



# IAAF @-Letter

## for CECS Level II Coaches

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No. 2

**SPECIFIC THEME:** Mental rehearsal techniques for athletes  
(with particular reference to the 400m hurdles)

**GENERAL THEME:** Basics of imagery and mental practice (mental rehearsal)

### Specific Theme

#### **MENTAL REHEARSAL TECHNIQUES FOR ATHLETES (WITH PARTICULAR REFERENCE TO THE 400M HURDLES)**

##### **1 Introduction**

Mental rehearsal involves using the imagination to create a performance in the mind. An example of this is a high jumper who mentally practices the whole process from preparation to successful completion of the jump. This has the effect of producing nerve impulses which travel the same pathways as for an actual physical movement. Thus the mind-body coordination is being established in a similar way to that which occurs from actual physical practice.

Athletes should be encouraged to use mental rehearsal regularly. They should ensure that the rehearsals are of a successful performance, preferably in a competition venue where they will compete in the near future (Winter, 1985, pp. 24-25).

##### **2 Relaxation training**

The following script can be put on a tape or learned and then followed:

- “Settle yourself into a comfortable, seated position, adjust your posture so that the chair is completely supporting your weight. Close your eyes and begin by taking three long, slow breaths, focusing on the feeling of relaxation each time as you breathe out. Notice with each breath that you take that there is a moment of relief with the exhalation of each breath.”
- “Continue to breathe slowly, enjoying the feeling of relaxation and as you do, try to associate that pleasant feeling with an increasing heaviness in each muscle group within your body.”
- “Let that feeling begin in the muscles around your forehead and face and then let it spread very slowly down through your neck and shoulders. Continue the spread of relaxation taking at least two min-

utes to spread it down through your whole body.”

- “When you have relaxed each and every muscle group within your body take two more deep breaths and then enjoy the feeling of relaxation.”
- “When you wish to ‘reawaken’, count slowly backwards from five to one, stretching your muscles as you do so. You will then feel refreshed and rested.”

It takes a little time for athletes to learn the relaxation procedure to the point where they can relax quickly but often this can be combined immediately with mental rehearsal, so that 5-10 min are spent on relaxation followed by 10-20 min for the rehearsal.

### 3 Mental rehearsal

It is important for the athlete to develop clear images of the situation in which he or she is to compete and to get the ‘feel’ of the movement. The more senses that are used, the more vivid are the images likely to be and the greater are the benefits of mental rehearsal to the athlete.

At the first stage of rehearsal the athlete should visualize a previous (successful) performance. This is followed by a rehearsal of the next competition in which the athlete will compete. Particular attention should be paid to the venue and to the cues and thoughts which have been decided upon.

Once the athlete is relaxed, the mental rehearsal is commenced, usually by cassette tape or controlled by the coach.

It will follow the procedure outlined below:

- “While staying as relaxed as you can try to create a picture in your mind of the competition venue in which you performed well in the past. Make sure as you create the picture of the venue that you make it as vivid as possible. Look at the layout of the venue, the grandstand, the scoreboard, the jumping pits, the track and so on. As you do this, put yourself into the picture as you were before your event at that competition. Try to see from inside your body, look at your clothes and notice also the temperature and how warm you feel. Notice what you can hear, perhaps spectators, competitors, other events, etc. Continue to make this image as clear as possible and then see yourself actually performing as you did at that competition, ‘feeling’ the performance as if you were actually doing it now.”
- “Once you have spent five minutes or so going through and repeating what happened at a past competition, move your thoughts forward to the next competition. Visualize the scene as it is likely to be and once you have created the scene, put yourself into the situation, imagining that you were warming up before your event. Now spend 5-10 minutes rehearsing how you wish to perform. Use all of your senses, ‘feel’ the scene; believe that you are there right now. Make sure that you see yourself completing the performance (or segments of it) in a successful manner. Continue rehearsing using positive thoughts and statements to your-

self, until you feel satisfied. Then count back from five to one, stretch your limbs and re-awaken.”

The exercise above has been found to be a useful starting point because it helps athletes to visualize a past (and positive) scene. This seems to help them to create positive images of future situations.

## 4 Application

### 4.1 General training

As athletes learn skills, or reach new levels of performance, it is important that they establish a clear mind-body coordination so that the new skill or performance level becomes something which seems to be achievable on a regular (predictable) basis. For example, a hurdler who has developed a more efficient style both physically and mentally will not break down under pressure. This shows that mental rehearsal in general training can be a very useful adjunct to physical exercise.

### 4.2 Competition preparation

When the athlete has an important competition coming up, mental rehearsal should be used as an integral part of the preparation. This means visualizing the actual venue etc. as vividly as possible, together with rehearsing strategies that he or she might have for that particular event. For distance runners visualization should involve particular segments of the race while for most other events the whole performance can be rehearsed.

### 4.3 Problem solving

Mental rehearsals can be used to help solve minor problems in technique, to eliminate negative thoughts (e. g. the image of failing) and to help train an athlete to avoid distractions.

In the latter case athletes can do their rehearsals while a tape of crowd noise is played. This can be very good training, particularly for a field athlete who might be making a jump or throw while the crowd is yelling about a track event.

### 4.4 During competition

For the field events it is useful for athletes to have a standard routine before each jump or throw. Part of this routine should include visualizing the desired performance.

Mental rehearsal has become one of, if not the most accepted of the psychological techniques used in sport. It offers the athlete and coach an extra tool, over and above physical training.

The key points are:

1. Mental rehearsal does not replace physical training.
2. Mental rehearsal is a skill which needs to be learned and practiced in much the same way as any other skill.
3. The more vivid the images created and the more ‘senses’ that are used, the more effective will be the rehearsal (Winter, 1985, pp. 24-25).

## 5 Imagery training for the 400m hurdles race

### 5.1 *The approach to the 8<sup>th</sup> hurdle in a 400m hurdles race*

Even though there are ten hurdles in a 400m hurdles race, it is at the 8<sup>th</sup> hurdle that technique and rhythm are tested to the extreme. It is at this point in the race that the lactic acid effect is starting to bite, the wind directions are likely to change, the position within the race is starting to become crucial, stride pattern may need to change whilst stride rhythm remains the same and good technique and hurdle clearance is essential. Unless total focus and concentration is directed to the job at hand, then the attainment of a successful outcome is unlikely.

### 5.2 *The focus*

The athlete must focus on the technical aspects of his or her race, on the lane and not on other athletes or external factors. The focus must be internal, monitoring rhythm and relaxation, whilst at the same time monitoring other factors or changes, such as wind shifts, another competitor hurdling at the same time in the next lane, or muscle tension. There must be a 'what if ... plan' developed for all variables within the race so that focus is maintained. By perceiving problems that could occur the athlete is prepared for anything.

### 5.3 *The segment*

As the approach to the 8<sup>th</sup> hurdle is a segment of 4.5-5.0 sec the imagery program must be as close to this time as possible. It is also important to

consider the lead-up to this particular segment of the race and therefore, there is a need for a particular beginning and ending of the segment. As the run from the 7<sup>th</sup> hurdle onto the 8<sup>th</sup> is the total time of the segment, it must also include a lead-up (or start) and flow-on (or end) as the race does not consist of just one segment.

It would seem feasible therefore to rehearse the event in four separate segments: Segment 1 – the start of the race to the 3<sup>rd</sup> hurdle, segment 2 – from the 3<sup>rd</sup> hurdle to the 6<sup>th</sup> hurdle, segment 3 – from the 6<sup>th</sup> hurdle through to the 9<sup>th</sup> hurdle, and segment 4 – the run from the 9<sup>th</sup> hurdle to the finish. When concentrating on the 3<sup>rd</sup> segment, the first two segments should also be run through in the imagery session in order to gain a realistic feel for the race at this stage. The fatigue factor is a very important focus of this race and without the lead-up of the previous segments, a true picture cannot be gained.

### 5.4 *The preparation*

In order to implement a plan of imagery there are four major factors that must be considered first:

- Does the athlete have the capacity, i. e. the physical fitness and hurdling skill, to perform the activity?
- Is the athlete concerned about the technique of mental imagery? If so, the coach should explain some of the proven research outcomes that support the techniques involved and justify his or her reasons for using them (e. g. to provide extra practice of the segment and to iron

out any inconsistencies, to determine any cues that are causing errors of judgment and to learn what the athlete should focus on during the race).

- The coach must explain to the athlete how to perform the imagery session.
- As the athlete will eventually have to perform the process on his or her own, he or she will need to assess how well an imagery session has gone.

If the athlete is new to imagery techniques, then teaching the general imagery skills are necessary. Several essential steps are involved when performing an imagery session and these should begin in a relaxed setting free from distraction. However, once the athlete is competent at imagery, then more distractions can be introduced to enable the athlete to be able to visualize in stressful and competitive situations (Collopy, 1996, p. 34).

#### 5.4 *The program outline*

Throughout the pre-competition phase the coach should have the athlete perform the actual physical skill training (i. e. a time trial run to the 9<sup>th</sup> hurdle). As this is a particularly demanding task, it may only be possible to perform the activity once or twice in a session per week over several weeks. When each repetition is run, the coach should instruct the athlete to make a note of any self-talk, positive and negative feelings, sights, sounds, tastes and smells, that he or she may experience. The coach notes down any information or cues that the

athlete relates. Questions could be: What were you thinking? Where was the wind coming from? Were you slowing down? How did you feel at that point in the race? Did anything distract you? What did you say to yourself? The coach times the runs with particular note of the intervals between the hurdles. This gives an indication of the accuracy of performance being imagined.

If the physical session is in the morning, the imagery session should be performed in the afternoon, the next day and before the next training session. Before the imagery session, the athlete should be relaxed using introductory techniques.

##### 5.4.1 The initial imagery sessions

The first imagery session is begun by directing the athlete to the start of the race. When the athlete is set on his or her marks and the gun goes, the coach times the visualization with a stopwatch to see how close to the mark the athlete is performing the race. If possible, the splits of the touch-down times (the time taken between each hurdle when the athlete touches his or her lead leg foot on the ground after the hurdle) should be obtained. This will give the coach an estimate of the accuracy with which the athlete is running his or her race in his or her visualization. The coach must get the athlete to relate what is happening as vividly as possible, make reference of what is happening, how he or she feels, what he or she sees, if it is slow motion or too quick, fuzzy or clear, any distraction that may be occurring, who or what is in the race, any past sensations, noise,

his or her position, the public, positive feelings, negative feelings, etc. Is he or she performing or is he or she watching himself or herself perform? This will give an indication as to whether he or she is rehearsing from an internal or external perspective. Ideally it should be of an internal perspective. The coach should get the athlete to run the whole race through and note down all information. This will give the coach an idea as to how the athlete perceives himself or herself and where his or her thoughts are during the race.

#### 5.4.2 The third segment

Once work has been completed in imagery to perfect the 1<sup>st</sup> and 2<sup>nd</sup> segments of the race, then work begins on the 3<sup>rd</sup> segment from hurdle 6 to 9. In each imagery session the athlete does the lead-up to segments and should feel in complete control of his or her race up to this stage. Now, on clearance of the 7<sup>th</sup> hurdle, the stopwatch is started and the athlete again describes as vividly as possible his or her feelings, sensations and any distracting cues.

After the imagery repetition all information is written down and the coach and the athlete discuss what is required in order to perform a perfect repetition. Videos of model performances can help to establish what is required.

Each imagery session should be repeated at least six times in a session and each effort must be timed with a stopwatch. If imagery is succeeding, then the athlete will be able to describe exactly what he or she has to do next at this stage. As the visualiza-

tion process becomes easier, the athlete can go through the visualization with some measure of physical movement, such as when warming up for practice or competition. This will enhance the imagery process.

At the end of each repetition the athlete rates how well his or her visualization went. This can be a simple rating scale of 1 (= poor), 2 (= fair), 3 (= average), 4 (= good), 5 (= excellent). Practice of these sessions must continue until all unnecessary cues are eliminated and only cues which promote correct technique, actions and feelings are related. The number of sessions required will be determined by the confidence and improvement the athlete is achieving. It is of course essential that imagery sessions be followed up by practical application and results monitored by the coach as to the success of the imagery program.

Prior to any competition, the imagery segments should be run as many times as the athlete needs in order to gain a feeling of control and confidence.

Many athletes simply repeat the problems experienced with the run from the 6<sup>th</sup> hurdle through to the 9<sup>th</sup> hurdle physically over and over again. However, often there is not enough actual training time or energy available for the perfecting of this segment of the race. The use of imagery enables the athlete to perform numerous repetitions over these hurdles without the risk of injury or fatigue (Collopy, 1996, p. 35).

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## Recommendations for using imagery

(Vealey, 1991)

### 1. Include imagery practice into systematic training and competition routines.

To be systematic, *daily* imagery practice is advised. This may only involve 10 minutes per day. It is also helpful for athletes to go through a pre-performance imagery routine before every contest. The routine should be individualized for each athlete and practiced in non-competitive situations. This routine might include the following progression: relaxation, practicing simple skills, practicing strategy for that contest, recreating past success experiences, and mental programming of goals for the competition. Another appropriate time to use imagery is after competitions to help the athletes review and understand their performances better. Using imagery at this time increases awareness of what actually happened during the competition.

### 2. Combine relaxation training with your imagery practice.

Research indicates that imagery combined with relaxation is more effective than imagery alone. Therefore, every imagery session should be started with some form of relaxing image or slow, deep breathing. The objective is to get relaxed and clear the mind to make it more accepting of positive images.

### 3. Practice imagery from both an internal and external perspective.

From an internal perspective individuals see the image form behind their own eyes as opposed to an external perspective from which they see the image from outside their body as with a movie camera. Practicing imagery from both perspectives can strengthen one's use of imagery training.

### 4. Practice imagery with realistic expectations.

Imagery is not a magical solution. It can be compared to a 'vitamin supplement' that can complement physical practice. Athletes should understand that imagery will not allow them to go beyond their physical limits.

### 5. When first learning, practice imagery in a quiet setting.

As relaxation and concentration usually facilitate imagery, practicing imagery should be started in a quiet, comfortable setting that is free of distractions. Only after having gained some skill at imagery, one will be able to use it in competitive or distracting situations.

### 6. Use triggers to facilitate imagery.

Triggers are words or phrases that help athletes focus on the correct cues during imagery. The key to a trigger is its ability to elicit a proper image. A cross-country skier having trouble with his uphill technique may, for example,

use the word *quick* to symbolize the quick, short kick technique needed on hills.

**7. Use cassette tapes or videotapes to aid imagery.**

Several audiocassette tapes on the market utilize imagery to enhance psychological skills such as relaxation and concentration. Athletes and coaches can also make cassette tapes for practice or specific physical skills and strategies.

**8. Practice using all of the senses during imagery training.**

Although imagery is often termed visualization or 'seeing with the mind's eye', sight is not the only significant sense. In sport, the senses of hearing, smell, and feeling are also important. Particularly important is kinesthetic sense, or the feel or sensation of the body as it moves through various positions. Using all appropriate senses may help the athlete create more vivid images. The more vivid the image is, the more effective it is.

**9. Imagine both performance and outcome when practicing imagery.**

It is important to use imagery to experience both the performance of a skill and the outcome associated with a skill. Generally, one should strive to imagine positive outcomes. If negative outcomes appear during imagery, one should remind oneself that one is in control of the image and bring one's focus back to imagining what a positive outcome would be like.

**10. Imagery must be practiced individually or in groups.**

A group setting would be good to introduce imagery, train imagery ability, and go through team strategies and goals. However, for athletics it is beneficial to individualize imagery programs to meet the specific needs of athletes. If there is time, coaches should meet with each athlete to implement individual imagery programs.

**11. One of the most effective times to start imagery training is during the pre- or off-season.**

To begin imagery in the middle of the competitive season may not be effective since imagery has not been systematically practiced. A systematic program of imagery should start prior to the competitive season so that athletes develop skill and confidence in their imagery.

## General Theme

### BASICS OF IMAGERY AND MENTAL PRACTICE (MENTAL REHEARSAL)

#### 1 Introduction

For many years athletes have been mentally practicing or rehearsing their motor skills. For example, the all-time golf great Jack Nicklaus described his use of imagery as follows:

“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, quoted in Weinberg & Gould, 2003, p. 284)

Nicklaus obviously believes that rehearsing shots in his mind before actually swinging is critical to his success. In fact, he said that hitting a good golf shot was 10% swing, 40% stance and setup, and 50% the mental picture of how the swing should occur.

As scientific evidence accumulates supporting the effectiveness of imagery in sport and exercise settings, many more athletes have begun using imagery to help their performances.

## 2 Defining imagery and mental practice

### 2.1 Imagery

Imaging involves mentally picturing an event as vividly as possible with the intention of duplicating that event in actuality (Cashmore, 2002, p. 137).

The process of imaging involves recalling from memory pieces of information stored from experience and shaping these pieces into meaningful images. These pieces are essentially a product of one's memory, experienced internally through the recall and reconstruction of previous events. Imagery is actually a form of simulation. It is similar to a real sensory experience, but the entire experience occurs in the mind (Weinberg & Gould, 2003, p. 284).

### 2.2 Mental practice (mental rehearsal)

It is possible that athletes use imagery without visualizing a skill performance (they may imagine themselves on the victory rostrum, for example). Mental practice, on the other hand, implies that an individual is using thought processes as part of the skill acquisition (Cashmore, 2002, p. 165). This shows that mental practice, while often used synonymously with imagery, is actually distinct. Berger, Pargman and Weinberg (2002, p. 165) try to make the difference clear by pointing out that mental practice (or mental rehearsal) means imaging the trial-by-trial repetition of a skilled act, while mental imagery can also be used as

a means of relaxing prior to, during, or after competition.

In the following, imagery is understood as a method of practicing or rehearsing a movement using as many senses as possible. Of the senses (kinesthetic, auditory, tactile, and olfactory), 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. However, using more than one sense helps to create more vivid images, thus making the experience more real (Weinberg & Gould, 2003, p. 285).

### **3 Nature and type of imagery**

Imagery can be positive or negative. Positive images are most often reported during practice and pre-competition, whereas negative images are most often reported during competitions.

Research has shown that positive imagery is associated with significantly better performance than negative imagery. Even suppressive imagery (trying to avoid a particular error, as in “Don’t picture a double fault”) will in fact make it more likely that one will image it, resulting in a decrement in actual performance.

As far as types of imagery are concerned, athletes describe basically four types: visual, kinesthetic, auditory, and olfactory. Of these, they employ visual and kinesthetic imagery most often, and to the same extent.

## **4 Imagery perspective**

Athletes usually take either an internal or external perspective for viewing their imagery. Which perspective is used depends on the athlete and the situation.

### *4.1 Internal imagery*

Internal imagery refers to imagery of the execution of the skill from one’s own vantage point. As if one had a camera on one’s head, one sees only what one would see if one actually executed the particular skill. Because internal imagery comes from a first-person perspective, the images emphasize the feel of the movement.

### *4.2 External imagery*

In using external imagery, one views oneself from the perspective of an outside observer. It is as if one were watching oneself in the movies or on videotape. There is little emphasis on the kinesthetic feel of the movement because one is simply watching oneself performing.

Many athletes switch back and forth between internal and external imagery. The important thing appears to be getting a good, clear, controllable image, regardless of whether it is from an internal or an external perspective. However, internal imagery makes it easier to bring in the kinesthetic sense, feel the movement, and approximate actual performance skills.

## 5 Factors affecting the effectiveness of imagery

### 5.1 Nature of the task

Feltz and Landers (1983) found that participants using imagery performed consistently better on tasks that were primarily cognitive (e. g. football quarterbacking) than on those that were more mostly motoric (e. g. weightlifting). However, as most sport skills have both motor and cognitive components; imagery can be effective to an extent in helping athletes with a variety of skills.

### 5.2 External imagery

Another important potential factor to consider regarding the effectiveness of imagery is the performer's skill level. Experimental evidence shows that imagery significantly helps performance for both novice and experienced athletes, although there are somewhat stronger effects for experienced athletes. While imagery may help novice performers learn cognitive elements relevant to successful performance of the skill, for experienced performers imagery appears to help refine skills and prepare for making rapid decisions and perceptual adjustments.

### 5.3 Imaging ability

The person's ability in the use of imagery is probably the most powerful factor influencing the effectiveness of imagery. Imagery is more effective when individuals are higher in their ability to imagine. In addition, imaging ability is an important factor in

distinguishing between elite and non-elite, or successful and non-successful performers. Good imaging ability has been defined mostly in terms of the vividness and controllability of images. It is important to let individuals know that the use of imagery is a skill and that therefore the vividness and controllability of one's imagery can be improved with practice.

### 5.4 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. In essence, imagery needs to be added to one's normal physical practice. However, mental practice does improve performance more than no practice at all (Weinberg & Gould, 2003, p. 290).

Overall, imagery should be viewed as a way to train the mind in conjunction with physically training the body. Imagery might be thought of as a 'vitamin supplement' to physical practice, as something that could give individuals an edge in improving performance.

## 6 How imagery works

One can generate information from memory that is essentially the same as an actual experience; consequently, imaging events can have an

effect on the nervous system similar to that of the real, or actual, experience. Sport psychologists have proposed five explanations of this phenomenon:

### 6.1 *Psychoneuromuscular theory*

The psychoneuromuscular theory originated with Carpenter (1894), who proposed the ideomotor principle of imagery. According to this principle, imagery facilitates the learning of motor skills because of the nature of the neuromuscular activity patterns activated during the imagined process. That is, vividly imagined events innervate the muscles in somewhat the same way that physically practicing the movement does. These slight neuromuscular impulses are hypothesized to be identical to those produced during actual performance, but reduced in magnitude. In spite of this reduction, the muscle activity is a mirror image of the actual performance pattern. The first scientific support of this phenomenon came from the work of Jacobson (1931), who reported that the imagined movement of bending the arm created small muscular contractions in the flexor muscles of the arm. In reearch with downhill skiers, Suinn (1972, 1976) monitored the electrical activity in the skiers' leg muscles as they imagined skiing the course; results showed that the muscular activity changed during the skiers' imaginings. Muscle activity was highest when the skiers were imagining themselves skiing rough sections in the course, which would actually require greater muscle activity.

### 6.2 *Symbolic learning theory*

Sackett's (1934) 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. When an individual creates 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 his or her partner will move on a certain shot, he or she will be able to better plan his or her own course.

### 6.3 *Psychological skills hypothesis*

Imagery also works through developing and refining psychological skills. The psychological skills hypothesis predicts that imagery can improve concentration, reduce anxiety, and enhance confidence – all important psychological skills for maximizing performance. For instance, several intervention techniques (e. g., stress management training, which focuses primarily on reducing or coping with anxiety) employ imagery as a key component.

The first 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 probably works in a variety of ways (Weinberg & Gould, 2003, p. 292).

#### 6.4 Bioinformational theory

Lang's bioinformational theory (1977, 1979) is probably the best-developed theoretical explanation for the effects of imagery. Based on the assumption that an image is a functionally organized set of propositions stored by the brain, the model holds that a description of an image consists of 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, 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 his muscles, would represent response propositions.

The crucial point 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 the person 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 propositions, which are more likely to create a vivid image than stimulus propositions alone.

#### 6.5 Triple code model

The triple code model of imagery, which also recognizes the 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 (an aspect which is mostly ignored by other models). Specifically, Ahsen's (1984) triple code model highlights understanding three effects that are essential aspects or parts of imagery. The first part is the image (I) itself. The image 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. The second part is the somatic response (S): the act of imagination results in psychophysiological changes in the body (a contention which is similar to Lang's bioinformational theory). The third aspect of imagery is the meaning (M) of the image. According to Ahsen, every image imparts a definite significance, or meaning, to the individual imager; the same set of imagery instructions will never produce the same imagery experience for any two people.

In essence, Ahsen's triple code, or ISM, model recognizes the powerful reality of images for the individual and also encourages coaches, as they help their athletes with imaging, to seek the meanings of the images to them.

In summary, the five explanations – psychoneuromuscular theory, symbolic learning theory, the psychological skills hypothesis, bioinformational theory, and the triple code model – all assert that imagery can help program an athlete both physically and mentally. All these explanations have also found some support from research (although the validity of the psychoneuromuscular theory has been questioned recently). Imagery might be regarded 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 athletes make movements more fluid, smooth, and automatic (Weinberg & Gould, 2003, p. 293).

## 7 The use of imagery

Apart from the fact that imagery can be used to improve concentration, building confidence, controlling emotional responses, coping with pain and injury, probably the best-known use of imagery is for practicing a particular sport skill.

Athletes can practice skills to fine-tune them, or they can pinpoint weaknesses and visualize correcting them. This practice can take the form of a preview or a review. An athlete can look forward to and visualize what to do in an upcoming competition or event, or he or she can review a past performance, focusing on specific aspects of the movement that were done particularly well.

Imagery can also be used to practice and learn new strategies or review alternative strategies for either team or individual sports.

## 8 Keys to effective imagery

Apart from the fact that imagery can be used to improve concentration, building confidence, controlling emotional responses, coping with pain and injury, probably the best-known use of imagery is for practicing a particular sport skill.

### 8.1 Vividness

When imaging, it is important to recreate or create as closely as possible the actual experience in one's mind. Particular attention should be paid to environmental detail, such as the layout of the facilities, type of surface, and closeness of spectators. The emotions and thoughts of the actual competition must be experienced. The imager should try to feel the anxiety, concentration, frustration, exhilaration, or anger associated with his or her performance. All of this detail will make the imagined performance more real.

When using imagery, the athlete must involve as many senses as possible and recreate or create the emotional feelings associated with the task or skill he or she is trying to execute (Weinberg & Gould, 2003, p. 296).

### 8.2 Controllability

Another key to successful imagery is learning to manipulate one's images

so they do what one wants them to. Many athletes have difficulty controlling their images and often find themselves repeating their mistakes as they visualize. Controlling their images would help them to picture what they want to accomplish instead of seeing themselves make errors. The key to control is practice.

Whether as person uses an internal or an external image appears to be less important than choosing a comfortable style that produces clear, controllable images (Weinberg & Gould, 2003, p. 296).

## 9 Developing 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. When setting up an imagery training program, the following tips should be considered:

- *Imagery evaluation:*

The first step in setting up imagery training is to evaluate the athlete's current level of imagery skill. Because imagery is a skill, individuals differ in how well they can do it. However, measuring someone's ability in imagining is not easy because it is a mental process and therefore not directly observable. As a result sport psychologists use mostly questionnaires to try to discern the various aspects of imagery content.

- *Proper setting:*

For the beginner it is best to practice in a setting with no distractions.

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 the use of imagery alone. So before each imagery session, athletes should relax by using deep breathing, progressive relaxation, or some other relaxation procedure that works for them.

- *Realistic expectations and sufficient motivation:*

Some athletes are skeptical that visualizing a skill can help to improve its performance. Such negative thinking and doubt undermine the effectiveness of imagery. However, to believe that imagery is magic that can transform an average athlete into a dream athlete is also dangerous. The truth is simply that imagery can improve athletic skills if one works at it systematically.

- *Vivid and controllable images:*

When using imagery relating to performance of a skill, one should try to use all one's senses and to feel the movements as if they were actually occurring. If possible, one should visit the actual competition site months in advance so one can visualize oneself performing in that exact setting, with its color, layout, construction, and grandstands. Moving and positioning one's body as if one were actually performing the skill can make the imagery and feeling of movement more vivid.

- *Positive focus:*

One should focus in general on positive outcomes, such as completing a successful attempt. Sometimes using imagery to recognize and analyze errors is beneficial. It is also important, however, to be able to leave the mistake behind and focus on the present. Athletes should try using imagery to prepare for the eventuality of making a mistake and effectively coping with it.

- *Videotapes and audiotapes:*

Many athletes have trouble imagining themselves, because it is difficult to visualize something one has never seen. A videotape can provide this feedback and allow one to picture how one looks performing at one's best. A good procedure for filming athletes is to film them practicing, carefully edit the tape to identify the perfect or near-perfect skills, and then duplicate the sequence repeatedly on the tape. After watching the film for several minutes in a relaxed state, the athlete closes his or her eyes and images the skill.

- *Image execution and outcome:*

Imagery should include both the execution and end result of skills.

- *Image in real time:*

Imaging must take place in real time. In other words, the time spent imaging a particular skill should be equal to the time it takes for the skill to be executed in actuality.

Imagery programs must be tailored to the athlete's individual needs, abilities, and interests (Weinberg & Gould, 2003, p. 297).

## 10 When to use imagery?

Imagery can be used virtually any time:

- Before and after practice;
- Before and after competition;
- During breaks in the action;
- During personal time;
- When recovering from an injury.

In order for imagery to be effective, it should be built into the daily routine (Weinberg & Gould, 2003, p. 303).

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