

The Four Ws of Imagery Use: Where, When, Why, and What

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The purpose of the study was to identify and describe the four Ws of athletes' imagery use: where, when, why, and what. Due to the in-depth nature of the questions being asked, a qualitative approach was employed. The participants were 14 elite athletes (7 male and 7 female), representing 7 different sports. A constant comparative method of analysis was conducted by two investigators. A conceptual framework was developed to display the four Ws of imagery use during and outside practice, as well as for pre-competition, competition, and post competition. Results from the present study indicated *where* and *when* athletes use imagery, and extended previous findings on *why* and for *what* athletes use imagery. It was proposed that a better understanding of the athletes' images can serve as a guide to future research and from a practical perspective, facilitate the development of more effective imagery interventions.

In the early 1990s, Hall and his colleagues (e.g., Barr & Hall, 1992; Hall, Rodgers, & Barr, 1990; Rodgers, Hall, & Buckolz, 1991) investigated the use of

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imagery by athletes in a variety of sports in order to develop more effective interventions. They essentially were asking four questions about imagery use: where, when, why, and what. Researchers have continued to seek answers to these questions and now, after approximately 10 years of study, a relatively comprehensive picture of imagery use has emerged.

Where do athletes use imagery? At first glance this seems to be a fairly basic question. The apparent answer is that athletes use imagery in practice and competition. The actual answer, however, is not quite that simplistic. Specifically, while the majority of the imagery research has focused on practice situations (e.g., using imagery to facilitate skill learning), athletes report using imagery more in conjunction with competition than training (Barr & Hall, 1992; Hall et al., 1990). Consequently, they are using imagery more for performance enhancement or execution than for skill learning. In addition, athletes often report using imagery outside of practice and competition (Salmon, Hall, & Haslam, 1994) in such places as school, work, and home. In fact, some athletes (e.g., elite soccer players) indicate using more imagery outside of practice situations than during them (Salmon et al., 1994).

When do athletes use imagery? As noted above, athletes use imagery most in conjunction with competition (Barr & Hall, 1992; Rodgers et al., 1991). Furthermore, they use it more just before competing than during or immediately after a competition. With respect to practice, athletes use imagery more during practice than before or after practice (Salmon et al., 1994). Outside of competition and practice, athletes use imagery during breaks in their daily activities (e.g., at work and school), and many routinely use imagery at night just before going to sleep (Hall et al., 1990; Rodgers et al., 1991).

Why do athletes use imagery? Athletes' imagery appears to be serving various functions. For example, they might be using imagery to help them improve their performance of a particular skill (i.e., facilitate learning), or they might be using it to psych themselves up for an important competition. They might be using imagery to help stay focused on the task at hand, or they could be using it for all three of these purposes. When considering imagery use by athletes, it is important to distinguish between function (i.e., why athletes are imaging) and content (i.e., what athletes are imaging).

Paivio (1985) proposed a framework for how imagery influences human motor performance. He suggests that imagery serves two basic functions and these two functions operate either at a specific or general level. The cognitive function involves the rehearsal of skills (cognitive specific imagery; CS) and strategies of play (cognitive general imagery; CG). The motivational function, at the specific level, involves imagining goals and the activities necessary to achieve these goals (motivational specific imagery; MS). At the general level (motivational general imagery; MG), images relate to general physiological arousal and effect. Recent research (Hall, Mack, Paivio, & Hausenblas, 1998) examining Paivio's proposal has identified two specific components of MG imagery. Specifically, MG-Arousal (MG-A) imagery is associated with arousal and stress, while MG-Mastery (MG-M) imagery is associated with being in control, mentally tough, and self-confident.

Research has supported the dual functions of imagery. The majority of imagery studies has examined the use of CS imagery. Considering the results of these studies collectively, it is generally accepted that CS imagery facilitates the learning and performance of motor skills (Driskel, Copper, & Moran, 1994; Hall,

Schmidt, Durand, & Buckolz, 1994). This is a robust finding across a variety of sport skills ranging from dart-throwing to basketball free-throws and strength tests. In addition to using imagery to rehearse specific sport skills (i.e., CS imagery), athletes also use imagery to rehearse game plans, strategies, and routines. This form of imagery represents the CG function of imagery. The role of CG imagery has usually been obtained from case study reports which have documented the performance benefits of CG imagery for rehearsing football plays (Fenker & Lambiotte, 1987), wrestling strategies (Rushall, 1988), pommel-horse routines in gymnastics (Mace, Eastman, & Carroll, 1987), and entire slalom canoe races (MacIntyre & Moran, 1996).

Experimental manipulations of imagery have produced results demonstrating the motivational function of imagery. Hall, Toews, and Rodgers (1990) found athletes instructed to imagine successfully performing a simple motor task voluntarily practiced longer than a control group. Martin and Hall (1995) instructed novice golfers to use imagery to help learn a putting task. These golfers spent more time voluntarily practicing the task than participants in a control group, and in addition, had more realistic self-expectations and adhered more to their training programs.

When examining the functions of imagery, it is important to match the imagery used (i.e., CS, CG, MS, MG-A, MG-M) with the intended outcome if imagery is to be most beneficial (Martin, Moritz, & Hall, *in press*). This is evident in the research that has examined the relationship between imagery use and self-confidence. Researchers have failed to find a consistent relationship between imagery use and self-confidence because study participants did not always use imagery conducive to enhancing self-confidence. Imagery will most likely enhance self-confidence when the MG-M function is emphasized. Feltz and Riessinger (1990) demonstrated that participants who use MG-M imagery on a muscular endurance task have higher and stronger efficacy expectations for their performance on the task than participants who do not use imagery. This finding was supported by Mills, Munroe, and Hall (*in press*) who found the MG-M imagery use of competitive athletes is related to their self-efficacy. A recent study (Callow, Hardy, & Hall, 1998) investigated the effects of a MG-M imagery intervention on the sport confidence of three elite badminton players. A single-subject multiple baseline design was employed. Once a week for 20 weeks, players completed Vealey's (1986) State Sport Confidence Inventory prior to a match. A baseline for sport confidence was established and the imagery intervention was implemented for Players 1, 2 and 3 at Weeks 5, 7 and 9, respectively. The two-week, six-session intervention consisted of imagery associated with confidence, control, and successful management of challenging situations (i.e., MG-M imagery). The intervention enhanced sport confidence for two of the players and stabilized the other players' level of confidence.

Just as MG-M imagery use is related to self-confidence, there is evidence that MG-A imagery is related to arousal and competitive anxiety. Hecker and Kaczor (1988) found athletes' heart rates significantly increased above baseline levels when they used MG-A imagery. In contrast, other researchers have found that CS imagery has no effect on arousal (Anshel & Wrisberg, 1993; Weinberg, Seabourne, & Jackson, 1981). In these studies the pre-performance heart rates of participants who imaged task performance were no different than the heart rates of participants in a control condition. Presumably, CS imagery lacks the stimulus characteristics

and response propositions required to increase arousal (cf. bioinformational theory; Lang, 1977, 1979).

It has generally been accepted by clinical practitioners that competitive anxiety can be influenced by the use of imagery (Gould & Udry, 1994; Orlick, 1990), but this has been difficult to demonstrate. For example, Terry, Coakley, and Karageorghis (1995) and Weinberg et al. (1981) found no significant difference in pre-performance state anxiety levels between control participants and those instructed to use CS imagery. A similar result was produced by Carter and Kelly (1997) using MG-M imagery. However, as part of a multimodal intervention, Hanton and Jones (1999) implemented cognitive specific and motivational general-arousal imagery to restructure negative thoughts and feelings associated with competitive anxiety. The imagery intervention, along with goal setting and self-talk, did result in greater self-confidence, facilitative interpretations, and overall performance improvement. As well, Vadocz, Hall, and Moritz (1997) found that MG-A imagery predicted competitive anxiety in a linear regression model, while CS and MG-M imagery failed to account for significant variance in athletes' self-reported anxiety. This bolsters the notion that there should be a match between imagery function and the intended outcome.

What do athletes image? Suppose you ask basketball players what they are imagining. They might say they are imagining performing well-executed jump shots from the top of the key. This will tell you something about what they are imagining, or the content of their imagery. The quality of an athlete's imagery is often a primary concern when investigating content. For example, researchers may be interested in the accuracy of the images (e.g., is the imagined jump shot being correctly executed?). Another consideration may be image vividness (e.g., is the player's imagery of the shot as clear and vivid as normal vision?). One approach to examining the quality of an athlete's imagery is through the administration of imagery ability tests.

Paivio (1986) argues that individual differences in imagery are a product of experience interacting with genetic variability. Researchers have been interested in determining whether it is possible to predict motor task performance and learning from variations in imagery ability. It seems reasonable to assume that if individuals are poor imagers, imagery will not be very effective in helping them perform or learn a motor task. Good imagers, by contrast, should be able to use imagery very effectively. Using instruments such as the Movement Imagery Questionnaire (MIQ; Hall & Pongrac, 1983) and the Vividness of Movement Imagery Questionnaire (VMIQ; Isaac, Marks, & Russell, 1986) to assess image quality, researchers have demonstrated that good imagers sometimes have an advantage over poor imagers in the performance and learning of motor skills (Goss, Hall, Buckolz, & Fishburne, 1986; Isaac, 1992).

Another approach researchers have taken when looking at imagery content is to compare positive imagery with negative imagery. A common belief is that athletes should imagine themselves performing accurately and successfully since imagining the skill incorrectly and imagining failure may interfere with performance. One of the first studies to investigate the effects of positive versus negative imagery practice was conducted by Powell (1973). Using a dart-throwing task, participants in the positive imagery group were instructed to imagine the dart landing near the center of the target, while those in the negative imagery group imagined a

very poor performance outcome (e.g., the dart hitting the edge of the board). Scores were obtained from three blocks of 24 actual throws (Blocks 1, 3, and 5), which were interspersed with blocks of imagery throws (Blocks 2 and 4), either positive or negative. Participants in the positive group improved their performance scores from Block 1 to 5 by an average of 28%, whereas the performance of the participants in the negative group deteriorated by an average of 3%. Powell (1973) concluded that what a participant imagines is liable to differentially affect later performance.

Woolfolk, Parrish, and Murphy (1985) demonstrated similar results using a golf putting task. These studies suggest that negative imagery can have a damaging influence on motor performance. However, athletes tend to be good imagers (Rodgers et al., 1991) and typically imagine themselves performing their sport skills clearly and accurately (Barr & Hall, 1992; Hall et al., 1990). Furthermore, athletes often imagine themselves winning and seldom imagine themselves losing (Hall et al., 1990).

A third approach to examining imagery content has been to consider the visual perspective athletes employ. Initial studies suggest that elite athletes favor an internal perspective (Mahoney & Avenier, 1977; Rotella, Gansneder, Ojala, & Billing, 1980), but more recent research (Hall et al., 1990) fails to support this suggestion. Hardy and his colleagues (e.g., Hardy, 1997; White & Hardy, 1995) argue that task differences may influence the use of each perspective. They propose that the external perspective would have superior effects on the acquisition and performance of skills that depend heavily on form for their successful execution, while the internal perspective would be superior for the acquisition and performance of open skills that depend heavily on perception for their successful execution. Regardless of which perspective athletes use, recent research suggests that kinesthetic imagery can be effectively combined with both internal and external visual perspectives (White & Hardy, 1995).

Purpose

As outlined above, our knowledge of the four Ws of imagery use (i.e., where, when, why and what) comes from current research employing a variety of approaches (e.g., imagery ability, imagery use, mental practice, intervention). As well, previous imagery research has focused on athletes' images that are considered important by the researchers (through the administration of questionnaires), but may not necessarily be considered important by the athletes themselves. Therefore, the primary purpose of the study was to identify and describe (through participant responses) the imagery used by athletes. Since the four Ws of imagery use have not been examined within a single study, this was the secondary purpose of the present investigation. A better understanding of athletes' imagery can serve as a guide to future research and, from a practical perspective, facilitate the development of more effective imagery interventions. Our knowledge of *what* athletes are imaging comes from a variety of sources and needs to be organized, and if possible, described in greater detail. Various reasons *why* athletes use imagery have been determined (e.g., CS, CG, MS, MG-M, and MG-A), but these have not been fully explored and there may be other functions that imagery serves (Hall et al., 1998).

Due to the in-depth nature of the questions being asked (i.e., where, when, why, and what), a qualitative approach was deemed appropriate. There has been a resurgence of qualitative technique into the sport psychology literature by such pioneers as Orlick and Partington (1988) and Scanlan, Stein, and Ravizza (1991). However, as White and Hardy (1998) note, few studies employ qualitative research methods to investigate imagery use in sport. Several researchers have used in-depth interviews to understand how elite athletes use psychological skills (Gould, Eklund, & Jackson, 1992; Orlick & Partington, 1988), to examine the knowledge of high performance coaches (Côté & Salmela, 1996), and to determine athletes' sources of stress (Scanlan et al., 1991). The data obtained in the present study from qualitative methodologies (e.g., in-depth interviews) will facilitate a greater understanding of how athletes use imagery in training and competition. Since elite athletes use imagery more than non-elites (Salmon et al., 1994), only elite athletes were included in the present study. In addition, athletes from seven different sports were included in order to make the findings relatively general. This was necessary since there are differences in imagery usage across sports (Munroe, Hall, Simms, & Weinberg, 1998; White & Hardy, 1998).

Method

Participants

The participants were 14 (7 male, 7 female) varsity athletes with an average age of 19.5 years. Athletes were chosen in order to obtain an equal number of males and females as well as athletes representing a variety of different sports. Athletes were from both team and individual sports including golf ($n = 2$), softball ($n = 2$), swimming ($n = 4$), tennis ($n = 2$), track ($n = 2$), volleyball ($n = 1$), and wrestling ($n = 1$). Within the sample, 7 of the athletes were sophomores, while 3 were seniors, 2 were juniors, and 2 did not state their class standing. All athletes came from a large university in the United States. Seventeen athletes initially volunteered for the study but only 14 completed the interview process.

Procedure

Interview Procedures. Prior to the beginning of the interview, the participants received introductory comments concerning the rationale for the study, the use of data, issues of confidentiality, issues and topics to be pursued, and the reasons for audio taping the interview. Also, a definition of imagery was provided based on the definition used by Hall et al. (1998). In-depth interviews were used to elicit information regarding imagery use from the athletes (Côté, Salmela, Baria, & Russell, 1993). An interview guide¹ approach (Patton, 1990) was employed. This approach uses topics to be covered during the interview but does not specify the exact sequencing of questions. This allows for the addition or elimination of questions and the introduction of new ideas as the interview progresses. The interview began by asking the athletes to explain their imagery use, if at all, in training. The interview then proceeded with the athletes' use of imagery in competition. Within each of these two situations (i.e., training and competition), specific questions were used with respect to the four Ws of imagery use. The questions relating to the functions of imagery (i.e., why athletes use imagery) followed Paivio's (1985) model of imagery, which includes both motivational and cognitive functions. For

example, a cognitive general question was "Could you describe your use of imagery to rehearse and execute strategies of play?" A motivational general question was "Could you describe your use of imagery to control arousal and stress?" With respect to the content of athletes' images (i.e., what they are imaging), a variety of topics were covered including sessions, effectiveness, nature of their imagery (e.g., positive versus negative), and type of imagery (e.g., visual). An example question was "Could you describe your imagery sessions?" Probing techniques were used in order to better understand the athletes' use of imagery (Patton, 1990). Each interview lasted approximately 30 to 60 minutes with an average length of 43 minutes and was tape recorded for future reference.

Data Analysis. A constant comparative method was used (Strauss & Corbin, 1990) in which interview transcripts were divided into text units and were compared and regrouped into a hierarchy of knowledge. This analysis was independently undertaken by two investigators following the procedures outlined by Côté and colleagues (1993). The computer program, QSR NUDIST (Non-numerical, Unstructured Data, Indexing, Searching and Theorizing) was used in the analyses. The program is designed to store, code, retrieve, and analyze text (Weitzman & Miles, 1995). The verbatim transcripts were imported into the NUDIST program and divided into text units which were the responses to each question. Each text unit was a word, phrase, or sentence containing only one idea. The text units were then indexed or coded. The text units were organized into categories by using a combination of inductive and deductive approaches (Patton, 1990). More specifically, categories were developed by clustering text units according to similar meaning. Because the coding scheme is represented in a hierarchical tree structure in the NUDIST program, the categories, which are the branches of the tree, are referred to as nodes (Weitzman & Miles, 1995). The root of the tree is the most general level with the branches being the higher order nodes. Tesch (1990) contends that it is important for the nodes to remain flexible as this allows for the modification and refinement of the nodes until the classification system proves satisfactory to the researchers. When the categorization of new data or text units fits adequately into the preexisting framework or hierarchical tree, theoretical saturation has been reached (Miles & Huberman, 1990). There was a 96% agreement between the two investigators on the coding of the various text units. When disagreements occurred, the text units were reread and discussed until a consensus was reached.

Results

The results outline the four Ws (i.e., where, when, why, and what) of imagery use and were derived from the participants' responses (meaning units). Figure 1 presents athletes' reported use of imagery in a left to right order starting with where and when and proceeding to why and what. *Where* consists of two categories, training and competition (Level 1 of Figure 1). *When* is comprised of five categories: during practice, outside practice, pre-competition, during competition, and post-competition (Level 2). *Why* athletes use imagery and *what* they are imagining represent Level 3. The former is comprised of the various cognitive and motivational functions of imagery use (Level 4), while the content of athletes' images includes the characteristics of length and frequency, effectiveness, nature, surroundings, and controllability (Level 4). Levels 5 and 6 represent elaborations of *why*

and *what*. The data in Figure 1 are presented from left to right, while the reader is reminded that the actual analysis progressed from right to left.

The frequencies with which the various uses of imagery were identified by the athletes are given in Tables 1 and 2. Athletes reported using imagery more in conjunction with competition (a total of 483 meaning units) than in training (a total of 312 meaning units). As well, athletes in the present study used imagery more in pre-competition (a total of 225 meaning units) than at any other time. The use of kinesthetic (a total of 58 meaning units) and visual imagery (a total of 50 meaning units) were comparable in this sample. These findings are secondary to the actual content analysis since a particular source (e.g., surroundings, Level 4) might not have been mentioned as frequently as another source (e.g., type of imagery, Level 4) but still could be important to athletes' imagery use. Therefore, the values in the tables should be interpreted with some caution.

Functions of Imagery (Why)

Cognitive Specific (CS). Cognitive specific imagery is the imagined rehearsal of specific sport skills. This is further divided into skill development and skill execution (Level 5 of Figure 1). Skill development is associated with the learning of a skill and entails working on technique and making corrections (Level

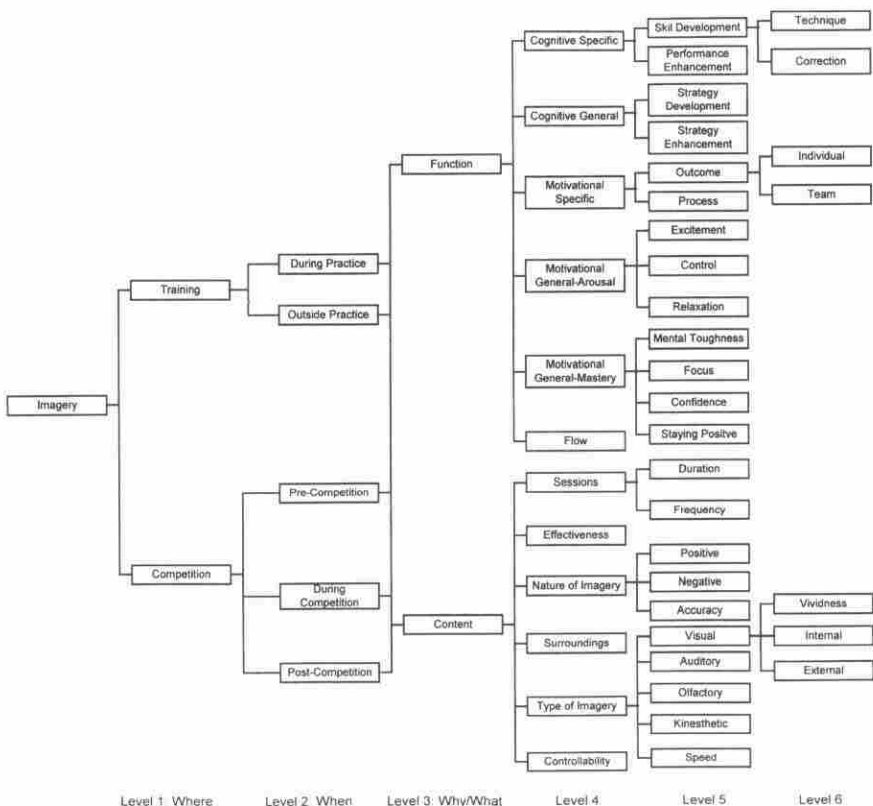


Figure 1 — A conceptual framework for athletes' use of imagery.

Table 1 Function of Images for All Times

Function			Training		Competition		
			During	Outside	Pre	Comp	Post
Level 4	Level 5	Level 6	tu (r)	tu (r)	tu (r)	tu (r)	tu (r)
CS	Skill development	technique correction	24(11)	6(5)	4(3)		3(3)
			9(4)	2(2)	3(2)	6(4)	22(11)
	Skill execution		5(5)	1(1)	15(8)	25(10)	
CG	Strategy develop.		3(2)	7(5)		1(1)	
	Strategy execut.		4(3)		12(7)	13(7)	
MS	Performance		4(3)	4(4)	3(1)	1(1)	2(2)
	Outcome	individual team	14(7)	6(5)	24(8)	18(10)	2(2)
					4(2)		1(1)
MG-A	Excitement		7(6)	1(1)	5(3)	6(4)	1(1)
	Control		3(2)		10(7)	5(2)	2(2)
	Relaxing		9(6)	6(4)	20(10)	7(5)	3(2)
MGM	Mental toughness			4(4)	9(5)	6(4)	
	Focusing		4(4)	2(2)	7(5)	11(6)	
	Confidence		20(12)	3(3)	16(8)	11(8)	10(8)
	Positive		2(2)				
Flow			5(3)	2(1)	2(1)	2(2)	

Note. tu = text units; r = number of respondents.

Table 2 Content of Images for All Times

Content			Training		Competition		
			During	Outside	Pre	Comp	Post
Level 4	Level 5	Level 6	tu (r)	tu (r)	tu (r)	tu (r)	tu (r)
Sessions	Frequency		21(12)	6(6)	11(9)	11(10)	6(5)
	Duration		4(4)	3(2)	2(2)	1(1)	1(1)
Effectiveness			17(10)	2(2)	12(11)	11(8)	5(5)
Nature of imagery	Positive		8(3)	4(3)	9(4)	6(3)	5(5)
	Negative		2(2)	6(3)	5(4)	8(3)	4(3)
	Accuracy		6(5)	4(4)	6(6)	3(3)	
Surroundings			2(2)	4(3)	5(3)	1(1)	
Type of imagery	Visual	vividness	4(3)	2(2)	3(2)	3(2)	3(2)
		internal	14(11)		6(5)		3(2)
		external	5(5)		3(2)	1(1)	4(3)
	Auditory		6(5)	4(3)	6(6)	2(2)	
	Olfactory				2(2)	2(2)	
	Kinesthetic		23(11)	10(5)	19(10)	12(7)	4(4)
	Speed			3(2)	2(2)	4(1)	
Controllability			1(1)				

Note. tu = text units; r = number of respondents

6). Technique is most frequently cited during practice and is exemplified by the following quotation by a golfer: "I use it [imagery] to reinforce something that I did well." Correction is most frequently reported in post-competition and is shown by the following quotation: "Like in an evaluative state going through and thinking of mistakes that I made, especially if I lose. But even if you win . . . you have to picture what went on and what you did right and what you did wrong."

Skill execution, attempting to perform as well as possible in a given situation, is reported most often during competition. "As soon as my feet step up to the batter's box, I'm looking at my coach, she sends me the sign, I picture it, then I step up to the plate and say 'throw me your best pitch cause I'm going to hit it there' then I drive it."

Cognitive General (CG). Cognitive general imagery is the imagined rehearsal of strategies of play. This function of imagery can be further divided into the higher order themes of strategy development and strategy execution (Level 5). Strategy development is the imagery used to learn the strategies and is reported most outside of practice. An example includes, "If I've played the course before, I'll definitely go through the course the night before several times, you know map out the plan that I want to do." Strategy execution is the imagery used to help perform the strategies in training and competition. Imagining what the opponent is going to do and what the reaction will be is most frequently cited during competition and is characterized in the following quote from a wrestler: "Maybe if I get put down and I need to get out quick sometimes I can almost like if I'm down on all fours I can almost picture myself exploding or popping up off the bottom before the whistle blows." Another example is as follows: "I picture a lot of times like my arsenal of shots. The moves I have and just hitting everything really fluid and everything going right. Um, the different setups I'll go into before I hit that move. How that guy is going to react and what I am going to do after that."

Motivational Specific (MS). This function of imagery involves imagining goals and related activities and is comprised of performance imagery and outcome imagery (Level 5). Imagining what it takes to achieve a goal is an example of performance imagery and emerges most often in training. The following quote by a swimmer is an example of performance imagery during practice: "In high school visualization was a major part of our program. Just sitting there imagining myself getting up on the blocks, bending over, diving in, getting into that first pace, that first turn, thinking all about me. I'm not worried about where the competition is. It's about me being in my own little world."

The outcome goals athletes imagine were classified as either individual or team (Level 6). An individual outcome goal involved the athlete completing the competition, winning, or overcoming the opponent and is most frequently reported during pre-competition or competition. "I imagine like a good outcome. You know, like how everyone else is going to react. How my coach will react to me before and after a good race" is an example of an individual goal during pre-competition. A team goal was one that concerned team accomplishments, as represented by this response from a swimmer: "Swimming is so individualistic, but there's always a team goal. You do team exercises, like what is our goal as a team and maybe people talk about it we imagine ourselves as a team winning or something like that so everyone feels together as a team."

Motivational General-Arousal (MG-A). MG-A imagery entails imaging the arousal and stress that are associated with the sport. Excitement, control, and relaxation are all higher order themes emerging from the data (Level 5). Imagery used for excitement is employed by athletes to get psyched up or motivated and reported most during practice and includes such statements as "Imagery is effective to get myself excited and getting ready to get out here and get my juices flowing." Conversely, control is the imagery used to maintain composure while in the sport and is frequently cited in pre-competition. It is exemplified in the following two responses from participants: "[before a match, I imagine] keeping my composure. When we play against a rude team or whatever, trying to learn from that and seeing myself keep my composure for the next time," and "I think I try to see myself staying in that happy medium because you don't want to get too emotional. Emotional recovery is what I think imagery helps you with." Athletes also employed MG-A imagery as a means of staying relaxed and calm and most frequently used this type of imagery in pre-competition, as characterized in the following statement: "When it comes to pre-competition you have to get yourself in the right arousal level and try to calm yourself and be composed. So I think that is one big thing imagery has helped my game a lot."

Motivational General-Mastery (MG-M). The MG-M function of imagery is composed of four higher order themes: mental toughness, focus, confidence, and positivism (Level 5). Mental toughness entails working through difficult situations and dealing with adversity and is reported most often during pre-competition and during competition. "I just picture things going smoothly and keeping my composure. I guess I focus on skills sometimes but I often think about what things will throw me off my game." This statement represents a volleyball player's use of mental toughness imagery during pre-competition, while the following statement by a tennis player pertains to using it during competition:

Psychological tension is the most dangerous thing to a tennis player. If you get upset with yourself, you're wasting emotional energy and this energy consequently takes away from your physical energy. It's wasteful. If you channel that energy, if you let them go then you are so much better off because if your mind is clear then your body is going to be much better off. Just visualize looking to the next point and forgetting the last one. That point you just lost is in the past and there is nothing you can do about it.

Using imagery to remain focussed during difficult situations was cited most often during competition. "[During a round] it [imagery] is very effective for me. It takes my mind off the negatives. My mind is focussed on what I want to do instead of what I don't want to do." Athletes also reported using imagery to gain or maintain confidence. This was most often reported during practice and pre-competition, for example:

Using imagery can enhance your confidence, because if you imagine yourself having a good race and finishing a competition and being excited about the time, you see that this gives you confidence before the next dive in. I would say that's definitely one of the main things to strive for in visualization and mental imagery and giving yourself the confidence when you step up to the blocks.

One athlete reported using imagery to stay positive during practice. "I try to imagine the finish and it being positive."

Flow. This motivational function of imagery involves all images that help the athlete get into their flow state or "be in the mode" and is most often reported during practice. The next two statements illustrate this flow imagery: "If everything is coming together one day and you're feeling good and you're running well sometimes you feel like a machine, that you can run at that pace all day long" and, "You try to get back to that point again so you try and pace yourself in a set and you can get in that cruiser mode, where you can just go. So a lot of times, mental imagery takes place in the water while you're trying to get to that feeling you had before when you were just cruising and having a great set."

Content of Images (What)

The content of athletes' images refers to *what* athletes are imaging. The data analysis revealed that content and function operate at the same level (i.e., Level 3).

Sessions. Sessions refers to how often athletes use imagery (frequency) and how long they image for (duration; Level 5). The most frequently reported time and place to do imagery was during practice evident in the following response: "I would say I use it [imagery] quite frequently. I would say a lot especially when focussed on a particular skill." The duration of athlete's images varied, especially between training and competition. In competition the sessions were often shorter as there was less time to image.

Effectiveness. Athletes commented on the effectiveness of their imagery. They believed imagery was most effective during practice and pre-competition. With respect to during practice, a tennis player noted: "I think it [imagery] is very effective just from doing it in your mind and then doing it repetitiously . . . we do a lot of repetition in practice. I think it helps the nerve transmissions in your brain. I think it has helped me a lot." Speaking about the effectiveness of imagery during pre-competition, a softball player said: "I've noticed that when I've thought about what I've wanted to do I go out that day and play better. I'm more into the game and what I'm doing. I do play a lot more smoother, more consistent."

Nature of Imagery. The nature of the imagery is comprised of three higher-order themes, including positive images, negative images, and the accuracy of the images (Level 5). Positive images were most frequently reported during practice and pre-competition. For example, one athlete remarked: "During practice I am thinking about nice places and nice things. It gets your mind off it. Then it's been a half an hour into practice." Negative images were most often reported during competition. Athletes sometimes imagined performing a skill improperly or imagined the negative outcomes associated with the competition. As one golfer noted, "Sometimes you can think smooth and low and still think awful shots."

The athletes indicated that their images were usually accurate and often very detailed. This is illustrated in the following statement by a golfer: "They [the images] are pretty detailed. To the extent of the weather, the course conditions. I prepare and think about it. If it's a sunny day and dry out, or muddy and raining, or hot and cold. I even try to think of the crowd, so everything, I try to encompass as much as I can."

Surroundings. It is not surprising that the athletes reported imagining competition surroundings (e.g., venue, spectators). They would do this as they used

their imagery to prepare for an event. The imagery of a cross country runner illustrates this well: "I think about the whole course in the evening . . . before I go to sleep I lay there . . . and I'll just imagine from start to finish every part of the course and where the hills are."

Type of Imagery. Athletes described four different types of imagery in their interviews: visual, auditory, olfactory, and kinesthetic (Level 5). Visual imagery was comprised of the vividness of that image as well as whether internal or external perspective was being used (Level 6). As shown in the following remark, the athletes' images were not always vivid: "Sometimes the color is sort of foggy, it's like black and white." Athletes reported using both perspectives and the following comment is an example of a tennis player using an external perspective: "Let's say I was in a practice or a match and I wanted to see what I did wrong, I'd step aside and I'd actually see myself hitting the shot."

A number of athletes described using auditory imagery such as hearing the crowd, and the ball hitting the bat. A tennis player remarked on the importance of auditory imagery:

If you're really visualizing something long then you are aware of the sounds because different balls have different sounds. Balls sound different when they are sliced; it sounds different than a topspin ball. The sound can be really important because if you imagine what it sounds like to hit a sliced backhand, which has a different sound than a topspin, it gets you in the mind set.

The olfactory imagery mentioned by athletes dealt with the smells associated with sport, such as the smell of freshly cut grass in golf, or the smell of chlorine in swimming. The comment of a tennis player illustrates olfactory imagery: "Only in a match situation would I say smell comes into it [imagery]. There is nothing better in a match situation when you open a can of balls, new balls with that pungent sort of bitter smell."

Kinesthetic imagery, imagining the feel of the movements, was often referred to by the athletes interviewed. A golfer remarked: "If I feel like I am not hitting the shot, then I'll step back and try to feel a few practice swings to get the feeling that I want for that particular shot" and a tennis player noted: "It's muscle memory you build up over the years of playing tennis and if it doesn't feel like that mould has been duplicated that's when you go back and think about what you did wrong."

In addition to the above four types of imagery, some athletes also commented on the speed of their images (Level 5). 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."

Controllability. How controllable are athletes' images? While controllability might seem to be an important imagery characteristic, it was only mentioned once: "I usually get distracted [with my images] by what lap I am on or how much longer do I have in practice or whatever."

Discussion

The purpose of the present research was to identify and describe athletes' use of imagery in training and competition while using the participants as active agents.

Results from the study confirm Barr and Hall's (1992) and Hall and colleagues' (1990) findings as to *where* athletes use imagery. While athletes use imagery both in training and competition, they use it more in conjunction with the latter. This suggests that athletes use imagery more to enhance performance than to aid in learning. Results from the study also support previous research (Barr & Hall, 1992; Rodgers et al., 1991) concerning *when* athletes use imagery. Athletes use more imagery just prior to competing than at any other time. Since athletes use imagery more in conjunction with competition than with training, it is not surprising that imagery use would be most prevalent in pre-competition. Imagery use prior to competition can help athletes feel more self-confident and in control of their arousal and stress levels.

With respect to *why* athletes use imagery, as Paivio (1985) proposes, they use it for both cognitive and motivational functions. That is, they use imagery for learning skills (cognitive specific imagery) and rehearsing game plans and strategies (cognitive general imagery). They also use it to set goals (motivational specific imagery), control arousal and stress (motivational general-arousal imagery), and to gain and maintain self-confidence (motivational general-mastery imagery).

The present study extends previous findings regarding why athletes use imagery. Previous research (Hall et al., 1998) has not made the distinction between skill development and performance enhancement for the cognitive specific function. As well, the results indicate that skill development can be further categorized into technique and correction. This is an important finding as the two constructs are very distinct. If the goal is to reinforce the performance of appropriate skills, then the technical side of CS imagery would likely be most beneficial. On the other hand, if the goal is to correct a bad habit or remedy a certain skill, then it would seem fitting to use the correctional aspect of CS imagery. Future research should investigate more fully the specific functions that CS imagery is serving.

The findings suggest that the cognitive general function can be further categorized into strategy development (i.e., the use of imagery to learn strategies or routines) and strategy execution (i.e., the use of imagery to enhance the performance of strategies in competition or training). While there has been little empirical examination of CG imagery, future research considering this function should make the distinction between strategy development and strategy execution. This distinction would also seem to be important in developing effective imagery interventions. Strategy development imagery can be emphasized when athletes are learning a new strategy, while strategy enhancement imagery can be stressed when athletes are attempting to execute a given strategy as effectively as possible.

Although goal setting studies have made the distinction between performance and outcome goals (Burton, 1992; Hanton & Jones, 1999; Weinberg & Gould, 1995), none have examined these types of goals in relation to imagery. The present study elaborates on previous research on motivational specific imagery by separating process imagery from outcome imagery. Furthermore, outcome imagery is categorized into team and individual components. Since athletes distinguish between process and outcome imagery, it would seem logical for practitioners to also make this distinction when developing imagery interventions. This distinction is one aspect of motivational specific imagery that is yet to be explored by researchers and would seem to be an important one as it was frequently cited by the participants.

Research (Hall et al., 1998; Vadocz et al., 1997) has suggested that the motivational general-arousal function of imagery is used to regulate the arousal and anxiety associated with performing. While these previous studies have recognized that MG-A imagery has multiple uses, the specific components comprising this function of imagery have yet to be identified or examined. The responses emerging from the present interviews suggest that this function consists of three components: excitement, control, and relaxation. This further categorization of MG-A imagery has important implications for both researchers and practitioners in terms of developing interventions. Motivational general-arousal imagery can be tailored to specifically target the component most appropriate for a given situation. It can be employed to help athletes psych themselves up (i.e., excitement), find the most appropriate arousal level (i.e., control), or calm themselves down (i.e., relaxation).

Motivational general-mastery imagery is used to master and handle difficult situations (Hall et al., 1998). The results from this study suggest further conceptualization of this function into mental toughness, focus, confidence, and positivism. As with motivational general-arousal imagery, more precisely defining the components of motivational general-mastery imagery permits the development and empirical examination of interventions targeted specifically to one or more of these components. For example, if athletes are having difficulties remaining positive in the face of adversity, the use of motivational general-mastery imagery can be geared to help them stay positive.

Flow is an additional function of motivational imagery that emerged from the data. Responses were made by participants where they alluded to the use of imagery to help get into a certain "mode" or automated state. Studies have been conducted examining the role of flow in sport, but not in conjunction with imagery. This is another area that warrants further investigation.

The content of athletes' images has been investigated using a variety of approaches such as measuring imagery ability and comparing imagery perspectives. The findings from this study offer a guide to organizing the relatively extensive amount of literature dealing with *what* athletes are imaging. They also support the results obtained in previous studies. For example, athletes' images are usually accurate and vivid (Isaac, 1992), tend to be positive rather than negative (Hall et al., 1990), incorporate both visual and kinesthetic information (White & Hardy, 1995), and incorporate both internal and external perspectives (Hardy, 1997).

This research extends our knowledge of *what* athletes are imaging in several ways. The imaging of surroundings by athletes has not commonly been reported in previous research. The athletes interviewed in this study said imagining surroundings, especially where they are going to compete, is very useful. This type of imagery helped prepare them for a forthcoming competition by giving them a sense of familiarity. As well, there previously has been no consideration given to the importance of olfactory imagery, imagining the smells associated with sport. This is one type of imagery that may be beneficial for athletes, hence making their images more vivid and more accurate.

The speed at which one images is an area of research that has received little attention. A number of athletes from the present sample alluded to the speed at which they were imaging different skills at different times. For instance, an athlete such as a tennis player may have very fast images during a match since the time to engage in imagery is limited. On the other hand, that same tennis player may have

very slow images outside of training or pre-competition when more time is available. How fast athletes' images should be and whether the speed of these images should vary in different circumstances may be a worthwhile topic of investigation. Related to the speed of images may be the controllability of images. The present study offers one caution for future research. While controllability has been of considerable interest in the imagery ability literature (Hogg, 1995; Weinberg & Gould, 1995; Vealey & Walter, 1993), in the present study only one response materialized from the interviews with respect to controllability of images. This suggests that controllability may be less of a critical factor than previously believed.

Murphy and Jowdy (1992) have concluded: "Many myths and misconceptions have gathered around the use of imagery and sport. . . . Future research needs to be directed toward a better understanding of the roles that imagery plays in human performance so that we can help all persons to optimally utilize their innate capacities" (p. 245). One value of this study was the development of a conceptual framework (Figure 1) that can guide and stimulate future research. The framework can be used as a guide for educating athletes about the reasons for using imagery such as using MG-M imagery to improve mental toughness, stay focussed, build confidence and remain positive. As well, the framework can be used as an educational tool to teach athletes the richness of their imagery content. Their images should be positive in nature, accurate, vivid, and include all the sensory modalities. For the practitioner, the framework may serve as a useful tool for developing more specific and effective imagery interventions. Practitioners can use the framework to check that they are including all components of an imagery function. For example, the framework indicates that athletes use CG imagery for both strategy development and strategy execution so the practitioner can check and make sure both are included in an intervention aimed at increasing CG imagery use.

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