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Imagery

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Imagery is a mental process that is almost always with us. When we feel hungry and think about a bacon sandwich, we see the cooked bacon curling out of the sides of the bread, smell the unique aroma, and taste the salty smoked meat. When we must give somebody bad news, knowing they will be upset, we rehearse the words we will use to deliver the news and the soft, somber tone of voice, then we perceive their distraught reaction. All these sights, sounds, tastes, smells, and emotions are aspects of imagery, a rich multi-sensory experience that we create intentionally, but which sometimes seems to arise automatically.

Athletes often generate imagery about their sports. They imagine themselves performing the technical skills; they picture themselves playing well or badly; they go over mistakes in their minds; they experience anxiety about upcoming competition; they think about winning or losing and their reactions to each (e.g., Morris, Spittle, & Perry, 2004). Imagery is a ubiquitous process, and researchers have found that it is the most widely-used psychological skills training (PST) technique among athletes, coaches, and sport psychologists (e.g., DeFrancesco & Burke, 1997). Nevertheless, the automatic imagery experiences athletes have about their sports are often negative (Morris, Spittle, & Watt, 2005). Because imagery can have a powerful influence on thoughts, feelings, and behaviors, all of which affect how athletes play their sports, imagery has been applied extensively for performance enhancement in sport (Morris et al., 2005).

Given that imagery appears in infinite forms in all aspects of our lives, psychologists have, for a long time, applied imagery in a great diversity of contexts (e.g., Stewart, 1996) that go well beyond the confines of PST and even the variety of approaches grouped under the rubric of cognitive-behavioral therapies (CBT), which form the majority of PST techniques. Thus, in this chapter I also describe and exemplify use of imagery in a psychotherapeutic context, involving mindfulness meditation and acceptance and commitment therapy (ACT; Harris, 2008).
What imagery is

Imagery is an ephemeral process. We can’t see it, hear it, or touch it, so defining imagery has proved challenging. In sport, the definition Richardson (1969) proposed is widely accepted. Morris et al. (2005) expanded on it a little to suggest:

Imagery, in the context of sport, may be considered as the creation or re-creation of an experience generated from memorial information, involving quasi-sensorial, quasi-perceptual, and quasi-affective characteristics, that is under the volitional control of the imager and which may occur in the absence of the real stimulus antecedents normally associated with the actual experience.

(p. 19)

This definition emphasizes that, although the generation of imagery is based on past experience, it is possible, and often desirable, to imagine something one has never actually experienced, such as performing a triple back somersault, running a marathon, or winning an Olympic final. The definition also makes it clear that people can control what they imagine, but when it is not consciously controlled our imagery is often unhelpful or even mischievous.

How imagery works

Many theories have been proposed to explain how imagery affects thoughts, feelings, and behavior. In sport, the focus has been on explaining how imagery can enhance learning and performance. An enduring explanation is the psychoneuromuscular theory (Jacobson, 1930). Jacobson argued that imagery triggers low-level innervation of the muscles involved in performance, strengthening those specific brain-to-muscle connections through feedback similar to that experienced when the task is performed physically. Symbolic learning theory (Sackett, 1934) focuses on cognition. Sackett specifically claimed that imagery involves rehearsal of the symbolic aspects of tasks, such as sequences of actions. Lang (1977) proposed a bioinformational theory, arguing that imagery involves representations of aspects of experiences, which he called propositions. Stimulus propositions represent the stimuli that signal action, whereas response propositions represent characteristics of the action taken. According to Lang, imagery that involves response propositions is particularly powerful. Lang’s interest was in the emotions that accompany behaviors, so bioinformational theory emphasizes affective response propositions. Although research has provided some support for each of these theories, no theory is without noteworthy limitations. Low-level innervations have been recorded in the muscles involved in specific movements, but critics argue that these are only by-products of the imagery process. Tasks involving larger cognitive components have shown greater performance effects during imagery than tasks with substantial motor components, but there is no direct evidence that imagery primarily has a cognitive focus. Studies have shown greater performance effects when response propositions are employed than for stimulus propositions alone. Other theories propose cognitive-, arousal-, attention-, or motivation-based explanations. Proponents of these explanations of imagery argue that imagery works by creating the appropriate arousal level for effective performance, by focusing attention on task-relevant cues, or by increasing motivation, so greater effort is applied to performance. Theories of imagery are addressed in detail elsewhere (Morris et al., 2005).
What is known about imagery

Imagery is one of the most frequently-researched concepts in sport psychology. A question commonly studied is whether imagery leads to enhanced performance (Morris et al., 2005). Studies have employed a range of different research designs to examine this issue. Often this research has taken the form of laboratory or field studies, where real-world complexities are reduced to increase control. Other studies have employed single-case designs, developed to examine the efficacy of psychological interventions in authentic circumstances. Here, sample size and strict control are sacrificed for greater ecological validity. Meta-analyses of studies have consistently concluded that imagery does enhance performance. Various factors affect the strength of the effect, including age and skill level of participants; type of task; imagery delivery variables, including length of imagery sessions, and frequency and duration of the imagery program; and method used to measure performance. There is also research evidence supporting the use of imagery to influence psychological variables (see Morris et al., 2005). Most frequently studied in this respect are arousal level and motivation. Studies have indicated that imagery can increase or decrease arousal level, whereas enhancing motivation is common, especially for strength and endurance tasks. Related to motivation is the demonstration of increases in self-efficacy, which can be interpreted as task-specific self-confidence. Several researchers have also reported increases in self-confidence more broadly related to sport performance. Another key variable associated with performance is attention. Research evidence also supports the application of imagery to enhance attention in sports tasks (Farrow & Kemp, 2003).

Sport psychology researchers have tested predictions from the major theories and models of imagery with varying success, as reported earlier in this chapter. The findings from this research have not ruled out any major theory, but they have shown limitations of each approach. A substantial amount of research has also been focused on the development of measures of imagery.

How imagery is measured

In early research in sport psychology, researchers employed imagery assessment techniques that had been developed in other areas of psychology. Following the principle that sport-specific measures are usually more sensitive, researchers developed instruments in the contexts of sport and movement. The assessment devices developed in this way measure two aspects of imagery, namely imagery use and imagery ability.

Measures of imagery use assess the extent to which athletes’ imagery is directed to each of several uses. The best-established measure of imagery use is the Sport Imagery Questionnaire (SIQ: Hall, Mack, Paivio, & Hausenblas, 1998). Hall et al. developed the 30-item SIQ from an earlier measure, the Imagery Use Questionnaire (IUQ), based on Paivio’s (1985) two-dimensional classification of cognitive/motivational and specific/general imagery functions. In exploratory factor analysis, however, items generated to assess the four categories of imagery use derived from Paivio’s classification produced five factors. In the main, the expected categories emerged: namely cognitive specific imagery (e.g., imagining specific skills), cognitive general imagery (e.g., imagining broad strategies), and motivational specific imagery (e.g., imagining striving for and attaining specific goals). In addition, however, motivational general imagery split into two factors, one concerned with imagery being used for the management of arousal and the other focused on imagery use associated with the experience of mastery. The five-factor SIQ has been widely examined.
in relation to key issues, such as type of sport, skill level, performance, and psychological variables. The SIQ is useful in the development of imagery programs, where it has been applied to identify the imagery use categories most frequently or effectively employed in a specific context. Then the content of imagery scripts can be written to concentrate on those types of imagery use.

Two measures of imagery related to movement have been widely used in sport, and they are the Movement Imagery Questionnaire (MIQ; Hall & Pongrac, 1983) and the Vividness of Movement Imagery Questionnaire (VMIQ; Isaac, Marks, & Russell, 1986). These measure imagery of simple movements only and focus on the visual and kinesthetic senses. This limitation raises concerns about their ecological validity for use in sport. They are described in detail elsewhere (Morris et al., 2005).

Watt et al. (2004) developed the Sport Imagery Ability Measure (SIAM), in which several common scenes from sport are described and each is imagined and then rated. The SIAM presents four scenes and respondents rate them on five dimensions (vividness, controllability, speed, ease, and duration of imagery), six sense modalities (visual, kinesthetic, auditory, tactile, gustatory, and olfactory), and emotion. Ratings are performed on 100 mm analogue scales to add sensitivity. The SIAM has been used in a wide range of sports and has produced equivalent factor structures among large samples in several countries, each using different languages (i.e., Finland, Israel, Sweden, Thailand). Strengths of the SIAM include its ecological validity for use in sport, the breadth of dimensions and senses assessed, and the sensitivity of the analogue scales. Given its greater breadth in terms of sense modalities and dimensions compared to other measures of imagery ability in movement and sport, the factor structure of the SIAM is more complex than the MIQ and the VMIQ.

Applying imagery

As previously remarked, we can imagine anything that we can think of. Which 15-year-old developing 1,500 meter athlete has not imagined sitting on the shoulder of the Ethiopian reigning champion and sprinting past her in the final straight to take Olympic gold to the roar of the crowd? For most 15-year-olds this event is not possible, but it can be imagined. The key question for sport psychologists is not whether it is possible to imagine, but how should this athlete in this sport context use imagery most effectively?

Using imagery in psychological skills training

Imagery has long been a major aspect of psychological skills training (PST) in sport, which is the application of psychological techniques for the purpose of optimizing athletes’ sport experiences. Most sport psychologists agree about a number of ways in which imagery can be used effectively in PST. These uses include imagery for learning/practising skills, learning/practising strategies/moves, previewing performance, reviewing performance, enhancing motivation, building confidence, reducing anxiety, increasing concentration, and recovering from injury or heavy training (Morris et al., 2004). A number of sources provide detailed descriptions of the use of imagery in these contexts (see Morris et al., 2005).

An aspect of the use of imagery that cannot be stressed too strongly is that it is important to enlist the commitment of the athletes for whom the imagery training is devised. Without a high level of motivation toward achieving, and some would even say belief in the
potential for imagery to influence performance directly (or enhance psychological variables that influence performance), the effectiveness of imagery will be limited. Reading a chapter like this one will not greatly influence most athletes. Hearing positive statements from a credible source, such as their coach, might have some influence, but, for most athletes, physically experiencing imagery is most effective. A simple example could be to ask athletes to imagine smelling and biting into a lemon and note the response of real salivation. A more substantial example is the string-and-bolt activity (see Morris et al., 2004).

A more systematic approach to assessing athletes’ current capacities for imagery, however, is to employ psychometrically-validated self-report measures of imagery ability, such as the SIAM. Using such measures in preparation for the application of imagery is important to the effectiveness of the training program. It can even help practitioners shape the content of the program. First, if athletes score low on most aspects of imagery, it is unwise to go straight into sport performance imagery. Imagery can be trained. Technically the term “imagery ability” is a misnomer, because abilities, as defined in psychology, are fixed capacities, whereas imagery skill can be increased by specific practice. Such practice often starts by imagining simple, static targets with the greatest meaning for the individual, such as visual images of faces of close family, the ball from the athlete’s sport, or auditory images of a favorite piece of music or the crowd cheering. Practice then moves to more complex imagery, perhaps involving more than one sense modality or multiple targets. Next, movement is added to the imagery. Once complex, dynamic imagery has been mastered, athletes can move to sport performance imagery. Second, where the measure of imagery ability indicates some imagery strengths, but other areas of weakness, and the strengths match the imagery skills needed in that sport, imagery programs might focus on those skills, especially if there is some urgency. For example, although visual imagery dominates in many sports, in sports such as diving kinesthetic imagery is usually much more important. Sport performance imagery should be acceptable (using kinesthetic imagery) provided the divers score high on kinesthetic imagery on the imagery ability questionnaire. If divers report high visual imagery, but low kinesthetic imagery, then training to enhance kinesthetic imagery is needed prior to sport performance imagery, otherwise a lot of effort could be wasted by the athletes trying to use an imagery training program for which they lack the imagery skill. Monitoring imagery ability plays an important role in matching imagery training to the imagery skills of each athlete, taking into account the profile of the sport in terms of factors such as sensory involvement and duration.

Just as measures of imagery ability should be used to guide the use of imagery with athletes and the design of imagery training, athletes’ current imagery use can be informative to practitioners. Measures such as the SIQ can be used to identify current use. Research and expert knowledge can inform practitioners about the most important categories of imagery use for effective imagery related to a specific sport context. Then the athletes and the context can be matched in a manner similar to that proposed for imagery ability.

So much research has been conducted on aspects of imagery and their relationships to various personal and contextual variables that it is difficult to bring it all together in a meaningful way. The PETTLEP (physical, environmental, task, timing, learning, emotion, perspective) model (Holmes & Collins, 2001) provides useful guidance, but even with its seven elements, it does not cover all considerations.

Morris et al. (2005) proposed an Imagery Training Program (ITP) model, which does not attempt to address all the specific variables that can influence how we design an imagery program in a specific context, but focuses attention on the generic components to be considered. Prerequisites for imagery training are those personal factors that affect the
design of an ITP, including age and gender, skill level, imagery use preferences, imagery ability, and internal and external imagery perspectives. Environment for imagery training refers to those situational factors that affect the design of the ITP, including the training or competition setting, noise level, physical location, whether imagery is dynamic or static, and whether the skills are open or closed. Pre-requisites and environmental components are pre-existing factors that should be considered first. They influence the three factors that follow, which are components related to structure and content. Content for imagery training is the central component, what we actually put in the ITP. This component includes use of sense modalities, perspective selection, choice of real time versus slow motion or fast forward imagery, skills (cognitive) focus, and motivational content. Rehearsal routines for imagery training are characteristics associated with the delivery of the ITP; that is, when and how it is rehearsed. They include duration of ITP sessions (how long they last), scheduling of sessions (how often they occur, what time of day, what relationship they have to training and competition), and patterning of sessions (e.g., from static to dynamic, from simple to complex). Enhancements for imagery training are ways in which ITPs can be improved, for example, by use of technology. Enhancements include use of cues and triggers, audio scripts, modeling, using video or portable devices, biofeedback, and flotation. Once the ITP has been operational for a short time, it is important to regularly assess how well it is working. Such evaluation should first be done soon after the ITP starts, so athletes do not continue to use ineffective or counterproductive imagery, and any misuse of techniques is quickly resolved. Evaluation of the imagery training program is the use of systematic techniques to judge what is (and is not) working. These assessments include formative and summative testing, verbal discussions with athletes, written reports by athletes, athlete self-evaluation ratings, and sport psychologist and coach observations of the athlete.

An advantage of such a generic model (see Figure 50.1) is that it does not lose currency when research identifies new key pre-requisites or aspects of content. In applying the ITP model, practitioners should always consider the most current evidence related to each component. Morris et al. (2005) did not claim to have identified every component, so other researchers and practitioners are free to propose additional components and relationships for the ITP model.

Figure 50.1 The Imagery Training Program (ITP) model. Adapted from Imagery in Sport by T. Morris, M. Spittle, and A. P. Watt, 2005. Copyright 2005 by Human Kinetics.
Using imagery in athletes’ lives

Published descriptions of imagery in sport usually focus on the use of imagery in PST either to enhance performance directly or to manage psychological variables that affect performance. Imagery can be applied to any aspect of athletes’ lives that affects their well-being. Imagery can also be employed within any psychological perspective.

Case study: Kathy's depressed mood

Kathy was a 15-year-old member of an age-group elite swimming squad. Recently, her development had stalled, and her performances seemed to be going backwards. She decided to see a psychologist to sort out her performance issues. For several sessions, discussion was superficial, but the psychologist noted that Kathy’s mood was flat. As trust developed, Kathy talked about her hopes and dreams and then burst into tears. She then revealed that she was a fraud. She believed she shouldn’t be in the squad because she wasn’t good enough and would never “make it.” As the psychologist asked why Kathy had these beliefs, it became clear that Kathy’s coach was giving her a hard time. Kathy’s negative perceptions of herself turned out to be based on statements made by the coach. Kathy’s depressed mood was based on the thought that she was worthless, emanating from her ruminations about the negative comments made by the coach, who was the most important voice in Kathy’s head at this point in her life.

Circumstances dictated that Kathy could not follow her swimming dream unless she stayed in the squad, so avoidance was a last resort. The psychologist decided to adopt an acceptance and commitment therapy (ACT; Harris, 2008) approach to help Kathy to manage her negative thoughts and feelings, so she could function effectively in the present environment. ACT is a mindfulness therapy, based on the importance of being in the present moment (see Chapter 21). Training in mindfulness allowed Kathy to observe her own thoughts and feelings. Acceptance is a key aspect of ACT, in which Kathy accepted her negative thoughts and feelings, especially about worthlessness, as something that everybody experiences, but that simply having them does not make them real; they are only some of the thousands of thoughts she has had that never amount to anything. What is important is action, particularly action based on core values. Kathy identified swimming to the best of her ability as a core value for her. This value was the basis for an imagery script that Kathy and the psychologist developed together.

In the imagery script, Kathy imagined herself at swimming training. Just as she was about to slip into the pool, the coach came up and made a typical negative comment to her. Kathy imagined feeling deflated and not up to pushing herself at training. At this point, Kathy imagined using her mindfulness skills to explore her thoughts and feelings. She accepted the negative thoughts and feelings she was experiencing, and then recognized that they were just her mind messing with her again. Kathy focused on her core value and determined to act to achieve the goals associated with that value. Kathy imagined jumping into the pool and training as hard as she was able. In her imagery, she was in the moment, acting in accordance with her goals and values. Kathy imagined ending the session tired, but very satisfied. In some imagery sessions, Kathy imagined her performance being timed and the times showing stabilization and then improvement. She and the psychologist then devised a modified script in which training was replaced by competition. Kathy imagined a typical comment from the coach (“don’t let yourself down again!”), accepted her thoughts and feelings about it, focused on her core value, and produced a personal best in her race.
In discussion with the psychologist after working with these imagery scripts for several weeks, Kathy observed two things: first, the coach seemed to talk to all the swimmers this way—it was just the coach’s misguided idea of motivating them; second, the coach didn’t seem to say negative things to Kathy as often as before. The psychologist also noted a marked improvement in Kathy’s mood and a reinvigoration of her commitment to her swimming dream.

Conclusions

Despite the extensive publication of theory, research, and practice related to imagery in sport, there still seems to be more that is not known about imagery than is unequivocally determined. Clearer direction for future research based on well-founded theory is required to direct effective application of imagery in sport. Nonetheless, practitioners continue to recommend imagery, and athletes and coaches use it and report positive effects. See Box 50.1 for a summary of key points from this chapter.

Box 50.1

Summary of key points about imagery

- Imagery is the psychological skills training technique most widely used by athletes, but it is not well understood how best to use imagery to enhance performance and well-being in sport. Athletes often have negative sport-related imagery experiences, so it is preferable to manage athletes’ imagery, based on the best evidence available.
- Theories and research have not produced definitive principles of imagery use, but can be used to guide practice with caution. Practitioners should reflect on the information that is available in a systematic way to help them devise the most efficacious imagery training programs. The Imagery Training Program model can guide this systematic process of imagery program development.
- Practitioners should also use a range of assessment methods, including observations, interviews, and psychometric measures. Assessing athletes’ imagery abilities can help to determine how to frame an imagery script, for example, in terms of use of sense modalities. Examining imagery use can help to focus imagery on the most effective categories of use for the specific situation.
- Imagery can be used in almost all therapeutic contexts. Devising an imagery program for therapeutic purposes should be based on a thorough understanding of the individual, the issues to be addressed, the therapeutic framework, and the best evidence available regarding the effective use of imagery.

References

Farrow, D., & Kemp, J. (2003). *Run like you stole something (the science behind the score line)*. Sydney, NSW, Australia: Allen & Unwin.


