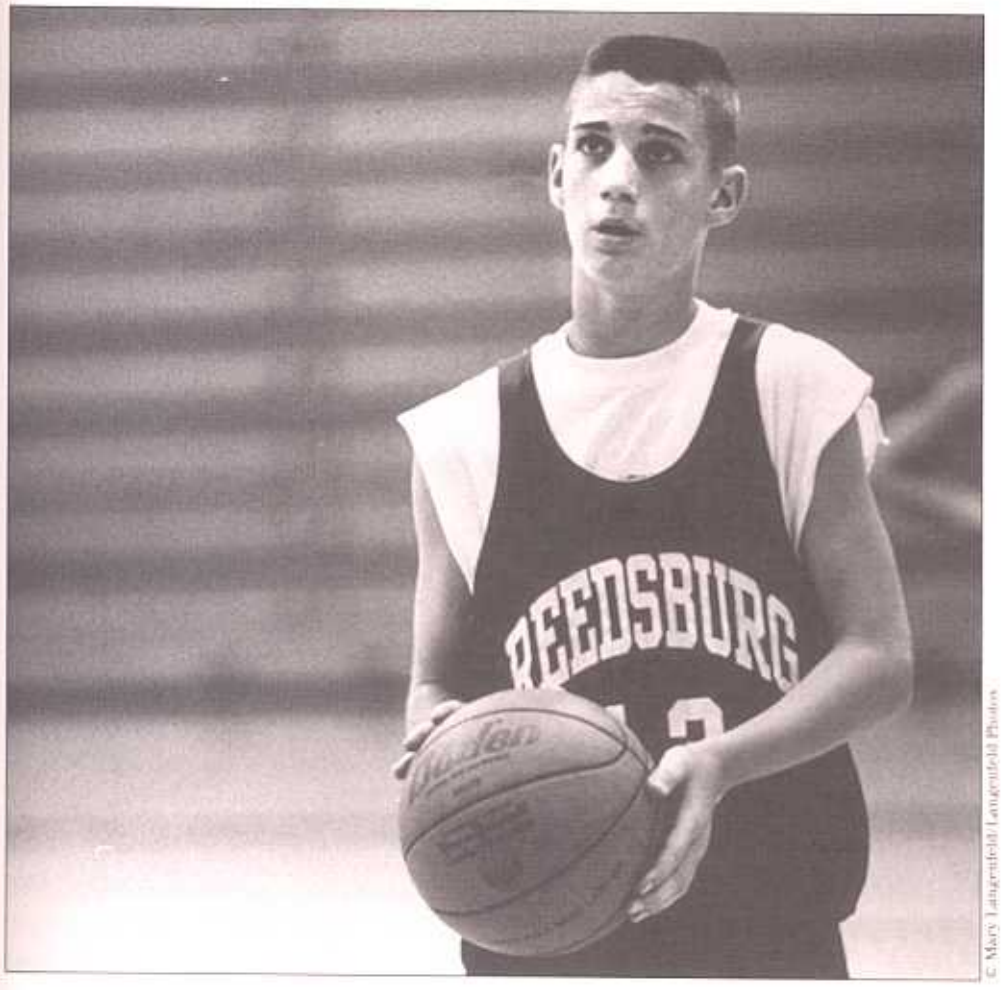
Chapter 13



Imagery

After reading this chapter you should be able to

1. define imagery and identify its uses,
2. discuss factors influencing the effectiveness of imagery,
3. describe how imagery works,
4. identify the different types of imagery,
5. explain how to develop a program of imagery training, and
6. explain when to use imagery.

Only in the last two decades have researchers been systematically studying the potential uses and effectiveness of imagery in sport and exercise settings. But athletes have been using imagery to help their performance for a long time. This quote by all-time golf great Jack Nicklaus demonstrates his use of imagery:

> *Before every shot I go to the movies inside my head. Here is what I see. First, I see the ball where I want it to finish, nice and white and sitting up high on the bright green grass. Then, I see the ball going there; its path and trajectory and even its behavior on landing. The next scene shows me making the kind of swing that will turn the previous image into reality. These home movies are a key to my concentration and to my positive approach to every shot.*
>
> —*Jack Nicklaus (1976)*

Nicklaus obviously believes that rehearsing shots in his mind before actually swinging is critical to his success. In fact, he has said that hitting a good golf shot is 10% swing, 40% stance and setup, and 50% the mental picture of how the swing should occur. In the 1960s former Olympic athlete Dwight Stones used to visualize his high jumps before performing them. Sometimes in his mind's eye or imagination he missed the jump—so he kept practicing in his head until he cleared the bar. Then, and only then, did he attempt the jump. Gold medalist Jean Claude Killy mentally rehearsed his slalom races before actually skiing down the mountain. He would run through the course in his head, seeing each turn, feeling his body respond to each mogul and shift in direction. Nicklaus, Stones, and Killy are three of the many athletes who, for quite some time, have used imagery to enhance performance.

As scientific evidence accumulates supporting the effectiveness of imagery in sport and exercise settings, many more athletes and exercisers have begun using imagery to not only help their performances but also make their experiences in sport and exercise settings more enjoyable. We will discuss the many uses of imagery in sport and exercise settings as well as what factors make it more effective. Many people misunderstand the term, so let's start by defining what exactly we mean by imagery.

What Is Imagery?

You probably have heard several different terms that describe an athlete's mental preparation for competition, including visualization, mental rehearsal, imagery, and mental practice. These terms all refer to creating or recreating an experience in the mind. The process involves recalling from memory pieces of information stored from experience and shaping these pieces into meaningful images. These experiences are essentially a product of your memory, experienced internally by recalling and reconstructing previous events. Imagery is actually a form of simulation. It is similar to a real sensory experience (e.g., seeing, feeling, or hearing), but the entire experience occurs in the mind.

Through imagery you can recreate previous positive experiences or picture new events to prepare yourself mentally for performance.

All of us use imagery to recreate experiences. Have you ever watched the batting technique of a great baseball player and tried to copy the swing? Have you ever mentally reviewed the steps and music of an aerobic dance workout before going to the class? We are able to accomplish these things because our minds can remember events and recreate pictures and feelings of them.

Our minds can also imagine (or "image") and picture events that have not yet occurred. Although imagery relies heavily on memory, we can build an image from several parts of memory. For example, an athlete rehabilitating from a shoulder separation could see herself lifting her arm over her head, even though she has not yet been able to do this. Many football quarterbacks view films of the defense they will be facing and then, through imagery, see themselves using certain offensive sets and strategies to offset the specific defensive alignments. Tennis great Chris Evert would carefully rehearse every detail of a match, including her opponent's style, strategy, and shot selection. Here is how she described using imagery to prepare for a tennis match:

> *Before I play a match, I try to carefully rehearse what is likely to happen and how I will react in certain situations. I visualize myself playing typical points based on my opponent's style of play. I see myself hitting crisp, deep shots from the baseline and coming to the net if I get a weak return. This helps me mentally prepare for a match, and I feel like I've already played the match before I even walk on the court.*

Imagery can, and should, involve as many senses as possible. Even when imagery is referred to as "visualization," the kinesthetic, auditory, tactile, and olfactory senses are all potentially important. The **kinesthetic sense** is particularly important to athletes because it involves the sensation of bodily position or movement that arises from the stimulation of sensory nerve endings in muscles, joints, and tendons. In essence, the kinesthetic sense is the feeling of our body as it moves in different positions. Using more than one sense helps to create more vivid images, thus making the experience more real.

Let's look at how you might use a variety of senses as a baseball batter. First, you obviously use **visual sense** to watch the ball as the pitcher releases it and it comes toward the plate. You employ kinesthetic sense to know where your bat is and to transfer your weight at the proper time to maximize power. You use **auditory sense** to hear the sound of the bat hit the ball. You can also use your **tactile sense** to note how the bat feels in your hands. Finally, you might use your **olfactory sense** to smell the freshly mowed grass.

Besides using your senses, learning to attach various emotional states or moods to your imagined experiences is also important. Recreating emotions (e.g., anxiety, anger, joy, or pain) through imagery can help control these states. For instance, an aerobic dance instructor might get angry after making a mistake during her routine. Later, using imagery, she might imagine getting angry but then controlling that anger by redirecting her thoughts back to her routine. In one case study, a hockey player had difficulty dealing with officiating calls that went against him. He would get angry, lose his cool, and then not concentrate on his assignment. The player was instructed to visualize himself getting what he perceived to be a bad call, and then to use the cue words "stick to ice" to remain focused on the puck. A soccer player who tore an Achilles tendon, in another case, felt angry when he thought he wasn't recovering quickly enough and would get down and not work hard at his exercises. But through imagery he turned his anger into a positive emotion that stimulated him to work even harder toward rehabilitation.

Does Imagery Work?

To determine if imagery indeed does enhance performance, sport psychologists have looked at three

different kinds of evidence: anecdotal reports, case studies, and scientific experiments.

Anecdotal reports, people's reports of isolated occurrences, are numerous (Jack Nicklaus's and Chris Evert's remarks are examples). Many of our best athletes and national coaches include imagery in their daily training regimen, and ever more athletes report using imagery to help recover from injury. A study conducted at the United States Olympic Training Center (Murphy, Jowdy, & Durtschi, 1990) found that 100% of sport psychology consultants and 90% of Olympic athletes used some form of imagery, with 97% of these athletes feeling it helped their performance. In addition, 94% of the coaches of Olympic athletes used imagery during their training sessions, with 20% using it at every practice session. Orlick and Partington (1988) reported that 99% of Canadian Olympians also used imagery. A highly successful swimmer reports on his use of imagery:

> *My visualization has been refined more and more as the years go on. That is really what got me the world record and Olympic medals. I see myself swimming the race before the race really happens, and I try to be on the splits. I concentrate on attaining the splits I have set out to do. About 15 minutes before the race I always visualize the race in my mind and see how it will go. . . . In my mind I go up and down the pool, rehearsing all parts of the race, visualizing how I actually feel in the water (Orlick & Partington, 1988, pp. 118–119).*

Although anecdotal reports might be the most interesting pieces of evidence supporting imagery effectiveness, they are also the least scientific. A more scientific approach is the use of **case studies**, which closely observe, monitor, and record an individual's behavior over a period of time. Case studies have been used to closely monitor how imagery over time might help improve performance. The first such case study concerned a field-goal kicker from Colorado State University, Clark Kemble (Titley, 1976). During the 1973 season, Kemble missed a few relatively easy field goals at crucial times in the game, sometimes causing his team to lose in the final seconds. Afterward, during the off-season, Kemble diligently used imagery to visualize himself making field goals in important games under all types of game conditions and to see himself bounce back from a missed field-goal attempt. During the next two seasons he went on to kick many field goals near the ends of games to help Colorado State win, and he was also perfect on extra points. To top that off, he kicked a 63-yard field goal to break the NCAA record!

Some **multiple-baseline case studies** (i.e., an approach studying just a few people over a long period of time, with multiple assessments documenting changes in behavior and performance) have investigated the effects of imagery on performance. Many other studies have focused on **psychological intervention packages**, approaches that utilize a variety of psychological interventions (e.g., self-talk, relaxation, concentration training) along with imagery. For example, Suinn (1993) has utilized a technique known as visuo-motor behavior rehearsal (VMBR) which combines relaxation with imagery. Research has demonstrated increases in the neuromuscular activity of skiers in the muscles used for skiing when they used VMBR, and similar performance increases for karate performers who used VMBR (Seabourne, Weinberg, Jackson, & Suinn, 1985). Other studies using imagery as part of a psychological intervention package have shown positive performance results with golfers, basketball players, figure skaters, and tennis players, although the improvements could not be attributed to imagery alone (see Perry & Morris, 1995 for a review).

Evidence from **scientific experiments** in support of imagery also is impressive and clearly demonstrates the value of imagery in learning and performing motor skills (Feltz & Landers, 1983; Murphy, 1994; Richardson, 1967a; 1967b; Weinberg, 1981). Among experimental evidence, several studies have demonstrated the effectiveness of imagery in basketball, football, swimming, karate, skiing, volleyball, tennis, and golf.

Factors Affecting the Effectiveness of Imagery

Several factors seem to determine to what extent imagery can improve performance. It is important to keep these in mind if you want to maximize imagery effectiveness.

Nature of the Task

Symbolic learning theory (discussed in detail later in this chapter) has shown that tasks involving mostly cognitive components, such as decision making and perception, show the greatest positive benefits from imagery rehearsal (Feltz & Landers, 1983). The performer practicing mentally "can think about what kinds of things might be tried, the consequences of each action can be predicted to some extent based

The nature of the task and the skill level of the performer affect how imagery will enhance performance. Novice and highly skilled performers who use imagery on cognitive tasks show the most positive effects.

on previous experiences with similar skills, and the performer can perhaps rule out inappropriate courses of action" (Schmidt, 1982, p. 520). In addition, the performer can rehearse the temporal and spatial regularities of a skill. For instance, to make the right decision to finish off a fast break, a basketball point guard might visualize running a break and note the changing positions of the offensive and defensive players.

Skill Level of the Performer

Another important potential factor to consider in the effectiveness of imagery is the performer's skill level. Experimental evidence shows that imagery significantly helps performance for both novice and experienced performers, although there are somewhat stronger effects for experienced players (Feltz & Landers, 1983). Imagery may help novice performers learn cognitive elements relevant to successful performance of the skill. After a physical education teacher demonstrates serving a volleyball, for example, she might have the students picture themselves performing the serve. For experienced performers imagery appears to help refine skills and prepare for making decisions and perceptual adjustments rapidly. For example, Olympic gold medalist Greg Louganis used imagery to help himself prepare to make minute changes in his dive based on his body positioning during different phases. He pictured himself making a perfect dive and feeling different points of the dive.

Imaging Ability

Research has indicated that imagery is more effective when individuals are higher in their ability to imagine or image (to develop the imagery). In addition, imaging ability has been shown to be an important factor in distinguishing between elite and non-elite, or successful and less successful performers (Murphy, 1994). Good imaging ability has been defined mostly in terms of the vividness and controllability of images (see more discussion later in this chapter on developing imagery vividness and controlability). It is important to let individuals know that imagery is a skill and, therefore, the vividness and controllability of one's imagery can be improved with practice (Rodgers, Hall, & Buckholtz, 1991). Sport psychologists working with Olympic athletes have found that although some athletes had difficulty getting controllable and vivid images, through systematic practice they were able to significantly improve the quality of their imagery.

Using Imagery Along With Physical Practice

It is important to remember that imagery does not take the place of physical practice. In fact, a combination of physical and mental practice is not better than physical practice alone within the same time frame if the mental component takes time away from physical practice (Hird, Landers, Thomas, & Horan, 1991). In essence, imagery needs to be added to your normal physical practice, but it shouldn't replace it. However, mental practice does improve performance more than no practice at all. Therefore, imagery should be viewed as a way to train the mind in conjunction with physically training the body, not as a replacement for physical practice. In essence, imagery might be thought of as a vitamin supplement to physical practice, one that could give individuals an edge in improving performance (Vealey & Walter, 1993). However, when an individual is injured, fatigued, or overtrained, then imagery might be employed as a substitute for physical practice.

How Imagery Works

How can just thinking about jumping over the high bar, hitting a perfect tennis serve, healing an injured arm, or sinking a golf putt actually help athletes accomplish these things? We can generate information from memory that is essentially the same as an actual experience; consequently, imagining events can have a similar effect on our nervous system to what the real, or actual, experience would. "Imagined stimuli and perceptual or 'real' stimuli have a qualitatively similar status in our conscious mental life" (Marks, 1977, p. 285). Think for a moment about dreaming. Perhaps someone dreams a big slobbering dog is chasing him; he awakes in a cold sweat to find that the dog was only in his imagination. Sport psychologists have proposed three theoretical explanations of this phenomenon.

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Psychoneuromuscular Theory

The **psychoneuromuscular theory** originated with Carpenter (1894), who proposed the **ideomotor principle** of imagery. According to his principle, imagery facilitates the learning of motor skills because of the nature of the neuromuscular activity patterns activated during the imaginal process. That is, vividly imagined events innervate the muscles somewhat as does physically practicing the movement. These slight neuromuscular impulses are identical to those produced during actual performance, but reduced in magnitude (indeed, these impulses may be so minor that they do not actually produce movement). Thus, although the magnitude of the muscle activity is reduced during imagery, the activity is a mirror image of the actual performance pattern.

The first scientific support of this phenomenon came from the work of Edmund Jacobson (1931), who reported that the imagined movement of bending the arm created small muscular contractions in the flexor muscles of the arm. In research with downhill skiers, Suinn (1972; 1976) monitored the electrical activity in the skiers' leg muscles as they imagined skiing the course and found that the muscular activity changed during their imaginings. Muscle activity was highest when the skiers were imagining themselves skiing rough sections in the course, which would actually require greater muscle activity (also see studies by Hale, 1982, and Harris & Robinson, 1986).

When you vividly imagine performing a movement, you use similar neural pathways to those you use in actual performance of the movement. Let's take the example of trying to perfect your golf swing. The goal is to make your swing as fluid and natural as possible to achieve a consistent and accurate drive off the tee. To accomplish this, you take a bucket of balls to the driving range and practice your swing, trying to automate it (i.e., groove your swing). In effect, you are strengthening the neural pathways that control the muscles related to your golf swing. You can also strengthen these neural pathways by imagining that you are executing a perfect swing. Through the imagery, your body believes that you are actually practicing the swing, so in effect you are programming your muscles and preparing your body to perform. Although there is some research to support

this explanation of how imagery works, more definitive research is necessary to empirically substantiate that imagery actually works as predicted by the psychoneuromuscular theory.

Symbolic Learning Theory

Sackett (1934) argued that imagery can help individuals understand their movements. His **symbolic learning theory** suggests that imagery may function as a coding system to help people understand and acquire movement patterns. That is, one way individuals learn skills is by becoming familiar with what needs to be done to successfully perform them. By creating a motor program in the central nervous system, a mental blueprint is formed for successfully completing the movement. For example, in a doubles match in tennis if a player knows how her partner will move on a certain shot, she will be able to better plan her own course. Similarly, a volleyball player should be familiar with the defensive team's position to decide where best to place his shots.

In a thorough review of more than 60 studies in the literature, Feltz and Landers (1983) found that subjects using imagery or some other form of mental practice consistently performed better on tasks that were primarily cognitive (mental) in nature than on those that were more purely motoric. For example, lifting weights or kicking a soccer ball are predominantly motoric, whereas playing chess or a quarterback's deciding which receiver to throw the ball to are mostly cognitive. The research that was reviewed thus supports the symbolic learning theory. Of course, most sport skills have both motor and cognitive components; imagery can be effective to an extent, therefore, in helping players with a variety of skills.

Psychological Skills Hypothesis

Sport psychologists have more recently argued that imagery also works through its developing and refining psychological skills, and the **psychological skills hypothesis** would predict that imagery can improve concentration, reduce anxiety, and enhance confidence—all important psychological skills for maximizing performance. And imagery is a convenient, effective tool to practice and learn a variety of psychological skills. For instance, several intervention techniques (such as stress-inoculation training and stress-management training), which focus primarily on reducing or coping with anxiety, employ imagery as a key component in the process. People visualize themselves successfully coping with stress in tough situations. A golfer, for example, might visualize herself standing over a 10-foot putt that would win a tournament. In the past, she has tightened up and missed. Now, in her mind, she sees herself taking a deep breath and relaxing her muscles as she goes through her preshot routine. With a relaxed body and mind, she visualizes sinking the putt and winning the tournament.

Three theories are that imagery works by producing muscle activity, providing a mental blueprint, or improving other psychological skills. All three theories have received some support in the literature–therefore, imagery works in a variety of ways.

Bioinformational Theory

Probably the best-developed theoretical explanation for the effects of imagery is Lang's **bioinformational theory** (1977, 1979). Based on the assumption that an image is a functionally organized set of propositions stored by the brain, the model states that a description of an image contains two main types of statements: response propositions and stimulus propositions. *Stimulus propositions* are statements that describe specific stimulus features of the scenario to be imagined. For example, a weightlifter at a major competition might imagine the crowd, the bar he is going to lift, locker-room conditions, and the people sitting or standing on the sidelines. *Response propositions*, on the other hand, are statements that describe the imager's response to the particular scenario, and they are designed to produce physiological activity. For example, having a weightlifter *feel* the weight in his hands as he gets ready for his lift, along with feeling a pounding heart and a little tension in their muscles, would be response propositions.

The crucial point to emphasize here is that response propositions are a fundamental part of the image structure in Lang's theory. In essence, the image is not only a stimulus in the person's head to which he or she responds. In fact, imagery instructions that contain response propositions elicit far greater physiological responses than do imagery instructions that contain only stimulus propositions (Hale, 1982). From a practical point of view, imagery scripts should contain both stimulus and response

MORE INFORMATION

Response vs. Stimulus Propositions: Lang's Bioinformational Theory

To be most effective, imagery scripts should contain both stimulus and response propositions. Here are examples of each:

Script Weighted With Stimulus Propositions

It is a beautiful autumn day and you are engaged in a training program, running down a street close to your home. You are wearing a bright red tracksuit and as you run, you watch the wind blow the leaves from the street onto a neighbor's lawn. A girl on a bicycle passes you, and you see she is delivering newspapers. You swerve to avoid a pothole in the road and you smile at another runner passing you in the opposite direction.

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Script Weighted With Response Propositions

It is a crisp autumn day and you are engaged in a training run, going down a street close to your home. You feel the cold bite of air in your nose and throat as you breathe in large gulps of air. You are running easily and smoothly, but you feel pleasantly tired, and can feel your heart pounding in your chest. Your leg muscles are tired, especially the calf and thigh ones, and you can feel your feet slapping against the pavement. As you run you can feel a warm sweat on your body.

propositions, which are more likely to create a vivid image than stimulus propositions alone.

Triple Code Model

Another fairly recent model, which also recognizes the primary importance of psychophysiology in the imagery process, goes a step further in stating that the meaning the image has to the individual must also be incorporated into imagery models. Specifically, Ahsen's (1984) triple code model (ISM) of imagery highlights understanding three effects that are essential aspects or parts of imagery. The first part is the image (I) itself. "The image is a sensation but it is internal at the same time. It represents the outside world and its objects with a degree of sensory realism which enables us to interact with the image as if we were interacting with the real world"(Ahsen, 1984, p. 34). The second part is the somatic response (S): The act of imagination results in psychophysiological changes in the body (this part is similar to Lang's bioinformational theory). The third aspect of imagery (mostly ignored by other models) is the meaning (M) of the image. According to Ahsen, every image imparts a definite significance, or meaning, to the individual imager, and that the same set of imagery instructions will never produce the same imagery experience for any two people.

Individual differences can be seen in Murphy's (1990) description of how figure skaters differed in their imagery when they were asked to relax and concentrate on "seeing a bright ball of energy, glowing golden, floating in front of me, which I inhale and take down to the center of my body." One skater imagined a glowing energy ball "exploding in my stomach [and] leaving a gaping hole in my body." Another skater said that the image of the ball of energy "blinded me so that when I began skating I could not see where I was going and crashed into the wall of the rink." In essence, Ahsen's triple code model

recognizes the powerful reality of images for the individual and also encourages us, as we help people with imaging, to seek the *meanings* of the images to them.

In summary, the five explanations—psychoneuromuscular, symbolic learning, psychological skills, bioinformational, and triple code—all assert that imagery can help program an athlete both physically and mentally, and they all have found support from research (although the validity of the psychoneuromuscular theory has been questioned recently). You might regard imagery as a strong mental blueprint of how to perform a skill, which should result in quick and accurate decision making, increased confidence, and improved concentration. In addition, the increased neuromuscular activity in the muscles helps players make movements more fluid, smooth, and automatic.

Uses of Imagery

Athletes can employ imagery in many ways to improve both physical and psychological skills, including concentration, confidence, control over emotional responses, acquiring and practicing sport skills and strategies, and coping with pain or injury.

Improve Concentration

By visualizing what you want to do and how you want to react in certain situations, you can prevent your mind from wandering. You can imagine yourself in situations where you often lose your concentration (e.g., after missing an easy shot in basketball, forgetting a step in an aerobic dance class, or dropping a pass in football) and then imagine yourself remaining composed and focused on the next play or step.

Build Confidence

If you have had trouble with serving in recent matches, for example, you might imagine hitting hard, accurate volleyball serves to build up your self-confidence. An official who has her confidence shaken when the crowd starts booing her calls against the home team could visualize herself taking control and maintaining confidence and impartiality on subsequent calls. Seeing yourself perform well in your mind makes you feel you can perform under adverse circumstances. A recent study (Moritz, Hall, Martin, & Vadocz, 1996) found that athletes high in confidence have different image content than athletes low in confidence. Specifically, compared with athletes low in confidence, highly confident athletes used more mastery imagery (e.g., I imagine myself to be focused during a challenging situation) and arousal imagery (e.g., I imagine the excitement associated with competing) and had better ability with kinesthetic and visual imagery.

Imagery can enhance a variety of skills to improve performance and can facilitate the learning of new techniques and strategies.

Control Emotional Responses

You can visualize situations that have caused problems in the past, such as choking under pressure or getting angry because of your own errors or officials' calls. You can then picture yourself dealing with these events in a positive way, such as taking a deep breath and focusing on your breathing as you concentrate on the task at hand. Along these lines, Pat Head Summitt, the highly successful women's basketball coach at the University of Tennessee, uses imagery for relaxation before important games when players tend to get too "pumped" and play out of control. Recent research has also revealed that arousal imagery produces higher levels of cognitive anxiety (Vadocz, Hall, & Moritz, 1997). Competitive state anxiety can be both facilitative and debilitative, so an athlete who is having trouble getting up for a competition might want to use arousal imagery, whereas an athlete who finds anxiety a problem will probably only make things worse by engaging in arousal imagery.

Acquire and Practice Sport Skills

Probably the best-known use of imagery is for practicing a particular sport skill. Athletes practice putting a golf ball, executing a takedown in wrestling, throwing the javelin, doing a routine on the balance beam, or swimming the backstroke—all in their minds. You can practice skills to fine-tune them or you can pinpoint weaknesses and visualize correcting them. A physical education teacher might have his students imagine the proper execution of a backward roll as they wait in line for their turn (imagery can be particularly useful during waiting periods). An aerobics instructor might have her students imagine a sequence of movements as they listen to the music before physically attempting the steps (see Figure 13.1). This practice can take the form of a preview or a review. A participant can look forward to and visualize what to do in an upcoming competition or event; a player can review a past performance,

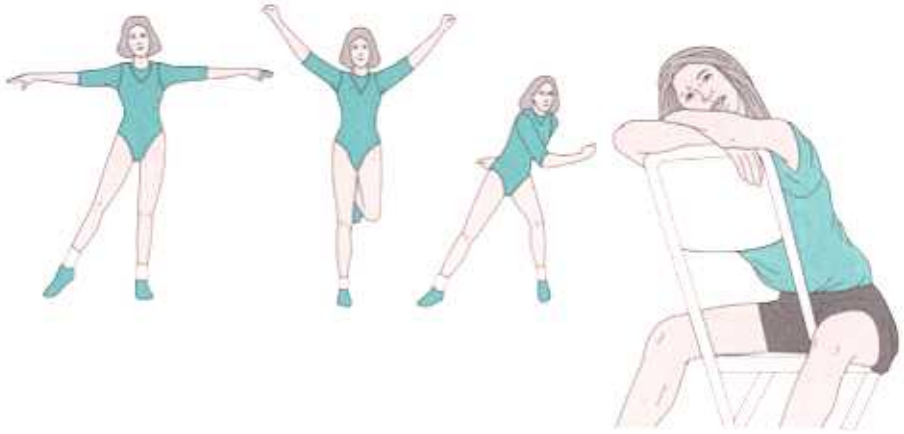

Figure 13.1 Imaging is a way to practice movement skills.

focusing on specific aspects of the movement that were done particularly well.

Acquire and Practice Strategy

Imagery can be used to practice and learn new strategies or review alternative strategies for either team or individual sports. A quarterback, for example, might visualize different defenses and what plays he would call to counteract them. A hockey goalie might imagine what he would do on a breakaway as three players converge on the goal. A softball pitcher might visualize how to pitch to different batters on the opposing team, based on their strengths and weaknesses. To prepare himself mentally to bat, Hank Aaron, the all-time leading home run hitter, used to visualize the different types of pitches a particular pitcher might throw him.

Cope With Pain and Injury

Imagery is also useful for coping with pain and injury. It can help speed up recovery of the injured area and keep skills from deteriorating all the while (Ievleva & Orlick, 1991). It is hard for athletes to go through an extended layoff. But instead of feeling sorry for themselves, they can imagine doing practice drills and thereby facilitate recovery. (We'll further discuss using imagery during injury rehabilitation later in this chapter.)

Solve Problems

Imagery can also be utilized to discover or solve problems in performance. If an individual is not performing up to past or expected levels, the player can use imagery to critically examine all aspects of the performance to find the potentially confounding factor. If a gymnast is experiencing trouble on a particular aspect of her floor routine, for example, she can visualize what she is doing now and possibly compare it to what she has done in the past when she was performing the moves successfully.

Functions of Imagery

Imagery has a myriad of specific uses. In addition, Pavio (1985) has distinguished between two of its functions: the motivational and cognitive functions. He suggests that imagery plays both cognitive and motivational roles in mediating behavior, each capable of being oriented toward either general or specific behavioral goals (see figure 13.2). On the motivational side, imagery can represent emotion-arousing situations as well as specific goals and goal-oriented behaviors. On the cognitive side, imagery can be focused on the strategies used in the performance situation or on the motor skills necessary for success.

Types of Imagery

Athletes usually take either an internal or external perspective for viewing their imagery (Mahoney & Avener, 1977). Which perspective is used depends on the athlete and the situation. Gymnasts who qualified for the 1976 U.S. Olympic team, for example, reported using internal imagery more frequently than external imagery. We'll look briefly at each perspective.

Internal Imagery

Internal imagery refers to imagining the execution of a skill from your own vantage point. As if you had a camera on your head, you see only what you would see if you actually executed the particular skill.

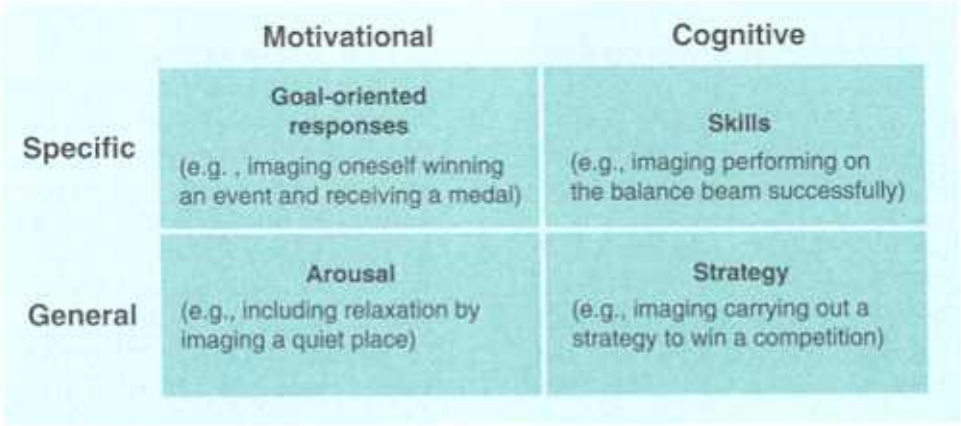

Figure 13.2 *Cognitive and motivational functions of imagery.* Adapted from Pavio, 1985.

As a softball pitcher, for instance, you would see the batter at the plate, the umpire, the ball in your glove, and the catcher's target, but not the shortstop, second baseman, or anything else out of your normal range of vision. Because internal imagery is done from a first-person perspective, the images would emphasize the feel of the movement. As a softball pitcher, you would feel your fingers gripping the ball, the stretch of your arm during the backswing, the shift of weight, and finally the extension of your arm upon release.

External Imagery

In external imagery you view yourself from the perspective of an external observer. It is as if you are watching yourself in the movies or on videotape. For example, if a baseball pitcher imagined pitching from an external perspective, he would see not only the batter, catcher, and umpire, but also all the other fielders. However, there would be little emphasis on the kinesthetic feel of the movement because the pitcher is simply watching himself perform it.

Regarding performance results, few differences have been established between external and internal imagery. Studies show no differences in performance generally between individuals given internal imagery instructions compared with those told to use external imagery. It was virtually impossible to characterize participants as strictly internal or external imagers because people's images varied considerably, both within and between images (Epstein, 1980; Mumford & Hall, 1985). In fact, most Olympic athletes surveyed by Murphy, Fleck, Dudley, & Callister (1990) indicated that they use both internal and external imagery.

However, although the research is inconclusive, some evidence suggests that internal imagery might indeed yield better results than external imagery. One study found that internal imagery produced more electrical activity in the biceps muscle than external imagery did when subjects imagined flexing their arm (Hale, 1982). Internal imagery makes it easier to bring in the kinesthetic sense, feel the movement, and approximate actual performance skills. For example, using an internal perspective, a golfer might become more aware of how her body feels and looks during her swing.

In summary, many people switch back and forth between internal and external imagery. As one Olympic rhythmic gymnast reported, "Sometimes you look at it from a camera view, but most of the time I look at it as what I see from within, because that's the way it's going to be in competition" (Orlick & Partington, 1988, p. 114). The important thing appears to be getting a good, clear, controllable image, regardless of whether it is from an internal or external perspective. It may be better sometimes to use external imagery (e.g., to correct a play that went wrong in football after watching game films), although at other times internal imagery might be better (e.g., practicing the golf swing just before hitting a drive).

Keys to Effective Imagery

Like all psychological techniques, imagery skill is acquired through practice. Some participants are

Whether a person uses an internal or external image appears to be less important than choosing a comfortable style that produces clear, controllable images.

When using imagery, involve as many senses as possible and recreate or create the emotional feelings associated with the task or skill you're trying to execute.

pretty good at it, whereas others may not even be able to get an image in their minds. There are two keys to good images—vividness and controllability. We'll consider each of these in turn.

Vividness

Good imagers use all of their senses to make their images as vivid and detailed as possible. It is important to recreate or create as closely as possible the actual experience in your mind. The closer images are to the real thing, the better they transfer to actual performance. Pay particular attention to environmental detail, such as the layout of the facilities, type of surface, and closeness of spectators. Experience the emotions and thoughts of the actual competition. Try to feel the anxiety, concentration, frustration, exhilaration, or anger associated with your performance. All of this detail will make the imagined performance more real.

If you have trouble getting clear, vivid images, first try to imagine things that are familiar to you, such as the furniture in your room. Then use the arena or playing field where you normally play and practice. Here you will be familiar with the playing surface, grandstands, background, colors, and other environmental details. You can practice getting vivid images with the three vividness exercises that follow. (We also recommend trying the exercises in *Put Your Mother on the Ceiling* by Richard DeMille, 1973.)

Vividness Exercises

1. *Imagining home.* Imagine that you are home in your living room. Look around and take in all the details. What do you see? Notice the shape and texture of the furniture. What sounds do you hear? What is the temperature like? Is there any movement in the air? What do you smell? Use all your senses and take it all in.

2. *Imagining a positive performance of a skill.* Select a particular skill in your sport and visualize yourself performing it perfectly. Perform the skill over and over in your mind, and imagine every feeling and movement in your muscles. For example, in serving a tennis ball, start by seeing yourself in the ready position, looking at your opponent and the service court. Then pick the spot where you want the serve to go. See and feel how you start the service motion and release the ball at the perfect height, the toss going just where you want. Feel your back arch and your shoulder stretch as you take the racquet back behind your head. Feel your weight start to transfer forward and your arm and racquet reach high to contact the ball at just the right height and angle. Feel your wrist snap as you explode into the ball. Now see and feel the follow-through with your weight coming completely forward. The ball goes exactly where you want it to, forcing a high floating return from your opponent. You close in on the net and put the ball away with a firm crosscourt volley.

3. *Imagining a positive performance.* Recall as vividly as possible a time when you performed very well. If you can recall a finest hour in recent memory, use that. Your visualization will cover three specific areas of recall: visual, auditory, and kinesthetic.

First, visually recall a picture of how you looked when you were performing well. Notice that you look different when you're playing well compared with when you're playing poorly. You walk differently; you carry your head and shoulders differently. When an athlete is confident on the inside, it shows on the outside. Try to get as clear a picture as possible of what you look like when you are playing well. Review films of successful performances to help crystallize the image.

Now reproduce in your mind the sounds you hear when you are playing well, particularly the internal dialogue you have with yourself. There is often an internal silence that accompanies your best performances. Listen to it. What is your internal dialogue like? What are you saying to yourself, and how are you saying it? What is your internal response when you face adversity during play? Recreate all the sounds as vividly as you can.

Finally, recreate in your mind all the kinesthetic sensations you have when playing well. How do your feet and hands feel? Do you have a feeling of quickness, speed, or intensity? Do your muscles feel tight or relaxed? Stay focused on the sensations associated with playing well.

Controllability

Another key to successful imagery is learning to manipulate your images so they do what you want them to. Many athletes have difficulty controlling their images and often repeat their mistakes. A base-

Tailor imagery programs to the exerciser's or athlete's individual needs, abilities, and interests.

ball batter might visualize his strikeouts; a tennis player, her double faults; a hockey goalie, a puck going past him for a goal; or a gymnast, falling off the uneven parallel bars. Controlling your image helps you to picture what you want to accomplish instead of seeing yourself make errors. The key to control is practice. The following quote by an Olympic springboard diver shows how practice can help overcome an inability to control one's images:

> *It took me a long time to control my images and perfect my imagery, maybe a year, doing it every day. At first I couldn't see myself; I always saw everyone else, or I would see my dives wrong all the time. I would get an image of hurting myself, or tripping on the board, or I would see something done really bad. As I continued to work on it, I got to the point where I could see myself doing a perfect dive and the crowd at the Olympics. But it took me a long time. (Orlick & Partington, 1988, p. 114)*

You can practice by doing the following controllability exercises.

Controllability Exercises

1. *Controlling performance.* Imagine working on a specific skill that has given you trouble in the past. Take careful notice of what you were doing wrong. Now imagine yourself performing that skill perfectly while seeing and feeling your movements. For example, a basketball player might see and feel herself shooting a free throw perfectly, getting nothing but net.

Now, think about a competitive situation in which you have had trouble in the past. Taking the basketball example, you might see yourself shooting two free throws at the end of a game with your team down by one point. See yourself remaining calm as you sink both shots.

2. *Controlling performance against a tough opponent.* Picture yourself playing a tough opponent who has given you trouble in the past. Try to execute a planned strategy against this person just as you would for a competition. Imagine situations in which you are getting the best of your opponent. For example, a quarterback might imagine different defenses and see himself calling the correct audible at the line of scrimmage to beat each defense. Then, he would actually see himself carrying out the successful play. Whatever your sport, make sure you control all aspects of your movements as well as the decisions you make.

3. *Controlling emotions.* Picture yourself in a situation where you tense up, become angry, lose concentration, or lose confidence (e.g., missing a field goal, blowing a breakaway layup, missing an empty net in soccer, or missing a jump and falling on the ice). Recreate the situation, especially the feelings that accompany it. Feel the anxiety, for example, of playing in a championship game. Then use anxiety-management strategies (see chapter 12) to feel the tension drain from your body and to instead focus on what you need to do to execute your skills. Try to control what you see, hear, and feel in your imagery.

Developing an Imagery Training Program

Now that you know the fundamentals and principles underlying the effectiveness of imagery and how to improve vividness and controllability, you have the basics you need to set up an imagery training program. To be effective, imagery should become part of the daily routine. It is important to tailor imagery programs to the needs, abilities, and interests of each athlete or exerciser.

Imagery Evaluation

The first step in setting up imagery training is to evaluate the athlete's or student's current level of imagery skill. Because imagery is a skill, individuals differ in how well they can do it. Measuring someone's ability in imaging is not easy, however, because imagery is a mental process—and therefore not directly observable. Although psychologists have tried different techniques, basically they use questionnaires to try to discern the different aspects of imagery content. Tests of imagery date back to 1909 when the Betts Questionnaire on Mental Imagery was first devised. Later the Vividness of Movement Imagery Questionnaire (Isaac, Marks, & Russell, 1986 was developed to measure visual imagery as well as the kinesthetic sensations accompanying the imagery. In addition, Hall, Mack, Pavio, and Hausenblas (1997) developed the Sport Imagery Questionnaire that asks individuals how often they use various types of imagery (e.g., imaging sport skills, strategies of

Sport Imagery Questionnaire

Read the following descriptions of four general sport situations. For each one, imagine the situation and provide as much detail from your imagination as possible (using all the senses—seeing, hearing, feeling, tasting, and smelling) to make the image as real as you can. Think of a specific example of the situation (e.g., the skill, the people involved, the place, the time). Now close your eyes and take a few deep breaths to become as relaxed as you can. Put aside all thoughts. Keep your eyes closed for about 1 minute as you try to imagine the situation as vividly as you can. Your accurate appraisal of your images will help you determine which exercises you will want to emphasize in the basic training exercises.

After you have completed imagining the situation, rate the four dimensions of imagery by circling the number that best describes the image you had.

1 = No image present
2 = Not clear or vivid, but a recognizable image
3 = Moderately clear and vivid image
4 = Clear and vivid image
5 = Extremely clear and vivid image

For each situation, pick the number that answers each of these four questions:

a. How vividly did you see yourself doing this activity?	1	2	3	4	5
b. How clearly did you hear the sounds of doing the activity?	1	2	3	4	5
c. How well did you feel yourself making the movements?	1	2	3	4	5
d. How clearly were you aware of your mood?	1	2	3	4	5

PRACTICING ALONE

Select a specific skill in your sport such as hitting a backhand, vaulting over the bar, swimming the breaststroke, or kicking a goal. Now imagine yourself performing this skill at the place where you normally practice (e.g., gymnasium, pool, field, rink, court) without anyone else present. Close your eyes for about 1 minute and try to see yourself at this place, hear the sounds, feel your body perform the movement, and be aware of your state of mind or mood.

a. _____ c. _____

b. _____ d. _____

PRACTICING WITH OTHERS

You are doing the same activity but now you are practicing the skill with your coach and your teammates present. This time, however, you make a mistake that everyone notices.

a. _____ c. _____

b. _____ d. _____

WATCHING A TEAMMATE

Think of a teammate's or an acquaintance's performing a specific skill unsuccessfully in competition, such as dropping a pass, falling off the balance beam, or missing an empty net.

a. _____ c. _____

b. _____ d. _____

(continued)

Sport Imagery Questionnaire (continued)

PLAYING IN A CONTEST

Imagine yourself performing in a competition. You are performing very skillfully, and the spectators and teammates are showing their appreciation.

a. _____ c. _____

b. _____ d. _____

SCORING

Now determine your imagery scores and see what they mean. First, add the ratings for your four answers to part *a* in each section, your four answers to part *b* in each section, and so on, recording them below.

Total dimension score

a. Visual	____	+	____	+	____	+	____	= ____
b. Auditory	____	+	____	+	____	+	____	= ____
c. Kinesthetic	____	+	____	+	____	+	____	= ____
d. Mood	____	+	____	+	____	+	____	= ____

For each dimension, your top possible score is 20 and your lowest possible score is 4. The closer you came to 20 on each dimension, the more skilled you are in that particular area. Lower scores mean you need to work on those aspects of your imagery.

Adapted from Martens (1982b).

play, staying focused, or the arousal that may accompany performance).

These imagery questionnaires can be used to evaluate different aspects of imagery ability and use; the practitioner chooses the most appropriate instrument for a specific situation. As an example and to see how good your own imagery skills are, complete the Sport Imagery Questionnaire (Martens, 1982b) given on p. 278, which measures how well athletes can use all their senses while imaging. There are no right or wrong answers to the questionnaire; the evaluation should take you 10 to 15 minutes.

After compiling feedback from the questionnaire, players and coaches can determine which areas to incorporate into the athlete's daily training regimen. The imagery program need not be complex or cumbersome, and it should fit well into the individual's daily training regimen. What follows are tips and guidelines for implementing a successful program in imagery training.

Proper Setting

People who are highly skilled in the use of imagery can perform the technique almost anywhere. But these people are rare. For the beginner it's best to practice in a setting with no distractions. Some people like to practice imagery in their rooms before going to sleep, others in the locker room before competition, and others during a break at school or work. As skills develop, people learn to use imagery amid distractions and even in actual competition.

Relaxed Concentration

Imagery preceded by relaxation is more effective than using imagery alone (Weinberg, Seabourne, & Jackson, 1981). So before each imagery session, relax by using deep breathing, progressive relaxation, or some other relaxation procedure that works for you. Relaxation is important for two reasons: (a) It lets you forget everyday worries and concerns and concentrate on the task at hand, and (b) it results in more powerful imagery because it won't have to compete with other events.

Realistic Expectations and Sufficient Motivation

Some athletes are quick to reject such nontraditional training as imagery, believing that the only way to

improve is through hard physical practice, drills, and blood and sweat. They are skeptical that thinking about and visualizing a skill can help improve its performance. Such negative thinking and doubt undermine the effectiveness of imagery. Other athletes believe that imagery can help them become the next Tiger Woods or Martina Hingis, as if imagery is the magic that can transform them into the players of their dreams. The truth is simply that imagery can improve athletic skills if you work at it systematically. Excellent athletes are usually intrinsically motivated to practice their skills for months and even years. A similar dedication and motivation is needed to develop psychological skills. Yet many athletes do not commit to practice imagery systematically. Remember that efforts in a systematic imagery program are rewarded in the near future.

Vivid and Controllable Images

Try to use all your senses and to feel the movements as if they were actually occurring. Many Olympic teams visit the actual competition sites months in advance so they can visualize themselves performing in that exact setting, with its color, layout, construction, and grandstands. Moving and positioning your body as if you were actually performing the skill can make the imagery and feeling of movement more vivid. For example, instead of lying down in bed to image kicking a soccer goal, stand up and kick your leg as if you were actually performing the skill. Imagery can be used during quick breaks in the action, so it is important to learn to image with your eyes open as well as closed. Work on controlling images to follow your instructions and produce the desired outcome.

Positive Focus

Focus in general on positive outcomes, such as kicking a field goal, getting a base hit, completing a successful physical therapy session, scoring a goal, or doing a perfect routine. Sometimes using imagery to recognize and analyze errors is beneficial (Mahoney & Avener, 1977) because nobody is perfect and we all make mistakes every time we play. It is also important, however, to be able to leave the mistake behind and focus on the present. Try using imagery to prepare for the eventuality of making a mistake and effectively coping with the error.

For trouble with a particular mistake or error, we suggest the following: First try to imagine the mistake and determine the correct response. Then immediately imagine performing the skill correctly. The image of the correct response (along with the feeling of that response) should then be repeated several times, and this should be followed immediately with actual physical practice. This will help you absorb what it looks like and how it feels to perform the skill well.

Imagining successful outcomes helps program the body to execute skills. The better that athletes can visualize successful performances, the stronger their motor programs will become. But errors and mistakes are part of competition, so they should be prepared to deal with them effectively. This is highlighted in the following quote by a three-time Olympian:

> *It's as if I carry around a set of tapes in my mind. I play them occasionally, rehearsing direct race strategies. Usually I imagine the race going the way I want—I set my pace and stick to it. But I have other tapes as well—situations where someone goes out real fast and I have to catch him, or imaging how I will cope if the weather gets really hot. I even have a "disaster" tape where everything goes wrong and I'm hurting badly, and I imagine myself gutting it out. (Murphy & Jowdy, 1992, p. 242)*

Videotapes

Many athletes can get good, clear images of their teammates or frequent opponents but have trouble imaging themselves. This is because it is difficult to visualize something you have never seen. The challenge is to capture that perfect shot, pass, jump, kick, or routine and lock it in for use with mental practice. A videotape can provide just this feedback—a picture of how you look performing at your best. Seeing yourself on videotape for the first time is quite eye-opening, and people typically ask, "Is that me?"

A good procedure is to film athletes practicing, carefully edit the tape (usually in consultation with the coach or athlete) to identify the perfect or near-perfect skills, and then duplicate the sequence repeatedly on the tape. The athlete observes her skills in the same relaxed state prescribed for imagery training. After watching the film for several minutes, she closes her eyes and images the skill.

A program called Sybervision (DeVore & DeVore, 1981) shows professional athletes in different sports hitting the basic shots perfectly. Along with repeated footage of these perfect movements, the tape also brings in auditory cues, such as the thwack of the bat as Rod Carew hits the ball. This approach still awaits detailed scientific scrutiny, but it appears to offer promise.

CLOSE-UP

Using Imagery to Cope With Adversity

Al Oerter holds the distinctions of winning four gold medals in the discus in four different Olympics (Carl Lewis is the only other Olympian to achieve this remarkable feat). In two of his gold medal performances Oerter won the gold on his last throw, and in the others he had to overcome injuries and poor weather conditions to win. In speaking about how he prepared for the Olympics and overcoming potential obstacles, this is what Oerter said:

> "I used to imagine that it was the day of the Olympic trials, the day that I had spent the last four years preparing for, and that it was raining. Pouring rain. The throwing area was slippery, conditions were atrocious, and I had to go out and throw anyway. And I imagined myself throwing well. I visualized myself throwing strongly, with good technique despite the rain. Or sometimes I would imagine that I was down to my last throw in the Olympic finals. The Russian was competing right ahead of me, and with his last throw he set a world record. So to win the gold medal, I now had to set a new world record! On my last throw of the Games, I would imagine that I did just that; I would see myself setting a new world record. Those were the things I visualized. I thought about what might go wrong, and I imagined responding to the challenge." (Murphy, 1996, p. 67).

Image Execution and Outcome

Imagery should include both the execution and end result of the skills. Many athletes image the execution of the skill and not the outcome, or vice versa. Athletes need to be able to feel the movement and control the image so they see the desired outcome. For instance, divers must first be able to feel their body in different positions throughout the dive. Then they should see themselves making a perfectly straight entry into the water.

Image in Real Time

A final principle is to image in real time (Nideffer, 1985). In other words, the time spent imaging a particular skill should be equal to the time the skill actually takes to occur. If a golfer normally takes 20 seconds as part of a preshot routine before putting, then his image of this routine should also take 20 seconds. Because athletes tend to image faster than the actual time it takes to perform the skill, it is a good idea to time the skill. Imaging in real time makes the transfer from imagery to real life easier.

When to Use Imagery

Although imagery can be used virtually any time, it appears to be most useful before and after practice, before and after competition, during breaks in the action in both practice and competition, during personal time, and when recovering from injury. In the following sections, we'll describe how imagery can be used during each of these times.

Before and After Practice

One way to schedule imagery systematically is to include it before and after each practice session. Limit these sessions to about 10 minutes; most athletes have trouble concentrating any longer than this on imagery (Murphy et al., 1990). To focus concentration and get ready before practice, athletes should visualize the skills, routines, and plays they expect to perform. After each practice individuals should then review the skills and strategies they worked on. Because they have just finished working out, the feel of the movement should be fresh in their minds, which will help create clearer, more detailed imagery than usual.

Before and After Competition

Imagery can focus athletes on the upcoming competition if they review in their minds exactly what they want to do, including different strategies for different situations. Imagery before a contest helps fine-tune actions and reactions. Optimally timing this precompetition imagery is individual: Some athletes like to visualize right before the start of a competition, whereas others like to image an hour or two beforehand. Some athletes image at two or three different times before the competition. What's

important is that the imaging fit comfortably into the pre-event routine. It should not be forced or rushed.

After competition athletes can replay the things they did successfully and get a vivid, controllable image. Similarly, students in physical education classes can imagine themselves correcting an error in the execution of a skill they just learned and practiced. They can also replay unsuccessful events, imagining performing successfully or choosing a different strategy.

Imagery can also be used to strengthen the blueprint and muscle memory of those skills already performed well. Larry Bird was a great shooter, but he still practiced his shooting every day. Good performance of a particular skill does not mean that imaging will not maintain or improve it further; its usefulness continues as long as one is performing his or her skill.

During Breaks in the Action

Most sporting events have some extended breaks in the action during which an athlete can use imagery to prepare for what's ahead. Many sports have a certain amount of "dead time" after each shot, and this is an ideal opportunity to use imagery.

During Personal Time

Athletes can use imagery at home (or in any other appropriate quiet place). It may be difficult to find a quiet spot before practicing, and there may be days when the athlete does not practice at all. In such cases athletes should try to set aside 10 minutes at home so that they do not break their imagery routine. Some people like to image before they go to sleep; others prefer doing it when they wake up in the morning.

When Recovering From Injury

Athletes have been trained to use imagery with relaxation exercises to reduce anxiety about an injury. They have used imagery to rehearse emotions they anticipate experiencing upon return to competition. Through imagery, athletes can mentally rehearse physical and performance skills, thereby staying sharp and ready for return.

Positive images of healing or full recovery have been shown to enhance recovery. Ieleva and Orlick (1991) found that positive healing and performance imagery were related to faster recovery times. (Similarly, terminally ill cancer patients have used imagery to see themselves destroying and obliterating the cancerous cells. In a number of cases, the cancer has reportedly gone into remission; see Simonton, Matthews-Simonton, & Creighton, 1978). Imagery can also help athletes, such as long-distance runners, fight through a pain threshold and focus on the race and technique instead of on their pain.

For imagery to be effective, it should be built into the daily routine.

MORE INFORMATION

How Different Professionals Use Imagery

As we have seen, imagery can be used in all sports and activities. Remember that imagery has many uses, not only to enhance performance. The following are examples of how coaches and sport professionals in several activities can use imagery to enhance performance:

- *Physical education.* After finishing a period of vigorous physical activity, ask students to stretch, sit down, and imagine themselves feeling relaxed and calm. Have them practice while they wait in line to participate in an activity.
- *Volleyball.* Before matches, reserve a quiet, dark room for players to visualize themselves performing against a specific opponent.
- *Exercise class.* During a cool-down period, ask participants to visualize how they want their bodies to look and feel.
- *Basketball.* Before practice have players imagine their specific assignments for different defenses and offensive sets.
- *Tennis.* During changeovers instruct players to visualize what type of strategy and shots they want to use in the upcoming game.
- *Swimming.* After every practice give swimmers 5 minutes to pick a certain stroke and imagine doing it perfectly or visualize it during rest periods between intervals.

SUMMARY

1 *Define imagery and identify its uses.*

Imagery refers to creating or recreating an experience in the mind. It is a form of simulation that involves recalling from memory pieces of information stored there from all types of experiences and shaping them into meaningful images. Imagery has many uses including reducing anxiety, building confidence, enhancing concentration, recovering from injury, and practicing specific skills and strategies.

2 *Discuss factors influencing the effectiveness of imagery.*

Consistent with the interactional theme seen throughout the text, imagery effectiveness is affected by both situational and personal factors. These include the nature of the task, the skill level of the performer, and the imaging ability of the person.

3 *Describe how imagery works.*

A number of theories or explanations attempt to explain how imagery works. These include the psychoneuromuscular theory, symbolic learning theory, psychological skills hypothesis, bioinformational theory, and triple code theory. All five explanations have some support from research findings, and they basically propose that physiological and psychological reasons account for imagery effectiveness.

4 *Identify the different types of imagery.*

There are basically two types of imagery: internal and external. People need not use one or the other exclusively. Whatever kind of imagery is comfortable to the individual should be practiced systematically, just like physical skills. Both types of imagery involve not only the visual sense but also kinesthetic, auditory, tactile, and olfactory senses.

5 *Explain how to develop a program of imagery training.*

Motivation and realistic expectations are critical first steps in setting up a program of imagery training. In addition, evaluation, using such an instrument as the Sport Imagery Questionnaire, should occur before the training program begins. Basic training in imagery includes exercises in vividness and controllability. Athletes should initially practice imagery in a quiet setting and in a relaxed, attentive state. They should focus on developing positive images, although it is also useful to occasionally visualize failures to develop coping skills. Both the execution and outcome of the skill should be imaged, and imaging should occur in real time.

6 *Explain when to use imagery.*

Imagery can be used before and after practice and competition, during breaks in the action, and during personal time. Imagery can also benefit the injury rehabilitation process.

KEY TERMS

imagery
kinesthetic sense
visual sense
auditory sense
tactile sense
olfactory sense
anecdotal reports
case studies
multiple-baseline case studies
psychological intervention packages
scientific experiments
psychoneuromuscular theory
ideomotor principle
symbolic learning theory
psychological skills hypothesis
bioinformational theory
triple code model
internal imagery
external imagery
vividness
controllability

REVIEW QUESTIONS

1. What is imagery? Discuss recreating experiences that involve all the senses.
2. What are three uses of imagery? Provide practical examples for each.
3. Compare and contrast the psychoneuromuscular and symbolic learning theories as they pertain to imagery.
4. Describe some anecdotal and some experimental evidence supporting the effectiveness of imagery in improving performance, including the nature of the task and ability level.
5. Compare and contrast internal and external imagery and their comparative effectiveness.
6. Describe two exercises each to improve vividness and controllability of imagery.
7. What is the importance of vividness and controllability in enhancing the quality of imagery?
8. Discuss three of the basic elements of a successful imagery program, including why they are important.

CRITICAL THINKING QUESTIONS

1. Think of a sport or physical activity you enjoy (or used to enjoy). If you were to use imagery to help improve your performance as well as enhance the experience of your participation, describe how you would put together a training program for yourself. What would be the major goals of this program? What factors would you have to consider to enhance the effectiveness of your imagery?
2. As an exercise leader you want to use imagery with a class, but the students are a little skeptical of its effectiveness. Using anecdotal, case study, and experimental evidence, convince them that imagery would be a great addition to making the class experience more positive.