PSYCHOLOGY

the will to win

A SPECIAL REPORT FROM

PEAK PERFORMANCE

The research newsletter on stamina, strength and fitness

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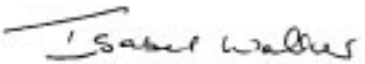
From the editor

In the bad old days, psychology was just for wimps on the lookout for excuses to justify poor performance. But these days, it's an essential part of every serious athlete's armamentarium – as crucial to success as training, recovery, kit, hydration and nutrition.

That's why we make no excuses for devoted an entire special report to this most elusive and personal of sports-related topics. Prepared almost entirely by Peak Performance's resident sport psychologist Lee Crust, the report ranges over a wide swathe of psychological territory, from goal setting (much more than New Year resolutions) to confidence building (confidence being a cause rather than an effect of good performance); from imagery (an all-sensory experience encompassing and surpassing visualisation) to 'flow' (that wonderful sense of being in complete control of your game); from individual performance profiling (to build on strengths and buttress weaknesses) to team cohesion (a prerequisite for success).

We also home in on how to make your thoughts and emotions work for you rather than against you, and consider the potential impact of psychological factors on the risk of sports injury. The overall message is that training your psyche can actually make a better athlete of you. You may not believe it now, but the articles that follow should start to convince you that there is more to peak performance than a well-honed body. And I suspect that once you start using some of the intensive exercises contained within the articles, you'll experience such benefits that you won't look back.

I hope you enjoy reading this special report and find it both interesting and useful.



Isabel Walker
Editor

Mental drills for physical people: how recreating all-sensory experience can profoundly affect your performance

A few years ago I remember seeing a close-up shot of former world motor racing champion Damon Hill in his Formula 1 car as his head swayed from side to side. There was nothing new about TV producers wanting to get closer to the action, but the odd thing about this shot was that Hill was sitting in a stationary car, waiting to exit the garage in an attempt to qualify for the race.

In fact there was a simple explanation for Hill's behaviour: like many other top sportspeople, he was using the time leading up to a performance to mentally rehearse and (in his case no doubt) imagine steering the correct racing line through each corner.

On top of the time spent honing skills and developing physical readiness, studies of top performers have shown that the elite from a variety of different sports complete many laps of the track, lengths of the pool or throws of the javelin in their minds before major competitions.

The aims of this article are to encourage more athletes to use and develop their imagery skills and (for those who are already converts) to advise on how to use these skills to maximum effect. It is clear that creating, or recreating, an all-sensory experience can have profound effects on physical performance and psychological functioning. Once learned, imagery can be applied in many different ways to aid sports performers, and is one of the most regularly used tools of the sport psychologist. However, recent research evidence suggests that to achieve maximum

benefits athletes and coaches should select the content of their images very carefully.

I will not spend too long making the case for using mental imagery, since scientific research strongly supports its use in sport as an adjunct to physical practice. However, sceptics who need convincing may wish to consider the following evidence:

- First, elite athletes and coaches use imagery regularly[1]. Do you really think world-class performers would devote time to a technique that didn't aid their performances?
- Secondly, case studies of the use of imagery programmes tailored to individual needs have demonstrated some dramatic performance improvements[2];
- Finally, and most importantly, a wealth of controlled scientific studies have shown that imagery can significantly benefit the learning and performance of a variety of sports skills[3].

One recent innovative study is particularly worthy of note, since very large treatment effects were noted. Figure skaters who walked through their routines or drew their routines on paper, while imagining the moves with their chosen music playing, showed dramatic performance improvements by comparison with controls who didn't use imagery[4].

Scientists have now turned their attention from the question of whether imagery works – given the strong evidence that it does – to the question of how it works. On this issue opinion remains divided and a healthy debate continues. Some experts believe that small neuromuscular 'firings' that have been demonstrated in some research studies provide sufficient feedback from imagined stimuli to allow for changes in performance.

A blueprint for performance

Others argue that imagery can help to develop a mental blueprint for performance, much like planning what you are going to say before making an important telephone call. Another line of evidence suggests that imagery may work more indirectly – facilitating changes in someone's psychological state by building confidence, promoting motivation and reducing performance anxiety.

At present, the exact mechanisms by which imagery works remain unclear, although recent work using brain imaging techniques has advanced our knowledge by confirming that the right hemisphere of the brain is the primary imagery centre.

If you watch children playing, you can rapidly appreciate how creative and imaginative they are. As children play with dolls and toys they create their own inner worlds, thereby engaging the right hemispheres of their brains. Unfortunately, much systematic education focuses on logical and analytical processes, which use the left hemisphere and tend to be more highly valued by adults.

'Imagery should involve far more than visualisation, including the feelings of movements, sounds, emotions and, in some cases, even smells'

The trouble is that without constant practice the brain's imagery centre reacts in much the same way as your muscles do if you stop training – *ie* it atrophies. Again using a body analogy, when you return to using this part of your brain after a long lay-off, it's like doing that first exercise session all over again. However, as with physical exercise, the more you train, the faster you adapt and the easier it gets.

Although imagery can be applied in very dynamic situations, it is best to learn how to do it in quiet, relaxed, non-competitive settings. You need to start by relaxing – closing your eyes and focusing on deep rhythmical breaths. You cannot afford to be half-hearted, so commit yourself to the process and try to decide beforehand what you are going to imagine. Some people might even decide to record a series of instructions onto a cassette tape to help direct their images.

A three-stage development plan

Sport psychologist Rainer Martens suggested that, in developing a systematic approach to using imagery, people should first work on increasing overall *sensory awareness*[5]. A fundamental point that must be made at this juncture is that visualisation and imagery are not one and the same; imagery should involve far more than visualisation, including the feelings of movements, sounds, emotions and, in some cases, even smells.

A cricket batsman, for example, might attempt to become more aware of sensory process by recalling the important visual environmental features, as well as the sound of the bowler

running in and the noise the ball made through the air. He may recall the feel of swinging the bat and making contact with the ball. The subsequent sounds of bat on ball and the call of his partner to run may also be considered. The sense of control as the ball reached the boundary, a feeling of determination and the smell of freshly mown grass may help to stimulate all the senses. So Martens proposes a first stage dedicated to appreciating things that the individual may have come to take for granted.

The next step is to develop *vividness*. It is true that some people are able to recall or create very clear and vivid images, while others may struggle to get an image at all. With practice, though, most people are able to sharpen their images so that recognisable sensory experiences are evident. This is the stage to be creative and experiment by using scenes and experiences that are very familiar to you. These exercises do not need to be sport specific at first, as the general idea is to promote overall clarity. You might like to try exercise 1, below, to help develop vividness.

Exercise 1: peeling an orange

Imagine you have an orange clasped in your hands. See the bright colour, feel the texture of the orange and imagine squeezing the fruit with your fingers. Now imagine peeling the orange by digging your thumb beneath the surface of the skin. Imagine your fingers and thumb working to remove the outer layer of the fruit. Feel the zestful spray as the juice begins to run onto your hand. Try to imagine the distinctive aroma. Once you have fully peeled the orange, imagine dividing it into segments before eating it. Recall the taste of the fruit as vividly as you can.

Alternatively, you could stare at the flame of a candle – or indeed any object – for a few seconds and then try to see the image again in your mind's eye. Close your eyes and try to recreate the image as clearly as you can. Focusing on your own hands is a particularly good exercise, as you can develop further movement awareness by closing your eyes, creating a new shape with your hands and, without looking, trying to imagine how your hands look. Then open your eyes and check how close you were to the real image.

You might try using imagery after a performance, as this is a time when you tend to remember more clearly and are often most able to recall the vividness of the situation and what happened.

The final stage of your development plan involves *control*. If you are mentally rehearsing what you are going to do, it is important to have control over your images. This is because imagery can be destructive as well as helpful. If, for example, a golfer is imagining the path of the ball on the green but continually sees herself missing the putt, this is hardly likely to help. The great thing about imagery is that, even if the golfer has missed putts in reality, imagery provides an opportunity to correct errors.

This stage is more sport specific and should incorporate your desired outcome. You should feel the movement and see a positive result, such as the golf ball following the correct path and entering the hole. If you do start imagining negative outcomes, try to recall a previous success – or even watch another person successfully complete the skill and try to replicate this in your mind, with yourself in the role of successful performer. You might like to try exercise 2, below, to develop control.

Although the most obvious application of imagery is in the learning and performing of sport skills, there are many other

Exercise 2: solving the problem task

Imagine working on a skill or technique that has given you problems in the past. See yourself in familiar practice surroundings. Imagine the scene as clearly as possible by seeing the layout and objects present, the colours, the noises, the weather and other people. Imagine performing the problem task, and try to become aware of what is going wrong.

Once you have identified this, imagine performing the task perfectly and make sure

you pay attention to how this feels. Feel the satisfaction of getting it right and the muscular contractions and control that allow you to execute the task perfectly. Imagine repeating the task time and again, as you would with a physical skill that you were trying to hone. Now imagine performing the task in a competitive situation or against a tough opponent. Imagine getting the better of your opponent and controlling the situation by using the skill and implementing a planned strategy. Make sure you see the positive end result of your endeavours.

ways to use the technique. For example, imagery can also be used to practise strategies, manipulate levels of arousal, manage stress, build confidence, deal with pain and periods of injury and develop an appropriate focus[3].

Recently researchers have suggested that, for maximum effect, athletes should match the content or type of imagery with the desired outcome[6]. Towards this end, you should think carefully about the components of your imagined experiences and ask yourself what you want to gain. Do you seek to facilitate learning and performance of skills and strategies, or are you attempting to build confidence or even psych yourself up?

The five main categories of imagery have been identified as follows:

- **Motivational specific (MS)** – This involves seeing yourself winning an event, receiving a trophy or medal and being congratulated by other athletes. MS imagery may boost motivation and effort during training and facilitate goal-setting, but is unlikely on its own to lead directly to performance benefits;
- **Motivational general-mastery (MG-M)** – This is based on seeing yourself coping in difficult circumstances and mastering challenging situations. It might include maintaining a positive focus while behind, and then coming back to win. MG-M imagery appears to be important in developing expectations of success and self-confidence;
- **Motivational general-arousal (MG-A)** – This is imagery that reflects feelings of relaxation, stress, anxiety or arousal in relation to sports competitions. There is good evidence to suggest that MG-A imagery can influence heart rate – one index of arousal – and can be employed as a 'psych-up' strategy;
- **Cognitive specific (CS)** – This involves seeing yourself perform specific skills, such as a tennis serve, golf putt or triple-toe-loop in figure skating. If learning and performance are the desired outcomes, evidence suggests that CS imagery will be the most effective choice;
- **Cognitive general (CG)** – This involves images of strategy and game plans related to a competitive event. Examples could

include employing a serve-and-volley strategy in tennis or a quick-break play in basketball. Case studies support the use of this type of imagery, although controlled experimental evidence is still needed.

Clearly there is potential for these types of imagery to overlap if, for example, you imagine specific sports skills, such as a golf putt (CS), with the accompanying positive outcome and tournament-clinching result (MS).

However, research suggests that if you choose the wrong type of imagery, you may not achieve any benefits. For example, one study showed that CS imagery significantly improved sit-up performance, while MG-M imagery was ineffective[7]. Conversely, other studies have shown MG-M imagery to be more effective than CS imagery for boosting self-confidence[8,9]. The trick is to decide what it is you want to achieve, then make the imagery content match your goals.

In designing imagery training programmes, I like to follow the FITT principle *(see below)*, which has often been associated with physical training.

Lee Crust

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One step at a time – how to raise your game by setting smarter goals

Anyone interested in athletics will be aware of the achievements of the US 200m and 400m sprinter Michael Johnson. In the course of a spectacular career, Johnson rewrote the record books when he became the only man ever to win both 200m and 400m Olympic gold medals, at the 1996 Olympics. At times he was, quite literally, 'in a class of his own'.

However, according to the man himself, his achievements were based not purely on talent but on hard physical conditioning, mental strength, a clear vision of where he wanted to go, and a plan of how to get there. Michael Johnson's book *Slaying the Dragon* is not just a record of his achievements but an insight into how one man mobilised his extraordinary talent through effective goal-setting. Not everyone has the talent to be a Michael Johnson, but anyone can achieve significant improvements in performance by the same means.

Many people associate goal-setting with new year resolutions, and are quick to dismiss the process as ineffective, since most well-intentioned, if vague, resolutions have failed before the end of January. Let's get one thing clear straight away: most such resolutions are perfect examples of how *not* to set goals!

Research on goal-setting in the world of business as well as sport and exercise has consistently shown that it can lead to enhanced performance. In fact, a recent meta-analysis (evaluation of pooled data from a whole series of studies) showed that goal-setting led to performance enhancement in 78% of sport and exercise research studies, with moderate-to-strong effects[1].

Goal-setting is a powerful technique that appears to work by providing a direction for our efforts, focusing our attention, promoting persistence and increasing our confidence (providing we achieve the goals we set ourselves).

But, while goal-setting is an easy concept to understand, its application needs more thought and planning than most people realise. One of the main problems is that not all coaches are aware of the principles of goal-setting and how to apply them effectively[2]. So a key purpose of this article is to give coaches and athletes a better understanding of how to use goal-setting to enhance performance and avoid disappointments.

It is always good to have a vision of what you want to achieve – whether this is related to fitness, weight loss, winning an Olympic medal or achieving a set standard of performance; but you also need a plan for how you are going to attain this goal. Dream goals inspire us and give us a target to aim for, but in order to deliver the goods they must be specific and realistic.

Most new year resolutions are dream goals that will never be realised because people fail to plan realistically the day-to-day process required to make such dreams into reality. If you focus only on your dream goal, you can easily become overwhelmed when you think about what it's going to take to achieve it. Research suggests that this does not lead to enhanced performances[3].

Short-term goals – the key to success

Top athletes like Michael Johnson and Steve Backley have understood that, although dream goals such as Olympic gold medals are important in helping to direct our efforts, it is the day- to-day 'short-term' goals that provide the key to success. I like to classify goals into three types:

- Dream goals are the ones that seem a long way off and difficult to achieve. In time terms, they may be anything from six months to several years away;
- Intermediate goals are markers of where you want to be at a specific time. For example, if your dream goal is to reduce your 400m PB by one second over 10 months, an intermediate goal could be a half second improvement after five months;

- Short-term or daily goals are the most important because they provide a focus for our training in each and every session. Past research on Olympic athletes found that setting daily training goals was one factor that distinguished successful performers from their less successful counterparts[4].

For every week and each training session you should decide what you need to do in order to take another small step towards the next intermediate goal, and ultimately towards your dream goal. Don't just set goals for competition: we all spend more time practising and training, so set targets for these periods too.

Breaking down the 'impossible' task

To demonstrate how goal-setting and goal-achievement can aid performance, let me describe my experiences of learning to ski. Having spent some time on the nursery slopes learning the 'snow-plough' turn and other basic moves, I and the rest of my group were both excited and apprehensive when the instructor announced it was time to make our way up to the higher slopes and ski all the way down. To a novice skier, this moment presents a real challenge to confidence. *En masse*, my group decided that we couldn't do it: we were not ready to ski all the way down; after all it was a long and difficult slope for novices to ski!

Our instructor then did a very clever thing by distracting our focus from the apparently 'impossible' task of skiing all the way down and breaking the task down into a series of smaller stages. We didn't feel confident enough to ski to the bottom, but could we ski to that tree 50m away to the left? Yes, we agreed – and off we went, following the instructor. On reaching the tree, the instructor picked a new target, and these small stages eventually led us all the way to the bottom. The next attempt involved fewer targets with increased distance between each target.

In this way, our main objective of skiing continuously all the way down, which at first seemed impossible, became easily attainable. Focusing on one small step at a time – and achieving that goal – developed confidence, and confidence allowed us

to move on to more challenging targets. This simple story encapsulates the need for short-term goals to direct our immediate focus.

According to sport psychologist Terry Orlick, there are four prerequisites for successful goal-setting[5]. First, you need to decide what you want – develop a vision; secondly, you must be committed, so your goals must be worth striving for; thirdly, you have to believe that your goals are achievable. Goals that are too easy to achieve provide little motivation; but, on the other hand, unrealistically difficult goals can lead to loss of confidence and eventual rejection of the goal. To avoid these kinds of problems, coaches and athletes should work together to reach an agreement on goals and should not be afraid of adjusting goals to optimise their potential effect. Orlick's fourth pre-requisite for successful goal-setting is to focus on one step at a time.

'Outcome goals can provide motivation, but focusing purely on the result can lead to increased anxiety'

In beginning the process of setting goals, it is important to be specific and realistic about what you are striving to achieve. Ditch such vague goals as 'to get fit' or 'to do my best' for more objective alternatives. Objective goals allow the sports performer and his/her coach to measure progress and re-evaluate the goal if targets prove either too difficult or too easy.

The types of goals set in sport and exercise typically reflect what psychologists have identified as outcome, performance and process goals. All three are valuable in guiding athletes towards higher standards of performance, although you need an awareness of some of their potential pitfalls.

I will use the example of a 100m sprinter to demonstrate the differences between these three types of goal. If the coach and athlete agree a goal of winning a medal at the European Indoor Championships, this is an 'outcome goal'. Outcome goals tend to focus on an objective competitive result, such as winning a medal or beating an opponent, but they can never be completely under your control since the ability and form of your opponents on the day can influence the result. You might even run a PB but still fail to achieve your specific goal and so damage your confidence. Outcome goals can provide motivation, but focusing purely on the result can lead to increased anxiety.

Alternatively you could set a 'performance goal', such as running under 10.5 seconds for the 100m, whose achievement is independent of other athletes. As such goals are set in the context of comparisons with your own previous performances, they tend to be more flexible and within your control. In the event of injury, performance goals can be easily readjusted to provide meaningful and realistic targets.

'Process goals' are to do with the actions or techniques that are required to achieve success. A sprinter who has a tendency to become overly concerned with the position of his/her competitors during the final 20m of races might set a process goal of focusing on a point beyond the finish line to ensure focus is retained until the line has been crossed.

Performance and process goals

Coaches have a preference for performance and process goals, since these can be more easily and precisely adjusted than outcome goals, although all three types of goal should be used as appropriate to the athlete and situation. One recent study found better results when using a combination of goal strategies (outcome, performance and process goals) than either one alone[6].

In the planning stages of a goal-setting programme, you should think carefully about factors that may hinder your progress. For example, most people set goals that are too difficult rather than too easy, which commonly leads to the rejection of those goals. Once rejected, the goals no longer direct our efforts or our focus.

It is also important to avoid setting too many goals. Instead, focus on one dream goal, perhaps two or three intermediate targets and two short-term goals for today's session. That's enough to start with, but be sure to give your short-term goals the highest priority. Through achieving these you will naturally progress towards the intermediate targets.

I recently set myself a goal of reducing my resting heart-rate from 75 to 65 bpm. In order to achieve this, I decided to chose an exercise mode that I enjoy (jogging) and to exercise three

times per week over the next six months. As my fitness increases and my resting heart rate becomes lower, I will adjust the frequency, intensity and duration of training to suit my needs.

However, I initially identified one major barrier to the achievement of my goal – time. My work schedule means that I have little time to spare during the day, while in the evening I often feel tired and want to relax. Because I value my fitness goal, the way around this problem has been to get up early on two days a week and to run before my working day starts. At the weekend I am more flexible and can make time for exercise during the day.

The point is clear: you must consider potential barriers to your goals and plan around them if possible. If you can see no way around your barriers, your targets may be unrealistic. You should always evaluate your goals, and charting your progress can be an effective way to do this and to boost your confidence and motivation as you see progress being made.

Goal-setting is a smart move for athletes who want to develop their self-confidence, increase their levels of motivation and achieve higher standards of performance. Remember that time spent in preparation is worth it and can prevent disappointments. Take the advice of athletes like Michael Johnson and use goal-setting to change small steps into great feats.

To help remember the key principles of goal-setting you need to think SMARTER. That is, your goals should be:

- **S**pecific – Indicate precisely what is to be done. Avoid vague alternatives;
- **M**easurable – You should be able to quantify your goal;
- **A**ccepted – Goals must be accepted as worthwhile, realistic and attainable;
- **R**ecorded – Write your goals down. This is the basis of a contract with yourself;
- **T**ime-constrained – Set specific time-limits;
- **E**valuated – Monitor your progress regularly;
- **R**eversible – In the event of injury, or failure to achieve over-difficult goals, reset your goals accordingly.

Lee Crust

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The majestic self-belief of Jonny Wilkinson – or how expectations can make or break your performance

The image of the Jonny Wilkinson majestically kicking his way into the history books during the 2003 Rugby World Cup final will live long in the memories of English rugby fans. The decisive drop-goal, scored with just seconds of extra time remaining, demonstrated not just immense skill but the confidence of a winner.

It is easy to forget that Wilkinson had failed with three previous attempted drop-goals up to this point in the match. These failures might have dented the confidence of a player with a more brittle temperament, resulting in more tentative and indecisive future actions. But in an interview following the final whistle Wilkinson revealed that, having missed the previous three attempts, he felt he was going to make the fourth one count. The rest, as they say, is history.

This one example encapsulates the importance of confidence and self-belief to the sports performer. Of course, having high levels of self-confidence is no guarantee of success and will not compensate for lack of skill, but in situations where competitors are evenly matched it can be the crucial determinant[1]. In research, confidence has been shown to consistently distinguish between highly successful and less successful athletes[2].

Although many people mistakenly assume that confidence reflects performance – *ie* we become confident once we have performed consistently well – it is becoming increasingly evident that confidence can be established beforehand.

Sport psychologists define self-confidence as the belief that you can successfully perform a desired behaviour[1]. Confident athletes expect success and have a high level of self-belief that appears crucial in determining how far they strive towards their goals. It is largely confidence that determines whether people give up or remain committed to their goals following a series of setbacks.

For the sake of simplicity, we may consider self-confidence as conceptually opposite to cognitive anxiety (negative beliefs and performance worries). Both are related to our beliefs and both, ultimately, influence our performance.

Coaches can often see fluctuations in the balance between these two opposing states reflected in the behaviour of their athletes. While confident athletes are not afraid of making mistakes, often taking calculated risks in order to take charge of a situation, self-doubters often avoid responsibility, becoming over-conservative and paralysed by fear of failure. Think of the football striker who has not scored for a number of successive matches and is riddled with self-doubt. When presented with a half-chance which would usually result in a snap-shot, he may elect to avoid responsibility and pass to a team mate.

'It is largely confidence that determines whether people give up or remain committed to their goals following a series of setbacks'

According to psychologist Albert Bandura, performers' situational-specific confidence, or 'self-efficacy', is based on four primary sources of information, represented graphically in Figure 1 below[3]. The first and most important factor is past performance accomplishments. What we have achieved in training and competition forms the basis of future expectations of success or failure. Repeated success naturally leads to positive expectations of further success, higher motivation and enhanced self-belief.

Unfortunately, the flip side of this principle is that repeated failures can give rise to a downward performance spiral and a 'snowball effect' whereby a performer starts to believe that success is unattainable. Of course, such an athlete does not mysteriously lose his or her physical skills and talents, but without confidence in these abilities high-level performance is rarely achieved.

The implication of Bandura's work for coaches is that it is vital for them to make sure their athletes achieve success, even if this means renegotiating overly ambitious goals. The athletes' perceptions are of overriding importance.

The importance of 'modelling'

Research has suggested that athletes can also gain confidence from viewing the successful performances of others at a similar level[1]. This second source of information is known as 'modelling' or 'vicarious experience'. For example, a tennis player lacking confidence in her volleying might find it useful to have a peer who has overcome similar difficulties demonstrate the skill. By viewing others, we begin to see that, with effort, success is attainable. The very common use of celebrities in fitness videos is an example of modelling.

A third way for coaches to help build confidence is through verbal persuasion. By means of careful reasoning, athletes can be shown that other people (*ie* the coach) have confidence in their abilities and believe they can achieve set goals. Coaches may even use deception to persuade their athletes that goals can be achieved – of which more later. Verbal persuasion can also take the form of 'self-talk', whereby the athlete convinces himself that success will follow.

Finally, Bandura suggests that emotional arousal can influence confidence. Although this is the least influential factor, it is important that physiological symptoms are perceived positively rather than negatively. Confidence can be enhanced by perceiving increases in heart and respiration rate as the body's natural preparation for top performance rather than as triggers for anxiety.

Clearly, confidence is enhanced by good preparation, planning and a sense of optimism. Conversely, negative thinking and pessimism can undermine performance and limit progress. By expecting failure, we set our belief system to a negative channel and start favouring information that is consistent with these beliefs.

During a training session we may have done some things well and struggled with others. When we have a negative mind-set

we tend to focus only on the things that went badly, leading to what psychologists call negative self-fulfilling prophecies and psychological barriers.

The four-minute mile was the classic example of a psychological barrier; runners were consistently achieving times of 4:03, 4:02 and 4:01, but no one could apparently run under four minutes. This led to a common perception that running a mile in less than four minutes was physically impossible. Remarkably, though, within 18 months of Roger Bannister's famous breakthrough 16 other athletes had managed the feat. Did these athletes suddenly get faster and train harder? No: the floodgates opened because Bannister had breached the psychological barrier and demonstrated what was possible, so athletes were no longer limited by their beliefs.

The power of hypnosis – how thoughts can spur you on or hold you back

Often we are capable of far more than we do, but we restrict ourselves by our beliefs. Can you identify any thoughts that are holding you back? Hypnotists work with this system by planting beliefs in our minds which our bodies will automatically follow. In one study, hypnotised participants were unable to lift a pen after being told it was too heavy to be lifted [4]. Clearly they were physically capable of lifting the pen but for some reason were unable to perform the task.

Psychologists studying electrical activity in their biceps and triceps found that the participants were unconsciously contracting their triceps muscles and working against the biceps to restrict movement. It appears that there is a strong unconscious drive for our bodies to react consistently with our beliefs. The question most interesting to sport psychologists is whether beliefs can be positively manipulated to enhance performance.

The fact that expectations influence performance has been demonstrated in controlled experiments and case studies. In medical settings, giving patients a sugar pill (placebo) and telling them it is morphine has been found, in some cases, to produce as much pain relief as the real thing[1].

Deception has been used in similar ways in sporting studies. In one, 24 participants had their arms strength-tested and were then asked to arm-wrestle an opponent[5]. Before each match, the researchers deceived both participants into believing that the objectively weaker participant was actually the stronger – and in 10 out of 12 contests, the 'weakest link' actually won! Clearly, the outcomes were not predicted by physical strength but by belief.

'Remarkably, in all three studies participants lifted more weight when they thought they were lifting less'

Similar results were obtained from three experiments that manipulated the beliefs of weight-lifters[6,7,8]. In each study, researchers first ascertained participants' one repetition-maximum (1RM) for the bench press. After a rest period, the participants performed further lifts when they were deceived into thinking the weights were either heavier or lighter than they actually were. Remarkably, in all three studies participants lifted more weight when they thought they were lifting less.

Deception allowed the participants to improve their 1RMs – an effect that was probably due to their (false) belief that they had already lifted the weight in question. Although deception appeared less effective with experienced weight-lifters, performance increases were still noted[8].

Another interesting study showed that expectations could influence perceptions of effort[9]. Forty female participants performed a cycle ride at 80% of their maximum oxygen consumption after viewing one of two videos depicting similar others performing the task. One depicted the task as strenuous but involved a woman who was coping; the other showed a woman who was clearly finding the task difficult and distressing.

Participants who viewed the 'distressed' subject gave significantly higher ratings of perceived exertion (RPE) during the ensuing ride. It is likely that viewing the distressing images made these participants expect the task to be harder and selectively attend to physiological cues (*ie* fatigue) that were consistent with these beliefs.

So how can coaches and athletes use this information to expect success and build confidence? I am not suggesting that coaches should deceive their athletes in pursuit of this goal, as

this can backfire and damage trust, but Bandura's model *(see figure 1)* does provide many other answers to this question. Nothing breeds confidence like success (performance accomplishments), so coaches must nurture their athletes by ensuring success in training and competition, which in some cases may mean redefining success or making it more achievable.

Success can be defined in two ways: in relation to others or in relation to an athlete's own past performance. If a marathon runner, for example, measures success only in terms of objective outcome, coming third may be perceived as failure and so damage confidence. But if the same runner measures success in relation to his own performance and notes that his finish time was over a minute faster than his PB, the perception is quite different. Athletes have more control over performance goals than outcome goals.

During training, coaches may need to work with their athletes on perceived weaknesses. To ensure success and build confidence they might simplify the skill or skills in question. Think about a person who decides she cannot do press-ups after a negative circuit training experience. To build confidence, the instructor may show the participant a simpler form of the activity (*eg* press-ups on knees) and allow strength (and success) to be built up over the next few weeks. As the athlete gains confidence, the instructor can work towards introducing the full press-up into the circuit. As a series of goals are steadily accomplished, performance and confidence are built.

'Nothing breeds confidence like success, so coaches must nurture their athletes by ensuring success in training and competition'

Simulated practice conditions can also be used to boost confidence by exposing the participant to performance conditions. In this way an athlete can develop confidence from the knowledge that he has overcome problems in practice. Mental preparation via competitive situation imagery is a particularly useful technique.

It is vital for athletes to know that their coaches believe in them. Although coaching often involves correcting mistakes and giving constructive criticism, it is important to give positive feedback and praise where appropriate in order to create a positive pre-competition environment.

Confidence does not always mean you will perform at your best, but it certainly increases the likelihood of reaching your potential. Remember that confidence can be nurtured. Outstanding performers like Jonny Wilkinson are not simply born with confidence; they develop it through hard work and effective training. The start point is challenging yourself to think confidently. If you believe you can win, you become a very difficult person to beat.

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A coaching tool for pinpointing strengths and weaknesses, designing training strategies and building better communication with athletes

Where sport psychology is concerned, it is often assumed that performers either have what it takes or are – and forever will be – somewhat lacking in mental skills. I have spent a considerable amount of time in my occupation trying to convince both coaches and athletes that mental skills can be learned in much the same way as physical ones can – through systematic training.

Think about how often you have heard players attributing their success or failure to confidence, motivation or concentration. Then think about how much time athletes who attribute their failures to mental factors spend on mental training and trying to address areas that could be improved. I can assure you that there is little correlation between recognition of the problem and application of the appropriate remedy.

People who are unfamiliar with psychological skills training often don't realise the range of options available to help improve performance. Furthermore, the psychological techniques that can lead to performance enhancement are often simple to learn and easy to incorporate into a regular training regime. The real skill of a psychologist or coach is in matching each athlete's requirements to the appropriate techniques.

If a 5,000m runner appeared to lack speed towards the end of a race, an effective coach would observe this and design a training programme to tackle the specific problem. The solution would not be to simply run more laps in a training session, but would involve work on speed-related drills. Similarly, if psychological factors require attention, the intervention must be tailored to specific needs.

But whereas speed – or lack of it – can be directly observed, psychological factors are often hidden. A key problem for coaches seeking to address such issues is how to work out what the problem is when they cannot observe what is going on in their performers' minds. A direct question does not always yield useful results since athletes can be reluctant – at least initially – to discuss such things.

'With performance profiling the athlete is self-determining and his or her perspective becomes a central rather than peripheral focus'

One approach that is becoming increasingly popular with sport psychologists and coaches in sport is performance profiling. This has many benefits and is useful for assessing physical and technical prowess as well as psychological factors. Evaluating strengths and weaknesses is a valuable process that can help in the planning of training regimes and the identification of long-term goals as a focus for self-improvement.

For many years the typical psychological evaluation resembled a medical consultation, with the psychologist making his or her assessment and deciding on techniques for a change and the athlete playing a relatively passive role. However, Butler and Hardy[1] identified an inherent weakness in this process since studies had shown that people's intrinsic motivation could be weakened by the application of external controls[2]. To put it simply, for athletes to remain motivated to adhere to psychological skills training programmes, they need to be more involved in the decision-making processes.

With performance profiling the athlete is self-determining and his or her perspective becomes a central rather than peripheral focus. In devising this technique, Butler also provided a mechanism by which athletes could explore aspects

of their performance that they may have taken for granted, and coaches and psychologists could gain further insight into their athletes' cognitive processes[3].

The research evidence on performance profiling is certainly supportive. For example, Graham Jones of Loughborough University reported successfully employing the technique with an elite-level racket sport player[4]. This performer had experienced temperamental problems when faced with pressure situations, but the profile identified an intervention appropriate for her specific needs and she showed significant improvements in her ability to cope with pressure following a six-month cognitive-behavioural programme.

According to Jones, performance profiling has three major purposes:

1. To aid in identifying an appropriate intervention;
2. To maximise the performer's motivation and adherence to the programme;
3. To monitor any changes over time.

Over the past few years, performance profiling has become a routine aspect of the improvement programmes used by many psychologists and coaches. For coaches who haven't yet tried it, the next section offers some useful guidance, based on the work of Butler and Hardy.

Stage 1 – introducing the idea

The athlete needs to be made aware that the performance profile can help to direct training to areas of specific need. This process can be aided by a sense of mutual trust, and it should be made clear that any information gained about the athlete will remain strictly confidential. Coaches should stress that there are no right or wrong answers involved in the process but that honest appraisal will facilitate a more productive outcome. You need to explain that the process will focus on the athlete's current feelings regarding his or her preparation for competition. Showing the athlete examples of previous profiles can help with this.

Stage 2 – the constructs

The athlete becomes actively involved in this stage of profiling, and the following question should be directed to the individual (or group in team situations): 'What, in your opinion, are the fundamental qualities or characteristics of an elite performer in your sport?'

The next 5-10 minutes should be spent listing the qualities or characteristics that the athlete feels are important. If an athlete finds this difficult, you can use prompts, but it is for the athlete to decide on what characteristics or 'constructs' are chosen. In my role as a sport psychologist, I get athletes to list the key psychological factors, but the same process can be applied to technical skills or physical attributes, such as strength, speed, agility, balance etc. In a typical session I usually find 15-20 constructs are elicited.

Stage 3 – assessment

On a scale of 0 (not at all important) to 10 (extremely important), the athlete then rates the perceived importance (I) of each construct for an elite performer in his or her particular sport. These ratings must be highly specific, since different sports place different demands on performers.

Next, the athlete uses the same 0-10 scale to rate his current perceptions of himself (Subject self-assessment or SSA) in relation to an ideal state of 10 (Ideal self-assessment or ISA). Then a simple calculation can be carried out to take account of both the importance ascribed to the construct and the subject's self-assessment in relation to the ideal. This is known as the 'discrepancy score', and higher discrepancies indicate areas that may need to be addressed through training or other intervention.

The table opposite provides a hypothetical example of these calculations for part of a tennis player's profile. For this particular performer, it would appear that refocusing after errors and concentration are key concerns that could be addressed via intervention strategies such as thought-stopping, self-talk or a quick set routine, depending on the exact circumstances and preferences of the individual.

Once the profile has been completed, the results should be placed into a visual format for easy display *(see table 1, below, for an example)*, which can form the basis of dialogue between you and the athlete. The athlete can be encouraged to offer further information relating to key constructs and invited to work on these as a means of improving performance.

Table 1 – an example section of a tennis player's performance profile

Construct	(I)	ISA	SSA	(ISA-SSA)	Discrepancy (ISA-SSA) x I
Confidence	10	10	8	2	20
Concentration	10	10	6	4	40
Refocusing after errors	10	10	5	5	50
Enjoyment	9	10	8	2	18
Relaxed attitude	8	10	7	3	24

The performance profile can also be used to monitor progress, and if the training strategies identified are suitable and effective, the discrepancy scores should be reduced over time. I normally advise athletes to reassess their state of preparedness at least every few months as this can aid motivation, if clear progress is highlighted, and demonstrate the need for further training alterations if it is not. Remember that reassessment should always relate to the same constructs identified in the initial profiling process.

The example presented above is one way to use a performance profile, but there are variations which can be used to gain additional information. For example, the coach can carry out his own assessment of the athlete in relation to the agreed constructs and so pinpoint areas of agreement on the one hand and differing perceptions on the other. Most people would agree that the coach-athlete relationship is much stronger when vision, goals and targets are shared and agreed and, conversely, that difficulties can arise when the opposite is true.

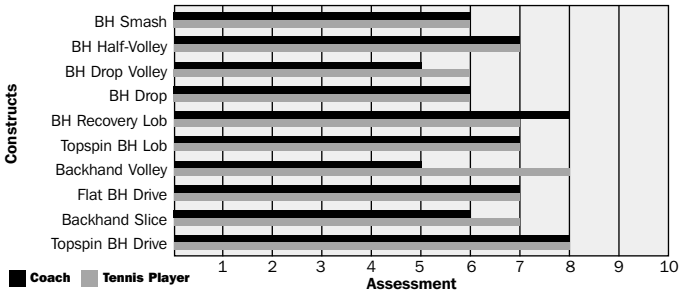
For example, a boxing coach might place a high priority on punching power (importance rating of 10) and believe his boxer needs to raise his game in this respect because he rates his performance in this respect as 6. The boxer, on the other hand, might perceive his power as adequate because he rates the construct as less important than the speed of his punch. He may believe that working on his power might compromise his speed and thus may be resistant to any recommendations geared to boosting this.

The point about involving both parties in the profiling process is that such differences are highlighted and can then be dealt with effectively through dialogue. Butler and Hardy explain that, in such circumstances, the coach and athlete might work on developing power through technical modifications in order to preserve the punching speed that the boxer rates as more important. Thus, where conflict might have arisen, the profile helps to focus training in a more productive fashion.

Figure 1, below, illustrates a tennis player's self-assessment and his coach's assessment in relation to his backhand strokes. This shows that coach and athlete are in general agreement over most of the relevant constructs but in major disagreement over the backhand volley. In such circumstances, video analysis of the player's performance might be a good way to resolve such differences and produce agreement on how to proceed.

Another useful variation on the standard performance profile is for the athlete to compare his or her current status in

Figure 1: assessment of backhand strokes by tennis player and coach



relation to the agreed constructs with a previous best standard rather than an ideal. If the performer has regressed as a result of an injury, this may provide a more realistic and motivating target in the short term.

According to Butler and Hardy, performance profiling can help coaches and psychologists develop a better understanding of their athletes by:

1. Highlighting perceived strengths and weaknesses;
2. Clarifying the athlete's and coach's vision of the key determinants of elite performance, and highlighting any differences;
3. Establishing areas where the athlete might resist change (as demonstrated by the perceived low importance of one or more constructs);
4. Providing a means of monitoring progress;
5. Highlighting discrepancies between the athlete's and coach's assessment of performance.

In summary, then, the performance profile appears to be a tool that is particularly useful for aiding the design of specific mental, physical and technical training programmes. The central involvement of the athlete in the process is a key strength that may boost motivation and promote adherence to any intervention strategies devised. It may also facilitate the coach-athlete relationship by promoting dialogue and addressing any perceived discrepancies. Additionally, the profile can be used as a monitoring device to assess the effectiveness of any interventions and highlight areas of good and poor progress.

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For peak experiences in sport, you need to go with the flow

One of the most perplexing characteristics of athletic performance is the fluctuation that can occur between one day and the next. What seemed like a rhythmical, easy, flowing performance one day can appear forced, awkward and disjointed the next.

Of course, there are many interacting factors that help to account for such fluctuations within individuals. What seems clear is that human beings are incredibly complex, which is why attempts to predict behavioural outcomes based on either physiological or psychological characteristics have often proved unsuccessful.

But, although common experience tells us that we cannot produce our best performances every time we compete, what if science could uncover a set of preparatory conditions that were powerfully linked to optimal performance and made success more likely? Sport psychologists have recently been working hard trying to do just that.

Surprisingly, this area of study has tended to be overlooked by researchers, as the predominant focus has been on overcoming negative psychological states, like anxiety. Psychologists regularly work with athletes to alleviate such problems by means of applied techniques, such as imagery or goal-setting. Much less is known, however, about the positive subjective experiences (states of consciousness) that have been variously described as peak experiences, optimal experiences, peak performance or 'flow'. In this article these concepts are considered as conceptually similar (although some researchers

define each separately) since strong correlations between them have been demonstrated in a number of past studies[1].

There is a range of possible experiences an athlete might encounter on a continuum from disorder, such as anxiety, to harmony, such as a state of flow. In a team situation this continuum could relate to cohesion or lack of it.

What is flow?

One of the most important aspects of my role as an applied sport psychologist is talking to athletes about their experiences in order to gain an insight into their thought patterns and typical ways of functioning. This is a prerequisite to establishing the best ways for athletes to prepare for competitions and intervening effectively to combat any negative processes, such as stress.

As part of this approach, I ask the athletes to describe their best and worst performances in as much detail as possible, including the thoughts, feelings and perceptions associated with these specific events. When describing their optimal performances, athletes across a wide range of sports and levels of performance tend to give remarkably similar responses. (If you are an athlete, you might like to think about this yourself; if you are a coach, you might like to use this exercise with the athletes on your team.)

Tennis players, for example, have described being completely absorbed in their matches, anticipating things before they happen and feeling as if they had all the time in the world to hit their shots, while retaining a sense of automatic responding and control. One player described himself as being so focused that the tennis ball seemed more like the size of a football.

A runner reflecting on a long-distance training run talked about feeling comfortable, easy and so immersed in the activity that she lost all sense of time. A footballer talked of feeling so attuned to the game that he was completely unaware of any spectators and felt himself moving automatically (on autopilot) and responding without thinking. A golfer recalled a fluid, easy swing and the feeling that he was in complete control and could land the ball wherever he pleased. In

recalling these events, their association with positive emotions and enjoyment is easily apparent.

An altered state with eight characteristics

Some authors have referred to flow as an altered state of consciousness to reflect attentional changes, but it is far from being a common mode of functioning, and research with elite performers seems to confirm that it is achieved infrequently[2]. The subjective examples mentioned above fit neatly with research definitions of flow, which is said to have the following eight characteristics[1]:

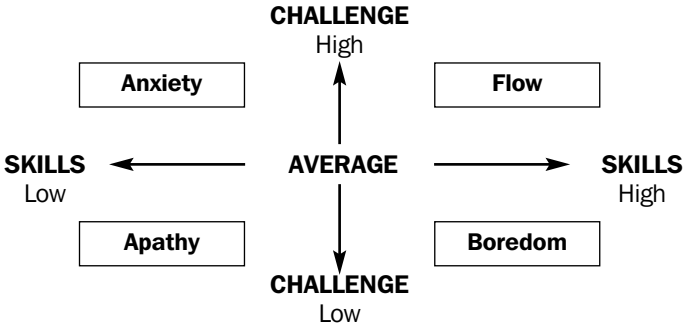
- perceived challenge-skill balance;
- merging of action and awareness;
- clearly-defined goals and feedback;
- total focus;
- sense of control;
- loss of self-consciousness;
- time distortions;
- intrinsically rewarding experiences.

To take the first characteristic first, by comparison with negative states such as anxiety – where there is a perceived imbalance between the demands of the situation and the athlete's ability to cope – flow seems to be related to a perceived balance between challenge and ability[3]. Additionally, flow has been said to be particularly likely to occur in situations of above-average challenge and skill.

This link between skills and challenge is illustrated in figure 1, overleaf. However, recent research suggests this model may be an over-simplification, since flow is not always present in high challenge/high skill situations. Indeed, in certain circumstances flow has been shown to occur in situations of low challenge/high perceived skill, which were predicted to facilitate boredom.

When describing the experience of flow, athletes tend to talk of things just happening automatically when they are thinking of nothing in particular. It is as if they become one with the activity. This kind of state seems most likely to occur when

Figure 1 – A flow model[4]



athletes have clear goals that allow for feedback regarding progress towards objectives. Total immersion in an activity is apparently most common when an individual knows and understands the goals for a given activity. This seems to reflect 'order' and certainty rather than 'disorder' in consciousness.

One of the experiences that clearly characterises flow is a sense of total concentration on task-relevant cues, with little if any processing of irrelevant information. Distractions are minimised, and athletes typically report a narrowing of focus. At the same time, they are aware of a sense of total control over even the most difficult situations, with little concern about how others are perceiving them.

Finally, people have reported time distortions associated with flow, with perceptions of time either speeded up or slowed down. For distance runners, time may seem to pass exceptionally quickly during a training run as they become totally immersed in and focused on the activity. By contrast, racket sports players may feel they have an abundance of time in which to select, organise and elicit an appropriate response. Ultimately, however, the end product of a flow experience appears to be the sensation of 'being on a high'.

The enjoyment associated with flow is thought to be related to 'intrinsic' motivation – the desire to perform an activity for its own sake. This is very different from 'extrinsic' motivation, which is linked with external rewards, such as prize money and

trophies. However, this does not mean that flow experiences cannot be attained while pursuing an external reward.

Although a satisfactory research base has been established, it is clear that our understanding of 'flow' is still in its infancy. Of greatest interest to athletes is the research on the circumstances most likely to facilitate flow. In two research studies[2,5] elite athletes have suggested that they can make flow happen, although conscious efforts to switch it on like a light are likely to prove disappointing.

It is probably most useful to focus on factors that have been identified as necessary precursors to flow, as follows:

- positive mental attitude;
- confidence in meeting the challenge;
- mental plans;
- physical preparedness;
- task goal-orientation;
- optimal environmental and situational conditions;
- positive team cohesion;
- high motivation;
- enjoyment;
- maintaining appropriate focus.

'An athlete would need to be confident in his or her abilities to meet the challenge in order to experience flow'

The first two factors, positive mental attitude and confidence, would appear to be consistent with theoretical work, since it has been suggested that flow will occur in situations where perceived skills match challenge. An athlete would need to be confident in his or her abilities to meet the challenge in order to experience flow. Mental plans and physical preparedness have previously been linked to optimal performance in Olympic athletes[6]. Good preparation is likely to remove uncertainty and allow total focus to be directed towards what needs to be done in order to achieve success.

The importance of goal-orientations

One of the most innovative studies in this area focused on the role of goal-orientations and how differences were potentially linked to experiences of flow. Goal-orientations are all about

what success means to individuals and how they evaluate their achievements. Success may be judged in terms of either quality of performance, irrespective of opponents and objective result (task-orientation), or comparison with others (ego-orientation).

For example, a marathon runner may judge success as finishing in the top 50 (comparison with others/ego) or breaking two-and-a-half hours (quality/task). It is clear which is the preferred goal-orientation, since you may beat your PB but still finish outside the top 50 simply because you cannot control how other people run.

Not surprisingly, task-orientation has been shown to be related to higher levels of intrinsic motivation and persistence, while ego-orientation is more likely to be linked with anxiety (a barrier to flow).

Do external rewards threaten or even replace intrinsic motivation?

Since elite-level sport is highly competitive, involves competitive goal orientations and can shift the emphasis away from the activity towards the external rewards, some researchers have speculated that flow is more likely to be achieved by lower-level participants. Previous research has shown that extrinsic rewards, such as prize money, may reduce intrinsic motivation or even replace it, as the reason for participation changes and is perceived to be controlled by the reward.

With the relationship between flow and intrinsic motivation well established, anything that reduces the enjoyment and sense of self-actualisation may also reduce the chance of achieving flow. However, even though 81% of elite performers reported experiencing flow infrequently[2], at this stage it is still unclear whether their non-elite counterparts experience it more often.

Other recent work has suggested that some individuals are more likely to experience flow than others because of pre-dispositional (personality) factors such as goal-orientation, perceived sporting ability, competitive trait anxiety and intrinsic motivation.

Environmental factors might also need to be taken into consideration: a recent study of 1,231 aerobic dancers found that ratings of the motivational qualities of music during classes were significantly related to ratings of flow[8]. Music rated as more motivational may enhance enjoyment, and in activities where music is matched to movement participants are more likely to become immersed in the activity and experience positive effects. It is evident that more research is needed before firm conclusions can be reached about the most effective flow facilitators.

What about factors that might prevent flow? It is just as important to remove known obstacles to flow as it is to promote it through known facilitators. Factors associated with preventing flow have been identified as follows:

- physical problems such as injuries;
- mistakes by self or team-mates;
- distraction and loss of concentration;
- negative mental attitude;
- low confidence;
- low intrinsic motivation.

In conclusion, flow is closely related to peak performance and optimal experiences in sport and exercise settings and, as such, must be seen as a Holy Grail for athletes, coaches and sport psychologists alike.

It is obvious that flow doesn't just happen, since certain precursors have been noted. And it would be unrealistic to expect to achieve flow during every performance, since it appears to depend on interactions between a combination of mental, physical and environmental factors.

At this stage, it is impossible to predict with certainty when or if we will achieve such a state, and in many ways this is part of the intrinsic challenge of sport. We can, however, contrive to maximise our chances of experiencing this enviable state by preparing both mentally and physically to meet the challenges of competition and training.

Undoubtedly, flow is a difficult phenomenon to measure and cannot easily be quantified by psychometric techniques.

However, the development of measures such as the Flow State Scale-2 (FSS-2) offer the promise of future investigations and perhaps the establishment of more consistent routes towards peak experience and performance in sport.

Finally, it is important to bear in mind what factors are most strongly related to flow. By embracing the challenges of sport and enjoying the journey towards our goals, the intrinsic rewards we gain are likely to lead us automatically in the direction of more positive experiences.

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These pre-performance strategies will get a grip on your emotions before they get a grip on 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, 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 can't 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: and 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 good news for athletes who experience unhelpful emotions before competition is that you can gain more control by altering your focus of attention'

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, 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 is often necessary to inspire maximal performance'

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, it is clear to me 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 can't control. 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 major athletic events it is impossible to observe what is going on inside the minds of, say, sprinters, you can 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 believed to be essentially controlled by forces beyond the self.

Mental preparation

The mental build-up 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 like to use imagery to recall positive past experiences and generate a sense of confidence. Imagery is a very flexible technique 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 sense, 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, so 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] and/or read the article on this subject on page 11.

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 events 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 20-30 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 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 can only distract you if you let them. They do not have to negatively influence your mood if you can learn to let them go and refocus.

Sugar Ray Leonard lost it in more ways than one

Such distractions can by 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 is to ignore such comments, although that is easier said than done. If you feel yourself attending 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 behaviours you are falling into their trap and giving 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 his or her 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, 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, 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. Additionally/alternatively, remove yourself physically from the source of these distractions if possible.

'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'

Learning any physical skill takes time, effort and practice. Psychological skills are no different in this respect, so don't 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 don't 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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Team cohesion and success: is there really a link?

Many of you will consider this 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 sport psychology is to prove that teams with greater cohesion are more successful. And 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 this time. He and his colleagues set about developing a sounder tool, known as the Group Environment Questionnaire (GEQ).

'There is clearly more to the dynamics of the formation and workings of groups than how much the individual members like each other'

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. And the researchers' belief that it can effectively measure cohesion by analysing its different components has been endorsed by other research teams.

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.

Task cohesion and team success

Another example of this principle at work is the Chicago Bulls team, which dominated the US National Basketball Association (NBA) in the 1990s: the team members allegedly didn't 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'm 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; and the researchers believe this is because they focused on task cohesion using the GEQ, integrated individual scores to produce a team cohesion score, then related these scores to an indisputable measure of team success. All things considered, this unique study goes further than any before it to examine the importance of cohesion for success in team sports.

'Specifically, coaches could work on making sure that team members are clear about and happy with team goals and the level of shared commitment'

The implication of these findings is that coaches and sport 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 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.

Raphael Brandon

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When it comes to doing your best, it's 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 performances 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 sport 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 or losing, enjoying or hating your training, and may even impact on your decision to stay with an exercise programme.

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.

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, below)* might be more effective.

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[1]:

1. In general, association appears to be linked with faster running times;
2. Dissociation can reduce the sense of effort and awareness of physical sensations such as pain and fatigue – usually up to moderate-to-high intensity;

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 post boxes. 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.

3. Athletes of all levels appear to favour association in competition and dissociation in training;
4. Elite athletes tend to use both strategies during training and races, and are able to switch between the two, as required.

Which strategy is best?

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. And focusing on internal states like rhythmical breathing can help you feel more relaxed during physical activity *(see table 2, overleaf)*. But, on the down side, 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.

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

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's 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' and try 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.

more experienced fellow athlete. Try to decide between you what is the best approach 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's all perfectly logical once you get started: you wouldn't 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 like 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.

'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'

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 can't 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.

Don't 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

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How much do psychological factors contribute to the risk of injury in sport ?

Physical factors are obviously the prime cause of injuries in sports and exercise, but psychology researchers are now finding that thoughts, perceptions and even aspects of personality may be linked to the incidence of injury.

Let me illustrate this argument with a sporting example. In 1991, UK football star Paul Gascoigne, of Tottenhan Hotspurs, was stretchered off the field during the FA Cup final after committing a serious foul on Gary Charles of Nottingham Forest. Gascoigne suffered a complete rupture of the anterior cruciate ligament (ACL), which threatened his £5m transfer to Lazio in Italy.

If you viewed the incident in isolation, it was quite clear that the injury was sustained as a result of a completely mistimed challenge. It might, then, be thought of as the sort of accidental collision that happens from time to time in contact sports. However, if you look back at the match prior to this point you are presented with an entirely different explanation.

In subsequent interviews Gascoigne has admitted to being over-aroused (too psyched-up), and his actions on the field are consistent with a classic case of 'behavioural frenzy'. From the first minute, it was clear that he was pumped-up and intent on making his mark. However, this state of mind led to a number of impetuous challenges which culminated in a serious injury. In this case it is likely that psychological dysfunction did contribute to the outcome.

Looking at the research literature, it is evident that personality factors, stress levels and attitudes have all received

attention as possible psychological antecedents of injury[1]. In trying to unravel the relationship between psychological factors and injury, investigators have often taken a similar approach to geneticists, who tend to search for patterns or trends that establish relationships between two variables (such as a mutated gene and a specific disease) although the existence of such relationships does not necessarily imply causation. Similarly, psychologists have assessed the personalities of injured athletes to try to identify common factors that may be linked with incidents of injury.

Past research has viewed the relationship between athletic injuries and psychological factors as essentially stress-related[1]. In this context, stress is predicted to produce increased anxiety and, consequently, alterations in attentional focus and muscular tension.

Subjective responses to stress

It is important to note here that stress is a subjective concept, in that not all people respond negatively to potentially stressful situations; one person may view a championship match as exciting and exhilarating while another sees it as a trigger for anxiety and 'choking'. Such responses usually depend on the individual's personality traits and coping responses.

The importance of coping mechanisms will be considered later in this article, but at this point it is useful to point out that between stress and its consequences lie individual coping strategies. Learning to cope with stress can prevent such negative reactions as attentional disruption and muscular tension, both of which are thought to increase the chances of injury.

Having a flexible attentional focus is an important attribute in many fast sporting activities that require both narrow focus (*eg* on a single environmental cue) and broad focus (on peripheral cues such as the positioning of other team members or opponents) at different times during play. Stress can cause attentional narrowing, which results in important peripheral cues being missed. For example, the football player who attends only to the ball may fail to withdraw from an unrealistic

challenge in which his opponent is obviously going to meet the ball first, giving rise to a late tackle and/or injury.

A significant body of past evidence also supports the notion that stress can increase muscular tension, which disrupts coordination and increases the risk of injury. For example, a figure-skater who becomes tense during a difficult routine might lose coordination as a result of muscular tension and consequently fall.

One important model that highlighted the stress-injury relationship cited both situational factors and personal characteristics as important determinants of outcome[2]. An athlete who tends to view situations as threatening, who has a history of life stressors and has poor coping resources is considered more likely to experience a negative stress response and, consequently, is more prone to athletic injury.

Although the relationship between stress and injury is complex, one large study of 452 athletes showed that, as predicted, athletes with more life stress, little social support and poor coping skills experienced most days of non-participation due to athletic injury[3].

The role of personality

Some researchers have been quick to associate personality traits with athletic injury. However, research on personality in sport and exercise has been controversial, plagued by inappropriate and inconsistent research methods and grossly over-generalised application of results. Unfortunately, many psychologists have adopted polarised stances that ascribe either great significance or no significance at all to the role of personality.

Many contemporary researchers are beginning to take the middle ground and suggest that the truth lies somewhere between these two positions. Nevertheless, the research findings to date are difficult to interpret due to inconsistencies, and the relationship between personality and injury remains unclear. It would seem unlikely that a personality category of 'injury-prone' athletes actually exists, although some studies have identified patterns/trends that appear to warrant further investigation[4].

One recent study identified injured college gymnasts as emotionally unstable and disturbed, stress prone and lacking in self control – a finding that appeared to support the stress-injury model mentioned above[5]. Other research has shown a readiness to take risks (lack of caution, spirit of adventure) as characteristic of injured athletes, although no causal relationship has been established. Some recent reviewers believe that personality characteristics impact on injury by either buffering or exacerbating the stress response[6].

Given all these inconsistencies and differences of opinion, it is likely that any link between personality and injury is an indirect one.

The role of attitude

In work with injured athletes, some sport and exercise psychologists have suggested that certain attitudes might predispose athletes to injury[7]. According to them, some of the gung-ho attitudes coaches often seek to instill can backfire in terms of injury. For example, strong motivational messages like 'no pain, no gain' and 'give 110%' might unwittingly lead athletes to take undue risks.

In many sports, participants need to be assertive and play hard, but within safe limits, employing appropriate techniques and strategies. This doesn't just apply to those involved in contact sports, since many other athletes suffer overuse injuries or fall victim to overtraining in attempting to go through the pain barrier.

A study cited by Weinberg and Gould illustrates perfectly why giving 110% does not always produce the best performances[1]. The study involved 400m runners who were asked to run all-out during a timed trial (giving 110% effort). A few days later the same runners were asked to complete a second run, this time at 95% of their capacity. Interestingly, runners' times were quickest during the 95% effort. The authors concluded that attempting to run beyond their capacity led to increased muscular tension, which compromised the coordination of muscles.

A second attitude associated with injury (especially in team situations) is the notion of 'worthlessness'. When an athlete sustains a minor injury that requires both treatment and rest, he/she may feel worthless as a result of not being able to contribute to winning. If the coach unwittingly reinforces this feeling, the performer might decide to risk playing through the injury in order to remain part of the team.

There are times when a coach must insist on injured players receiving treatment and sitting-out the competition for the benefit of all concerned. In such cases, he or she should be careful to reassure the players that their contribution to the team will be greater with early treatment and quick recovery than with the lengthier rehabilitation that will be needed after playing through injury.

'The most consistent psychological factor related to injury seems to be stress. It therefore follows that the ability to cope with stress can act as an essential buffer against injury'

The most consistent psychological factor related to injury seems to be stress. It therefore follows that the ability to cope with stress can act as an essential buffer against injury. Although the causes of stress can arise both inside and outside the sporting arena, and the coping mechanisms used by athletes appear to vary considerably[8], one of the most fundamental buffers to stress appears to be social support from significant others. This can include a variety of supporters (coach, parents, partner, sport psychologist, *etc*) and a range of different approaches, from formal counselling to simply 'being there'.

An in-depth exploration of coping responses is far beyond the scope of this article, but such approaches as stress-inoculation training, cognitive affective stress management and systematic desensitisation, employing such applied techniques as progressive muscular relaxation, meditative relaxation, and cognitive restructuring, are commonly cited in applied sport psychology texts.

However, there are some simple approaches that coaches can use to help athletes deal with stress 'in the moment', as follows:

- Maintain consistent behaviour. A coach can transfer tension and nervousness to athletes by behaving differently during competition than in practice situations;

- Help athletes to embrace challenge and view pressure situations in a positive light as a chance to excel. To this end, it is important to help athletes focus on what needs to be done in the present rather than on past events or future possibilities;
- Familiarise athletes with competitive conditions by setting up simulated practice situations;
- Plan strategy and tactics in advance to reduce the uncertainty which is often a root cause of anxiety;
- Encourage athletes to take their time. When athletes feel stressed they often rush their actions. Practise simple activities, such as breathing control, as a means of refocusing on the task in hand and remaining calm during breaks in play.

Lee Crust

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WHAT THE SCIENTISTS SAY

Reports on recent psychology-related studies by Isabel Walker and Lee Crust

Choking under pressure

What causes skilled and experienced athletes to 'choke' under the many pressures of competition? This question has been investigated by a team of Australian researchers, who set out to examine the role of self-consciousness and trait (or dispositional) anxiety as predictors of choking in sport.

Choking has been defined as 'performance decrements under pressure circumstances' and is thought to occur when a performer focuses in a conscious way on skills that have become automatic, with a detrimental effect on performance.

In the Australian study, 66 student basketball players completed questionnaires designed to measure self-consciousness and sport anxiety before completing 20 free throws under two different conditions:

1. Low pressure – observed only by a research assistant with no consequences attached to performance;
2. High pressure (about one hour later) – videotaped, observed by an audience and with a performance-contingent financial incentive.

The hypothesis was that performance would decline under pressure and that performers displaying high self-consciousness and/or trait anxiety would be most susceptible to choking.

In fact there was an overall decline in performance from the low pressure to the high pressure condition, with a mean score (successful shots out of 20) of 13.56 under low pressure, falling to 12.53 under high pressure. Of the 66 participants, 35 had a lower score under pressure, seven scored the same and 24 scored better.

When analysing the relationship of self-consciousness and sport anxiety ratings and free throw scores, the researchers made the following findings:

- As expected (but contrary to some previous research) high self-conscious participants were more likely to choke than their low self-conscious counterparts;
- This tendency was particularly evident for the private self-consciousness sub-scale (where attention is directed inwards, to private thoughts and feelings, as opposed to public self-consciousness, where attention is directed to the self as the object of others' awareness);
- In terms of trait anxiety, only somatic trait anxiety (measuring physical feelings, *eg* jitteriness) was a significant predictor of choking.

Because a significant minority of the participants actually improved their performance under pressure, the researchers believe that a good deal could be learned by studying athletes who are 'choking-resistant'.

'Finally,' they conclude, 'intervention studies are needed to examine whether athletes can be inoculated to choking effects and to test the efficacy of choking recovery strategies. Specific techniques to ameliorate choking would most likely benefit the many athletes who experience choking and hence suffer diminished enjoyment or social anxiety.'
J Sci Med Sport 2004; 7:2:174-185

Bodybuilding dependence – not just a problem for men

Bodybuilding dependence appears to affect male and female bodybuilders equally, despite previous claims that it is predominantly a male problem. This was a key finding of a UK study set up to test the validity of the nine-item bodybuilding dependence scale, correlate it with previously validated exercise dependence measures and investigate differences between men and women and between competitive and non-competitive bodybuilders.

The researchers point out that, although exercise dependence appears to be common among bodybuilders, it has received far less attention from research psychologists than dependence in distance runners and other aerobic performers.

'However,' they explain, 'many differences exist in the motivations and psychological characteristics of bodybuilders compared with other

exercising populations. Therefore, the results of this exercise dependence research cannot necessarily be generalised to bodybuilders.'

A total of 285 bodybuilders were divided into four categories – male and female competitive bodybuilders and male and female non-competitive bodybuilders – to complete the following:

- The bodybuilding dependence scale (BDS) – a nine-item measure incorporating three subscales: social dependence, training dependence and mastery dependence;
- The exercise dependence questionnaire (EDQ) – a 29-item measure designed to assess the extent of exercise dependence and incorporating such factors as interference with social life, withdrawal symptoms, exercise for weight control and stereotyped behaviour;
- The muscle dysmorphia inventory (MDI) – a 27-item questionnaire, measuring distorted body image (whereby people see themselves as punier – in this case – than they actually are).

Analysis of the data provided strong support for the three-factor model of bodybuilding dependence. 'It therefore appears,' comment the researchers, 'that this phenomenon is indeed multifaceted, involving dependence on the social aspects of bodybuilding training (social dependence), the actual weight training itself (training dependence) and a desire to exert control over training schedules (mastery dependence).'

The validity of the BDS was strongly supported by significant correlations with the MDI subscales and with five of the eight EDQ subscales.

As the researchers had hypothesised, the competitive bodybuilders scored significantly higher on all three BDS subscales than their non-competitive counterparts. 'Preparing for bodybuilding competition is an extremely arduous activity,' they point out, 'and those who possess an obsessive attitude towards their bodybuilding are far more likely to participate in such competition than bodybuilders whose approach is more casual.'

Less expected was the finding that bodybuilding affects male and female bodybuilders (whether competitive or non-competitive) in equal measure.

Previous claims that muscle dysmorphia and exercise dependence are a predominantly male concern in western society may be unfounded, conclude the researchers.

'Therefore, doctors and sport psychologists should be alert to possible exercise dependence in female bodybuilders who present with relevant symptoms such as overuse injuries, severe withdrawal symptoms when unable to train, training when ill or injured, and training interference with family and friends.'

Br J Sports Med 2004;38:17-181

Thought suppression – a paradoxical effect

Pay attention now: don't think about the referee and his biased decisions. Are you succeeding in not thinking about him? If you have ever tried to suppress disruptive or irritating thoughts, you will know that it is easier said than done – and recent research suggests we might actually achieve the opposite, just as trying hard to go to sleep may actually serve to keep us awake.

A team of researchers from the University of Western Australia have examined the dubious benefits of thought suppression in a sporting context in two studies using videotaped clips of Australian Rules Football.

In the first study, involving 102 undergraduates, participants watched a video with short sequences focusing on players, coaches and umpires, and were then asked to complete a brief questionnaire to assess their awareness of target images. Before this task, they were divided into three groups, as follows:

- **General** – asked simply to view the video and answer a questionnaire describing what they had seen;
- **Suppression of intention to harm** – additionally asked not to pay attention to players attempting to harm others;
- **Suppression of umpires** – asked not to pay attention to umpires.

The researchers also manipulated 'cognitive load' (played distracting background noises to simulate increased stress levels) to test the theory that stressful conditions would aggravate the difficulties of thought suppression.

As predicted, analysis of the results revealed that subjects asked to suppress their attention to umpires actually paid more attention to them than those whose thoughts were allowed to roam freely. However, this effect was not apparent in the group asked to suppress awareness of intention to harm, and was not aggravated by distracting external stimuli.

The researchers offer two possible explanations for this discrepancy: first, there were significantly fewer 'intention to harm' images than those featuring umpires; secondly, intention to harm may have been too subjective a focus to be interpreted meaningfully by the students.

The research was later extended using a further 64 students, who viewed the same footage but were assigned to one of just two conditions:

- Suppression of umpires, as in the first study, and
- Suppression of umpires plus cue word (a word to aid refocusing of attention to task-relevant cues, such as the ball).

The results of this study showed that under conditions of high cognitive load (with distracting background noise – considered similar to that of stressful conditions) the additional use of a task-relevant cue word was significantly more effective in suppressing unwanted focus than suppression alone (36% v 65%).

A suggested explanation for these findings is that when thought suppression is attempted without a new focus, the unwanted thought is likely to return quite quickly. The key to effective thought-suppression thus seems to be replacing the undesired thought with a preferred option.

From a practical viewpoint, this research demonstrates that thought-suppressing techniques have to be carefully applied. Simply instructing someone not to attend to a distracting stimulus may be ineffective or, even worse, damaging to performance. To gain maximum benefit from the process, the Australian researchers argue that it is essential – especially in conditions of high stress – to follow any attempts to clear the mind and stop unwanted thoughts with an effort to refocus on a task-relevant cue.

Journal of Sport and Exercise Psychology, 24, pp306-319

How encouragement boosts performance

Offering verbal encouragement to athletes attempting maximal effort is entirely instinctive. Indeed it is almost impossible to imagine a situation in which coaches, parents, fellow athletes and friends would stand silent on the sidelines, instead of shouting out such motivators as: 'keep it going', 'go for it', 'push it' and other such urgings.

But what evidence do we have that this form of verbal encouragement actually works? Very little, according to a team of US researchers, who decided to test the value of verbal encouragement in a controlled study.

They explain: 'Although the use of encouraging statements is a ubiquitous feature of maximal exercise testing, few studies have examined the effects of frequency of encouragement on exercise performance. Those that have…have not provided sufficient procedural details to evaluate these effects. Furthermore, no study has systematically varied the frequency of verbal encouragement. The aim of this study was to determine the effects of frequency of verbal encouragement on exercise performance.'

A group of 28 students (12 men and 16 women) performed a treadmill test designed to elicit a maximal effort in less than 12 minutes without any verbal encouragement. At the end of each three-minute exercise stage, ratings of perceived exertion (RPE) were recorded and blood samples taken. The test ended when the participant either attained VO2max or became exhausted.

The participants were then placed into one of four experimental groups, each matched for overall fitness, and performed a second exercise one week later.

During this test, the control group received no verbal encouragement at all, while the other three groups received verbal encouragement over 20, 60 and 180 seconds respectively, beginning with stage 3 of the exercise test – *ie* after six minutes.

Verbal encouragement consisted of a set of encouraging statements read from a prepared text. These statements, including 'Way to go!', 'Come on!', 'Good job!', 'Excellent!', 'Come on, push it!', 'Keep it up!' and 'Let's go!', were rehearsed by the investigators beforehand, kept at a constant volume and accompanied by hand clapping.

For each group, comparisons were made between the two tests for key variables, including relative VO2max, exercise time, blood lactate concentration, respiratory exchange ratio (RER) and ratings of perceived exertion (RPE), with the following results:

- There were no significant differences between one test and the other for the control group (no verbal encouragement) and the '180E' group (infrequent encouragement);
- The second test values of the '60E' group were significantly higher than their first test values for relative VO2max, blood lactate concentration, RER and RPE;
- The second test values of the '20E' group were significantly higher on all these measures and also for exercise time.

'The results suggest,' conclude the researchers, 'that frequent verbal encouragement (every 20 and 60secs in the present study) leads to significantly greater maximum effort in a treadmill test than when no encouragement is given or when the encouragement is infrequent…'

But what were the psychological mechanisms behind this increased maximal effort? The researchers, who can only speculate, offer several possible explanations:

1. Talking to the participants might have distracted them from the discomfort of the test and made it less 'aversive' (the so-called dissociative strategy);

2. Some of the encouragement statements (*eg* 'Excellent!' and 'Good job!' can be seen as 'positive reinforcers', helping to maintain the running response;

3. Others (*eg* 'Come on!', 'Keep it up!' and 'Let's go!' resembled instructional commands, which might lead to greater response effort since most people have a history of following instructions;

4. Some of the statements might have acted as 'establishing operations', increasing the value of the stimuli that reinforce running on the treadmill (*ie* achieving a competitive goal, looking good, avoiding failure).

'The mechanisms by which these effects are mediated are clearly complex and should be addressed in future research,' the researchers acknowledge.

J Sports Sci 2002 Apr 20(4) 345-52

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