

Module 7

Psychology

Introduction

The increased stress of competitions can cause athletes to react both physically and mentally in a manner which can negatively affect their performance abilities. They may become tense, their heart rate races, they break into a cold sweat, they worry about the outcome of the competition, they find it hard to concentrate on the task in hand.

This has led coaches to take an increasing interest in the field of sports psychology and in particular in the area of competitive anxiety. That interest has focused on techniques which athletes can use in the competitive situation to maintain control and optimise their performance. Once learned, these techniques allow the athlete to relax and to focus their attention in a positive manner on the task of preparing for and participating in competition.

Overview of the psychology module

In this module we look at how psychology can help improve sporting performances.

- Lee Crust explains what to think about when you are training and competing.
- Daniel Bishop explains how the use of imagery can help your performance.
- Daniel Bishop outlines a 10-point plan to help make imagery work for you.
- Lee Crust identifies strategies to control your pre-competition emotions.
- Raphael Brandon explains how team cohesion and success go together.

All the articles in this module are applicable to most sports.

When it comes to doing your best, it is the thoughts that count

When it comes to running, or any other endurance sport, your mind can be your biggest asset or your worst enemy. Enjoying your training and achieving your best performance is not simply down to physical conditioning: your mental state and particularly the thoughts that run through your mind can affect the way you feel during exercise. It is normal for athletes to plan their race strategy in minute detail, but how many systematically plan what they are going to think about during training or competition?

Having worked with and questioned athletes on their thoughts over a number of years, I can tell you that the number who do plan their thoughts is surprisingly small. I say surprising because, as a sports psychologist, I am aware of what scientific research has been showing for a number of years: that thoughts do matter. In fact the nature and quality of your thoughts can make the difference between winning and losing, enjoying or hating your training, and may even impact on your decision to stay with an exercise programme.

Much of this scientific evidence comes from studies of marathon runners. Neuroscientists have shown that we have thousands of thoughts running through our minds each and every day. Athletes spend a large percentage of their time thinking sport-related thoughts, but most of these are unplanned and random. The first step towards becoming more organised and purposeful in your thinking is to become more aware of them. So when you next go for a training run, cycle or swim, try to become more aware of what you are thinking about.

Association and dissociation

So what should you be thinking about? Two very different mental strategies have emerged, both commonly used by elite and other runners. *Association* involves focusing on bodily sensations and monitoring any changes, usually internal, that occur. Breathing rate and muscular sensations provide physiological cues that allow you to pace yourself with a view to avoiding or minimising pain.

By contrast, *dissociation* is about directing attention away from bodily sensations by a form of distraction designed to reduce the athlete's awareness of fatigue or effort. This can be achieved by many means, including music. However, more 'active' strategies like counting tasks or the alphabet game (see table 1) might be more effective.

Table 1 - Techniques for dissociation

1. **Music** – This can generate positive thoughts, improve your mood state and distract you from the physical demands of your sport. But be careful not to get too distracted if you are running in a busy area.
2. **Counting game** – Count the number of blue cars you see, or the number of dogs or postboxes. Be inventive.
3. **Alphabet game** – Work through from A to Z for a chosen category, such as women's names or countries.
4. **Rainbow game** – Try to notice as many colours as possible while you work out: aim for all the colours of the rainbow.
5. **Active fantasy** – Imagine yourself as a lottery winner and decide how to spend your winnings.

Avoid thoughts relating to your work, jobs you have to do and anything problematic, as this can increase tension. Try to be creative and have fun with dissociation. It can help you relax and enjoy your sport even more.

I am often asked which of these strategies is best. There is no simple answer, but a recent review of scientific research in this area came to the following conclusions:

- in general, association appears to be linked to faster running times
- dissociation can reduce the sense of effort and awareness of physical sensations such as pain and fatigue, usually up to moderate to high intensity
- athletes of all levels appear to favour association in competition and dissociation in training
- elite athletes tend to use both strategies during training and races, and are able to switch between the two, as required.

When trying to decide which strategy might be best for you, it is important to consider your personal situation, preferences and goals. For example, most athletes perform training runs at a slower pace than they use in competition, making body monitoring less essential. A better goal for training might be to relieve boredom and monotony, in which case dissociation, with active mental processing, might be most beneficial. Dissociation may also benefit athletes who want to improve their endurance by running or exercising for longer at moderate intensities.

However, because dissociation works by distracting the mind, it might work against an athlete setting an ideal pace for optimum performance. The reason why association appears so important in competition is that by monitoring bodily responses an athlete can ride that thin line between pushing for maximum performance and overdoing it.

Association involves entering a more concentrated state when you can react to changes within your body. Focusing on internal states, like rhythmical breathing, can help you feel more relaxed during physical activity (see table 2). But on the downside, there is some evidence of a link between association and injury. Some athletes, it appears, choose to associate with pain and fatigue-related symptoms and end up pushing themselves too hard.

Table 2 - Techniques for associative body-monitoring: follow this three-stage plan

1. Focus on your breathing. Controlled, relatively deep rhythmic breathing is the key to relaxation. When you breathe out, try to imagine the tension leaving your body.
2. Try to remain relaxed while running (or cycling or swimming), but be aware of tension and fatigue in your muscles. It is often a good idea to start from the head and work down, giving each area or group of muscles your attention. If you notice tension, try to focus on a cue-word, such as 'relax' or 'easy' to let the tension flow out of the muscles.
3. Keep your pace in line with the information you gain from body-monitoring. You might, for example, increase the pace if you feel very positive. Repeat the monitoring constantly or, alternatively, take some time out for dissociation. You might also reinforce your mood by telling yourself how well you are doing and that you need to keep working hard and remain focused.

Most successful elite marathon runners have been shown to combine associative and dissociative strategies when planning their thoughts. There are times, especially in races, when you need to be very aware of your own physical state, and of events in the external environment. However, there are also times when you can plan to 'switch off' and give yourself a break from the mental demands of competition or training. The best thing is to construct a plan with your coach, exercise leader or even a more experienced fellow athlete. Try to decide between you what the best approach is for you, and plan what you will be thinking about during the race or training sessions.

For a 30-minute training run, you might decide on cyclic phases of thinking, eg 10 minutes of body monitoring, 10 minutes of alphabet game, then more body monitoring to the end. It is all perfectly logical once you get started. You would not leave your physical preparations to chance, so why allow your thoughts to crop up in random fashion?

Learn to script your internal dialogue

When running, cycling or swimming for long periods of time, the mind can wander freely, if you let it. When this happens, your natural internal dialogue, or self-talk, becomes important. If your concentration does stray, or your body monitoring detects fatigue, it is vital that your self-talk remains positive. The best thing is to avoid over-emotional self-talk and focus on self-instructing, motivational content. To this end, you can plan and even rehearse what you are going to say to yourself beforehand, just as you might rehearse an important telephone call or speech. The key is to stay positive even when the situation is less than ideal. This is not an easy feat to pull off and will take some time to master.

The first step in this process is to become more aware of your thoughts during training and competition. If you want to gain more control over your thoughts, try to formulate a simple plan and try it out over a number of weeks during training. If you notice any undesirable patterns in your thinking, such as negative self-talk or loss of focus, you can try to combat these by planning more positive alternative thoughts. You can, for example, frame positive statements that you repeat to yourself regularly. Ideally, write these statements down and place them in prominent positions where you cannot avoid seeing them. Work on recalling these statements when you become aware of negative thoughts or feelings. This might seem a little strange at first, but you are actually programming your brain to notice more 'positives' and, over time, this will become a habit.

Athletes often recall that their very best performances are accompanied by few thoughts, a feeling of complete control, effortless movements and a sense of being 'on automatic pilot'. Sport psychologists often refer to this as a 'state of flow'. The aspects of positive thinking and focus discussed in this article have been shown to increase the likelihood of achieving flow, although environmental factors can also be important.

Do not leave your psychological preparation to chance. Remember that you control your thoughts, not the other way round. The way you think is strongly linked to the way you perform. So if you want to perform better, gain greater control and enjoy your sport more, start planning today because, in this sphere, the thoughts really do count.

Lee Crust

How to think your way into a winning performance

A 1988 survey undertaken by Orlick and Partington revealed that 99% of the 235 elite athletes in their sample used mental imagery for performance preparation. A report the following year by Jowdy, Murphy and Durtschi at a US Olympic Training Center showed that 90% of their respondents used imagery for training and competition, and 94% of coaches reported using imagery with their athletes. Professional British athletes from Sally Gunnell to Rob Andrew have used imagery to prepare just before competitions. The positive effects of imagery are well documented in the scientific literature, and it continues to be one of the hot topics in sports psychology.

Imagery is commonly referred to as ‘mental practice’ or ‘mental rehearsal’ because it normally involves ‘going through the motions’ of your sport in your head. There are a number of aspects of the process that are widely considered necessary for imagery to be effective. Here I will briefly introduce the relevant theory behind imagery and its purported effects, together with some empirical evidence for its potential benefits.

Psycho-neuromuscular theory

This theory maintains that during imagery the motor programme for a given activity is run, albeit at a lower level, in the correct sequential order. In other words, the neurons fire in the same pattern as during the physical action but at a level not great enough to produce movement. The physical implications of this theory mean that it is easy to test.

Some of the earliest work on psycho-neuromuscular theory was done by Jacobsen (1930) using electromyography, a technique for measuring intramuscular electrical activity. He found that the electromyographic (EMG) activity during imagery of a physical action mirrored the EMG of the actual execution of the action itself, although at a greatly reduced amplitude. Similar findings have been produced in more recent studies. For instance, Bakker, Boschker and Chung (1996) asked subjects in their study to image the performance of a biceps curl with both a 9kg dumbbell and a 4.5kg dumbbell. EMG activity was significantly greater in the ‘active’ arm when lifting a 9kg dumbbell was imaged, and the comparison EMG measure in the ‘passive’ arm was significantly less, regardless of weight, implying that the muscular activity during imagery was also specific to the muscle that would normally be active in executing the task.

Try this experiment

The mind-body link in action can be demonstrated fairly easily by the ‘string and bolt’ method. Suspend a bolt, or any object of comparable weight, from a piece of string about 20cm in length. Tie the free end of the string around one forefinger and place the elbow of the same arm on a solid surface, bent at an angle of about 45 degrees, suspending the newly created pendulum in mid-air. While

making sure that you keep your arm absolutely still, try to feel the movements that the muscles of your forearm would need to make in order to swing the pendulum back and forth. It is essential to concentrate hard. Now feel yourself bringing the pendulum to a halt, then moving it from side to side, then in a clockwise circle, then anti-clockwise – the order is immaterial.

Virtually everyone who tries this experiment will see the pendulum move in the direction imaged, and see it stop on command, without a conscious attempt to move it. There is no ‘trick’ to this, it is a very real psycho-neuromuscular phenomenon. The signals from your brain are strong enough to elicit the correct muscle movements, imperceptible to the naked eye, such that the pendulum itself moves.

Now ask yourself precisely which muscles you would consciously use, and in what order, to bring about the pendulum swings. It becomes clear (unless you are an expert in the kinesiology of the lower arm) that imagery allows us access to the motor programmes for a variety of actions, the instructions for which are not consciously accessible. These can be the sorts of skill that you as an athlete perform automatically to varying degrees, eg the tennis player making a reaction stop volley or the distance runner whose every movement is taking place on auto-pilot. Thus imagery is capable of fine-tuning movements that we may take for granted as being ‘as good as they can be’. Improved motor-neuron recruitment could mean the difference between hitting a winner or the net, or between first and second place.

Feel it... do it

Along with the procedure for the string and bolt method, there exists an important distinction between two types of imagery perspective, internal and external. The internal perspective is ‘first-person imagery’, in which you imagine the activity as if you were physically going through the motions. The internal perspective provides us with a great deal of sensory information not afforded by the external perspective, aka ‘third-person imagery’. This means a visual approach to imagery, as if you were an external observer, or watching yourself on videotape. The instructions I gave for the string and bolt demonstration were from an internal perspective. Referring back to the instructions, remove the focus from the muscles of the forearm and substitute the word ‘see’ for ‘feel’. All of a sudden the perspective has switched to an external viewpoint. Many experts believe the internal perspective to be the most effective. The content of an imagery programme is thus crucial to its effectiveness, and Lang’s (1989) Bio Informational theory accordingly addresses this aspect.

Bio Informational theory

This theory maintains that the brain is cognitively organised into discrete compartments containing finite sets of propositions, each containing

information about the characteristics and interrelationships of various stimuli and their associated physical/behavioural responses. Stimulus propositions hold information about the external environment, such as the ambient temperature, the presence of opponents, the sound of a starter's pistol, etc, or salient contextual information, such as the importance of the competition. Response propositions describe one's response to these external stimuli, such as changes in heart rate, limb movements, feelings of anxiety and apprehension. In order for a response proposition to be elicited, a sufficient number and quality of stimulus propositions must be activated.

According to Lang, when a cognitive mapping is made between a stimulus response pair, the connection between them can be either reinforced or modified according to the desirability of the outcome. More often than not, during imagery training, a sports psychologist would be responsible for describing and/or developing what is known as the imagery 'script', whether it is tape-recorded or spoken. The skill of the psychologist in constructing this script thus determines its effectiveness. In the string and bolt example, the word 'feel' constitutes use of a response proposition, in contrast to 'see', which is a stimulus proposition. Many researchers agree that there is an inextricable link between external/internal perspectives and the use of stimulus/response propositions, respectively.

In the study mentioned earlier by Frank Bakker and his colleagues, I neglected one important detail. The researchers manipulated the instructions so that half of the subjects were asked to 'see' themselves performing the task, while the other half were asked to 'feel' the movements. The subjects in the first group actually displayed no greater EMG when asked to picture the lift than they did at baseline. In other words, if increased motor neuron activity is our goal, then response propositions seem to be more effective.

Symbolic learning theory

This theory (Sackett, 1935) suggests that a 'mental blueprint' is formulated for any given activity and that the neurological connections for this blueprint can be strengthened by imagery. In essence the blueprint is a mental map of the movements required to execute a new skill. These mental maps are initially created by physical training and are bolstered by a combination of mental and physical practice.

Symbolic learning theory mostly holds true for cognitive rather than motor tasks. It is primarily focused on the skill-learning function of imagery. For example, the theory maintains that a move in judo or gymnastics would benefit more from imagery training than a less cognitive task such as running. However, activities like running may gain considerable benefit from the 'psyching-up' function of imagery, which brings me to my last theory.

Activation/arousal theory

This specifies that imagery establishes an optimal level of psychological arousal by arriving at a ‘preparatory set’ to enhance either learning or performance, depending on the type of activity to be undertaken. Thus, imagery for physical preparation should occur immediately before the execution of the skill in question. Evidence indicates that certain performance preparation tactics can be more suitable for some skills than others. For example, performance preparation for an endurance event, such as a marathon canoe or running race, would differ extensively from that applied to a briefer and more directed activity such as a jumping or throwing event. The idea of developing an optimal level of arousal is by no means new, and goes back at least as far as the often cited inverted-U hypothesis of Yerkes and Dodson in 1908.

It has also been suggested that varying levels of arousal are required for different sports. Gross motor activities such as running, cycling and swimming require psyching-up/high arousal, while fine motor tasks such as golf putting require lower arousal, perhaps through relaxation imagery. Thus, while Michael Johnson conjures up images of power and explosiveness at the start line, Tiger Woods may be using his walk up to the 18th green at Augusta to picture his ‘quiet place’, in order to steady his trembling arms and reduce the sweat pouring from his palms.

Take some REST

There is compelling evidence that ‘reduced environmental stimulation therapy’ (REST), usually in the form of flotation, increases the effectiveness of imagery. Research suggests that the sensory deprivation brought about by REST can facilitate a host of positive physical, physiological and behavioural changes, all of which help to improve the value of imaging.

One study of 22 elite college basketball players (by Wagaman, Barabasz and Barabasz in 1991) compared free throw shooting imagery during flotation REST to an imagery-only control group. The float group showed significantly higher scores than the controls on an objective performance measure (number of free throws scored). This suggests that REST can help make imagery more successful. If you do not have access to a flotation tank, a darkened room may do (take the phone off the hook!).

Get in tune with your body

I must admit to noticing something of a contradiction: how do athletes achieve this ‘switching off’, when all around them is buzzing? I have conducted recent research into the efficacy of pairing music with imagery training in recreational runners, with extremely promising results.

Participants in the study were randomly allocated to an imagery-training condition, imagery-plus-music condition, or a no-imagery control group.

Participants were tested for imagery ability at maximal treadmill running performance at both pre- and post-intervention. The same music as used in the imagery-plus-music condition was played during the warm-up before treadmill running at both times of testing.

The runners in the music group performed significantly better at maximal treadmill running than did the imagery-only or control group. Not only this, but kinaesthetic/internal imagery ability improved in both intervention groups as opposed to their non-imaging counterparts.

My explanation for the effects of music on performance is strikingly simple. Classical conditioning is probably the most famous of all learning theories. An unconditioned stimulus (UCS, the imagery training) may bring about an unconditioned response (UCR). The UCR in this study was hypothesised to manifest itself as physiological changes in the athlete such as increased peripheral blood flow to muscle structures or increased motor-neuron activation.

During the process of classical conditioning, a neutral stimulus, the conditioned stimulus (CS), is continually paired with the UCS, such that the learner begins to make an association between the CS and the UCR. After a matter of time, the CS presented alone is enough to elicit the response, this time known as the conditioned response (CR).

In this study, the music acts as the CS, also serving as the ‘condensing’ of all the information obtained from a relatively long imagery session into a much smaller segment. In addition, because of the ease with which musical tunes are recalled and recognised, it provides a strong and durable CS. Thus, it may well be advisable to continually pair a favourite tune with ‘psyching-up’ of activation imagery training, and then to play the same tune immediately before a physical performance.

However, the effectiveness of this practice is wholly dependent on the skill with which the imagery script is constructed, and this is an art in its own right.

Daniel Bishop

A training script for an endurance runner, plus a 10-point plan for making imagery work

The following article is aimed at increasing physiological arousal in an endurance runner. It would take place following a thorough introduction to the requisite muscle groups and their functions. Some of the salient aspects of an imagery script are put in brackets for easy identification to enable you to refer back.

(REST) ‘Before starting, I would like to remind you that you are seated in a comfortable chair in a quiet room with no distractions, including bright lights. Your arms and legs should be rested comfortably, with your head supported. If there are other things on your mind, or something is bothering you, you must first resolve these problems before continuing with this script.’

(*Breathing exercise, optional*) ‘To begin with, develop a relaxed breathing style. You may find it helpful to close your eyes through the entire programme, including this breathing exercise. Breathing in slowly through your nose, first allow your stomach and then your chest to expand outwards, drawing as much air as possible into the lungs. Allow the shoulders to lift gently as your breathing deepens. When you can draw in no more, allow the air to pass slowly from your mouth as your chest and stomach recede and your shoulders sink.’

‘Close your eyes if they are not already closed; imagine being by yourself on a cross-country training run, running briskly through woodland and miles from any cars or buildings.’

(*Multi-sensory information*) ‘It is a warm spring morning and the sun is shining hazily through the canopy of trees and drifting clouds. Feel its gentle warmth on the nape of your neck (Proprioceptive). You can also feel the slightest of breezes flickering across your forehead, keeping you perfectly cool (Proprioceptive). You are miles from anyone, with only the birds for company. Feel and hear (Auditory) the soft soil and woodchips crunching lightly under your feet with each stride. The scenery whizzes by, everything becomes blurred into a palette of serene colour (Visual). The colours of spring leap out at you, greens, browns, reds. Small flowers add dashes of intense colour to the peaceful backdrop of the woodland. Smell their scent (Olfactory). It urges you to take in deeper breaths. As a result, your breathing is deep and slow. The air today is richer than usual, rich with energy-giving oxygen. Picture the bright red, oxygen-rich blood surging around your body. Huge volumes course through your large thigh and buttock muscles. This is reflected in the feeling of warmth in them – they are supple and strong, and exude power. This is a run you wish could go on forever, knowing that you can never feel tired in this euphoric state.’

(*External perspective*) ‘Look at yourself now as an outsider would see you. The stride pattern of your legs: quick drives forward and then strong pulls against the ground, propelling you forwards. Notice the uprightness of your posture and the protrusion of your chest as your powerful arms drive back and forth like highly

efficient pistons. Think of how effortlessly and efficiently your arms and legs work together and the power that your muscles generate. You feel energised; you feel strong and relaxed and transcend everything around you. Your arms and legs burst you forward. For all intents and purposes, your body is a highly specialised machine, each of its parts working together in absolute synchrony. Electricity is flowing around your body, surging from a seemingly endless supply.'

(Internal perspective) 'Think of one of your arms only, how it feels as it describes its arc through the air. The posterior head of your deltoid and your latissimus dorsi contract to swing the arm sharply backward. Just at that moment, electrical signals from your brain tell the fibres of your pectorals and those in your anterior deltoid to contract in order to propel your arm forward with force. At the end of the drive forward, these muscle fibres are maximally contracted and begin to relax as the signals tell the latissimus dorsi and posterior fibres of your deltoid to take over again. All this time, the musculature of the opposite arm is working in perfect synchrony, so that one arm is always providing you with force in a forward direction. Your arms seem to move through their own channels. These channels have no air resistance whatsoever, and your arms fly through them with consummate ease. Your upper body is still, it makes no movements; it is a strong base for your arms to work from. It is as though you are caught in a trance. Everything around you is superfluous, irrelevant.'

'You are running alongside a stream, which ripples incessantly. The fast-moving water compels you to compete. Feel your strides quicken as your powerful hip flexors contract, feel the strong muscles in your shoulders driving you onwards. All of a sudden, the stream changes its course to veer sharply across your path (*stimulus proposition*), forcing you to jump over the water. Your body lowers slightly, and your stride lengthens in order to gain additional lift and thrust; you swing your arms in exaggerated arcs. At takeoff, your quads and glutes contract powerfully (*response propositions*) in perfect unison, propelling you upwards and forwards, sending you clear of the stream. Your arms swing sharply forward to give added momentum, jack-knifing you at the waist. Your body coils to absorb the impact on the other side, before easing back into your stride.'

Clearly, a good knowledge of your sport is important in order to construct a good imagery script. The more relevant sensory images you can evoke, the more effective the script will be. The content will also differ depending on the aim of the programme, eg arousal versus skill learning, and the type of sport. For instance, an imagery script for hockey requires considerable perspective switching and greater emphasis on cognitive processes than, say, a script for running. However, regardless of your sport, the following 10-point plan should help make your imagery more effective.

The top 10 plan for ideal imagery

1. Develop an imagery script on cassette to use as a focal point if your motivation and/or training are waning. If you are unhappy with your own voice, ask a dulcet-toned friend to do the recording. To give an idea of script length and the time taken, speaking at 165 words per minute enables easy comprehension and assimilation of information. Thus a 12-minute recording will require a script slightly longer than this article. Perhaps even more effective would be audio imagery combined with video modelling by someone else. This is known as 'vicarious experience' (sympathetic understanding of another's experience) and is a major precursor of self-efficacy (situation-specific self-confidence) for performing a given task. It is important that the person in the video is of a comparable skill and appearance, and that the execution of the skills is correct. In this way, video modelling can provide not only learning but also motivational benefits - ie, if they can do it, so can I.
2. For most sports, use an internal imagery perspective. Concentrate on the feelings associated with your sport. If it has a technical orientation, especially if you are graded according to presentation, as in gymnastics, use the external way of imaging. Remember, however, that imagery perspective is partly a natural attribute, and people vary in their favoured perspective. In fact, most athletes switch perspectives naturally throughout imagery.
3. Make the internal imagery multi-sensory, ie incorporating all the senses: visual, auditory, olfactory (smell), proprioceptive (touch, balance and movement) and gustatory (taste). The thicker the description you can summon up in your imagery script, the more effective it will be. Use plenty of superlatives and descriptions of positive mood.
4. Image in real time. Some research has shown that slow-motion imagery elicits very different muscle EMG from real-time imaging and thus may not be as beneficial.
5. Remember to include significant stimulus response pairings. Examples are the sound of the crowd cheering, your coach giving last-minute instructions, the smell of dew before a very important race coupled with the resultant butterflies in the stomach, a slight rush of adrenaline, the feeling of pressure and anxiety, a dry mouth, and so on. Again, your choice of pairings needs careful thought.
6. Incorporate REST (reduced environmental stimulation therapy, such as flotation) into your imagery training. The mind should be undisturbed and uncluttered.
7. Imagery ability is a major factor in making it work. Ability comes with practice, and time spent on mental training can be just as important as that devoted to physical work. 10 minutes three times a week can bring a wealth of benefits.
8. If you want a method of translating all of your imagery practice into a pre-competition routine, try pairing a favourite tune with each imagery session, so that playing the tune may evoke all the associated

physiological and behavioural changes. For best results, choose music that you personally find motivating, making you feel energised.

9. From a learning point of view, imagery coupled with actual execution of the task has been shown to be more effective for skill acquisition than imagery on its own. Thus it would make sense to undertake imagery training immediately before physical training, though this may cause some REST problems.
10. One final tip is to use biofeedback - most conveniently, in the form of a personal heart rate monitor to assess your progress. Research has shown that biofeedback can heighten and quicken learning during imagery training. Learn to associate relaxing imagery with lowered heart rate, and arousal imagery, eg pre-competition psyching up, with increased heart rate.

Finally and most importantly, do not expect miraculous improvements overnight. Be patient with mental training and apply the above tenets regularly. Successful imagery can be rewarding in many aspects of life as well as sport and exercise.

Daniel Bishop

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Use these pre-performance strategies to take control of your emotions (before they take control of you)

Competition can bring out the best or the worst in athletes, and the psychological demands are especially high when individuals or teams are striving to achieve the same goals. When physical skills are evenly matched, it is often the competitor with the stronger mental approach, the one who can control his or her mind before and during events, who wins. However, many athletes wrongly assume that mental aspects of performance are innate and unchangeable when in reality, systematic mental training can have a similar impact on performance as physical workouts.

Getting into the correct mind-set prior to competition is one of the most crucial aspects of top performance. In fact, a study of Olympic athletes by Orlick and Partington [1] showed that the combination of mental and physical readiness was a key factor that distinguished more successful athletes from their less successful counterparts in the Olympic Games. Perhaps even more impressive is the finding that, of the three states of readiness assessed (mental, physical and technical) only mental factors were statistically linked with final Olympic rankings.

If you have ever observed performers during the lead-up to competition, you cannot have failed to notice that behaviour starts to change. As the anticipation builds, athletes and coaches cope with the demands of the situation in various ways, some becoming withdrawn and quiet and some more aggressive than usual, while others disappear frequently to the toilet. Emotional reactions to stressful situations can drain an athlete's resources and impact negatively on performance if poorly managed. That is why it is important to have in place a strategy to deal with pre-performance stress.

Triggers for emotions

Emotions can be defined as brief positive or negative feelings occurring in response to meaningful or important situations, which can influence mood states. Basic emotions such as fear, anger, joy and surprise are commonly experienced in sport, although complex mixes of emotions are often evident. Positive emotions can help sustain motivation and enable us to approach events with enthusiasm and energy. Negative emotions, by contrast, are linked to avoidance behaviours and withdrawal. Emotions in the sporting arena can be triggered by many things personal to an individual, including memories, conversations with other people, seeing the competition venue, weighing up the opposition, etc.

Researchers have studied emotions in order to determine why they occur and what impact they have on behaviour. At first it was thought that emotions were simply the result of physiological changes, since physiological symptoms such as increased heart rate were commonly observed in such reactions. To test this theory, scientists injected volunteers with the so-called 'stress' hormone

epinephrine (adrenaline) to see if emotions could be generated in the laboratory. A small minority of participants reported feeling genuine emotions (usually sadness) while most reported physiological changes (to be expected after administration of adrenaline) and ‘as if’ emotions – feelings closely associated with being happy, sad or angry, but not the ‘real thing’. [2]

Best friend or worst enemy?

Subsequent research demonstrated that emotions could be induced by directing participants’ thoughts to emotional triggers, such as deceased relatives (sadness) or past achievements (pride). In summary, research in these areas has shown that both physiological arousal and the cognitive interpretation of that arousal are important in determining the emotional response.

During the lead-up to an important competition, the body starts to prepare for the demands to come by releasing hormones such as epinephrine into the bloodstream, setting in motion the physiological changes associated with increased arousal (sometimes referred to as the ‘fight or flight’ response). In addition, changes occur in the attentional system, as athletes become more focused and alert, with increasingly active minds. This overall increase in arousal can be your best friend or your worst enemy. The key to achieving an appropriate mind-set is to analyse the changes in a rational manner and channel your emotions in a positive direction.

Many elite athletes associate increased arousal with excitement as the body readies itself for competition, and use it as a cue to focus on pre-planned routines. This positive interpretation of the arousal response usually leads to more positive emotions and optimistic outlooks. Conversely, some athletes interpret physiological changes like an increased heart rate as anxiety, worry and apprehension, with a negative impact on emotions that is not conducive to good performance.

The most important thing to remember is that your interpretation of physiological changes directs your emotional response. However, the relationship between thoughts and emotions works in both directions. Although emotions are the result of cognitive interpretations, they can also impact on your thoughts, giving rise to a vicious circle of negative thoughts and emotions.

The good news for athletes who experience unhelpful emotions before competition is that you can gain more control by altering your focus of attention. The next time you feel these unwanted changes occurring, try going through the following psychological routine:

1. Tell yourself ‘this is my body preparing me to perform well’, and repeat the affirmation as necessary.
2. Try to recall an image of yourself either winning or performing well, and connect this with the feelings you experienced at the time.

You will need to practise this routine on a regular basis in order to establish it as a habitual response that will help you feel more composed and energised before competitions. If negative images jump into your mind during this time, try to visualise the most successful athlete in your sport and the way he or she runs, competes and enjoys performing. In short every positive thing about them. Then visualise yourself with similar positive attributes.

Even experienced athletes get nervous and irritable before competing, and a little tension (as long as it is controlled) is often necessary to inspire maximal performance. The techniques outlined above will not remove all the tension, but they should help you to channel your emotions more positively, which is what top athletes have to learn to do. The difference between winners and losers often boils down to coping skills, in that some athletes have learned to cope with competitive situations better than others.

It is important to challenge the belief of some athletes that emotions and mood states are simply reactions to external events. In fact, the athlete has considerable capacity for control in this area. A recent study by Stevens and Lane identified a number of strategies employed by athletes to regulate their moods [3]. Although unique strategies were employed for specific mood dimensions, results indicated that 'changing location' and 'listening to music' were among the most commonly used strategies. Various research studies have demonstrated the ability of music to impact on emotions and mood by either calming or stimulating the individual as required, although careful consideration is needed in the selection of appropriate music. Listening to music or engaging in a mentally active process, such as a crossword, can help to stop the mind wandering in the hours leading up to competition, although immediately beforehand athletes need to be completely focused on the task in hand.

Having worked with sportsmen and women who have experienced emotional disturbance prior to competing, I believe that mental preparation needs are highly varied. The common approach that I have found successful is to develop with each athlete a coping response that becomes automated and can be consistently applied in changing circumstances. Such a coping response puts the athlete in control by creating a familiar psychological comfort zone regardless of whatever is going on in the external environment.

One of the biggest triggers for anxiety is uncertainty – which is, of course, inherent in all sporting events. The key principle for the athlete is to control the things you can control but not to waste energy on things you cannot. Many top athletes have found, to their cost, that giving attention to how opponents might perform or how technically good others were in the warm-up has a negative impact on their focus. The one thing you can control is your own preparation, so that should have your full focus. By developing consistent routines and ways of coping with distractions, uncertainty can be reduced and you are less likely to be negatively affected by external factors.

Because athletes have varying requirements, it is impossible to standardise the pre-competition preparation. However, you may wish to adopt some of the ideas below in creating your own pre-performance strategy to achieve the desired emotional state. These ideas are all designed to be put into practice in the hour before competition, although the principles can be adapted for other times.

Physical preparation

The warm-up period can be an important psychological aid as well as preparing the body for the rigours of competition and helping to prevent injury. Remember the comfort zone? By developing a relatively stable warm-up routine, including mobility work, stretching and increasing deep muscle temperature, uncertainty can be reduced and the athlete's attention directed to appropriate cues, such as quality technique and body awareness. The development of routines in sport has consistently been shown to be important in directing attentional focus to important cues, so aiding performance.

Although during the last major athletic event it was impossible to observe what was going on inside the minds of the sprinters, you could clearly observe the regularity of the warm-up routines and the intense concentration written on athletes' faces prior to taking their marks. These routines are not haphazard, but have been systematically designed to promote optimal functioning in the final few minutes before performance.

Golfers have routines that allow them to prepare in the same way for each shot, as do some rugby place kickers, and tennis players before serving. The key to any routine is that it provides the athlete with control and directs attention to the important cues. Coaches and athletes should work together in deciding the key attentional cues and the sequence in which these should occur. Such routines are the opposite of superstitious rituals that take control away from the performer; with superstitions, the outcome is essentially believed to be controlled by sources other than the self.

Mental preparation

The mental aspects prior to performance should involve focusing on what you are going to do during the event. This can include specific strategies and the establishment of optimal attentional focus. Some athletes will use imagery to recall positive past experiences and generate a sense of confidence. Imagery is a very flexible method to employ prior to competition, but it needs to be used correctly for maximum effect. Imagery is not just a form of visualisation, but an all-sensory experience that should involve the kinaesthetic senses, emotions and auditory experiences to increase the impact. Many people use imagery simply to see themselves winning but it can be employed to imagine good technique, coping with difficult situations, recreating emotional feelings and rehearsing the upcoming event in the mind. Imagery is a powerful technique since the brain

interprets the imagined scenarios very literally, directly enhancing such psychological variables as confidence.

Always keep imagery sessions short (no more than a few minutes) and simple just before competition. Tailoring the imagery to the desired outcome is essential, so if you want to improve your mood, imagine a realistic scenario that makes you feel good. For more advice on incorporating imagery into your preparation, you may like to read a very practical book entitled *In Pursuit of Excellence* [4].

Mental preparation can include the repeated use of positive self-statements (affirmations) such as 'I have trained hard, and am in great shape'. These affirmations act by occupying our attention in such a way as to change our belief system over time, so that we begin to attend to feelings or happenings that are consistent with these new beliefs. In the example given above, we begin to focus on events that reinforce our belief that we are in great shape, such as a fast training run. In this way negative perceptions can be tuned out.

The 'quick set' routine

Psychologist Jeff Simons has described one of the best ways to organise the last 20 to 30 seconds before competition in what has become known as the quick set routine [5]. This three-phase routine is designed to provide a quick focus that can be used just before competition or as a means of refocusing quickly following a distraction. It is minimal in content, which appeals to many athletes, and involves a physical, emotional and focus cue. An example for a sprinter could be:

1. Close your eyes, clear your mind and maintain deep rhythmical breathing, in through your nose and out through your mouth (physical cue).
2. Imagine a previous race win, see yourself crossing the line first and recreate those feelings (emotional cue).
3. Return your focus to the sprint start, thinking of blasting off on the 'B' of the bang (focus cue).

However meticulous your planning, things often occur at the competition site that are out of your control. Such events have the potential to impact on your emotional state, distract you from your goals and push you out of your optimal state of preparedness. However, it is important to remember that things only become distractions if you let them. They do not have to negatively influence your mood if you can learn to let them go and refocus.

Why Sugar Ray Leonard lost it in more ways than one

Distractions can be provided by your opponents. It is increasingly common for opponents to use psych-out strategies or mind games to try and break your concentration and consistency. Comments such as: 'I'm surprised to see you

competing so soon after that injury' are attempts to divert your attention away from your preparation and towards negative memories and self-doubt.

The best strategy with such comments is to ignore them, although that is easier said than done. If you feel yourself paying attention to them, it is important to become aware that you have lost your optimal focus and need to refocus quickly. First, 'let go' of the distraction and put it out of your mind; say to yourself 'let it go', shake down your body, and refocus on your breathing. Some people might prefer to use their quick set routine to refocus in such circumstances.

Remember that some opponents are actively seeking to unsettle you and that by reacting to their comments or behaviour you are falling into their trap and allowing them the psychological edge. By engaging in this psychological duel you run the risk of disrupting your emotional state, becoming over-aroused and suffering a catastrophic decline in performance that is difficult to recover from quickly. Reacting emotionally often means that you discard your carefully laid plans and operate a strategy of reprisal. Self-control is best regained by not reacting to provocation. This, in turn, can make your opponent worried or angry as it demonstrates that their attempts to undermine you have failed. Attempts to engage in such antics can, in any case, be a sign that your opponent is worried about you.

A classic example of how emotions can affect sport performers came in a famous 1980 boxing match between Sugar Ray Leonard and Roberto Duran. Leonard was considered the better boxer who was expected to outclass Duran with slick movements and long-range punching. However, before the fight Duran insulted Leonard in front of his family and this, to the dismay of Leonard's trainer Angelo Dundee, sent Leonard into a rage, which completely altered the course of subsequent events. Instead of fighting to the pre-planned strategy devised with his trainer, Leonard let his emotions take over and decided he was going to 'beat up' his opponent. Duran's actions amounted to a psychological masterstroke as Leonard ditched his boxing skills and opted for a brawl. It was exactly what Duran had hoped for, and he won a points decision.

There are many other potential distractions for the athlete, including the actions of friends or family, coaches or team-mates, the environmental conditions, memories, delays and irrelevant thoughts. All of these can detract from your preparations, so be ready to clear your mind and refocus as necessary. Alternatively, remove yourself physically from the source of these distractions if possible.

Take time to learn

Learning any physical skill takes time, effort and practice. Psychological skills are no different in this respect, so do not expect miraculous overnight changes in your performance. If you are a serious athlete, it is best to work with your coach

to devise routines and mental plans. Once you are happy with these, they can be introduced first to practice situations and later to competition.

Give yourself a few weeks to use these new techniques before re-evaluating them and adding or deleting parts as necessary. It is unlikely that the initial plans or routines will be perfect, so do not be afraid to develop them. It is also sensible to add distractions to your training sessions in order to simulate more realistic conditions. This can include attempting to refocus while people are trying to distract you. You might even practise your refocusing skills using imagery, by envisaging potential distracting scenarios in your mind. Only when you are comfortable with your strategies should you start to use them in competitions. Remember to give it time, as improvements take time to show through.

Emotions are an essential part of sport and competition, but if you do not gain control of them before competing they might control you and hinder your performance. While it is true that some people are more emotionally sensitive than others, taking mental charge by implementing psychological plans and routines can help all athletes to a more optimal state of readiness for performance.

Lee Crust

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Is there a link between team cohesion and success?

You may consider the above to be a question with a boringly obvious answer. Surely there must be a link between team cohesion and competition success? Anyone who has played in a team where everyone gets on well and communication is good feels this has a lot to do with how well the team plays.

However, this assumption is based on feelings and perceptions which may not be borne out in reality. Just because you enjoy the team atmosphere does not necessarily mean you are definitely going to win more games. The key research question for sports psychology is to prove that teams with greater cohesion are more successful. This is a question that various researchers have been grappling with for around 30 years.

Famously, a German researcher called Hans Lenk [1] disproved the notion that only cohesive groups could win by showing data collected from the notoriously dysfunctional German rowing eight that was successful in the 1968 Mexico Olympic Games. Anecdotally, Olympic rowing provides another famous example of how low cohesion and success can mix, as 1988 GB gold medallists Holmes and Redgrave were supposedly not the best of pals. In subsequent Games (1992 and 1996), however, winners Redgrave and Pinsent were highly cohesive (from an outsider's viewpoint at least).

These examples cast doubt on the assumption that the greater the cohesion the greater the team success, although a reasonable amount of research carried out in the 1970s and 1980s supported this assumption [2]. But if the relationship between cohesion and success is not cut and dried, this raises more questions:

- If winning is possible without cohesion, how important is cohesion to the winning formula?
- Are there specific aspects of cohesion that are crucial for team success and others that are less important?

To provide reliable answers to these questions, psychology researchers need to be able to analyse and measure team cohesion with validity. In science, the term validity refers to how well your measuring tool actually assesses what you are aiming to measure. In physical terms a ruler is obviously a highly valid measure of length, but in the realms of psychology, in which variations in individual perceptions are involved, validity is not so easy to establish. A research team led by Albert Carron [3] concluded that much of the early research on cohesion was limited by the less than rigorous Sport Cohesiveness Questionnaire in use at the time. He and his colleagues set about developing a sounder tool, known as the Group Environment Questionnaire (GEQ).

These researchers aimed to base this new tool on a sound concept of what cohesion actually involved for sports teams. They argued that previous research had over-simplified the concept of cohesion by measuring one particular aspect, such as the perceived attraction of the group members to each other. There is clearly more to the dynamics of the formation and workings of groups than how much the individual members like each other.

Carron et al's model of cohesion identified four key contributing factors that interact to facilitate social or task cohesion: environmental, personal, team and leadership.

The model measures the following categories of cohesion:

1. individuals' perception of the 'group integration' (social)
2. individuals' personal attraction to 'group' (social)
3. individuals' perception of group task ('group integration task')
4. individuals' personal attraction to group task.

The GEQ comprises four or five questions under each category. Other research teams have endorsed Carron et al's belief that cohesion can be effectively measured by analysing its different components.

Interestingly, research into cohesion using the GEQ suggests that 'task' cohesion is more important for team success than 'social' cohesion. And this could explain the equivocal results of earlier cohesion studies, and why it is sometimes possible for successful team-mates to actively dislike each other and still win. Most coaches and athletes prefer team-mates to like each other, but it appears that as long as they are completely focused on their common task and share the same goals and beliefs, success is possible even without social cohesion. Another example of this principle at work is the Chicago Bulls team, which dominated the NBA in the 1990s. The team members allegedly did not speak to each other off-court, but practised and competed together with 100% professionalism and commitment.

With this example in mind, Carron et al recently set up a new study to examine the relationship between task cohesion and team success in elite basketball and football teams [4], measuring just the group integration task and group attraction to task categories of cohesion from the GEQ. Each member of the 18 basketball and nine football teams involved tackled the following questions after the end of their regular season, ranking each answer from 1 ('strongly disagree') to 9 ('strongly agree'). Questions 1-4, 7 and 9 were reverse scored (ie 9 = 1)

1. I am not happy with the amount of influence I have.
2. I am unhappy with my team's level of desire to win.
3. This team does not give enough opportunities to improve my personal performance.
4. I do not like the technical strategy of this team.
5. Our team is united in trying to reach its goals for performance.
6. We all take responsibility for any loss or poor performance.
7. Our team members have conflicting aspirations for the team's performance.
8. If a team member has a problem, everyone wants to help him.
9. Our team members do not communicate freely about each player's responsibilities during competition and practice.

The key findings were as follows:

- The mean team cohesion scores for basketball teams were 6.05 for group integration task and 6.11 for attraction to group task. For football teams the mean scores were 6.33 and 7.04 respectively.
- Scores in both these categories were highly correlated with team success for both sports, success being defined as match results over the season, excluding play-offs. The teams with the highest 'team cohesion' scores had the best season win:loss percentage records.

This study offers clear evidence that real-world sports teams benefit from high levels of task cohesion. The strength of the relationship between cohesion, as measured by the task categories of the GEQ, and team success as measured by the win:loss record was higher than in previous research. The researchers believe that this is because they focused on task cohesion using the GEQ, integrated individual scores to produce a team cohesion score, and then related these scores to an indisputable measure of team success. All things considered, this study goes further than any before it to examine the importance of cohesion for success in team sports.

The implication of these findings is that coaches and sports psychologists would be well advised to assess team cohesion and develop team-building strategies to improve task cohesion. Specifically, coaches could work on making sure that team members are clear about and happy with team goals and the level of shared commitment. They could also work on developing team communication and shared responsibility – developing the ‘we’ mentality.

In his book on football psychology, Sven Goran Eriksson talks a great deal about how the ‘we’ mentality can raise the performance of all the players in a team and help reduce the pressure associated with big matches [5]. He describes eight key attributes of an effective team, and I invite you to note that all are task-oriented and have nothing to do with social relationships. The ‘good team’, according to the England manager, has:

1. a common vision
2. clear and definite goals which go hand in hand with this vision
3. members who share their understanding of strategy and tactics
4. great inner discipline (meaning they act professionally together)
5. players with characteristics which complement each other
6. a good division of roles among the players, with all members being treated equally
7. players who put the common good before their own interests
8. players who take responsibility for the whole team, with everyone accepting mistakes as long as people do their best.

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