a movement sequence.

References

- Arvinen-Barrow, M., Weigand, D. A., Thomas, S., Hemmings, B., & Walley, M. (2007). Elite and novice athletes' imagery use in open and closed sports. *Journal of Applied Sport Psychology, 19*, 93-104.
- Bakker, F. C., Boschker, M. S. J., & Chung, T. (1996). Changes in muscular activity while imagining weightlifting using stimulus or response propositions. *Journal of Sport and Exercise Psychology, 18*, 313-324.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W. H. Freeman.
- Beauchamp, M. R., Bray, S. R., & Albinson, J. G. (2002). Pre-competition imagery, self-efficacy and performance in collegiate golfers. *Journal of Sports Sciences, 20*, 697-705.
- Callow, N., & Hardy, L. (2001). Types of imagery associated with sport confidence in netball players of varying skill levels. *Journal of Applied Sport Psychology, 13*, 1-17.
- Callow, N., Hardy, L., & Hall, C. (2001). The effects of a motivational general-mastery imagery intervention on the sport confidence of high-level badminton players. *Research Quarterly for Exercise and Sport, 72*, 389-400.
- Callow, N., & Waters, A. (2005). The effect of kinesthetic imagery on the sport confidence of flat-race horse jockeys. *Psychology of Sport and Exercise, 6*, 443-459.
- Calmels, C., D'Arripe-Longueville, F., Fournier, J. F., & Soulard, A. (2003). Competitive strategies among elite female gymnasts: An exploration of the relative influence of psychological skills training and natural learning experiences. *International Journal of Sport and Exercise Psychology, 1*, 327-352.
- Calmels, C., & Fournier, J. (2001). Duration of physical and mental execution of gymnastic routines. *The Sport Psychologist, 15*, 142-150.

- Calmels, C., Holmes, P., Lopez, E., & Naman, V. (2006). Chronometric comparison of actual and imaged complex movement patterns. *Journal of Motor Behavior, 38*, 339-348.
- Carter, J. E., & Kelly, A. E. (1997). Using traditional and paradoxical imagery interventions with reactant intramural athletes. *The Sport Psychologist, 11*, 175-189.
- Chase, M. A., Magyar, T. M., & Drake, B. M. (2005). Fear of injury in gymnastics: Self-efficacy and psychological strategies to keep on tumbling. *Journal of Sports Sciences, 23*, 465-475.
- Coelho, R. W., De Campos, W., Da Silva, S. G., Okazaki, F. H. A., & Keller, B. (2007). Imagery intervention in open and closed tennis motor skill performance. *Perceptual and Motor Skills, 105*, 458-468.
- Cohn, P. J. (1991). An exploratory study on peak performance in golf. *The Sport Psychologist, 5*, 1-14.
- Cotterill, S. T., Sanders, R., & Collins, D. (2010). Developing effective pre-performance routines in golf: Why don't we ask the golfer? *Journal of Applied Sport Psychology, 22*, 51-64.
- Cumming, J., & Hall, C. (2002). Athletes' use of imagery in the off-season. *The Sport Psychologist, 16*, 160-172.
- Cumming, J., Nordin, S. M., Horton, R., & Reynolds, S. (2006). Examining the direction of imagery and self-talk on dart-throwing performance and self efficacy. *The Sport Psychologist, 20*, 257-274.
- Dale, G. A. (1996). Existential phenomenology: Emphasizing the experience of the athlete in sport psychology research. *The Sport Psychologist, 10*, 307-321.

- Dale, G. A. (2000). Distractions and coping strategies of elite decathletes during their most memorable performances. *The Sport Psychologist, 14*, 17-41.
- Decety, J., & Ingvar, D. H. (1990). Brain structures participating in mental stimulation of motor behavior: A neurophysiological interpretation. *Acta Psychologica, 73*, 13-31.
- Decety, J., Sjöholm, H., Ryding, E., Stenberg, G., & Ingvar, D. (1990). The cerebellum participates in mental activity: Tomographic measurements of regional cerebral blood flow. *Brain Research, 535*, 313-317.
- Denis, M. (1985). Visual imagery and the use of mental practice in the development of motor skills. *Canadian Journal of Applied Sport Sciences, 10*(4), 4S-16S.
- Driediger, M., Hall, C., & Callow, N. (2006). Imagery use by injured athletes: A qualitative analysis. *Journal of Sports Sciences, 24*, 261-271.
- Driskell, J. E., Copper, C., & Moran, A. (1994). Does mental practice enhance performance? *Journal of Applied Psychology, 79*, 481-492.
- Epstein, M. L. (1980). Relationship of mental imagery and mental rehearsal to performance of a motor task. *Journal of Sport Psychology, 2*, 211-220.
- Farahat, E., Ille, A., & Thon, B. (2004). Effect of visual and kinesthetic imagery on the learning of a patterned movement. *International Journal of Sport Psychology, 35*, 119-132.
- 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.
- Feltz, D. L., & Riessinger, C. A. (1990). Effects of in vivo emotive imagery and performance feedback on self-efficacy and muscular endurance. *Journal of Sport and Exercise Psychology, 12*, 132-143.

- Féry, Y. A., & Morizot, P. (2000). Kinesthetic and visual image in modeling closed motor skills: The example of the tennis serve. *Perceptual and Motor Skills, 90*, 707-722.
- Gadamer, H. G. (1975). *Truth and method*. New York: Seabury Press.
- Garza, D. L., & Feltz, D. L. (1998). Effects of selected mental practice on performance, self-efficacy, and competition confidence of figure skaters. *The Sport Psychologist, 12*, 1-15.
- Giorgi, A. (1975). An application of phenomenological method in psychology. In A. Giorgi, C. T. Fischer & E. L. Murray (Eds.), *Duquesne studies in phenomenological psychology* (Vol. 2, pp. 82-103). Pittsburgh, PA: Duquesne University Press.
- Gordon, S., Weinberg, R., & Jackson, A. (1994). Effect of internal and external imagery on cricket performance. *Journal of Sport Behavior, 17*, 60-75.
- Gould, D., Eklund, R. C., & Jackson, S. A. (1992). 1988 U.S. Olympic wrestling excellence: I. mental preparation, precompetitive cognition, and affect. *The Sport Psychologist, 6*, 358-382.
- Grouios, G. (1992a). The effect of mental practice on diving performance. *International Journal of Sport Psychology, 23*, 60-69.
- Grouios, G. (1992b). Mental practice: A review. *Journal of Sport Behavior, 15*, 42-59.
- Grouios, G., Kouthouris, H., & Bagiatis, K. (1993). The effects of physical practice, mental practice, and video - demonstration practice on the learning of skiing skills. *International Journal of Physical Education, 30*, 25-28.
- Hale, B. D., & Whitehouse, A. (1998). The effects of imagery-manipulated appraisal on intensity and direction of competitive anxiety. *The Sport Psychologist, 12*, 40-51.

- Hall, C. R. (1985). Individual differences in the mental practice and imagery of motor-skill performance. *Canadian Journal of Applied Sport Sciences, 10*(4), 17S-21S.
- Hall, E. G., & Erffmeyer, E. S. (1983). The effects of visuo-motor behavior rehearsal with videotaped modeling of free throw accuracy of intercollegiate female basketball players. *Journal of Sport Psychology, 5*, 343-346.
- 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.
- Hardy, L., & Callow, N. (1999). Efficacy of external and internal visual imagery perspectives for the enhancement of performance on tasks in which form is important. *Journal of Sport and Exercise Psychology, 21*, 95-112.
- Heidegger, M. (1962). *Ideas: General introduction to pure phenomenology*. New York: Collier.
- Highlen, P. S., & Bennett, B. B. (1983). Elite divers and wrestlers: A comparison between open and closed skill athletes. *Journal of Sport Psychology, 5*, 390-409.
- Holmes, P. S., & Collins, D. J. (2001). The PETTLEP approach to motor imagery: A functional equivalence model for sport psychologists. *Journal of Applied Sport Psychology, 13*, 60-83.
- Husserl, E. (1931). *Ideas toward a pure phenomenology and phenomenological philosophy* (W. R. B. Gibson, Trans.). New York: Humanities.

- Ihde, D. (1986). *Experimental phenomenology: An introduction*. Albany, N.Y.: State University of New York.
- Ingvar, D. H., & Philipson, L. (1977). Distribution of cerebral blood flow in the dominant hemisphere during motor ideation and motor performance. *Annals of Neurology*, 2, 230-237.
- Isaac, A. (1992). Mental practice - does it work in the field? *The Sport Psychologist*, 6, 192-198.
- Jacobson, E. (1932). Electrophysiology of mental activities. *American Journal of Psychology*, 44, 677-694.
- Jedlic, B., Hall, N., Munroe-Chandler, K., & Hall, C. (2007). Coaches' encouragement of athletes' imagery use. *Research Quarterly for Exercise and Sport*, 78, 351-363.
- Johnson, M. S. (1998). *The athlete's experience of being coached: An existential-phenomenological investigation*. Unpublished doctoral dissertation. University of Tennessee, Knoxville.
- Jordet, G. (2005). Perceptual training in soccer: An imagery intervention study with elite players. *Journal of Applied Sport Psychology*, 17, 140-156.
- Kendall, G., Hrycaiko, D., Martin, G. L., & Kendall, T. (1990). The effects of an imagery rehearsal, relaxation, and self-talk package on basketball game performance. *Journal of Sport and Exercise Psychology*, 12, 157-166.
- Lang, P. J. (1977). Imagery in therapy: An informational processing analysis of fear. *Behavior Therapy*, 8, 862-886.
- Lang, P. J. (1979). A bio-informational theory of emotional imagery. *Psychophysiology*, 16, 495-512.

- Lidor, R., & Singer, R. N. (1994). Motor skill acquisition, auditory distractors, and the encoding specificity hypothesis. *Perceptual and Motor Skills, 79*, 1579-1584.
- MacIntyre, T. E., & Moran, A. P. (2007a). A qualitative investigation of imagery use and meta-imagery processes among elite canoe-slalom competitors. *Journal of Imagery Research in Sport and Physical Activity, 2*(1), Article 3. Retrieved May 20, 2008, from <http://www.bepress.com/jirspa/vol2002/iss2001/art2003/>.
- MacIntyre, T. E., & Moran, A. P. (2007b). A qualitative investigation of meta-imagery processes and imagery direction among elite athletes. *Journal of Imagery Research in Sport and Physical Activity, 2*(1), Article 4. Retrieved May 20, 2008 from <http://www.bepress.com/jirspa/vol2002/iss2001/art2004/>.
- Mack, G., & Casstevens, D. (2001). *Mind gym: An athlete's guide to inner excellence*. New York: McGraw Hill.
- Mahoney, M. J., & Avenier, M. (1977). Psychology of the elite athlete: An exploratory study. *Cognitive Therapy and Research, 3*, 361-366.
- Malouff, J. M., McGee, J. A., Halford, H. T., & Rooke, S. E. (2008). Effects of pre-competition positive imagery and self-instructions on accuracy of serving tennis. *Journal of Sport Behavior, 31*, 264.
- Martens, R. (1987). Science, knowledge, and sport psychology. *The Sport Psychologist, 1*, 29-55.
- Martin, K. A., & Hall, C. R. (1995). Using mental-imagery to enhance intrinsic motivation. *Journal of Sport and Exercise Psychology, 17*, 54-69.

- Martin, K. A., Moritz, S. E., & Hall, C. R. (1999). Imagery use in sport: A literature review and applied model. *The Sport Psychologist, 13*, 245-268.
- Merleau-Ponty, M. (1962). *Phenomenology of Perception*. London: Routledge.
- Minas, S. C. (1980). Mental practice of a complex perceptual-motor skill. *Journal of Human Movement Studies, 4*, 102-107.
- Morris, T., Spittle, M., & Watt, A. P. (2005). *Imagery in Sport*. Champaign, IL: Human Kinetics.
- Munroe, K., Giacobbi, P. R., Hall, C., & Weinberg, R. (2000). The four Ws of imagery use: where, when, why, and what. *The Sport Psychologist, 14*, 119-137.
- Munroe, K., Hall, C., Simms, S., & Weinberg, R. (1998). The influence of type of sport and time of season on athletes' use of imagery. *The Sport Psychologist, 12*, 440-449.
- Munroe-Chandler, K. J., Hall, C. R., Fishburne, G. J., & Strachan, L. (2007). Where, when, and why young athletes use imagery: An examination of developmental differences. *Research Quarterly for Exercise and Sport, 78*, 103-116.
- Nicholas, A. R., Holt, N. L., & Polman, R. C. (2005). A phenomenological analysis of coping effectiveness in golf. *The Sport Psychologist, 19*, 111-130.
- Nordin, S. M., & Cumming, J. (2005). More than meets the eye: Investigating imagery type, direction, and outcome. *The Sport Psychologist, 19*, 1-17.
- Olsson, C. J., Jonsson, B., & Nyberg, L. (2008). Internal imagery training in active high jumpers. *Scandinavian Journal of Psychology, 49*, 133-140.
- Orlick, T., & Partington, J. (1988). Mental links to excellence. *The Sport Psychologist, 2*, 105-130.

- Page, S. J., Sime, W., & Nordell, K. (1999). The effects of imagery on female college swimmers' perceptions of anxiety. *The Sport Psychologist, 13*, 458-469.
- Paivio, A. (1975). Coding distinctions and repetition effects in memory. In G. H. Bower (Ed.), *Psychology of learning and motivation* (Vol. 9). Orlando, FL: Academic Press.
- Paivio, A. (1985). Cognitive and motivational functions of imagery in human performance. *Canadian Journal of Applied Sport Sciences, 10*(4), 22S-28S.
- Palmer, R. E. (1969). *Hermeneutics: Interpretation theory in Schleiermacher, Dilthey, Heidegger and Gadamer*. Evanston, IL: Northwestern University Press.
- Pascual-Leone, A., Nguyet, D., Cohen, L. G., Brasil-Neto, J. R., Cammarota, A., & Hallett, M. (1995). Modulation of muscle responses evoked by transcranial magnetic stimulation during the acquisition of new fine motor skills. *Journal of Neurophysiology, 74*, 1037-1045.
- Ploszay, A. J., Gentner, N. B., Skinner, C. H., & Wrisberg, C. A. (2006). The effects of multisensory imagery in conjunction with physical movement rehearsal on golf putting performance. *Journal of Behavioral Education, 15*, 247-255.
- Polkinghorne, D. (1989). Phenomenological research methods. In R. S. Valle & S. Halling (Eds.), *Existential-phenomenological perspectives in psychology* (pp. 41-62). New York: Plenum.
- Pollio, H. R., Henley, T. B., & Thompson, C. J. (1997). *The phenomenology of everyday life*. New York: Cambridge University Press.
- Post, P. G., Wrisberg, C. A., & Mullins, S. (2010). A field test of the influence of pre-game imagery on basketball free throw shooting. *Journal of Imagery Research in Sport and*

- Physical Activity*, 5(1), Article 2. Retrieved January 22, 2010, from <http://www.bepress.com/jirspa/vol2015/iss2011/art2012>.
- Ravizza, K. (1977). Peak experiences in sport. *Journal of Humanistic Psychology*, 17, 35-40.
- Roure, R., Collet, C., Deschaumes-Molinario, C., Delhomme, G., Dittmar, A., & Vernet-Maury, E. (1999). Imagery quality estimated by autonomic response is correlated to sporting performance enhancement. *Physiology and Behavior*, 66, 63-72.
- Rushall, B. S., & Lippman, L. G. (1998). The role of imagery in physical performance. *International Journal of Sport Psychology*, 29, 57-72.
- Sackett, R. S. (1934). Influence of symbolic rehearsal upon retention of maze habit. *Journal of General Psychology*, 10, 376-396.
- Salmon, J., Hall, C., & Haslam, I. (1994). The use of imagery by soccer players. *Journal of Applied Sport Psychology*, 6, 116-133.
- Scanlan, T. K., Stein, G. L., & Ravizza, K. (1991). An in-depth study of former elite figure skaters: III. sources of stress. *Journal of Sport and Exercise Psychology*, 13, 103-120.
- Short, S. E., Bruggeman, J. M., Engel, S. G., Marback, T. L., Wang, L. J., Willadsen, A. et al. (2002). The effect of imagery function and imagery direction on self-efficacy and performance on a golf-putting task. *The Sport Psychologist*, 16, 48-67.
- Short, S. E., & Short, M. W. (2005). Differences between high- and low-confident football players on imagery functions: A consideration of the athletes' perceptions. *Journal of Applied Sport Psychology*, 17, 197-208.

- Smith, D., Holmes, P., Whitemore, D., Collins, D., & Devonport, T. (2001). The effect of theoretically based imagery scripts on field hockey performance. *Journal of Sport Behavior, 24*, 408-419.
- 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*, 80-92.
- Smith, D., Wright, C. J., Cantwell, C. (2008). Beating the bunker: The effect of PETTLEP imagery on golf bunker shot performance. *Research Quarterly for Exercise and Sport, 79*, 385-391.
- Sordoni, C., Hall, C., & Forwell, L. (2000). The use of imagery by athletes during injury rehabilitation. *Journal of Sport Rehabilitation, 9*, 329-338.
- Suinn, R. M. (1972). Behavior rehearsal training for ski racers. *Behavior Therapy, 3*, 519-520.
- Taylor, J. A., & Shaw, D. F. (2002). The effects of outcome imagery on golf-putting performance. *Journal of Sports Sciences, 20*, 607-613.
- Thomas, S. P., & Pollio, H. R. (2002). *Listening to patients: A phenomenological approach to nursing research and practice*. New York: Springer Publishing Company.
- Valle, R. S., & Halling, S. (Eds.). (1989). *Existential-phenomenological perspectives in psychology: Exploring the breadth of human experience*. New York: Plenum Press.
- Vealey, R. S., & Greenleaf, C. A. (2010). Seeing is believing: Understanding and using imagery in sport. In J. M. Williams (Ed.), *Applied sport psychology: Personal growth to peak performance* (6th ed., pp. 267-304). New York: McGraw-Hill.

- Weinberg, R. (2008). Does imagery work? Effects on performance and mental skills. *Journal of Imagery Research in Sport and Physical Activity*, 3(1), Article 1. Retrieved November 20, 2008, from <http://www.bepress.com/jirspa/vol2003/iss2001/art2001/>.
- Weinberg, R., Butt, J., Knight, B., Burke, K. L., & Jackson, A. (2003). The relationship between the use and effectiveness of imagery: An exploratory investigation. *Journal of Applied Sport Psychology*, 15, 26-40.
- Weinberg, R., Seabourne, T. G., & Jackson, A. (1981). Effects of visuo-motor behavior rehearsal, relaxation, and imagery on karate performance. *Journal of Sport Psychology*, 3, 228-238.
- White, A., & Hardy, L. (1995). Use of different imagery perspectives on the learning and performance of different motor skills. *British Journal of Psychology*, 86, 169-180.
- White, A., & Hardy, L. (1998). An in-depth analysis of the uses of imagery by high-level slalom canoeists and artistic gymnasts. *The Sport Psychologist*, 12, 387-403.
- Wrisberg, C. A. (2007). *Skill instruction for coaches*. Champaign, IL: Human Kinetics.

Appendixes

Appendix A

Letter of Invitation

Dear [Gymnast's Name],

My name is Phillip Post and I am a doctoral student at the University of Tennessee. For my dissertation, I am conducting a research study on gymnast's experiences of using imagery in their sport. The criteria to participate in this study are as follows:

- You must have competed at the NCAA Division I level or above (e.g., national or international level).
- You must be currently competing or have competed within the last two years.
- You must be willing and able to openly discuss your imagery experiences as a gymnast.

If you meet the above criteria and are willing to contribute to this research investigation, you will be asked to participate in an audio-taped interview that will last approximately 30-60 minutes (or as long as you wish to talk about your imagery experience). Interviews will be conducted at a time and in a manner that is convenient for you, either face-to-face, over the phone, or video conferencing.

If you do decide to participate, please contact me and we will arrange an interview time and manner (i.e., face-to-face, over the phone, or video conferencing) that is convenient for you. If you do choose to participate in the study you will be asked to respond to the following open-ended question "think of a time when you have used imagery in your sport and can you describe that as fully as possible to me?" From there I will use follow-up questions to gain further clarification or to obtain additional details to previous comments. It is important to note that there are not right or wrong answers; I'm truly interested in getting your first person perspective on your experience of using imagery. If you have questions, please feel free to contact me at any time. I thank you in advance for your time and consideration in assisting me with this research project.

Regards,

Phillip Post

Appendix B

Informed Consent

You are invited to participate in a research study I am conducting for my doctoral dissertation at the University of Tennessee. The purpose of this study is to learn more about athletes' experience of using imagery in their sport. To accomplish this purpose I would like to conduct an interview with you at a convenient time and location. The interview should last between 30 and 60 minutes.

During the interview I will ask you to describe in as much detail as possible your experiences of using imagery in your sport. I may occasionally ask follow-up questions to gain further clarification or to obtain additional details to previous comments. I should point out that there are no right or wrong answers to any questions. My sole purpose is to gain an understanding of your personal experience of using imagery.

Your interview will be digitally recorded and subsequently transcribed. Because confidentiality is an important issue several measures will be undertaken to protect your identity. First, all of our discussions will be kept private and confidential. Second, I will not use your actual name in the transcript of your interview nor will it appear when the results are described in the final written manuscript. I will ask you to choose a pseudonym (fake name) to use in place of your given name. Finally, I will store the audio files of your interview on my personal computer and will store the hard copies of your transcript in a locked filing cabinet in my office at the University of Tennessee. The only other persons that will see your transcript will be members of a research team that will be assisting me in identifying key themes, unless you specifically give permission in writing for me to do otherwise. However, for future reference I will retain the transcript of your interview (with all identifying information removed) in a secure file on my personal computer.

If you have questions at any time about the study or the procedures, you may contact the primary investigator, Phil Post (865-974-0601; ppost1@utk.edu). If you have any questions about your rights as a participant, contact the Research Compliance Services section of the Office of Research at (865) 974-3466.

Your participation in this study is voluntary; you may decline to participate without penalty. If you decide to participate, you may withdraw from the study at any time without penalty. If you withdraw from the study before the interview is completed, your information will be returned or destroyed. I have read the above information and agree to participate in this study. I have received a copy of this form.

(Signature of participant)

(Print name)

(Date)

Appendix C
Demographic Questionnaire

1. Age _____
2. Gender _____
3. Years participating in gymnastics _____
4. Level of expertise _____
5. Frequency of imagery rehearsal:
 - a. Average number of times a day _____
 - b. Average number of times a week _____
 - c. Average number of times a month _____
6. Average length of a rehearsal:
Less than 5 minutes 5-10 minutes more than 10 minutes
7. Location(s) of imagery sessions:
 - a. At home _____
 - b. At practice _____
 - c. At competition _____
 - d. Prior to competition _____
 - e. Other areas _____
8. Is there any other information you would like to share regarding your imagery experience or use?

Appendix D

Sample Field Note

It is October 24th and I just finished an interview with an All-American gymnast. Overall I think it went extremely well. The interview took place at the [Name] University library. We were fortunate to reserve a small conference room in the back of the library. The white room was heated and quite comfortable, which was a welcome from the cool temperatures outside. After the initial getting to know you phase, which is always a bit awkward, the interviewee opened up and spoke freely regarding her imagery use. What struck me most about the interviewee was how confident and articulate she was. She was able to describe her experience in great detail. One drawback to my interview was that I was cognizant of her time, in that I knew she did not have all day. Even though she had a few hours between her morning and afternoon practices, I felt guilty taking up her break time. However, she seemed interested in the conversation and it did not appear like she wanted to leave. In fact, the interview took about 45 minutes and she took an additional 10 minutes to find out more about the study. For the most part I think my follow up questions were adequate, but we will see when I listen to the audio-file again and analyze it. I hope that my follow up questions did not lead her in any way, but maybe a few did on occasion. In terms of content, her ability to articulate what it is like to image in slow motion was insightful. Additionally, she also described detail experiences of using imagery during her bar routine. I was quite surprised when she said this, and I think I had a couple of follow up questions clarifying this particular experience. At the conclusion of the interview she was interested in my topic and told me she would be willing to help out in any way. Overall the interviewee was very helpful and provided a detailed description of her imagery use. It will be interesting to listen and analyze the audio-file later.

Vita

Phillip Guy Post was born May 3, 1978 in San Jose, California to his loving parents Tony and Gloria Post. Prior to attending the University of Tennessee he obtained a Bachelor of Arts degree in Psychology at the University of California, Santa Cruz. He then earned a Masters of Science degree in Kinesiology at California State University, Fullerton. In May 2010 he received his Doctor of Philosophy degree in Exercise and Sport Sciences with a concentration in Sport Psychology.