SPORTS PSYCHOLOGY II

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A CIP catalogue record for this book is available from the British Library.

Printed by: PLP Commercial Printers
Impressions House, 3-7 Mowlem Street, London E2 9HE

Published by P2P Publishing Ltd

Registered office: 33-41 Dallington, London, EC1V 0BB
Tel: 0845 450 6402
Registered number: 06014651

ISBN: 978-1-905096-24-4

Publisher Jonathan A. Pye
Editor Sam Bordiss
Designer Charlie Thomas

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From the editor

Sport Psychology is a constantly evolving science that athletes and coaches need to get their head around; otherwise they'll be left with a headache and a runners-up medal. The importance and development of sports psychology is signified by the publication of this special report, the first 'sequel' in the series.

This special report starts with two chapters on motivation, which is appropriate because the first thing an athlete needs if he or she wants to be successful is motivation! You may find that lessons on motivation can be applied to all walks of life, not just in the sporting arena.

These chapters are followed by research on the importance of half-time, the relationship between dieting and moods and the values of attributing success and failure. Finally there are two two-part chapters, the first of which tackles emotional intelligence, with the second taking an in-depth look at imagery and ergogenic aids. Plenty to be getting your head round then!

To understand better how an ageing Muhammad Ali defeated the stronger champion George Foreman in 1974, how Donald Bradman was able to average 99.94 in test cricket, how Lance Armstrong won the Tour de France seven consecutive times following cancer or how Jack Nicklaus won 18 golf majors, read more about sport psychology, after all, it's all the mind.

I hope you find this special report to be both enlightening and applicable to your training, and engineer success in future performances.

Sam Bordiss
Editor

The Motivational Dynamics of Sport

Introduction

Motivation is an internal energy force that determines all aspects of our behaviour; it also impacts on how we think, feel and interact with others. In sport, high motivation is widely accepted as an essential prerequisite in getting athletes to fulfil their potential. However, given its inherently abstract nature, it is a force that is often difficult to exploit fully. Some coaches, like Portugal manager Luiz Felipe 'Big Phil' Scolari, appear to have a 'magic touch', being able to get a great deal more out of a team than the sum of its individual parts; others find motivation to be an elusive concept they are forever struggling to master.

What is it that makes individuals like the 45-year-old sprinter Merlene Ottey, who competed in her seventh Olympics in Athens 2004, churn out outstanding performances year in, year out? Elite athletes such as Ottey have developed an ability to channel their energies extremely effectively. Indeed, motivation is essentially about the direction of effort over a prolonged period of time.

There are numerous approaches to the study of motivation. Some are based on schedules of positive and negative reinforcement (*eg* BF Skinner's and Ivan Pavlov's behaviourism) while others focus on an individual's sense of mastery over a set of circumstances (*eg* Albert Bandura's self-efficacy theory). This article explores the constituents of motivation using a contemporary approach, popularised by Americans Edward Deci and Richard Ryan, known as self-determination theory, which emphasises the role of individual choice.

This article will also outline some of the key findings from recent literature and provide four evidence-based techniques

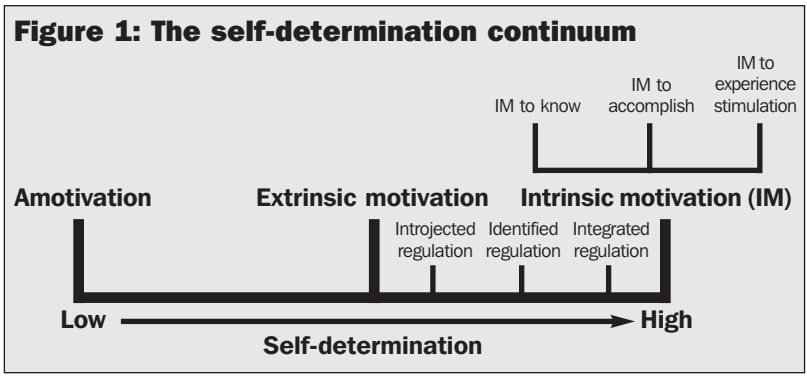
relating to the enhancement of motivation. You will be able to tailor the motivational techniques to enhance your participation in sport or the performance of others. You will learn that motivation is a dynamic and multifaceted phenomenon that can be manipulated, to some degree at least, in the pursuit of superior sporting performance.

Different types of motivation

One of the most popular and widely tested approaches to motivation in sport and other achievement domains is self-determination theory[1-3]. This theory is based on a number of motives or regulations, which vary in terms of the degree of self-determination they reflect. Self-determination is the degree to which your behaviours are chosen and self-initiated. The behavioural regulations can be placed on a self-determination continuum (see Figure 1 below). From the least to the most self-determined they are amotivation, external regulation, introjected regulation, identified regulation, integrated regulation and intrinsic motivation.

Amotivation represents a lack of intention to engage in a behaviour. It is accompanied by feelings of incompetence and a lack of connection between one's behaviour and the expected outcome. For example, an amotivated athlete might be heard saying, 'I can't see the point in training any more – it just tires me out' or 'I just don't get any buzz out of competition whatsoever'.

Figure 1: The self-determination continuum



Such athletes exhibit a sense of helplessness and often require counselling, as they are highly prone to dropping out.

External and introjected regulations represent non-self-determined or controlling types of extrinsic motivation because athletes do not sense that their behaviour is choiceful and, as a consequence, they experience psychological pressure. Participating in sport to receive prize money, win a trophy or a gold medal typifies external regulation. Participating to avoid punishment or negative evaluation is also external. Introjection is an internal pressure under which athletes might participate out of feelings of guilt or to achieve recognition.

'Self-determination is the degree to which your behaviours are chosen and self-initiated'

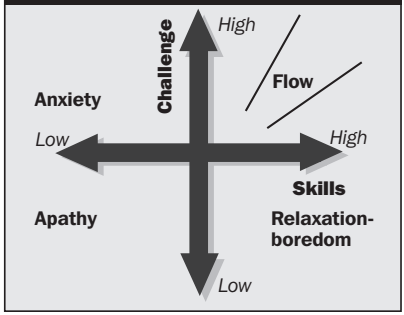
Identified and integrated regulations represent self-determined types of extrinsic motivation because behaviour is initiated out of choice, although it is not necessarily perceived to be enjoyable. These types of regulation account for why some athletes devote hundreds of hours to repeating mundane drills; they realise that such activity will ultimately help them to improve. Identified regulation represents engagement in a behaviour because it is highly valued, whereas when a behaviour becomes integrated it is in harmony with one's sense of self and almost entirely self-determined. Completing daily flexibility exercises because you realise they are part of an overarching goal of enhanced performance might be an example of integrated regulation.

Intrinsic motivation comes from within, is fully self-determined and characterised by interest in, and enjoyment derived from, sports participation. There are three types of intrinsic motivation, namely intrinsic motivation to know, intrinsic motivation to accomplish and intrinsic motivation to experience stimulation. Intrinsic motivation is considered to be the healthiest type of motivation and reflects an athlete's motivation to perform an activity simply for the reward inherent in their participation.

Flow: the ultimate motivational state

According to Hungarian psychologist Mihalyi Csikszentmihalyi, the highest level of intrinsic motivation is flow state [4, 5]. Flow is

Figure 2: Illustration of flow theory (Csikszentmihalyi, 1975, 1990)



characterised by complete immersion in an activity, to the degree that nothing else matters. Central to the attainment of flow is a situation in which there is a perfect match between the perceived demands of an activity and an athlete's perceived ability or skills (*see Figure 2*). During flow, self-consciousness is lost and athletes become one with the activity. For example, a World champion canoeist I work with often describes how the paddle feels like an extension of her arms while she is in flow.

An overbearing or unrealistic challenge can cause excess anxiety, which means that coaches need to ensure that athletes set realistic goals. Conversely, if athletes bring a high level of skill to an activity and the challenge that it provides is relatively low, such as Brazil's Ronaldinho playing in a minor football league, this can result in boredom. The final quadrant in Figure 2 shows apathy, which transpires when both challenge and skill are low. To promote flow, it is important to find challenges that are going to stretch athletes just a touch further than they have been stretched before.

Recent motivation research based on Self Determination Theory

A study examining the relationship between athletes' goal orientations and their levels of intrinsic and extrinsic motivation indicated that British collegiate athletes with task-related or personal mastery goals were far more likely to report high self-determination than athletes with ego-orientated or social comparison-type goals[6].

The study provided tentative support for the proposition that focusing on personal mastery and self-referenced goals promotes intrinsic motivation to a greater degree than focusing

on winning and demonstrating superiority over others. This has important implications for practitioners who work with children, given the wealth of evidence that suggests that a focus on personal mastery and intrinsic motivation (enjoyment) brings the most positive motivation outcomes [7,8].

A very recent study showed that during competition deemed to be important, intrinsically motivated athletes developed task-oriented (positive) coping strategies[9]. Conversely, extrinsically motivated athletes tended to avoid dealing with key issues and were far less likely to achieve their goals. In another study, researchers adopted a qualitative approach to answer the question 'why does the "fire" of elite athletes burn so brightly?'[10]. They sought to demystify the differences between high achievers and also-rans in the world of sport. Their interviews with 10 elite Australian track and field athletes revealed three overarching themes:

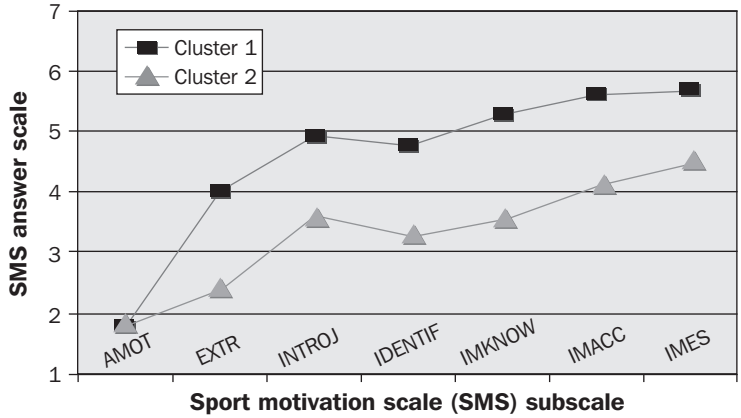
'Without high intrinsic motivation, athletes are likely to drop out when they encounter problems'

- Elite athletes set personal goals that were based on both self-determined and extrinsic motives;
- They had a high self-belief in their ability to succeed;
- Track and field was central to their lives – everything rotated around their involvement in the sport.

Using a statistical procedure known as 'cluster analysis', colleagues and I have identified two types of 'motivation profile'[11]. The first was characterised by high levels of both controlling and self-determined types of behavioural regulations and the second by high self-determined and low controlling motivation. A comparison of the two profiles on the motivation outcomes of enjoyment, effort, positive and negative affect, attitude towards sport, strength and the quality of behavioural intentions, satisfaction, and frequency of attendance showed that participants in the first profile reported higher levels on all eight positive consequences when compared to those in the second profile.

This finding suggests that the simultaneous presence of high extrinsic and high intrinsic motivation is likely to yield the most positive benefits for adult athletes. However, it is critical that

Figure 3: Comparison of two sport motivation profiles (from Vlachopoulos and Karageorghis, under review)



Note: AMOT = Amotivation, EXTR = External regulation, INTROJ = Introjected regulation, IDENTIF = Identified regulation, IMKNOW = Intrinsic motivation to know, IMACC = Intrinsic motivation to accomplish, IMES = Intrinsic motivation to experience stimulation. Participants in Cluster 1 consistently exhibited the best motivation outcomes.

extrinsic motives are nurtured on a firm foundation of high intrinsic motivation. Without high intrinsic motivation, athletes are likely to drop out when they encounter problems such as injury, non-selection or demotion.

We conducted a follow-up study confirming the profiles identified in 2000 and came up with a similar solution (*see Figure 3*) using a new sample of adult athletes[12]. Importantly, we found that participants in cluster 1 also reported better concentration on the task at hand.

Motivational techniques for coaches and athletes

1. Goal setting

- Athletes should be encouraged to set a few ambitious but achievable long-term goals; perhaps to represent their country in a major championship in three or four years. Through empowering athletes to set their own goals, they are more likely to accept the challenges that lie ahead and pursue the goals with enthusiasm[13];

- To keep athletes on track with their long-term goals, they should also set appropriate medium-term goals. For example, following a bronze medal-winning performance at the 2004 Athens Olympics, UK heptathlete Kelly Sotherton set herself the medium-term goal of winning the 2006 Commonwealth title in Melbourne (which she achieved) en route to pursuing her long-term goal to be crowned Olympic champion at the 2008 Beijing Games;
- By far the most important goals in practical terms are those for the short-term, as it is these that keep athletes focused on the checkmarks which are seminal to achieving superior performance. Therefore, short-term goals should be predominantly process-oriented. For example, when Manchester United's Wayne Rooney injured a metatarsal six weeks before the start of the soccer World Cup, he set a series of process goals in his race to regain full fitness. These included daily physiotherapy sessions, remedial exercises in an oxygen chamber, non weight-bearing aerobic activities, monitoring of nutritional intake and so on;
- Goals need to be monitored and revised on a regular basis. One of the biggest mistakes that coaches make in setting goals is that they are often too rigid in their approach. The goal setting process works best when there is some flexibility and the individual athlete or team take ownership of each goal. Thus, coaches and managers are better off exercising some democracy when setting goals, particularly if working with more experienced athletes.

'A reward should be informational in nature rather than controlling'

2. Using extrinsic rewards

According to SDT[1], the key aspect in using extrinsic rewards effectively is that they reinforce an athlete's sense of competence and self-worth. Thus, a reward should be informational in nature rather than controlling. If a reward comes to be controlling, it can significantly undermine intrinsic motivation. For a reward to be informational, it is advisable that it has relatively little monetary worth (*ie* it is a token reward), such as a 'woman of the match' or 'athlete of the tour' title. Also,

the reward should be presented to an athlete in front of all potential recipients with some emphasis placed on the prestige associated with it. Other popular ways of using token rewards include etching athletes' names on annual honours boards for their contributions, or awarding a special item of clothing.

3. Motivational music

A particularly good way to motivate athletes in training and prior to competition is through the use of music they perceive to be inspirational. Sydney Olympics rowing gold medallist, Tim Foster, now a respected coach, uses music to punctuate all of the indoor training sessions that he leads. Specifically, during circuit training or rowing ergometer intervals, he puts on loud/fast music, while during recovery periods he plays soft/slow music. Therefore, work and recovery times are regulated by music. Research from Brunel University indicates that this approach increases work output, reduces perceived exertion and improves in-task affect – the pleasure experienced during the activity[14,15].

4. Positive self-talk

Positive self-talk is a technique that can be used to enhance motivation across a wide range of achievement domains. It makes use of an athlete's powerful inner voice to reinforce their self-esteem or important aspects of their performance. With appropriate repetition, self-talk can positively alter an athlete's belief system. I use three types of self-talk in my work with athletes and will illustrate each with an example to assist you in coming up with your own.

The first type is known as task-relevant self-talk, which serves to focus an athlete's attention on the task at hand. A karateka I worked with used the mantra 'pillar of power' to reinforce his strong posture. The second type is known as mood-related self-talk, which impacts on how athletes feel. An international water skier came up with 'butterflies in formation' to represent how the butterflies in her tummy would work for her rather than against her. The third type is known as a positive self-affirmation

statement and the most famous exponent of these was the legendary boxer Mohammed Ali who repeated the claim, 'I am the greatest' so many times that even his opponents believed it.

Summary

Each and every one of us has an untapped energy source that can be drawn upon to bring about superior results. Enhancing motivation is fundamentally about a change of attitude, developing a positive 'can do' mindset and engaging in systematic behaviours – the short-term process goals – that facilitate improvement. If you have a leadership role in sport you will have considerable influence on how motivated your athletes or team might feel. You can instil a good work ethic, recognise individual effort and instigate transparent reward structures that reinforce people's sense of competence. To work best, the techniques mentioned in this article need to be moulded around specific circumstances and the needs of individual athletes. Always strive to be original and innovative in the application of motivational techniques.

"I figured that if I said it enough, I would convince the world that I really was the greatest." **Muhammad Ali**

Dr Costas Karageorghis is a senior lecturer in sport psychology at Brunel University, where he also manages the athletics club. He has published extensively in the area of the motivational dynamics of sport and has been a BASES accredited sport psychologist for 10 years

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To create a positive motivational climate you need more carrot than stick

Introduction

The motivation for participating in sport and striving for improvement is likely to vary considerably from person to person. Indeed, most people have multiple motives rather than single reasons. For example, a tennis player might be attending individual coaching sessions to improve her ranking in order to demonstrate competence, repay the support of her parents and qualify for more prestigious tournaments offering more prize money! Sometimes these multiple motives reinforce each other, but at other times they can cause internal conflicts – as with the young athlete who feels pulled between his athletic career and his academic studies – and then something has to give!

One of the major difficulties for coaches working with groups of athletes with diverse motives and goals is to create a motivational climate that facilitates the development of all these motives – or at least as many as possible. If anyone tells you this is easy, they are lying. As well as being flexible, you will need to have a good grasp of some of the fundamental principles of motivation and knowledge of how to apply them.

Motivation has been defined as 'the direction and intensity of ones efforts'[1]. Direction refers to the decision to commit and to turn up to training on a regular basis. The intensity dimension is about how much people are prepared to give in each training session. In sport, these dimensions are often related, with committed individuals attending training on a regular basis and working hard during their sessions.

Some coaches believe that motivation is a fixed personality

trait or characteristic – that you either are or aren't a motivated athlete. In fact, though, motivation is not quite that cut and dried since the motivational climate created by the coach will impact on the motivation of the athletes under his or her guidance.

'In sport, direction and intensity are often related'

In many ways it's a matter of fit. For example, when I was a teenager I harboured dreams of being a professional football player. However, the main reasons I played football were because I enjoyed it and because I wanted to master my chosen position of goalkeeper. I remember playing for two clubs during this period, under coaches whose approach to training and motivation could not have been more different.

The first coach acted like a drill sergeant in training, continually shouting instructions and berating players for the smallest of mistakes. His motivational climate was one of fear and intimidation, in which players became afraid to make mistakes. Feedback would usually focus on what had gone wrong and praise was rarely offered. As a group we quickly came to understand that when the coach stopped shouting he was satisfied. Here was a coach determined to remain in control and achieving his aims by intimidation. Although he was reasonably successful, most players disliked him and I soon felt it was time to move on.

This example demonstrates the negative approach to coaching and motivation, which relies on negative reinforcement to shape behaviour, so that players do exactly what the coach requires in order to avoid punishment and/or humiliation.

I enjoyed my training much more and, more importantly, played much better football when I went on to work with a coach whose approach was primarily positive. Rather than using negative reinforcement and punishment, the positive approach focuses on using rewards (such as praise) to reinforce the behaviour desired by the coach.

Reinforcement and punishment

It is important to understand the principles that underlie these two polarised approaches to coaching. The work of the

psychologist BF Skinner has led to a more complete understanding of what is termed operant conditioning, whereby behaviour becomes either more or less likely depending on its consequences[2]. The theory is that if you reward or reinforce behaviours they are more likely to occur again, while punishment is more likely to reduce the chances of that behaviour occurring in future. Both rewards and punishments can be used as motivators.

Now here's the part where people get confused, because the carrot-and-stick approach is less straightforward than you might think. Reinforcements and punishments can be either positive or negative. However, to avoid confusion, you must think of positive and negative in this case in terms of either adding something or taking something away, not in terms of good or bad (*see box and table overleaf*).

From these examples it is evident that there are positive and negative ways to coach. Whereas the negative approach focuses primarily on punishing unwanted behaviours, often by creating a climate of fear, the positive approach centres on looking for things that are done well and rewarding them with positive reinforcement[3]. Depending on the approach used, players are motivated either to avoid making mistakes or to repeat desired responses.

'A positive approach is as demanding as a negative one'

As you might expect, most coaches will use both reinforcements and punishments to encourage optimal motivation and shape desired behaviours.

Sport psychology research evidence overwhelmingly supports the use of a predominantly (80-90%) positive approach[4], with punishment kept to a minimum[5]. Behavioural modification techniques based on positive reinforcements have been successfully used to increase output during training sessions[6], improve performance[7], and reduce errors[8].

It's at this point in my lectures that some students tell me that they prefer a more authoritarian coach, even one who shouts. That way they know what is expected of them – and that there will be negative consequences if they fail to live up to those expectations.

How operant conditioning works[5]

Whereas *classical* conditioning works by forming an association between two stimuli (*eg* a 'clicker' and a treat in dog training), *operant* conditioning forms an association between a behaviour and a consequence.

There are four possible consequences to any behaviour, as follows:

- Something good can start or be presented;
- Something good can end or be taken away;
- Something bad can start or be presented;
- Something bad can end or be taken away.

Anything that *increases* a behaviour – makes it occur more frequently, makes it stronger or makes it more likely to occur – is termed a *reinforcer*. Normally a person will perceive 'starting something good' (positive reinforcement) or 'ending something bad' (negative reinforcement) as worth pursuing and will repeat the behaviours that seem to cause these consequences.

Anything that *decreases* a behaviour – makes it occur less frequently, makes it weaker, or makes it less likely to occur – is termed a *punisher*. Normally a person will perceive 'ending something good' (negative punishment) or 'starting something bad' (positive punishment) as worth avoiding and will not repeat the behaviours that seem to cause these consequences.

Note that these definitions are based on their actual effect on the behaviour in question – *ie* they must reduce or strengthen the behaviour to be defined as punishment or reinforcement. Pleasures meant as rewards that do not strengthen a behaviour are indulgences, not reinforcers; would-be punishments that do not weaken a behaviour are classified as abuse.

These processes are illustrated in graphic form in the table opposite.

However, it is important to point out that a positive approach doesn't mean being 'laid-back', having few rules and even fewer expectations of your athletes: far from it. A positive approach is as demanding as a negative one, except that rewards tend to predominate over punishments as the route to better performance.

I have met a few athletes who feel motivated by punishment. However, I have yet to meet an athlete who doesn't enjoy being on the receiving end of praise, a positive gesture – like a pat on the back – or a positive non-verbal signal, like a smile or an

Types of reinforcement and punishment

	Stimulus added	Stimulus removed
Behaviour increases	*Positive reinforcement* Giving praise to a football striker for a quick turn and shot at goal makes this behaviour more likely to occur again.	*Negative reinforcement* A coach who continually shouts criticism at his players becomes quiet and thus conveys his satisfaction. More likely to occur again.
Behaviour decreases	*Positive punishment* A coach who generally praises her players, criticises some sloppy marking. Players become aware that the coach is unhappy and will strive to avoid a repeat.	*Negative punishment* A coach who usually gives lots of praise and encouragement withdraws this type of feedback. Players perceive that the coach is not happy and this acts as a type of punishment.

approving nod of the head.

A predominantly positive approach to coaching will sometimes involve punishment. If, for example, one of your athletes has been late for training a number of times you might need to criticise them in order to ensure better time-keeping in future. Letting someone know you are unhappy is perfectly justified – as long as you limit your criticism to the particular behaviour that has made you unhappy rather than indulging in more general character assassination.

Taking a positive approach to coaching is not about praising athletes continuously, regardless of success or failure, but about giving praise when it is merited. That means recognising and rewarding not just successful overall outcomes – *ie* winning – but also performance improvements, improved approximations (like a more technically correct forehand in tennis) and effort. One study showed that children who were praised for their efforts following failure were more persistent, enjoyed the task more and performed better than children praised for having high ability[9].

The scheduling of positive reinforcement is also an important factor. Continuous praise is actually a bad thing – unless you are working with novices – as it devalues the reward, which is seen as too-easily obtained[3]. In this kind of climate,

players essentially switch off.

You also need to be aware of how your behaviour may be perceived by others. If, for example, you adopt a predominantly positive approach, using positive reinforcements, but for some reason remain fairly quiet during a session, your behaviour may be interpreted as a withdrawal of the normal praise and hence a punishment.

Giving constructive feedback

One problem I have noticed when working with novice coaches is that they tend to ignore signs of real progress and focus only on what is wrong. Successful feedback is a matter of balance. If you are constantly focusing on people's mistakes, there is a risk that their confidence will be eroded and their motivation damaged. A little praise can go a long way to sustaining someone's motivation. If you feel it necessary to be critical or corrective in your feedback, I suggest using the 'sandwich approach' (*see box below*) to help sustain motivation.

Why should a negative approach to coaching, using more punishment and criticism than positive reinforcement, be discouraged when there is evidence to show that punishment can help to eliminate some unwanted behaviours?[4] There are three serious drawbacks to incorporating punishment into your coaching style:

The sandwich approach[10]

At times coaches need to be critical, but this can lead to defensive behaviour on the part of the athlete, as criticism can be perceived as a threat to self-esteem. One way to avoid this is to 'sandwich' your corrective feedback between two positive statements. Let's take an example of a football coach being critical of a striker who has missed a relatively simple chance to score. Rather than berate the player, the coach might consider something along the lines of the following feedback sandwich:

- 'That was a great run you made to create space…
- '… but it was a poor finish. You were leaning back on contact and that's why the ball lifted over the bar. Next time try to keep your head over the ball.
- 'Keep going because you are stretching their defence.'

When presented in this way, the feedback becomes more constructive by balancing praise and criticism while also providing instruction.

1. The predominant use of punishment normally works by creating a fear of failure, and this can often lead to performance decrements as athletes focus on the consequences of losing or making mistakes rather than on what needs to be done to be successful. Fear of failure can promote indecision, with consequent tentative responses and a tendency to choke in high-pressure situations. In hockey, for example, a winger needs to take risks by running at the full backs and committing his opponents; this will not always be successful but it only has to work once for a match-winning goal to occur. However, if the player fears a backlash from his coach if he loses the ball, he might become tentative and avoid responsibility by passing to a team mate. 'Playing it safe' is often a counterproductive tactic which has been linked to poorer performances. Fear of failure has also been linked to less enjoyable experiences in sport and increased drop-out rates[11].

'A little praise can go a long way to sustaining someone's motivation'

2. If you are working with athletes who are attention seekers, making an example of them by punishing them in front of others can actually reinforce the behaviour you want to eliminate. Poor behaviour, such as constantly turning up late for practice, is sometimes designed to provoke a response. The best way to deal with such behaviour is on a one-to-one basis in a private setting; otherwise it is likely to recur as it gives the attention seeker exactly what he craves.

3. The predominant use of punishment as an approach to coaching doesn't promote good relations between coach and athlete. It can lead to the build-up of hostility, resentment and discouragement, resulting in loss of motivation.

If you want an example of how not to do it then look no further than heptathlete Kelly Sotherton's former coach, Charles van Commenee. After Sotherton had achieved a Bronze medal in the Olympic Heptathlon in Athens she was blasted by her coach, who described most of her performances as 'mediocre' and criticised her for not tapping into her reserves. Maybe Kelly was capable of a silver medal, and Commenee's comments might

have been designed to motivate her to perform better in future. But I would question whether such negative comments, given in public, were helpful following her best international performance to date. Surely this achievement was worthy of some praise? Kelly has recently defended Commenee's tough approach, but the two have parted company.

There are times when students point out (quite correctly) that coaches who use a predominantly negative approach have often achieved great success. However, it sometimes goes unnoticed that these same coaches are exceptional tacticians or have great technical expertise. In such cases it is highly likely that their success is attributable to these qualities rather than their negative approach to coaching[3].

Knowing your athletes

There are some players for whom a negative approach to coaching might be effective, but you really need to know your athlete before employing such tactics.

Creating the most productive motivational climate depends on many inter-related factors, including the characteristics of the group and individuals, their preferred style of coaching, the qualities of the coach (knowledge, expertise etc), situational factors (*eg* the dangers involved in a given activity) and, of course, the coaching style favoured by the coach[12].

There are many coaches I have seen and talked to who have adopted a coaching style based on their own experiences of being coached (*eg* the style of their old PE teacher). My advice is to think about what you are trying to achieve and whether your adopted style best suits the individuals or group you are working with.

In my experience, the best coaches are flexible and able to adapt to the requirements of different situations. This will nearly always involve criticism or punishment as well as praise, but will rely primarily on a positive approach in order to motivate players to perform at their best.

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Half-time psychology: don't just walk the walk – talk the talk!

Introduction

The half-time period in a match is not just about refuelling and physical therapy. It's also an absolutely crucial time for the coach and team to gather their thoughts and prepare mentally for the challenges of the second half. This article reveals the importance of effective communication and other underestimated factors.

Looking back to half-time in the 2005 European Champions League final, with Liverpool 3-0 down to AC Milan, according to his Liverpool colleagues, captain Steven Gerrard was in a state of disbelief and was ready to concede defeat. Afterwards, all he could remember of half-time was the manager getting his pen out, writing down the changes he wanted on the board and telling the team to try and get an early goal, as that could make the opposition nervous. But Gerrard said that, to be honest, he just couldn't concentrate. There were all sorts of things going through his head. He just sat there with his head in his hands. He really thought it was over.

The half-time period in a game tends to create an emotional experience amongst the players and the coach. A full review might take place a day or two after the game, which can be generally analysed free of the emotional reactions associated with the game itself. However, at half-time the outcome of the game is yet to be decided. The interval is often only around 15 minutes in duration, and is the only direct opportunity the coach will have to speak to all the players and to influence the second-half performance and result.

The half-time team talk will, of course, depend on the score

and the coach's perspective of the match. It is also important to note other variable factors, such as the context of the game – *eg* is it a cup match in which the loser gets knocked out? Is it a league game and what are the league positions of the teams contesting the game? Is one team an overwhelming favourite to win the game? Is the team winning but not performing well?

Football, in particular, is a game with many psychological demands, such as confidence, motivation and concentration, and these demands can be influenced by the situation in the game at half-time. For example, if a team is winning 3-0 and performing very well, it will go into the half-time break with a different psychological perspective from that of the team that is losing. However, if the same team is winning 2-0, and just before the half-time break the losing team score and make it 2-1, the psychological perspective of both teams would be different; the losing team would gain renewed optimism by scoring the late goal, and the team conceding the goal may become frustrated! Half-time is also psychologically important because it's the first time in the game that the players have an opportunity to reflect consciously for a sustained period on the game.

The coach's role at half-time

The main goal of the coach during the half-time interval is to influence positively the second-half performance as much as possible. The coach may give the players feedback on how they are performing individually or collectively as a team, and discuss technical, tactical and physical aspects of the game, including formations, styles of play, changing tempos and pitch conditions.

A key element of a successful half-time talk is communication. This is a two-way process that consists of giving and receiving information. Coaches can learn a lot about the development of the game at half-time by listening and asking the members of the team questions to prompt a two-way discussion. However, while coaches are typically good at talking, being in charge and giving instructions, they are often poor listeners.

It is also important to note that communication is not only verbal. As early as the late 1960s, research in communication

had indicated that non-verbal behaviour (*ie* body language) plays an important role in communication[1-3]. Researchers have determined that just 7% of what we communicate is the result of the words that we use or the content of our communication; 38% of our communication to others is a result of our verbal behaviour, which includes tone of voice, timbre, tempo and volume; and 55% of our communication to others is a result of our non-verbal communication, our body posture, breathing, skin colour and our movement.

Leadership styles

The leadership style also has a major influence on the effectiveness of a half-time team talk. There are several types of leadership styles, including 'authoritarian', 'democratic' and 'laissez-faire' (*see box, page 37*). It is possible for coaches to use different methods in different situations, and it's important to note that personality types, cultural behaviour and other factors also contribute to coaching styles.

Some coaches display a combination of the different leadership traits, whereas others favour one style in particular. A good coach will adapt his or her leadership style to expectations, knowledge, experience and group members. For example, if a group is hostile, the leader may prefer to adopt an autocratic style. If the group is friendly the leader may choose a more democratic, person-centred style. Problems can arise if strategies for preparation used by the leader do not match the group expectations of the team.

Psychology of half-time substitutions

As with other factors in a match, like scoring a goal or a poor refereeing decision, the psychology of a second-half substitution can change the tactical aspect of the game and give an insight to what the manager's state of mind may be. For example, if a team is winning 2-0 at half-time and the manager of the winning team substitutes an attacking player with a defensive player, this could be perceived as being a negative tactic, and possibly that the manager doesn't have confidence

in the team to carry on playing the same style; or as a statement by the manager saying 'we are going to hang on to our 2-0 lead, rather than seize the initiative and extend the scoreline'.

Earlier this year, England rugby union coach Andy Robinson came in for criticism for replacing captain Martin Corry during their 18-12 Six Nations defeat to Scotland. Brian Moore (ex-England player, now working as a sports commentator) commented: 'I don't think you should ever take your captain off, unless there is an injury; it's a huge psychological blow once your captain is substituted.'

'A good coach will adapt his or her leadership style'

The criteria in deciding who to take off depends on the context of the match, and there are many tactical factors that could influence whether a player should be substituted, and who to bring on at half-time. However, substituting your captain when he or she may not be playing well can have a massive impact on the team's mental state. It may, for example, have a negative effect, producing the belief in the team that the coach is panicking. It can also be a good idea to bring on a substitute who regularly performs well against the opposition you are playing – this may induce panic in the opposing team.

Sometimes a team's performance isn't always reflected in the scoreline. If the team is playing well and goes into the interval losing against the run of play, is it worth keeping faith in the team to carry on performing well in the second half and hoping that the breaks will come, or does the manager make changes and risk disrupting the flow of the game thereby affecting the team's performance?

Using neuro-linguistic programming in half-time psychology

Essentially, neuro-linguistic programming (NLP) is the study of excellence in how we think, how we behave and how we communicate. It provides a series of techniques, skills and methodologies that can be used to create strategies to enable us to fulfil our potential in all areas of our lives. The brain not only controls the application of skills and strategic movements, but it also affects actual body movements that people used to

Comparison of coaching styles: 'Big Phil' Scolari and Sven Goran Eriksson

Two very different styles of leadership were clearly evident at this year's World Cup finals in Germany: the Portugal manager Phil Scolari's autocratic ('do as I say') style and the England manager Sven Goran Eriksson's democratic (involve the players in decision-making) style. The autocratic style, which fits in with Phil Scolari's approach, can be broken into two types – 'telling' and 'selling'. The democratic style, which fits in with Sven's approach, consists of 'sharing' and 'allowing'.

Autocratic style – telling (Phil Scolari)

- The coach decides on what is to be done;
- The players are not involved in the decision-making;
- The coach defines what to do and how to do it.

During a game it is clear to see that Phil Scolari is very dominant, authoritative and animated, consistently yelling instructions to the players in the team.

Autocratic style – selling (Phil Scolari)

- The coach decides on what is to be done;
- The coach explains what is required and the objectives;
- The players are encouraged to ask questions to confirm understanding;
- The coach defines what to do and how to do it.

During the game situation, the coach explains the object and purpose of each tactical manoeuvre.

Democratic style – sharing (Sven)

- The coach outlines the training requirements to the players;
- The coach invites ideas/suggestions from the players;
- The coach makes the decision based on the players suggestions;
- The coach defines what to do and how to do it.

Democratic style – allowing (Sven)

- The coach outlines the training requirements to the players;
- The coach defines the training conditions;
- The players brainstorm to explore possible solutions;
- The players make the decision;
- The players define what to do and how to do it.

In practice, many coaches will use a variety of styles and types depending on the coaching situation.

consider automatic. NLP can help sportsmen and women to gain control over what many consider to be 'automatic' functions of our own neurology. Research has shown that

Half-time anchors and dissociation in practice

In 2000, a world record crowd of 109,874 at Stadium Australia were treated to a thrilling Tri-Nations contest that will go down in rugby folklore as one of the sport's all-time great games. An injury-time try from Jonah Lomu right at the end of the match earned New Zealand a stunning victory over arch rivals Australia in Sydney.

The All Blacks had begun at breakneck speed and after just five minutes were 24-0 up, leaving the Aussies shell-shocked. Australia looked to be out of the game. But they immediately started an amazing fightback and by half-time had they had levelled the scores and the momentum was now with Australia.

With the scores level at half-time, New Zealand must have been very disappointed to have squandered a 24-0 lead and the New Zealand coach, Wayne Smith, could have thought that his team's momentum had been irrevocably lost.

But Smith stayed calm in the dressing room and focused on the positive aspects of the performance in the first half. Dissociating himself from the emotion of the event enabled him to stay calm and purposeful. The trigger for the anchor came just before the All Blacks ran out for half-time; they stood unified in a huddle and recalled all their hard training and excellent play in previous matches. After a seesaw second half, the All Blacks eventually won after the last-minute try.

imagining an event can produce the same effect on structures in the brain as performing that event in reality!

For example, research carried out at the University of Chicago into visualisation in basketball players divided a number of people into three groups[4]. Each was tested shooting a number of penalty shots in basketball. The groups were then given different instructions:

- Group 1 did not practise penalty shots for 30 days;
- Group 2 practised shots every day for 30 days;
- Group 3 practised shots only in their mind (visualisation) for 30 days.

After 30 days the three groups were tested again:

- Group 1 showed no improvement at all (as expected);
- Group 2 showed a 24% improvement (not especially satisfactory given that they had been practising with the ball for one month);
- Group 3 improved by 23% (impressive considering they had not even seen a ball for 30 days!).

Applying NLP at half-time

NLP can be applied at half-time in a number of different ways, just by using the principle of positive instruction. Stating what you want rather than what you don't want can have a powerful positive effect on the mind, but many coaches still tell players what they don't want, producing negative thoughts.

'When you shoot don't miss the target' might be the instruction from the coach to player, but would it not be better to instruct the player when he shoots to hit the target? If somebody asks you not to think of the colour black, what immediately comes to mind? The very thing you were asked not to think of! Phrases such as 'don't foul', 'don't lose the ball', 'don't lose the game' can all be replaced by more positive instructions.

Here are some half-time techniques that can be used in sequence to create the right state of mind for the coach and the players. These techniques are 'dissociation', 'reframing' and 'anchoring'. They are aimed at creating a logical state of mind for the coach at half-time and getting the players to go out into the second half in peak mental state to achieve their desired outcome.

Dissociation

Dissociation is about recreating a past experience from the perspective of an onlooker or observer. This means that the person does not re-experience the original emotion but instead experiences the detached emotions of an 'observer'. This enables the coach to think logically and not emotionally. The technique of dissociation is useful just before half-time, so the coach can think logically and not emotionally when delivering the half-time team talk.

Reframing

Reframing is the process of shifting the nature of the problem. It is the process of changing a negative statement into a positive one by changing the frame of reference used to interpret the experience. If all meaning is context dependent, changing the context will change the meaning.

Depending on the situation at the end of the first half, we

can decide from what perspective we want to go out in the second half. A perfect example of a reframe was in the 2005 European Champions League final when Liverpool's manager Rafa Benítez urged his players to 'go out and score the first goal and see what happens from there'. If he had said 'go out and score three goals' the size of the task may have been too great. Another possible reframe is when a team comes in losing; the coach can reframe the situation by asking them to wipe the first half from their minds and just focus on winning the second half.

Anchoring

An anchor is a stimulus that creates a response either in you or in another person. When an individual is at the peak of an experience during an intense emotional state, an applied specific stimulus can establish a neurological link between the emotional state and the stimulus. Anchoring can occur naturally or be set up intentionally and can assist in gaining access to past states and linking the past state to the present and future. Anchors can be used by both coaches and players to produce a state of mind or mood needed for a given situation (*see box below*).

Installing an anchor

- Decide on the state you want to anchor – *eg* being calm and relaxed, confident, motivated *etc*;
- Choose an anchor (or anchors) that you wish to trigger that state – *eg* press thumb and middle finger together;
- Recall a memory or imagine a situation where you can experience that state – *eg* recall a situation where you were totally calm, relaxed, confident *etc*;
- When the experience is vivid and you are in the desired state at the peak of its intensity, squeeze your thumb and middle finger together;
- Release the anchors when the experience begins to fade;
- Now do something else – open your eyes, count down from 10 to break the state and distract yourself;
- Repeat the steps above several times, each time trying to make the memory more vivid (not required when the anchor is established at the high point of a real experience, but you can strengthen the anchor by establishing it at the high point of several such experiences);
- Apply the anchor and check that the required state occurs;
- Apply the required anchor during the half-time interval to generate the appropriate emotional state.

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Eating psychology – new thinking on mood, food and performance

Introduction

Optimising eating patterns for maximum performance can increase the risk of eating disorders in vulnerable athletes. This article examines how athletes and exercisers can gain confidence to exert healthy self-control around food.

Weight management and diet is an important issue for athletes and exercisers alike. Exercisers tend to be interested in diet for health or body image related reasons, while athletes are often motivated to lose weight because they believe it can lead to improved performance or as a necessary part of preparation in weight-classified sports.

While a low body weight can be helpful for health and/or sports performance, caution is urged if success comes from using extreme strategies. Although engaging in sport and exercise and eating a healthy diet is an effective way of controlling weight and raising self-esteem, it is important to avoid developing obsessive thoughts about diet. This article will examine some of the myths about controlling eating behaviours, suggest how unhealthy eating behaviours develop, and propose strategies to gain confidence to exert self-control around food. We use data from a recent case study to explain the intervention we propose [1].

Myths about eating behaviours

The importance of weight loss is highlighted repeatedly by the media, which bombards us with information on diet and exercise, including what to eat, how to lose weight, and how to exercise. Ideally, all individuals should be able to eat healthily

without any difficulty and maintain a healthy weight. However, some individuals do need to lose weight and learn strategies to maintain a healthy weight without dieting. Evidence suggests that the majority of those who diet to lose weight fail to keep the weight off over an extended period and have a higher weight gain in the future compared with individuals who do not diet[2]. The minority of individuals who succeed in losing large amounts of weight long term by using extreme weight loss techniques can be condemned to a life of weight obsession, yo-yo dieting, chronic hunger and mood swings.

'Evidence suggests that many athletes and exercisers have a good nutritional knowledge of food'

Studies show that some athletes are prone to using extreme strategies to lose weight. Moreover, athletes needing to reach a certain bodyweight often use extreme weight loss methods in a quest to lose a large amount rapidly. For example, in a study investigating weight loss dietary practices such as fasting in boxers[3], one boxer reported that his diet in the days before competition involved only eating raw lemons, advice he was given by a former world professional boxing champion.

Making the weight can clearly be detrimental, leading to dehydration and reduced energy levels, and poor performance. Unfortunately, some athletes may also believe that they will gain mental toughness by making the weight using these methods, and this will improve performance. Sports such as boxing and wrestling can positively reinforce extreme dieting, because two boxers who are both equally starved can compete, which means the winning boxer positively reinforces the use of extreme weight-making strategies such as the 'lemon-only' diet. However, as research shows[3], rapid weight loss leads to hampered performance when performance is assessed using methods such as finish time, or the amount of repetitions performed.

Fortunately, many coaches, fitness instructors and nutritionists recommend careful planning when reducing body fat rather than crash dieting. After giving such advice, it might be reasonable to assume that athletes will develop and maintain healthy eating behaviours. However, this is not always the case. A number of studies show that education programmes and

knowledge about nutrition and food risks does not often translate into more healthy eating behaviours[4]. Arguably, it is possible that such individuals had already developed some dysfunctional eating attitudes and unhealthy eating behaviours, so providing nutritional information would not have worked anyway. Moreover, evidence suggests that many athletes and exercisers have a good nutritional knowledge of food[5]. The key therefore to developing healthy eating habits and to be in control of eating behaviour is to identify how any abnormal eating behaviours may have developed, and then learn strategies to enhance confidence and exert self-control around food.

How do eating behaviours develop?

Diet and patterns of eating behaviour derive from a number of individual and environmental factors. Amid a number of possible factors, cognitive aspects, and particularly thought processes about food and around eating behaviours are especially important.

We should remember that for most of us, what we eat, how much we eat and when we eat are choices we freely make; we are not force-fed. While acknowledging this point, individuals make choices around food along with a number of issues.

The desire to eat is a biological urge and trying to deny this urge can be very difficult, something that is exacerbated when we have conditioned behaviours. For example, the boxer on the lemon-diet believes that this will lead to weight loss and making the weight based on this belief is reinforced when he makes the weight. He will experience positive emotions when he feels he can make the weight and use these emotions to help endure the unpleasant feelings from such a diet to achieve his goal.

Obsessive thoughts and unhealthy eating behaviour such as binging and dieting are often linked to experiencing negative emotions. For example, an individual who reports feeling stressed, frustrated, or depressed, might tend to binge eat on unhealthy foods. Data from a recent study illustrates this point[6]. An exerciser named Abbey was asked if emotions affected her eating behaviour. She replied: 'Yeah, when I'm depressed I eat.

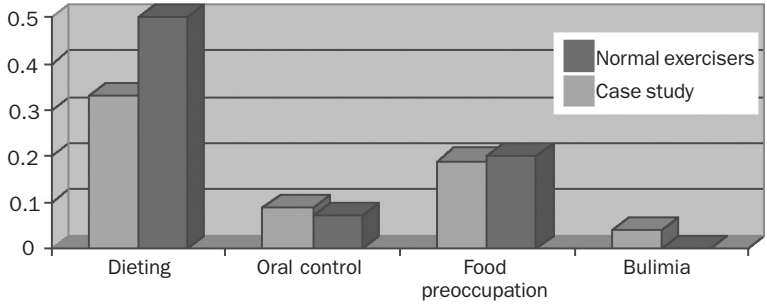
I eat lots of really unhealthy foods like biscuits, chocolates and crisps – the sweeter and fattier the better and I keep eating even though I am full – what is that saying? I know by eating it won't make me happier, but I keep trying all the same'.

Abbey may partly choose to eat sweet foods because the surge of sugar can temporarily boost levels of chemical substances in your brain that help you feel happy. However, while these foods may make you feel better for a short time, it can have detrimental effects if you gain weight. Further, it could lead to habitual patterns whereby you repeat episodes of binging whenever you feel depressed. If binge eating leads to weight gain, individuals can then become depressed because of their subsequent weight gain. Binge eating as a response to stress and depression can in turn become the cause of subsequent feelings of stress/depression, and a negative cycle of unpleasant emotions and binge eating emerges.

Dysfunctional eating behaviours may depend on the intensity of negative emotions being experienced, and whether those negative emotions are internalised to a sense of self, rather than a response to external factors. For example, an individual who feels they can't do a task because she/he feels she/he is a useless person is more likely to adopt disordered eating behaviours such as binging more than an individual with high self-esteem. Many individuals say they cannot consistently maintain healthy eating behaviours because they experience bouts of depressed mood, and use eating as a strategy to make them feel happier[7]. However, if asked in an interview about eating behaviour, many of these same individuals will also indicate that they know that binge eating won't make them feel better (see Abbey's statement)!

An important key to controlling eating behaviours is to unlock the extent to which the individual is aware of the emotions that accompany food and what has caused these emotions in the first place. Individuals who have difficulty controlling their weight are often unaware of the cause of these feelings. One factor that may influence our future eating behaviour is our eating behaviour in childhood[8]. For example,

Figure 1: Eating Attitude Test scores: A case study from applied work



adults may choose to eat more sweet foods when they are upset partly because they were given sweet foods to cheer them up when they were children. Research also shows strong support for the link between poor dietary control and stress [9]. An inability to control diet and an inability to cope with the stresses of everyday life are closely related.

Developing strategies to control eating behaviours

Recent research has explored the emotions that link diet and eating. A measure called The Exercisers Eating Scale, or TEES for short, to examine 'eating behaviour' (*ie* what we eat), 'weight management techniques', 'dietary responses to emotions', 'emotional responses to diet', and 'body image' has been developed[6]. Examples of items for each factor are contained in Table 1 (*overleaf*). By using 'The Exercisers Eating Scale', emotions related to diet, eating behaviour and body image can be assessed and an intervention package can be developed to improve healthy eating behaviours and weight control. The TEES can be used to monitor progress with reassessment being done at regular intervals.

To illustrate the issue, we provide data from an athlete whom we worked with recently[10]. The athlete was a 39-year-old male who previously competed at national level, but more recently exercised for health and fitness related reasons. We screened

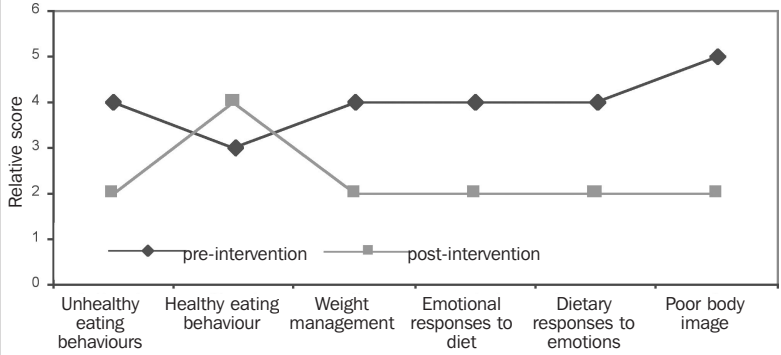
Table 1: The Exercisers Eating Scale (TEES)

	Strongly disagree				Strongly agree	
Unhealthy eating behaviours						
1. I eat lots of fatty foods	1	2	3	4	5	6
2. I eat lots of sweets and sugary foods	1	2	3	4	5	6
Healthy eating behaviour						
3. Most days I eat more than three portions of fruit and/or vegetables	1	2	3	4	5	6
4. I eat a variety of fruits and/or vegetables	1	2	3	4	5	6
Weight management						
5. I control my weight by limiting my calorie intake	1	2	3	4	5	6
6. I omit some foods from my diet to lose weight	1	2	3	4	5	6
Emotional responses to diet						
7. I feel guilty when I eat high calorie foods	1	2	3	4	5	6
8. I worry when I eat certain foods because I may gain weight	1	2	3	4	5	6
9. I feel disgusted with myself if I overeat	1	2	3	4	5	6
10. I feel disappointed with myself when I overeat	1	2	3	4	5	6
Dietary responses to emotions						
11. I eat more unhealthy foods when I am under stress	1	2	3	4	5	6
12. I eat more when I'm nervous	1	2	3	4	5	6
13. I eat unhealthy foods when I am depressed	1	2	3	4	5	6
14. When I'm angry, I often eat more	1	2	3	4	5	6
15. When I am tense I eat more	1	2	3	4	5	6
Body image						
16. My stomach is too fat	1	2	3	4	5	6
17. I think I am overweight	1	2	3	4	5	6

the athlete for possible indicators of eating disorders using the Eating Attitude Test[11]. We interpreted data using norms from an exercise population of 598 exercisers.

As figure 1 illustrates, it is normal for exercisers to engage in dieting behaviours, but very few exercisers are preoccupied by food or show bulimic tendencies. Our client reported similar scores to the average other than he engaged in less dieting and more bulimic behaviours. We also screened our client using the

Figure 2: Changes in attitudes to diet following an intervention: A case study from applied work



TEES, and as figure 2 indicates, before our intervention, he engaged in weight-making activities, experienced unpleasant emotions after eating, and tended to eat when experiencing unpleasant emotions such as depression and anxiety. He also had a poor body image believing himself to be overweight. Following screening, we therefore concluded that there were no symptoms of an underlying clinical condition.

Our intervention focused on the diet-emotion link. First we asked him to keep a diary of when he was eating, what he was eating, and what emotions were being experienced. It is important for the individual to be aware of the factors associated with binge eating, particularly if they wish to curtail these behaviours. The process of recording a diary is important as it not only provides the consultant with valuable information, but also helps raise self-awareness of factors that lead to binge eating for the client. For example, our client recorded in his diary: 'I came home from work after a bad day today, went to the gym and ate a huge meal when I got home. Later, I sat down and thought about why I binged. Partly it was because I felt I could because I had exercised, but the exercise just masked the real reason that I was unhappy over an incident at work.'

Our client had now named the feelings and expressed where these feelings came from. Our work focused on

developing self-confidence to exert control around food. Specifically, we focused on weakening the link between eating food and emotions, both in terms of the use of food to enhance mood, and the effects of food on raising negative mood. Caution is urged here as we still encouraged the client to enjoy food, and to look forward to social engagements involving food, and to enjoy each meal, but asked him to eat consciously, anticipating negative emotions that might arise from comfort eating.

'The strategies people used to control their emotions are highly individualised'

Firstly, we asked the client to challenge, or question, the belief that exercise allows an individual to eat as much as they like. Secondly, we sought to explore the strategies the client was using to regulate pleasant and unpleasant emotions. In this case, his exercise was a strategy to enhance emotions, as was eating unhealthy food. By using a food diary, it was possible to see the type of self-talk that the client was engaging in when deciding what to eat and how much to eat.

Information in the diary helped develop self-talk scripts to help the client facing similar situations in the future. It is important for clients to realise that they are active in the decision-making process on whether to binge eat, and self-talk should be targeted at enhancing self-confidence and enabling the use of a different strategy.

We asked our client to think back to the situations in which he made a decision to eat chocolate, and to explore what he said to himself. He then replayed the scenario and sought to remove the link between eating chocolate and improved mood, choosing a different strategy. There are a number of different strategies that could be used. For example, one method would be to tell someone (partner, friend, mother etc) what your day was like, and develop social support networks.

It also helps if you can collate a list of things that work for you and which will help you deal with these emotions and prevent you from binge eating. For example, plan something to keep yourself busy; read a book, go for a walk, go to the movies, phone a friend and organise to meet etc. If you know you have a problem with your diet in the evening then plan to use these strategies at this

time. However, it is important to recognise that the strategies people used to control their emotions are highly individualised – there's no single strategy that can be universally applied.

A second key aspect of the use of a diary is to recognise the process through which an individual can be confident enough to take control of decisions around food changes during the intervention. It is important that success is positively reinforced and individuals should seek to reward themselves when they have made a good decision around food. However, this reward should not be linked with food. It is important for the consultant to closely monitor the food diary in the initial stages of the intervention, and encourage the individual to congratulate themselves on their achievements.

As individuals become more confident in their ability to make correct decisions around food, they also think less about weight management issues and engaging in dieting behaviours. Furthermore, once food is no longer seen as a primary strategy for emotional regulation, individuals tend to eat a far healthier diet. This trend is evidenced in our case study as depicted in figure 2. However, a cautionary note is that this approach is not a 'quick fix'. The urges to eat in order to enhance emotions can take a considerable time to weaken and it is only through successfully choosing a different strategy to enhance emotion that confidence to show self-control will strengthen.

Summary

Diet and exercise are inextricably linked; diet provides the fuel for engaging in exercise, and exercise provides a strategy for maintaining body shape. Both diet and exercise are strategies for enhancing our emotions. However, exercise can serve as a strategy for masking dysfunctional eating patterns, and experiencing unpleasant emotions following binge eating can be part of a negative food-emotion cycle. The intervention reported here challenged the athlete's beliefs and attitudes around food and used self talk as the medium to initiate behavioural change. As a result his dietary attitudes and behaviour were enhanced.

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Attribution Theories: how to learn from success and failure alike

Introduction

One of the most thought-provoking and imaginative sport psychology book titles I have seen recently is Susan Halden-Brown's Mistakes worth making[1]. For me, this title captures the essence of positive thinking and optimism, characteristics that can become important companions on the journey towards peak performance. I have always believed that occasional failures are a natural part of the learning process, since I have yet to meet a sports performer who has never experienced setbacks.

In order to learn from mistakes and failures, it is important to be able to assess what has happened objectively. But this is less easy than it sounds since the emotions connected with both success and disappointments can cloud our judgement and compromise our objectivity.

When we compete against others, or against our own standards, the consequences of what sport psychologists call 'achievement strivings' are quite naturally going to provoke evaluation when the outcomes are very important to the individual. In such situations, people naturally strive to make sense of what has happened to them. The problem is not about persuading coaches and athletes to reflect on and evaluate their successes and failures but ensuring this is done in an objective manner.

One thing that is clear from examining the research literature is that in situations with definite outcomes (*ie* win/lose), our perceptions of why we either won or lost have important consequences for our affective states (*eg* feelings of pride, anger

or shame), self-esteem, future motivations and behaviours (*eg* persistence)[2,3].

It is evident that different people can have widely varying perceptions about the same event or situation. If, for example, you asked a sample of football supporters why Arsenal remained unbeaten throughout the entire Premiership season of 2003-04, you would probably be treated to a wide range of opinions. Some might perceive Arsenal's success as based on an outstanding defence, while others would cite the ability of Thierry Henry to score vital goals. If you were a Manchester United supporter, you might perceive Arsenal as simply downright lucky!

'The magnitude of the emotional response is likely to be influenced by the importance of the event outcome'

Research suggests that athletes' methods of explaining their successes and failures are based upon their unique experiences and learned behaviours[4]. The important point I am making is that individual perceptions and reality do not always match, and when emotions get thrown into the mix, perceptions and reality can be poles apart. From a psychological viewpoint, however, it is perceptions that matter most.

You will hear a wide variety of explanations for performances just by listening to the post-performance interviews that are now such a common feature of major sporting events. In psychological research, these explanations are commonly referred to as attributions – the causes or reasons behind success or failure.

Sport psychologists have been studying athletes' attributions for more than 20 years, and various researchers have developed theoretical frameworks to enable them to study how attributions influence individual psychological states, and how individual differences pre-dispose people to certain types of attributions of success and failure.

The four most common attributions

One such framework was popularised by Bernard Weiner[5]. Attribution theory suggests that the multitude of explanations given to explain outcomes can be condensed into just a few categories. Weiner identified ability, effort, task difficulty and

Figure 1 – Weiner's original attribution model

		LOCUS OF CAUSALITY	
		INTERNAL	EXTERNAL
STABILITY DIMENSION	STABLE	ABILITY	TASK DIFFICULTY
	UNSTABLE	EFFORT	LUCK

luck as the four most commonly ascribed attributions. Although the model has since been extended [6], Weiner's original two-dimensional model will suffice to demonstrate the importance of attributions (*see figure 1, above*).

The locus of causality referred to in the figure relates to whether the individual perceives the cause of success or failure to lie with internal (relating to oneself) or external (environment/ situational) factors. Traditionally, the locus of causality has been linked to emotions, with such attributions promoting feelings of either pride or shame associated with winning or losing [7].

However, the magnitude of the emotional response is likely to be influenced by the importance or significance of the event outcome. If, for example, a sprinter attributed winning an Olympic gold medal to the effort expended in preparation and training, this is clearly an internal attribution likely to promote feelings of considerable pride. When failure is ascribed to internal attributions – *ie* 'I failed because I am not good enough' – negative emotional states like shame are a likely consequence.

If, however, a footballer bemoans his team's bad luck and attributes defeat to a refereeing mistake; that reflects an external attribution. These are considered less likely than internal attributions to impact on emotions, although Weiner himself suggested that 'unstable' external attributions of failure – such as a refereeing mistake – might promote anger (and not just among the fans!)

The stability dimension reflects the likelihood that the event will recur. A tennis player who attributes her success (*eg* in winning a tournament) to having the ability to stay focused

under pressure is likely to be motivated by the expectation of future success, since ability is considered to be relatively stable and enduring. Unfortunately, though, when people give stable attributions for failure, the expectation is that failure will recur – a situation that can be psychologically demotivating and lead to a state of perceived helplessness.

Since the amount of effort an individual can expend in chasing success varies – given fluctuations in motivation – effort is considered an unstable attribution.

Weiner's model has since been extended to include a third dimension of 'controllability' – the degree to which individuals perceive themselves as able to influence events. When success can be ascribed to factors within your own control, motivation is likely to be increased.

The model can be summarised as follows:

- Stability factors influence expectation of future success;
- Causality factors influence emotional responses;
- Control factors influence levels of motivation.

The flow diagram above right shows the process by which people almost immediately evaluate their performance and arrive at an attribution, and how this attribution can impact on behaviours such as task persistence.

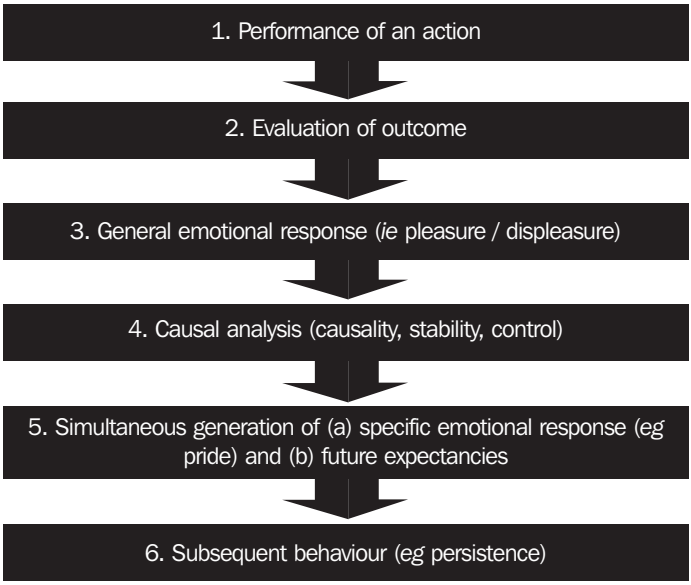
The problem of defining success

Researchers have tested Weiner's model and the explicit predictions that accompany the model. Unfortunately, some of the instruments used to collect data on athletes' attributions have been limited because study participants have been asked to choose 'one main attribution', whereas the reality is that people often give multiple inter-connected reasons for success or failure[4].

Another problem concerns the concept of success, which can be difficult to define when there is no definite result. However, despite these limitations, a number of interesting findings have emerged that have implications for coaches and athletes alike.

First, although research has supported the link between the

Figure 2: the attribution process



causality dimension of attribution and the generation of emotional responses, contemporary findings have shown that all three listed dimensions relate to emotional responses[7]. For example, one study showed that the generation of more positive mood following a graded exercise test was related to personally controllable and stable attributions[8].

Secondly, perhaps the most robust findings relate to what has been termed the 'self-serving bias' – a tendency to attribute success to internal factors, such as ability and effort, and failures to uncontrollable external causes such as luck or weather conditions. In simple terms: when I win it's all down to me and my efforts (good for confidence), but when I lose it wasn't my fault (a form of ego-protection and a way to maintain self-esteem).

To illustrate the self-serving bias with regard to success, I will draw on my own experiences. A simple experiment I have conducted with undergraduate sports science students on a

number of occasions makes the point quite clearly. I ask students to carry out a coin-tossing experiment in which each student is paired with an opponent and asked to predict whether the coin will land with heads or tails up on 10 occasions. Each student gets a score out of 10 and the winner is the one who predicts most accurately. This task is chosen specifically because it concerns a 'game of chance', and the success or failure of each individual is primarily down to luck.

Although most people call about five correct responses, there is always some variability around the mean. And a high proportion of those who 'win' – *ie* score more than five – tend to attribute success to their ability to predict, even though in subsequent attempts their fortunes will fluctuate just as much as those of all the other participants.

'Don't let your athletes get away with faulty attributions'

The existence of a self-serving bias for failure is not as well supported by research evidence[7], but it does seem to be a problem, since some people attempt to avoid personal accountability by inaccurately attributing performance declines to uncontrollable external factors. It may be that when athletes are in a predicament (need to explain failure), an easy way to avoid responsibility is to make excuses or attempt to justify the outcome as beyond their control.

One recent investigation showed that two distinct groups of elite athletes could be identified on the basis of ego-protection[9]. Some athletes appeared willing to attribute failures to internal factors and take personal responsibility for setbacks.

These athletes appeared to be more solution-oriented following setbacks, and looked for ways to improve and overcome problems.

An example of how setbacks can be viewed in a positive light and how personal accountability can aid future progress emerges from the case of Canadian boxer, Eric Lucas[3]. Lucas lost four bouts to tough opponents during the early part of his career, but was quick to attribute each loss to a lack of experience – a factor that was clearly subject to change and could be improved by personal commitment. These losses were indeed 'mistakes worth making' since Lucas took personal

responsibility for his losses; gained more experience and in 2001 became WBC Super Middleweight World Boxing Champion.

By contrast, a second set of elite athletes appeared to focus on external explanations for their failures (including blaming other people) and tended to over-analyse the problem rather than looking for a solution. By offloading personal responsibility, the athletes were able to protect their own self-esteem, but failed to address factors that were within their own control. Such people are likely to block their own path back to better performances.

However, other researchers have suggested that attributing failure to unstable rather than stable factors is a more commonly observed self-serving bias in sport [10]. The implications of this are more positive, in that recurrence of failure would therefore not be regarded as inevitable.

My advice to coaches is: don't let your athletes get away with faulty attributions! If you hear one of your players attributing a winning, technically correct volley in tennis to luck, you need to correct this perception straight away by drawing attention to the effort and practice that has led up to this outcome. Correcting such an attribution can help performers learn to re-attribute success by acknowledging that improvements are down to effort not luck which, in turn, enhances motivation.

Research in schools has shown that teaching children to re-attribute failure to a lack of effort, rather than a lack of ability, reduces performance declines after failure [11]. In sport and physical education research, re-attributional training has been shown to be equally effective [12].

When evaluating performances with your athletes, don't just tell them what you think happened; start by asking ask what they think happened. In this exchange, you need to listen carefully for clues because some people don't easily share their real thoughts and feelings. This is where building a strong relationship with your athletes will stand you in good stead.

The trick of remaining objective

Once you have listened to your athletes' attributions the tricky bit is to remain objective in deciding whether those attributions

match your own observations. If you feel that the athlete is using either form of self-serving bias, then your skills as a communicator will be needed to encourage re-appraisal.

As one source suggests[3], 'coaches and sport psychologists alike serve their athletes well when they encourage a well-timed search for personal accountability and potential control, especially after setbacks are experienced'. Remind your athletes that setbacks do not necessarily have to result in reduced motivation, providing they are attributed to rectifiable deficiencies and viewed as temporary occurrences.

Pay particular attention to athletes who are self-blaming and tend to inaccurately attribute their failures to internal and stable factors, such as a lack of ability or physical capacity. In such cases, you may need to correct these attributions and make the athletes aware that problems can be solved and improvements are possible, since otherwise a negative emotional state known as 'learned helplessness' can ensue.

My advice to athletes is simple: after important wins or losses, take some time to reflect on what happened, but don't do this immediately after emotionally-charged events. Seek the advice of people you trust to confirm or challenge your attributions, and then attempt to solve any problems by working on improving your performances.

Use setbacks as springboards to improvement but, conversely, don't allow yourself to become over-confident when external factors may have contributed to your success. Your emotional state and motivation will be influenced by your attributions – so it's well worth being objective.

Lee Crust

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EMOTIONAL INTELLIGENCE

In the first Psychology Special Report we looked at Emotional Control. It's now time to take the next step up the emotional staircase! This two part chapter will help you understand the concept and hopefully apply it to your chosen sport. Part One introduces the basics behind emotional intelligence with a stage by stage summary of how to develop this mind skill. Part Two is more specific, concentrating on emotional intelligence for endurance athletes, where the mind can suffer as much as the body.

Part One: Why your head should rule your heart

Introduction

In recent years, sports psychology research has seen the rise of a concept named emotional intelligence. But what is it, how can it help sports performance and how can we enhance our own emotional intelligence?

Emotional intelligence is a relatively new concept that has emerged over the last decade, which to date has principally been studied in business settings[1]. It is defined as 'the capacity to recognise and utilise emotional states to change intentions and behaviour'. Emotional intelligence can be measured using pen and paper tests[2]; in such tests, the responses to statements such as 'When I experience a positive emotion, I know how to make it last' and 'I motivate myself by imagining a good outcome to tasks I take on' are recorded and assessed.

Emotional intelligence can be summarised thus:

- The ability to recognise different emotional states
- Assessing the effects of emotions on subsequent behaviour
- The ability to switch into the best emotional state to manage a particular situation

Not surprisingly many businesses have used emotional intelligence ratings as part of their selection processes, but the

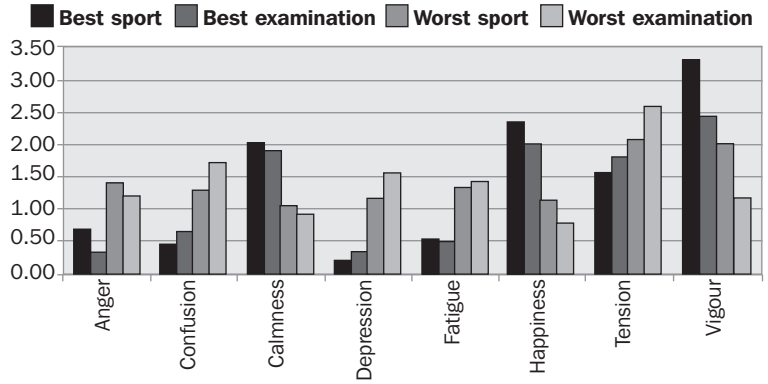
ability to recognise the emotional states in others in the sporting context is clearly desirable, and the skill of raising the emotions of the team is a potentially priceless asset.

Research

In a recent study, we looked at emotional states associated with success and failure in sport competition and academic examinations[3]. The expansion of sport science as an academic study means that growing numbers of students experience the dual stresses of taking examinations and participating in competition. The results of this study are depicted in figure 1 which shows that a) emotions are strongly associated with success, and b) emotional profiles linked with success are somewhat different between sports competition and an examination.

Compared to exams, success in sport was associated with vigour and anger. Importantly, emotionally intelligent people can get themselves into the appropriate emotional states for the demands of the situation. If the situation requires high arousal, as in the case of athletes in our study, emotionally intelligent

Figure 1: Mood and performance in sport and examinations



Source: Lane, 2006, *Mood and Human Performance: Conceptual Measurement and Applied Issues*, Nova Science Publishers

people are good at getting themselves psyched up. Equally, if the situation requires calmness, emotionally intelligent people are good at relaxing themselves.

Our research group has conducted a number of studies looking at the nature of emotional intelligence [4]. We have found that emotionally intelligent people use psychological skills such as imagery, goal setting and positive self-talk more often than their less emotionally intelligent counterparts. We have found that emotionally intelligent people are mentally tough and also that they find exercise enjoyable. Importantly, it seems that emotional intelligence can be enhanced through suitably developed intervention packages. What follows is a six-stage approach to assessing and implementing strategies that people can use to enhance their emotional intelligence:

Stage 1: Developing emotional self-awareness

The capability to change emotional states and learning how to change emotions in relation to performance requires self-awareness. We need to be able to identify when our emotions are influencing our performance and how our emotions change over time. We need also to be able to assess the emotional states that other people are feeling, picking up on their body language, verbal and non-verbal gestures.

There are many possible ways in which to assess emotions, including standard psychometric tests; however, athletes often find repeated completions of standardised scales to be a tiresome task. An alternative approach is to use an open-ended diary type approach such as a video or an audio diary.

Assessment of emotions should start by asking the athlete to think carefully about a situation in which performance was very important. It helps if the athlete spends some time rehearsing this situation in their mind, and tries to remember how they felt. The athlete then writes down all of the emotions they experienced. They should also rate how they performed in the situation to allow comparisons between successful and unsuccessful performance (*see table 1a overleaf*).

As table 1a indicates, emotions such as anxiety can be positive

Table 1a: Example of emotional states associated with successful and unsuccessful performance from an athlete

Emotional states experienced with successful performance
● Happy. Felt that this was my opportunity to demonstrate an excellent performance. Felt I could beat anybody.
● Calm and nervous. Felt nervous but really at ease with these feelings. I accepted and expected to be nervous but felt ready to start.
● Anxious but excited. Felt so ready to compete but a little nervous. Nerves and excitement come together.
● Confident. I remembered all the successful training sessions and previous best performances.
Emotional states experienced when performance was poor
● Could not concentrate due to feeling nervous.
● Could not get nerves out of my mind and started to question my confidence.
● Started thinking negatively and started feeling emotionally drained, fatigue.
● Felt nervous, went to the toilet and started worrying that I was not hydrated enough, so drunk more, and went to toilet more. Started worrying that I would need to go to toilet during competition.

and negative. It is the combination of emotions, and the thoughts that are linked with these combinations, that determines whether these emotions are motivational or demotivational.

Table 1b shows an example of the interpretation of a team's emotions. The emotions described are similar to those described in table 1a. This is a typical response; athletes tend to use similar constructs to explain success and failure in the individual or team setting – for instance good performance being associated with high self-confidence and poor performance with low self-confidence.

The team description of emotions linked with success talks about the need for common goals even though each individual has a specific goal. Note the emotions that derive from feeling that some players put more effort into training and performance than others. Team cohesion will not develop without a sense of common purpose, for example achieving a common goal, and

Table 1b: Example of emotional states associated with successful and unsuccessful performance from a sports team

Emotional states experienced with successful performance
● Happy and positive. Lots of positive talk between players. Difficult tasks perceived as attainable challenges.
● Sense of a team goal even though each player had individual goals. A sense of calmness that each player will fit into the team and the unit will work together.
● Calm and nervous. Shared sense of nervousness; more like excitement.
● Positive comments and constructive comments when errors are made.
Emotional states experienced when performance was poor
● Players getting frustrated and cope by balling out team-mates.
● A sense that some players want to achieve more than others.
● A sense that negative emotions affect some players and these players do not try hard enough to overcome these emotions.
● Team-mates very critical and players avoid taking risks as mistakes lead to abusing comments and unpleasant emotions.

believing that every player needs to contribute 100% effort to that goal. If team members believe some make more effort than others, this can lead to a blame culture and scapegoating.

Key point: The athlete should assess both their own emotions and those of their team-mates (using mental imagery to help recreate the situations) and note which were associated with best performance and which with poor performance.

Stage 2: Developing self-awareness of emotional states during daily performance

Stage 2 builds upon stage 1. If stage 1 provides the extreme emotions linked with success and failure, stage 2 provides the 'running commentary' of emotions on a daily basis. Table 2 (*overleaf*) contains an example of a small sample of the emotions experienced in a professional footballer. Notice how

Table 2: Example of emotional states experienced during the day from a professional soccer player

My emotional states experienced during the day
● Felt furious during the drive in to training. Too many people on the road. Why do bad drivers follow me to work?
● Felt tired this morning. Struggled with training this morning. Became frustrated and felt a little angry when I made mistakes.
● Felt happy with overall effort made in training.
● Became irritated later in the day over trivial matters and cannot think why, but was angry nonetheless.
My team-mates' emotional states experienced during the day
● Became annoyed at some of the players who did not start training seriously. I feel tired and was trying my hardest.
● Usual banter between the players, although Bob took being wound up very negatively this morning.
● Coach was critical this morning.

emotions from things other than sport can influence how we interpret new situations, whether sport or otherwise.

In this example, the player was frustrated and felt angry during the drive into training, and as a consequence, became angry during training. It's likely that his poor tolerance of errors (by others and himself) was in part because of feeling angry and tired at the onset of training.

Stage 3: Identification of strategies to regulate emotion

It is important to remember that there are ways of dealing with emotions such as anger and anxiety without the need for intervention by a sport psychologist. For example, research has found that listening to music is effective at changing a range of emotions (as described in the second part of chapter seven)

In the example described in table 3, the soccer player recognises that he preferred to release feelings of anger publicly

Table 3: Emotional states experienced during the day and strategies to change them

My emotional states experienced during the day
● Felt furious during the drive in to training. Too many people on the road. Why do bad drivers follow me to work? ● I Felt tired this morning. Struggled with training this morning. Became frustrated and felt a little angry when I made mistakes.
My team-mates' emotional states experienced during the day
● Became annoyed at some of the players who did not start training seriously. I feel tired and was trying my hardest. ● Usual banter between the players, although Bob took being wound up very negatively this morning. ● Tried to get this thought out of mind and focus on my own game. ● Glad the players had a go at Bob and not me this morning.
What I did to change these emotions or maintain them if they were helpful to performance
● I did nothing – just swore at the other driver to get the anger out and I felt much better than just stewing. ● I Tried to relax and used self-talk to try to psych myself up. When I felt angry I let this out, swearing at myself.

with the result that everyone around him knew he was annoyed. However, while anger might have been helpful to him, it might not have been helpful to the team who might not have understood why he was angry, especially as they were not aware that he started getting angry on the drive in to training. Equally, he uses the team for emotional support and is seemingly unaware of the influence his expressions of anger alter his team-mates' emotions.

Stage 4: Set emotionally focused goals

Once an athlete becomes aware of emotions he or she has experienced, the effect these have on team-mates and,

importantly, whether the emotions were helpful or unhelpful, the next step is to try to change these emotions. For example, identifying that the athlete may experience dysfunctional anger when tired can lead to effective strategies designed to control these feelings. Goal setting has been found to be an effective intervention strategy in a plethora of different skills, but the desire for change is crucial. Resistance to the notion of the adverse effects of negative emotions on others will only serve to maintain a lack of cohesion in a team setting.

Stage 5: Engage in positive self-talk

Once the individual has identified a need for change, developing an appropriate self-talk diary that can run alongside a diary used to record emotions can be helpful. We cannot change our emotions immediately, but we can change the dialogue that runs through our mind when we experience emotions

It is often difficult to engage in self-talk that is counter to the emotion being experienced. For example, depressed individuals find it difficult to engage in positive self-talk. By contrast, happy individuals find it easy to maintain positive mood. Positive self-talk statements are best conducted when the athlete is calm and when the emotion diary or performance diary is being evaluated. Asking an athlete to think of a sentence that they can say to themselves when they recognise the beginning of detrimental emotion can be a helpful way of preventing that emotion from starting. We have found that athletes quickly grow in confidence in their ability to recognise and control emotion through self-talk, and the early stages of raising emotional intelligence can be rewarding for the athlete and consultant.

Stage 6: Role-play to develop emotional control competencies

Role-play can be a very effective method of working with emotions and can also be an enjoyable activity for those taking part. Role-play works effectively when a situation described in

the daily diary is re-enacted.

A good starting point is to deal with specific emotions that are frequently experienced in the person or group of persons you're working with. In keeping with the soccer data presented above, it appears that our athlete frequently experiences anger and publicly releases this anger as a strategy to control or change it. Someone could therefore act as the referee to try to frustrate the player, while others play the role of team-mates, where the aim is to frustrate the player further.

'If the task requires calmness, increasing effort can produce further frustration'

At the end of the role-play, the build-up of anger can be examined, particularly the warning signals that could be used to prevent the player becoming dysfunctional. Feedback from other players on the consequences of their team-mate getting angry and how this affects them can also provide a valuable source of information.

Anger typically follows a pattern, and anger control involves teaching strategies to recognise the building frustration and strategies to deal with these feelings. One strategy might be to try to reinterpret the cause of the anger, but this is very difficult for people prone to anger, who usually find it difficult to think beyond the immediate and highly intense feelings of rage.

An alternative strategy is to try to increase physical effort to alter the situation that is causing frustration. However, this might not be compatible with the arousal levels that are required for the task. If the task requires calmness and planning, increasing effort can produce further frustration. For example, if a football team goes behind, one player madly chasing the ball might be counter-productive to the required tactics!

One possible strategy is to teach players to manage their anger internally and not to show anger to the opposition or to other team-mates. Players typically buy into this approach because they are aware that poor emotional control can lead to poor performance or poor discipline. In this approach, players are taught to visualise releasing the anger externally and to play this image in their mind when they feel angry. The player effectively releases the anger but does not affect team-mates or provide impetus to the opposition in doing so.

Summary

Emotional intelligence is concerned with the awareness, appraisal and utilisation of emotions for individuals and for teams. Emotional intelligence can be altered through training that focuses on the role of emotions in our behaviour.

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Part Two: Ultra-endurance psychology – training the mind to take control

Endurance performance is mentally tough; the best athletes can push themselves to sustain physical fatigue and remain psychologically positive over long distances and durations. This doesn't happen by chance; endurance athletes can train the mind to develop emotional control.

This article will put the development of emotional control into the specific context of preparing for the Marathon des Sables, a six-day event that involves distances of approximately a marathon per day and is ranked as one of the toughest endurance events in the world. The event also involves coping with searing heat, extreme foot blisters, huge sand dunes and having to carry your own supplies – not for the faint-hearted.

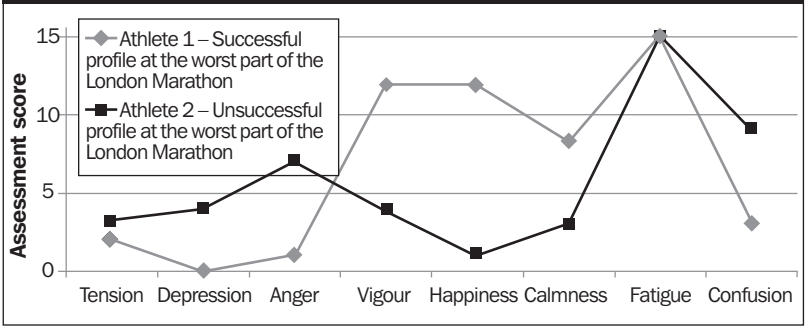
What research has been carried out?

At the University of Wolverhampton, we have done a great deal of research on psychological states in relation to endurance performance. We've studied anxiety and self-confidence in duathletes[1] and triathletes[2] and also studied emotional states before and after marathon races[3,4].

Our recent work has looked at emotional states before, during and after competition. We have looked at changes in emotions during four-hour and two-hour bouts of intense cycling[5,6]. We also looked at emotions before and at the worst point of the race during the London Marathon[7].

Our latest work has looked at changes in moods and emotions during the course of the Marathon of Britain, a foot race covering a route of approximately 175 miles held in set stages over six days[8]. We have also looked at mood state changes during a 44-day solo expedition to the South Pole[8]. These studies provide a large data set on which to draw and make recommendations for endurance athletes.

Fig 1: mood profiles of successful and unsuccessful runners at the 2004 London Marathon



Trends

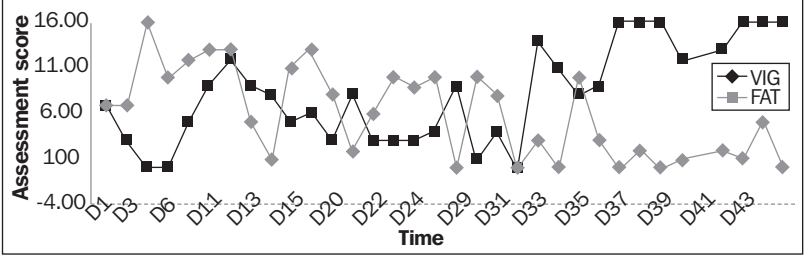
An analysis of the results of these studies shows several trends. First, it is normal to experience intense emotions before competition. Many athletes feel very anxious and most feel some degree of anxiety. Anxiety can be related to inadequate race preparation, setting a goal that is beyond your ability or perceiving the course to be overly difficult. Rarely do athletes get all of these things right and they should expect to feel anxious before each run.

However, they should try to interpret these feelings to mean that they are excited; sport performance is by its very nature uncertain, and even the most confident athletes still have a degree of anticipation regarding how things will turn out. It is possible to feel anxious but to interpret these feelings in a motivational way as being ready to perform. Anxiety can be a good thing.

The second trend is that athletes experience a mixture of emotional states during bouts of long, intense exercise. Runners should expect to feel fatigued. Athletes who cope successfully with endurance performance tend to feel fatigue and happiness simultaneously, whereas athletes who do not cope very well tend to feel fatigued, depressed and angry at the same time.

To illustrate these profiles, data from the 2004 London Marathon is depicted in Figure 1 above. It is noteworthy that

Fig 2: vigour and fatigue of female explorer during an expedition to the South Pole



there are no differences in fatigue between the two runners but that the successful runner reports feeling fatigued, vigorous and happy.

Figure 2 (*above*) is a graph of a female explorer completing an expedition to the South Pole. This shows that vigour and fatigue fluctuate during repeated bouts of hard exercise; the key message is that endurance athletes should expect to feel intense fatigue and learn strategies to cope.

The third trend is that psychological toughness is built on a firm platform of physical fitness. To enjoy repeated bouts of hard exercise during competition you need to have experienced repeated bouts of fatigue that follow long-duration exercise in training. In the same way you train your body to cope with the demands of training, you also train your mind to think positively about the experience.

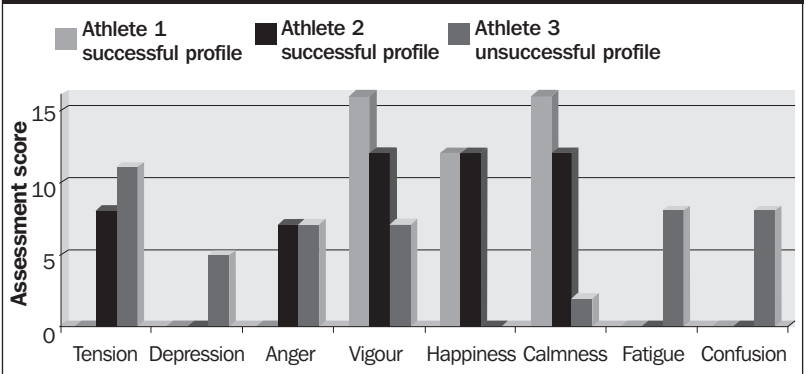
Developing emotional control

Task 1: learning to recognise your emotional profile associated with success

We all have experienced intense emotions before important events. Some athletes can channel these feelings to enhance performance; some can regulate these feelings and reduce anxiety, while others become debilitated by anxiety.

We also know that we rarely experience one emotion on its own but rather groups of different emotions together. I have depicted these profiles graphically in Figure 3 overleaf. Using

Fig 3: mood profiles of runners



this example, the first athlete feels excited and calm, the second feels anxious and excited, and the third feels anxious and downhearted. Athletes 1 and 2 should perform successfully whereas athlete 3 will probably perform poorly.

● **Athlete 1** is an emotional profile typified by feeling vigorous, lively and alert, and in control. This athlete has regulated negative and unpleasant emotions. It is a profile often associated with supreme self-confidence and the perception that all challenges can be attained.

● **Athlete 2** shows a different emotional profile associated with success. In contrast to athlete 1, athlete 2 has a profile depicted by feeling vigorous, tense and angry. Athlete 2 will use feelings of tension and anger to aid motivation. For athlete 2, feeling tense can be like a warning signal – 'I am about to try to achieve an important goal, and unless I work really hard, I will not achieve my goal'.

● **Athlete 3** is a different story. This athlete feels anxious, angry, downhearted and depressed. These emotions are likely to interfere with performance. Feeling tense might make you want to try harder but when it is combined with feeling depressed, it can make you feel like giving up. Our research has found that feeling downhearted and depressed is possibly the most damaging emotion to experience before and during

competition. When athletes feel depressed, angry and fatigued at the same time they tend to turn anger inwards to self-blame and implode; poor performance is likely.

Task 2: assessing your emotional profile

I ask athletes to complete self-report scales before training sessions and before competition. I also ask them to rate whether they achieved their goals. Emotional responses occur in all of these situations and knowing how emotions change can be extremely useful in understanding how behaviour can change. You should assess your emotional profile before a number of different performances; something that can be done by completing an emotion scale shortly before competition or a training session[4]. After competing, you should rate whether you performed to expectation or underperformed.

Performance should be rated in relation to your own expectations and your own goals. You will need around five successful and five unsuccessful performances before you can gather trends. Obviously, this is not always possible to do as you might be having a run of good form where most sessions/races are successful.

One way to get started is to think back to some of your recent performances and rate how you felt before a few races where you performed well (in relation to your own expectations) and a few races where you performed poorly (again in relation to your own expectations). Once you have a profile associated with successful and unsuccessful performance, a psychological skills programme can be tailored for your specific needs.

Assessment questionnaire

We assess emotions using self-report methods, typically a questionnaire. Of course, there are limitations with such an approach, as accuracy requires honesty. However, I would argue that there is not a better method available. A valid assessment of emotion necessarily requires access into thoughts and feelings.

It's true that we can make hormonal measurements (*eg*

adrenaline) to infer emotions, and also that these hormones are detectable in emotions such as anxiety, anger and excitement. However, a limitation with this approach is that the physiology of emotional states such as vigour or excitement is similar to other high activation states such as anxiety and anger.

The only way to validate a physiological measure of anxiety or vigour is to compare it against a self-report measure; that is, to ask someone whether they were angry, anxious or excited.

It's important to know your emotional states associated with success and failure. Once you've identified the factors linked with poor performance, you can begin to develop a strategy to combat these factors.

Task 3: visualising success

One strategy for developing emotional control is to use imagery. Imagery is effective because it can be used to replay situations. The emotions experienced during those situations can be changed from dysfunctional to functional. Imagery is a good way to do this as the situation can be replayed and aspects of it can be changed.

A good way of starting to learn imagery is to find a quiet place on your own. Sit down in a chair and make yourself comfortable, close your eyes, breathe deeply and evenly until you feel calm and relaxed. Picture yourself standing in your competitive environment and look around you taking care to notice as many details as possible. What can you hear? What does your competitive environment smell like? How are you feeling? Immerse yourself in your competitive environment using all of your senses. Using 30-second blocks, you should relive the experience through your own eyes in real time. We encourage athletes to visualise in the first person and recall the emotional experiences before and during performance.

We also use imagery to help athletes cope with difficult situations. You should try to anticipate a difficult situation and see yourself coping with it successfully. An important part of this process is to imagine successfully tackling a number of the factors that make the task difficult; never underestimate the

difficulty of the task as this can create a false sense of self-confidence.

For example, imagine yourself coping through the toughest part of the race, when your body feels exhausted. Imagine yourself coping successfully with this fatigue, feeling anger and depression starting to build up as you sense your physical fitness not being able to match the standard of performance you have set as a goal.

During imagery sessions you should rehearse the psyche-up strategies that would be used to raise vigour. For ultra-endurance events such as the Marathon des Sables, you should imagine how you will feel at the start of a difficult stage. This could be three days into a multi-day event when you have residual fatigue. Imagine how you talk yourself into feeling ready, downplaying feelings of soreness. Imagine yourself as a runner of the course; focus on each step, on the small details, and go through how attainable each part is when broken down in to simple steps. What this can do is to develop effective coping strategies for successfully dealing with unpleasant emotions experienced in competition.

Task 4: use self-talk

Controlling emotions during an event is also about controlling that inner voice in your head. When you are feeling tired, this inner voice can be very negative. It can question what you are doing, talk you out of keeping going, and become a general nuisance. Positive self-talk is needed when feeling tired.

Endurance running involves coping with fatigue, which can be learned; you can turn the voice off and you can turn from negative to positive. First, think back to those runs when you felt tired. Think of what you said to yourself. Write it down. The next step is to change the negative self-statements into positive self-statements.

For example, consider the negative self-statement, 'My legs have gone. I will have to stop'. This relationship between feeling tired and what to do about these feelings is clearly terminal for performance. We need to change both parts of this self-

Marathon des Sables preparation strategy

Run in the heat. Mental conditioning can occur with physical conditioning. Being able to cope mentally is also about coping physically. The two are closely related. We know the Sahara will be hot. It is not easy to simulate these conditions in the UK, especially in the winter. At the University of Wolverhampton, our strategy is to ask athletes to run on a treadmill in the lab at a comfortable running zone in hot conditions. We assess body core temperature, perceived exertion and emotional states before, during and post run. We do this at monthly intervals, assessing changes, and hopefully the improvements that have occurred.

Talk to previous runners. Speaking with someone who has completed the course can develop the mindset 'if he/she can do it, so can I'. At the University of Wolverhampton we have arranged sessions in which Matt Wilson, an ultra-endurance athlete who has completed the Marathon des Sables. He talks to runners about how he trained and what practical steps he took during the event. Use video film footage. Watching video footage of athletes coping with the race helps build an image of what it will be like. This can be used to create an image of the difficulty of the race. It is good for imagery sessions as the runners can picture themselves coping with running in conditions similar to the actual event.

statement. Rather than saying 'my legs have gone' we need to change this to a transient statement such as 'my legs are tired'. This is more likely to be true in any case. Tiredness tends to come in waves during endurance running and intense feelings of physical tiredness can pass.

It is also important to change the strategy for dealing with fatigue. I suggest that runners should focus on their technique when feeling tired. Focusing on technique is a good strategy as it is largely under the control of the athlete. If the runner focuses all of their attention on technique, this can detract attention from sensations of fatigue. The outcome is a much more positive self-statement: 'My legs are feeling tired, so I will concentrate on my technique to make it more efficient.'

A good way of using self-talk is to try to anticipate difficult moments in competition or in training. Develop self-talk scripts to change negative scenarios to positive ones. Use a

combination of imagery and self-talk to create situations in which you experience unpleasant emotions, and see yourself deal successfully with these situations, using positive self-talk to control the inner voice in your head that can be negative.

Preparing for the challenge of the Sahara

Preparing for the Marathon des Sables is about researching all the possible challenges. Ideally, you would go out there a month before competition, go around the course, practise running in the heat, specific hills, and so on. If you have the time and resources to do this, I suggest you go. However, many athletes do not have this opportunity and therefore I will focus on how they can cope.

Firstly, it is important to anticipate the challenges before they occur. This has been a theme running though all of the strategies suggested so far, and learning to perform in extreme environmental conditions is no exception. For the Marathon des Sables, this means finding out how to cope with blisters, about learning to run carrying equipment, about coping with the heat, about controlling your drinking and many other factors that we are still learning about. We do know that some people cope better than others. Unfortunately, there is not a huge research base to use, but there are people who have completed the course and many of these are happy to pass on tips. The box below outlines our strategy.

'You should try to anticipate a difficult situation and see yourself coping with it successfully'

Conclusion

Lets' draw together the main points outlined here. What should an ultra-endurance athlete know and expect before an event? Expect to feel fatigue and develop strategies to cope with this. Expect also to feel anxious before each run but try to interpret these feelings as excitement; sport performance is by its very nature uncertain, and even the most confident athletes still have a degree of anticipation regarding how things will turn out. Remember that psychological toughness is built on a firm platform of physical fitness. To enjoy an event such as this, athletes need to have experienced repeated bouts of fatigue

that follows long-duration exercise. In the same way you train your body to cope with the demands of training, you also train your mind to think positively about the experience. Finally, prepare thoroughly for the specific demands of the event.

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The first chapter of the first Psychology Special Report looked at imagery drills for sporting performers. This two part chapter will emphasise the fundamentals behind imagery and its importance to training and performance. Part One concentrates on understanding the basics including self-hypnosis and visualisation. Part Two takes a specific look at the merits of music and video as ergogenic tools.

"The man without imagination has no wings, he cannot fly."
Muhammad Ali

Part One: Imagery in sport – how imagination can enhance performance

Introduction

The progression of the human species has relied heavily upon our capacity to look beyond where we are now. These same qualities of foresight and vision can be harnessed to produce superior sporting performance

Just as a bright and active imagination can facilitate progress in academic, work-related and social domains, so it can facilitate progress in sport. Indeed, 30 years of personality research in sport have shown that the most common psychological characteristic of elite athletes is high intelligence. You may find this quite surprising as athletes are often teased by non-athletes as being 'intellectually challenged'.

However, top athletes regularly engage the right side of their brain, the creative side that uses images and abstract concepts, to practise skills and rehearse various scenarios that are integral to their discipline. To assist you and your athletes in harnessing the power of imagination, I am going to explore recent research and practical applications of two techniques that are often taught by sport psychologists: Imagery and Self-hypnosis.

Case study: Robert the fly-half

Robert Grant is a second-year undergraduate on a sports scholarship at a university in the London area. From his days as a schoolboy county player, I helped Robert use the power of his imagination to run moves in his mind's eye just prior to their execution. Robert was predominantly a playmaker in his position of fly-half. He honed these playmaking skills to perfection during his sixth form years and has now become very proficient in using imagery to rehearse complex sequences of play. He imagines a play through his own eyes and recreates exactly where and how he will receive the ball from his scrum-half. He feels the ball land in his hands as though a strong magnetic attraction was drawing it in. Robert then imagines accelerating, dummying, sidestepping and propelling himself towards the try line or passing the ball smoothly to a team mate. His imagery includes detailed attention to how he will dodge the opposition's three-quarters and counter their typical defensive positions. This brief mental process, conducted just after each move is called by the team captain, allows him to anticipate effectively and gain a split-second advantage that often proves decisive.

Understanding imagery and self-hypnosis

Mental imagery is the process by which we create or recreate experiences in the mind using information stored in our memory. You engage in imagery every time you have a dream, but this is an unstructured form of imagery. Structured imagery is aided by a vivid imagination, and the more control athletes have over their imagination, the more they are able to control their performance. Athletes vary greatly in their imagery ability and in the senses they engage during imagery[(1)].

Some like to 'feel' movement internally – a process known as kinaesthesis – while others like to see their performance unfold as if watching the playback from a headcam – this is known as visual-internal imagery. Another frequently used type of imagery is referred to as visual-external imagery – seeing yourself perform from a distance as though watching from a grandstand or viewing video playback. With practice, it is possible to engage all of the senses at once or synaesthetically to create really vivid experiences.

Research shows that the more clearly you are able to

experience mental images and the more accurately you can control your imagined movements, the more likely you are to translate the images into superior performance[2]. As a sport psychologist, I often train athletes to use imagery in a structured way to help revive or create the ultimate performance. Below is a brief case study of a simple application of imagery that I used with a young rugby union player a few years ago.

Self-hypnosis

Self-hypnosis is a state of heightened awareness and relaxation that is self-induced. It is used by athletes in a variety of sports as a stress management technique and can also accelerate many aspects of mental training. I often use it hand-in-hand with imagery whereby I get athletes to relax using self-hypnosis and then to engage in sport-specific imagery. There is nothing mystical about hypnosis; just think of it as reaching a deep state of relaxation that is extremely pleasurable.

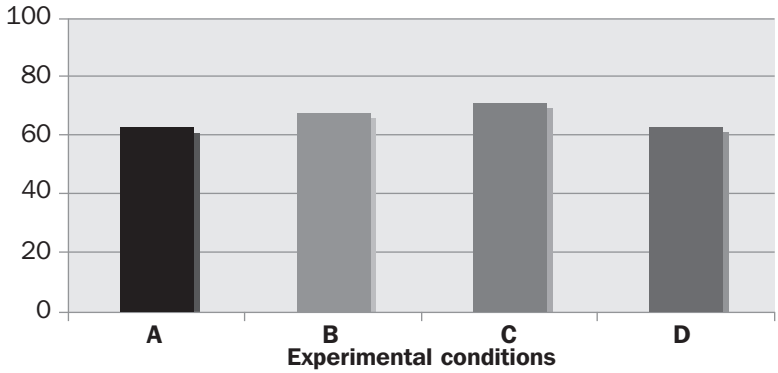
You may well have experienced something similar to a hypnotic state when driving a car along a very familiar route. Your detailed knowledge of the route means that you drive the car automatically – with very little conscious effort. In such a state, when you are not thinking about the action of driving, it is very easy to miss your exit on the motorway – a phenomenon known as highway hypnosis.

A common misconception that people have about hypnosis is that it must involve a deep state of trance, in which you are oblivious to what is going on and have absolutely no control over your actions. In actuality, you have full control and are able to tap the power of the right brain – the creative side – far more effectively than in a normal state of wakefulness.

The body of knowledge

Research shows that if you imagine yourself performing any sports skill, this causes electromyographical (EMG) activity in the musculature resembling that which would occur during the physical execution of the skill [3]. For example, if you were to imagine yourself flexing your left arm from the elbow joint, it

Figure 1: Effects of imagery on isometric muscular endurance



Means for isometric muscular endurance under conditions of imagery only (A), motivational music (B), motivational music and imagery (C) and a no-imagery/music control (D)

(Karageorghis & Lee, 2001)

would be possible to monitor activity in the biceps muscles even though no physical movement occurs[4]. However, the pattern of activation during imagery does not match precisely the pattern of EMG recorded during actual movement.

Despite differences in the pattern of activation, imagery has the effect of priming muscles for subsequent physical action, and this clearly has potential benefits for the performance of many sports skills. It is also evident that the neural impulses passed from the brain to the muscular system during imagery may be retained in memory almost as if the movement had actually occurred[2]. The implication of this is that physical skills may be improved even during periods of injury when physical practice is not possible. Moreover, there is growing evidence to suggest that a combination of imagery and relaxation can accelerate the rehabilitation process following injury or surgery[5].

It has been suggested that visual-internal imagery (the 'headcam perspective') comes naturally to us because it represents how we normally experience the world. This means that external imagery often has the potential to add something

new. For example, researchers have shown that a visual-external kinaesthetic perspective (*ie* seeing yourself from a distance and feeling movement) is superior for learning and retention of new sports skills, especially those that are technically complex such as throwing events in athletics, ice dance routines or gymnastics sequences[6].

However, anecdotal evidence suggests that visual-internal imagery tends to aid the kinaesthetic sensations to a greater degree than visual-external imagery[7]. Given that it can elicit greater bodily activation, the implication is that an internal perspective is superior when you wish to psych up or prime yourself for competition. Both internal and external perspectives have their merits and you should aim to combine all of the senses for maximum effect.

'Mental practice conducted in a trance is far more life like than conventional mental practice'

An experiment we conducted at Brunel university using task-relevant imagery prior to an isometric muscular endurance task showed that imagery combined with motivational music was more effective than using imagery only, music only, or a no-imagery/music control condition (elaborated on in Part Two)[8]. Carefully selected music complements imagery via the extra-musical associations it creates or through evoking positive memories that facilitate performance[9].

Imagery establishes a mental blueprint for sports skills and tactical ploys[10]. Indeed, a popular acronym used by sport psychologists is 'Wysiwyg'[11] which stands for What You See Is What You Get. Research has shown repeatedly that task-relevant imagery (*eg* mental practice) combined with physical practice is more effective than physical practice alone[2]. Moreover, mental practice conducted in a hypnotic trance is far more lifelike and intense than conventional mental practice[12].

Imagery techniques for you and your athletes

Learning skills – one of the best uses of imagery comes during the learning or honing of a sports skill. The more images that can be used to replace verbal explanation or reasoning in learning, the more simply and effectively techniques will be

Examples of images that aid the mastery of sports skills	
Breaststroke in swimming	Kick through the water like a frog
Drive in golf	Swing of a pendulum in a grandfather clock
Free throw in basketball	Shooting out of a telephone box
Long-distance running	Finish like a steam train
Pulling in archery	Draw your shoulder blades together to hold an orange
Shot in netball	Make the arm into a gooseneck on follow-through
Throwing a javelin	Whip the arm through
Top of the cycle range	Kick the pedal out like a football
Weightlifting	Pull your elbows through the ceiling

mastered, and the faster learning will progress. Whether you are in the position of teacher or learner, imagery has a significant part to play in communicating and understanding skills. If you can capture the heart of a skill in a simple image, practice is made far less arduous.

A particularly good way to develop your skills is thorough recreating the image of an expert in your sport. I often ask athletes to observe a top performer they really admire – say Roger Federer if they're a male tennis player – and then to imagine themselves as that performer in full flow. I increase the intensity of the experience through progressively adding each of the senses.

For example, to recreate the experience of serving, the player is asked to imagine the feeling of stretching up and swinging the racket, the sound of the ball as it makes contact with the sweet spot of the racket, the smells in the air and the taste of sweat, in addition to seeing himself perform the skill.

Getting psyched-up – under-arousal is just as much a limiting factor to peak performance as is over-excitement and high anxiety. Thankfully, the power of your imagination can also be used to get you feeling 'up' for a competition or training session. Before you start the exercise (see box, below), sit in a

comfortable chair, relax by closing your eyes and breathing slowly and deeply, and allow the tension to leave your muscles as you exhale. Spend a few minutes doing this until you feel really relaxed.

Getting psyched up using imagery

- Think back to the start of a previous performance during which you were optimally psyched up. Recall the precise state you were in before the competition commenced, *eg* focused, in control, poised, full of self-confidence, *etc*;
- Step into that state of readiness, experiencing it in first person – through your own eyes (the 'headcam perspective'). Notice exactly how it feels, both mentally and physically;
- Now try to encapsulate that sensation in a single word, image or feeling;
- In future, use that word, image or feeling whenever you need to feel fully psyched up. Practise using it in training to strengthen its salience;
- It can be anything you want – 'alert', a raging bull or feeling invincible – as long as it works for you.

Capturing performance 'in the zone' – on those rare occasions when you're performing in 'the zone', it's advisable to try to 'capture in a bottle' all of the mental aspects of your performance. This will help you to recreate that optimal mindset in the future. Use a notepad immediately following your next successful performance to jot down everything that you sensed.

Holding on to performance 'in the zone'

- After a successful performance analyse through each of your five senses: what you saw, heard, felt, smelt or tasted at the time of peak performance;
- Take particular note of the self-talk that was taking place inside your head and the impact it had on your performance;
- Practise recreating the signals of success in your mental warm-ups and mental rehearsal.

Practising 'what if' scenarios – One of the most useful applications of imagery is to use a team's collective set of imaginations to come up with things that might go wrong – the so-called 'what if' scenarios. Players can then systematically devise strategies for each possible 'what if'. These strategies are discussed in detail and rehearsed mentally. Oft cited 'what ifs' for which sportspeople adapt strategies include 'What if we suffer a bad refereeing decision?', 'What if our best player is sent off in the first 15 minutes?', 'What if we get delayed and arrive at the competition venue an hour late', 'What if the pitch is waterlogged?' and so on. In individual sports, I use this exercise with an athlete accompanied by their entire support team – coach, manager, agent, physiotherapist, etc. Athletes routinely report that this application of imagery can make a critical difference in the heat of competition.

A script for self-hypnosis

This is one of the most popular self-hypnosis techniques employed by athletes. It aims to help you distance your mind from the here and now and place you in a setting that you associate with relaxation and inner calm. It may be useful for the first couple of times that you or your athletes try it to print out the instructions and have someone read them out. However, the script is written so that it can be recorded as an MP3 file or onto an audiocassette for use by the athlete alone. Where you see continuation marks (...) leave a pause for a few seconds and remember to speak slowly and clearly throughout.

A particularly good time to use imagery in the form of mental rehearsal is just before you return to a state of full wakefulness at the end of the self-hypnosis exercise. The heightened state of awareness achieved during self-hypnosis will allow you to enjoy extremely vivid mental rehearsal that will programme the pattern of muscular activity that is specific to your sport. When golfing legend Tiger Woods feels anxious, he gets his mental coach Jay Brunza to hypnotise him. Woods is then able to engage in positive imagery, block out any nagging doubts and focus on the task at hand. Hypnosis works well as a stress

Self-hypnosis script

Firstly you need to relax, put on some very relaxing music or sounds of nature, sit or lie down in a position that you find comfortable in a place where you are unlikely to be disturbed. Look up at your eyebrows and begin to concentrate on the sounds around you… maybe the distant sound of a car driving by or the hustle and bustle outside on the street… then concentrate on the sounds of the music, feel it flowing over you as if it were the tide going in and out, in and out… now begin to pay attention to the sound of your thoughts… concentrate on your breathing. Take deep breaths in and out… in and out… listen to your heart beat… become aware of your eyelids and feel them blinking quickly and notice that you have a strong desire to close your eyes… allow your eyes to close and feel a deep sensation of relaxation. In a few seconds, you will imagine your favourite place of relaxation… maybe somewhere you have been before, a beautiful garden, a deserted beach, a summer meadow or somewhere you can imagine you would feel relaxed… and now… just imagine that you are standing on a balcony… and there is a long set of stairs in front of you… leading down from this balcony… there are strong stairs… with wide steps… and a handrail on each side… the stairs are well lit… and you can see them clearly… In a few seconds' time… you can count down from 10 to one… and with each descending number between 10 and one… you will take a single step down the stairs… and with each descending number you will become more and more calm, more and more relaxed… each step down from the balcony will take you deeper and deeper… into *your* wonderful state of relaxation… and as you slowly descend these stairs… you are going to experience a sense of ever-deepening relaxation… throughout your entire body… You will feel the stairs under your feet… and when you eventually reach step one, you can pause and wonder where you might go next… again you feel very tranquil and this tranquillity is accompanied by a sense of anticipation… you will then step off… and when you do so… you will find yourself in your favourite place of relaxation… and enjoy… this beautiful place… Provide yourself with only positive and beneficial suggestions. For example, relating to increasing your self-confidence, attaining peak performance in an upcoming competition, or mastering a specific sports skill that has perhaps proved elusive to you. If, at any time, for any reason, for example in case of emergency or any situation where full attention is required, by opening your eyes, you will be fully alert. To take yourself out of your relaxing place in a gradual manner, simply count up slowly from one to ten, on reaching the number eight, open your eyes, and at the number 10 you will be fully awake and alert. As you stand up, have a stretch and notice how good you feel.

This is an adaptation of a script published by the London College of Clinical Hypnosis.

management tool and as a precursor to mental rehearsal.

Summary

This article has outlined ways in which you can use the power of your imagination and a heightened state of awareness to develop skills that will improve sporting performance. You should try to follow formal mental practice with physical practice of the same skill as soon as possible. This approach has been shown to be particularly effective in developing superior sports skills. The practice of mental skills such as imagery and self-hypnosis will enable you or your athletes to add an entirely new dimension to your training programme that will certainly pay dividends in the long run. Remember that if you can see it, you can create it; if you can feel it, you can perform it; and if you can imagine it, you can achieve it!

Dr Costas Karageorghis

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Part Two: 'Tuning up' performance – music and video as ergogenic tools

Introduction

Recent research has seen some creative approaches to developing psychological skills, such as listening to carefully selected music and watching personal motivational videos. This article evaluates these new techniques, explains how they can be assessed and suggests ways in which they can be incorporated into training

Music as an ergogenic aid

Music can play an important part in the preparation process for sport performance. The sight of athletes wearing headphones in warm-up areas before competition is commonplace, and club anthems are often played as teams come out to play. The proposed performance-enhancing effect of crowd noise and crowd singing is also well documented anecdotally.

Sport psychology researchers have recently sought to move from anecdotal to scientific knowledge in this area. The development of a scientific evidence base for the effects of music and motivational videos requires researchers to design appropriately controlled studies that seek to control for a number of factors that could affect the results. The scientific base for these new ideas is emerging with encouraging results from initial tests.

Cutting-edge research to investigate the effects of music on psychological states is led by my academic sparring partner and former Brunel University colleague, Dr Costas Karageorghis. Karageorghis suggests that music may elicit a number of psycho-physiological responses that lead to improved performance.

There are four main areas in which music may benefit performance:

1. Listening to music may narrow the attention of the performer, and consequently this could divert the performer's attention away from feelings of tiredness and fatigue;
2. Listening to music also has an influence on arousal states, and hence, in pre-competition situations, may be used to stimulate or calm the performer;
3. Music has innate rhythmical qualities that individuals may respond to and which can make performing seem easier by allowing for the synchronisation and emulation of movement patterns to the music;
4. Listening to music may increase positive mood and decrease negative mood.

In a series of studies, research has demonstrated that listening to motivational music before performance is associated with increased strength [1].. Research has found that listening to music is associated with enhanced mood states, with listeners perceiving exercise to be less exhaustive [2].

A key question stemming from this work is what type of music leads to improved performance. The answer is unfortunately not straightforward. Karageorghis argues that a multitude of factors need to be considered in the selection of music designed to enhance performance, which could be summarised under four headings [3,4]. Musical factors such as lyrics, harmony and melody, and personal factors, such as socio-cultural background, associations and preferences, are proposed to determine the motivational qualities of an individual piece of music:

- **Rhythm response** – music with a high tempo rhythm is good for high-energy tasks, while a slow rhythm is more suitable for low-energy tasks;
- **Musicality** – refers to the harmony and melody in the song;
- **Cultural Impact** – musical preference tends to be formed during adolescence and there are huge differences in personal preferences reflecting the age and background of listeners. For example, it's not surprising that 19-year-old athletes tend to prefer different music to 30-year-old athletes. My preference

is to listen to the Sex Pistols whilst exercising – a style of music not shared by many in the gym;

● **Association** – this relates to the time of release, whether the individual follows the music of the artist, or, as in the case of the theme tune to Rocky, powerful images are associated with the music.

The development of a 'music rating scale' provides researchers and practitioners alike with a tool to select motivational music for athletes [3,4]. What emerges from this research, and something that could be predicted using common sense, is that the vast range of musical preferences make it difficult to select tracks that suit all athletes.

'Some athletes find music more influential than others'

The theoretical explanation for this effect, and one that is helpful in developing a way forward, is 'self-regulation theory'. This is concerned with how people learn to change their emotions. Through experience, individuals learn to recognise the effects of what they do on how they feel and, importantly, become aware of this link.

It is important to recognise the individual nature of self-regulation theory and develop individually tailored interventions. For example, soul music might promote happiness for some people; heavy metal might make others happy. Two people may therefore select two completely different choices of songs or pieces of music when choosing music in terms of its ergogenic properties.

Susceptibility to music

In a study that asked athletes how they regulated unpleasant and potentially harmful mood states, athletes reported listening to music as a strategy for regulating anger, confusion, depression, fatigue and tension, and for raising vigour [5]. However, an important point that also emerges from this study is that some athletes find music more influential than others. Selecting appropriate music for some athletes could lead to potent effects, and it is worth identifying these athletes before starting work.

In an attempt to provide coaches with a scale to identify athletes who respond to music, as a strategy to enhance psychological preparation, a series of studies were conducted to develop a valid and reliable scale[6,7,8]. This scale uses questions such as, 'If you need to feel energetic, how effective is listening to music as a strategy to achieve this feeling?' and, 'If you are feeling worried, how effective is listening to music as a strategy to change this feeling?' to assess how susceptible an athlete may be to music.

Case study

To illustrate how music can be integrated into an athlete's preparation, I'll use a case study from work with a professional boxer [9,10]. We introduced music because the boxer found traditional relaxation techniques awkward and ineffective. Indeed, it transpired that he already used music to change his emotional states as a normal part of the training cycle and listened to music during the middle of the day to try to relax in between training sessions.

Following exploration of the type of music that was effective, we developed a series of CDs to be used for relaxation. The growing use of portable MP3 players, which can store programmed music selections, means that athletes can now quite literally carry around their relaxation strategy.

The boxer also used music in the final stages of preparation for a World Championship contest. With a televised World Championship contest, a boxer will know the exact time of the fight and this allows the support team to develop carefully planned warm-up routines. This was something we developed and prepared for in the weeks leading up to the contest.

Music is an ideal medium around which to plan a warm-up routine. A two-hour build-up was developed, using music as the trigger to change what was happening during the warm-up:

- Two hours before competition calming and relaxing music was played;
- 90 minutes before competition the music changed to more upbeat music;

Integrating music and video into training

A question that I am frequently asked by athletes and coaches is, 'How do I integrate sport psychology training into normal practice?' Although almost all athletes recognise the importance of psychology in terms of its impact on performance, few take time to practise psychological skills. Sitting in a changing room with your eyes closed engaging in imagery or relaxation techniques is only likely to work in an environment where such activities are socially accepted. Psychological practice in training is clearly more difficult as it tends to be less socially acceptable. One advantage of using music and motivational videos is that they build on what athletes tend to be doing already.

Let's consider a training session for a hypothetical athlete. It's a typical session and the aim is to improve physical fitness. The session involves a 10-minute warm-up, followed by a weight-training session involving sets of five repetitions at 90% of one repetition maximum with two minutes' rest between each set. The session lasts for an hour and ends with a 10-minute warm-down.

During the session

Sit down before the session and remind yourself what the goals are for that session (working on the assumption that you're working to a plan and each session has short-term goals that build to long-term goals). Music can be used to accompany this process with a view to developing the appropriate psychological state. Motivational videos can be developed to enhance skill development or raise emotions that enhance performance. A motivational video I used with a professional boxer was a film showing him successfully completing an extremely physically demanding task. Watching this before high-intensity training increases emotional states associated with high activity. Both imagery and motivational video can provide an excellent basis for imagery sessions to enhance good technique and raise motivation.

During the session

Music can be a powerful aid during a fitness training session. Use a selection of appropriately motivating music (ideally played using a portable MP3 player). For the most demanding parts of the session, music that enhances emotional arousal should be played, with sedative music played in rest periods to enhance recovery, lower arousal and thereby increase attentional control.

After the session

Record the session in your training diary. Comment on the extent to which each goal was achieved. Reflect on the effectiveness of music as a strategy to raise motivation, and personal motivational videos either to raise emotional arousal or improve technique. Consider how you will make these goals more challenging in future sessions.

● 45 minutes before competition, when the warm-up (both physically and psychologically) starts to build up, the music became more motivational and upbeat.

However, care was needed not to over-arouse, because the plan for the early rounds was to fight a particular strategy. To do this, it was important that the athlete remained calm, especially since over-arousal is linked with a loss in attentional control.

The music routine was integrated into the boxer's final few training sessions, whereby the warm-up sequence was rehearsed before key sparring sessions. Fortunately, boxing lends itself to this approach because boxers compete far less often than tennis players do, for example (where this approach could be used for less important games rather than in training).

'Music is an ideal medium around which to plan a warm-up routine'

Discussions with the boxer revealed that listening to the theme tune played as he entered the ring generated moderate to intense emotions even if it was played away from competition. When his theme tune ('Let me entertain you' by Robbie Williams) came on the radio on the way to training, he went silent. 'It takes me back to the moment I get in the ring,' he said.

This is possibly not surprising as evidence shows that physical symptoms, or somatic anxiety, is at its highest shortly before competition, and therefore he would associate listening to the song with that period before competition. The music was used in conjunction with imagery sessions in which positive self-talk regarding the contest was rehearsed so that the athlete felt in control of his emotions as the music was played. When the theme tune is played shortly before competition it can help sharpen the athlete's mind in preparation for the contest.

Video as an ergogenic aid

A strategy that can be used in conjunction with music is video footage. This work is being pioneered by Roberto Forzoni, a sport psychologist at the English Institute of Sport[11]. Forzoni has developed relatively short video clips that are accompanied by an athlete's preferred music, or music that targets a specific psychological state that could be used in training and before

Top 10 tips for producing effective personal motivational videos

1 Keep the personal motivational videos short – three minutes is an ideal length.
2 Use slow motion effects showing the athlete performing excellent skills.
3 Show a close-up of the athlete's face. This will arouse an emotional response making the personal motivational video a more powerful tool.
4 Use inspirational music to score the personal motivational video. Combinations are endless.
5 Use graphics to start the video, leading the athlete to the theme of the personal motivational videos, and then at appropriate points through the production.
6 Use dissolve fades from normal to slow motion sequences to maximise the effects.
7 Try to minimise the variety of special effects, particularly transitions (there is a temptation to use many different effects on the same personal motivational videos, which may reduce the impact of the message).
8 Include short (10sec) clips of athlete-preferred role models where appropriate.
9 Synchronise the video footage with the music score, and in particular the lyrics, where possible. Many fantastic opportunities to reinforce messages are missed when this synchronisation is not used and you will be amazed how many opportunities will occur to do this.
10 Be prepared to invest time and experiment with clips, music and graphics to produce the ideal combination.

competition. Consistent with the ease with which music can be used in preparation through improved technology, many athletes have access to DVD players, often through their own laptop computer.

Videotaped sessions of key training sessions and competition are extremely helpful in my work in professional boxing. Videotaping and analysing sparring and training sessions prove to be a very effective way of developing psychological skills. The boxer, coach and sport psychologist view videotape sessions on a 3ft-square screen in a lecture theatre at my university. These are then repeated throughout the programme.

Video analysis of the sparring sessions leads to detailed discussion on the strengths and limitations of performance, and the strengths and weaknesses of his opponent. For each opponent we would have details of the number of punches thrown for each 30 seconds of each round; ratio of head-to-

body punches, the number of counter-punches that were thrown, jabs *etc*.

Regardless of the opponent, we observe that boxers tend to show consistent habits. For example, one boxer may move predominantly to one side and throw fewer punches in the first half of a round. This information was used as the basis for goal setting for technical sessions and imagery scenarios, while training was focused around exploiting the opponent's weaknesses.

An aspect of developing personal motivational videos is the cost of equipment and time it takes to make the video. As computer technology becomes more sophisticated and computer memory becomes cheaper, the ability to put together three-minute clips with associated music becomes easier.

However, Forzoni does suggest that a downside to personal motivational videos stems from the time it takes to produce them. He allows a minimum of one hour for every minute produced, emphasising that this is minimum time. In a recent article in Sport and Exercise Scientist, he suggested 10 top tips to producing personal motivational videos (listed further)

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