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Key Concepts in Sport Psychology

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2.5: Anxiety and Arousal

Definitions: 'Arousal' is a form of diffuse or undifferentiated bodily energy which primes us for emergency action. 'Anxiety' may be defined as negatively interpreted arousal – an emotional state characterised by worry, feelings of apprehension and bodily tension that tends to occur in the absence of real or obvious danger.

Most athletes know from personal experience that if they wish to perform consistently well in competition, they must learn to control their arousal levels effectively. For example, tennis champion Rafael Nadal revealed that 'the important thing is for me to have the calm. It is what is needed to play my best' (cited in Flatman, 2010, p. 14). However, for Christine Ohuruogu, Britain's 2008 Olympic gold medallist in the 400m sprint, some anxiety before a race is essential because 'you need some level of pre-race nerves to get the adrenaline going but it is crucial to keep it under control' (cited in the *Guardian*, 2009, p. 35). These quotations raise two key questions for sport psychology researchers. First, what exactly is arousal and how does it differ from anxiety? Second, what is the relationship between arousal, anxiety and athletic performance?

In psychology, the term 'arousal' refers to a form of diffuse or undifferentiated bodily energy which primes us for emergency action. According to Gould et al. (2002), it is a 'general physiological and psychological activation of the organism which varies on a continuum from deep sleep to intense excitement' (p. 227). Physiologically, feelings of arousal are mediated by the sympathetic nervous system. In particular, when we become aroused, our brain's reticular activating system triggers the release of biochemical substances like epinephrine and norepinephrine into the bloodstream so that our body is energised for action. Although arousal involves *undifferentiated* bodily energy, anxiety is an emotional label for a particular type of arousal experience. In short, anxiety may be defined as *negatively interpreted* arousal – an emotional state characterised by worry, feelings of apprehension and bodily tension that tends

to occur in the absence of real or obvious danger. This proposition raises the question of individual differences in arousal interpretation.

It has long been known that athletes differ from each other in how they perceive and interpret their arousal states. For example, a low level of arousal may be experienced either as a relaxed state of readiness or as an undesirable 'flat' or sluggish feeling. Conversely, symptoms of high arousal such as a rapid heartbeat and a feeling of 'butterflies' in one's stomach may be perceived as pleasant excitement by one athlete but as uncomfortable anxiety by another performer. To illustrate the former interpretation, consider Tiger Woods' view that 'the challenge is hitting good golf shots when you have to … to do it when the nerves are fluttering, the heart pounding, the palms sweating … that's the *thrill*' (cited in Davies, 2001, p. 26). Taken together, these observations suggest that it is not the *amount* of arousal that affects performance but the way in which such arousal is *interpreted*. Exploring this idea empirically, Jones and Swain (1992) showed that somatic symptoms of anxiety can have either a *facilitative* or a *debilitative* effect on sport performance depending on how the athlete perceives them. Interestingly, in a recent review, Thomas et al. (2009) claimed that athletes who perceive arousal symptoms as facilitative tend to perform better, have higher levels of self-confidence, use more effective coping strategies and display more resilience than do counterparts who perceive such symptoms as debilitative of performance. Unfortunately, there is a semantic problem at the heart of research on 'directional' anxiety effects. Specifically, as 'anxiety' is usually defined as negatively interpreted arousal, it makes little sense to talk of facilitative *anxiety*. Instead, it is more accurate to refer to facilitative *arousal*.

Three main theories in sport psychology have guided research on the relationship between arousal, anxiety and athletic performance since the 1990s: 'Catastrophe theory' (e.g. Hardy et al. 2007); the 'conscious processing' (or reinvestment) hypothesis (Masters and Maxwell, 2008); and 'attentional control theory' (Eysenck et al. 2007). These theories may be summarised briefly as follows.

To begin with, catastrophe theory (e.g. Hardy, 1990; Hardy et al., 2007) distinguishes between cognitive anxiety and physiological arousal. Furthermore, it postulates that when cognitive anxiety is high, increases in arousal tend to improve performance up to a certain point beyond which further increases may produce a swift, dramatic and discontinuous (hence the term 'catastrophic') decline in performance rather than a slow or gradual deterioration. The cornerstone of catastrophe theory is the

assumption that arousal may have different effects on athletic performance depending on the prevailing level of cognitive anxiety in the performer. Specifically, when an athlete experiences high cognitive anxiety, the arousal-performance curve should follow a different path under conditions of *increasing* versus *decreasing* arousal. This hypothesis was supported, in part, by Vickers and Williams (2007) who discovered that high level of cognitive anxiety combined with a high level of physiological arousal sometimes led to 'choking under pressure' (see **2.8**) among biathlon performers – but not when these athletes were able to pay attention to task-relevant information. Unfortunately, the complex three-dimensional nature of catastrophe theory has made it difficult to test.

The second theory of the relationship between arousal, anxiety and athletic performance is the conscious processing (or reinvestment) hypothesis (Masters, 1992). This theory has generated a considerable amount of research in sport psychology (see review by Masters and Maxwell, 2008) – especially with regard to the relationship between conscious attention and skilled performance under anxiety-provoking conditions. It was spawned, in part, by an attempt to explain the well-known 'paralysis-by-analysis' phenomenon (see **2.8**) whereby skilled performance tends to deteriorate whenever people try to exert conscious control over movements that had previously been under automatic control. According to Masters (1992), when athletes experience increases in their anxiety levels, they attempt to ensure task success by reverting to a mode of conscious control that is associated mainly with an *early* stage of motor learning (i.e. one that relies on explicit rules and that typically results in slow and effortful movements). This temporary regression is held to involve a 'reinvestment' of cognitive processes in perceptual-motor control. So, the conscious processing hypothesis postulates that anxiety exerts a debilitating influence on performance by increasing a participant's self-consciousness of his or her movements. If this conscious processing theory is correct, then anxiety should have *differential* effects on skilled performance depending on how the skill had been acquired originally (i.e. whether it had been learned explicitly or implicitly). In an effort to test this prediction using the skill of golf putting, Masters devised an intriguing experimental paradigm in which participants who acquired the skill of golf putting using *explicit* knowledge subsequently experienced impaired performance when tested under conditions of high anxiety. Two conditions were crucial to the

experiment. In the explicit condition, participants were instructed to read coaching manuals on golf putting. Conversely, in the implicit condition, participants were given no instructions but had to putt golf balls while performing a secondary task which had been designed to prevent them from thinking about the instructions on putting. Results suggested that the implicit learning group showed no deterioration in performance under stress in contrast to the golfers in the explicit learning condition. Masters interpreted this result as indicating that the skills of athletes with a small pool of explicit knowledge were *less* likely to fail than were those of performers with relatively larger amounts of explicit knowledge. To summarise, the conscious processing hypothesis predicts that athletes whose cognitive anxiety increases will tend to revert to conscious control of normally automatic skills. This prediction has been corroborated reliably. For example, Wilson et al. (2007) found that people's performance deteriorates when pressure manipulations require them to consciously attend to their movements.

Finally, attentional control theory (ACT) (Eysenck et al., 2007) postulates that cognitive anxiety (or worrying) depletes the resources of working memory and diverts the performer's attention from task-relevant to task-irrelevant information. According to Wood and Wilson (2010), ACT proposes that attentional control depends on the interaction between two systems – a top-down, goal-driven system that is influenced by the performer's current goals and a bottom-up, stimulus driven system that is influenced by salient information. ACT also suggests that anxiety increases the influence of stimulus-driven attentional system at the expense of the goal-driven system. In a test of this latter prediction, Wilson et al. (2009) used eye-tracking technology to analyse the visual search behaviour of soccer players as they prepared to take penalties in five-a-side matches (where there is a smaller distance between the goal-posts than in eleven-a-side matches) under various conditions of anxiety. Results corroborated a prediction of ACT by indicating that when anxious, the penalty takers displayed an attentional bias towards a salient and threatening stimulus (the goalkeeper) rather than to the ideal target for their kick (just inside the goal-post).

In summary, two general conclusions have emerged from research in this field (Moran, 2011). First, anxiety and arousal are best regarded as multidimensional constructs which do not have simple linear relationships with athletic performance. Second, increases in physiological arousal and cognitive state anxiety do not inevitably lead to a deterioration in athletic

performance. More precisely, the effects of arousal and anxiety on sport performance depend crucially on the way in which the performer appraises them cognitively.

REFERENCES

Davies, D. (2001) Relaxed Woods identifies the major pressure points. The *Guardian*, 6 April, p. 26.

Eysenck, M.W., Derakshan, N., Santos, R. and Calvo, M.G. (2007) Anxiety and cognitive performance: Attentional control theory. *Emotion*, 7, 336–353.

Flatman, B. (2010) Holding court. *The Sunday Times*, 4 July, p. 14 (Sport).

Gould, D., Greenleaf, C. and Krane, V. (2002) Arousal-anxiety and sport. In Horn, T.S. (ed.) *Advances in Sport Psychology*. 2nd edn. Champaign, IL: Human Kinetics. 207–241.

Guardian, The (2009) *The Guardian and Observer guides to keeping fit with Britain's medal winners*. January, p. 35.

Hardy, L. (1990) A catastrophe model of anxiety and performance. In Jones, G. and Hardy, L. (eds), *Stress and Performance in Sport*. Chichester: John Wiley, pp. 81–106.

Hardy, L., Beattie, S. and Woodman, T. (2007) Anxiety-induced performance catastrophes: Investigating effort required as an asymmetry factor. *British Journal of Psychology*, 98, 15–31.

Jones, G. and Swain, A.B.J. (1992) Intensity and direction as dimensions of competitive state anxiety and relationships with competitiveness. *Perceptual and Motor Skills*, 74, 467–472.

Masters, R.S.W. (1992) Knowledge, 'knerves', and know-how: The role of explicit versus implicit knowledge in the breakdown of a complex motor skill under pressure. *British Journal of Psychology*, 83, 343–358.

Masters, R.S.W. and Maxwell, J.P. (2008) The theory of reinvestment. *International Review of Sport and Exercise Psychology*, 2, 160–183.

Moran, A.P. (2011) *Sport and Exercise Psychology*. 2nd edn. London: Routledge.

Thomas, O., Mellalieu, S.D. and Hanton, S. (2009) Stress management in applied sport psychology. In Mellalieu, S.D. and Hanton, S. (eds) *Advances in Applied Sport Psychology*. London: Routledge. 124–161.

Vickers, J.N. and Williams, A.M. (2007) Performing under pressure: The effects of physiological arousal, cognitive anxiety and gaze control in biathlon. *Journal of Motor Behaviour*, 39, 381–394.

Wilson, M. Smith, N. C., and Holmes, P. S. (2007) The role of effort in influencing the effect of anxiety on performance: Testing the conflicting predictions of processing efficiency theory and the conscious processing hypothesis. *British Journal of Psychology*, 98, 411–428.

Wilson, M.R., Wood, G., and Vine, S.J. (2009) Anxiety, attentional control, and performance impairment in penalty kicks. *Journal of Sport & Exercise Psychology*, 31, 761–775.

Wood, G. and Wilson, M.R. (2010) A moving goalkeeper distracts penalty takers and impairs shooting accuracy. *Journal of Sports Sciences*, 28, 937–946.

2.6: Measuring Stress and Anxiety

Definitions: Stress is a pattern of physiological, behavioural, emotional and cognitive responses to real or imagined stimuli that are perceived as endangering us or harming our well-being in some way. Anxiety may be defined as negatively interpreted arousal – an emotional state characterised by worry, feelings of apprehension and bodily tension that tend to occur in the absence of real or obvious danger.

Competitive sport, especially at the elite level, is a stressful experience for many athletes. For example, Rebecca Adlington, the first British woman to win two gold medals at the Olympics for swimming, admitted that she had to lie down on the floor before her races in the 2008 Games in Beijing in order to avoid 'standing up and being sick, because I was more nervous than I've ever been in my life' (cited in Moss et al., 2008). In view of such experiences, stress and anxiety have attracted considerable research interest in sport psychology (e.g. see reviews by Hanton et al., 2008; Thomas et al., 2009). Before we address measurement issues, however, we need to define key terms.

Although the terms 'stress' and 'anxiety' are used interchangeably in everyday life, psychologists do not regard them as synonymous. To explain, psychologists (e.g. Lazarus, 1966) believe that stress is a broader construct than anxiety. Specifically, it refers to a pattern of physiological, behavioural, emotional and cognitive responses to real or imagined stimuli that are perceived as endangering us or harming our well-being in some way (Martin et al., 2009). Put simply, stress occurs whenever we perceive that the demands of a given situation threaten to tax or exceed our coping resources (see **2.9**). The key proposition here is that cognitive appraisal (or how a person interprets a situation) is central to the experience of stress. 'Stressors' are the environmental demands (e.g. competing for one's country in the Olympic Games) that people face in pressure situations. In sport, these demands include competitive

(e.g. the pressure of performance expectations), organisational (e.g. logistical) and personal (e.g. family issues) stressors (Fletcher et al., 2006). Finally, 'anxiety' is a negative emotional response to stressors – an emotional state characterised by worry, feelings of apprehension and bodily tension that tends to occur in the absence of real or obvious danger. Since the seminal research of Spielberger (1966), psychologists have distinguished between anxiety as a mood state ('state' anxiety) and anxiety as a personality characteristic ('trait' anxiety). For example, a basketball player may feel anxious in the dressing-room before an important match but may become calmer once the competitive action begins. On the other hand, a player who scores highly on trait anxiety may feel pessimistic before and during the match.

As we explained elsewhere (see **2.5**), anxiety is widely regarded as a tri-dimensional construct comprising cognitive, somatic and behavioural components. *Cognitive* anxiety involves worrying or having negative expectations about oneself or about an impending situation or performance. For example, Martinent and Ferrand (2007) found that competitive athletes worried a lot about poor performances, especially the possibility of making mistakes. *Somatic* anxiety refers to the physical manifestations of the stress response which include neuroendocrine secretions (e.g. of cortisol – the 'stress hormone'), increased perspiration, a pounding heart, rapid shallow breathing, clammy hands and a feeling of 'butterflies' in one's stomach. Recently, Strahler et al. (2010) used the 'cortisol awakening response' (CAR) to investigate anticipatory anxiety among athletes one week before an important competition. Surprisingly, their results indicated that although these athletes reported experiencing a significant rise in somatic anxiety as the day of a competition loomed, there was no significant increase in CAR activity. This finding suggests that neuroendocrine indices of athletes' somatic anxiety do not always correspond with these performers' subjective experience. Finally, *behavioural* anxiety refers to the way in which nervousness affects people's posture, movement and actions. For example, Pijpers et al. (2003) found that, as predicted, the bodily movements of highly anxious climbers were jerkier and displaced more from their centre of gravity than were those of less anxious counterparts.

Historically, sport psychology researchers have used psychometric scales rather than psychophysiological instruments or behavioural indices to measure anxiety processes in athletes. This preference is attributable mainly to the simplicity, brevity and administrative convenience of self-report measures. Among the most popular psychometric

measures of anxiety are the Sport Competition Anxiety Test (SCAT; Martens, 1977), the Sport Anxiety Scale (SAS; Smith et al., 1990) and its successor the Sport Anxiety Scale-2 (SAS-2; Smith et al., 2006), and the Competitive State Anxiety Inventory-2 (CSAI-2; Martens et al., 1990). These scales, which are concerned more with the measurement of anxiety *intensity* in athletes rather than how anxiety is interpreted by them, can be described as follows.

First, the SCAT is a ten-item unidimensional trait anxiety inventory (i.e. it assumes that trait anxiety has only a single dimension). Parallel versions of this test are available for children (aged 10–14 years) and for adults (of 15 years and above). Typical items include 'When I compete I worry about making mistakes' and 'Before I compete I get a queasy feeling in my stomach'. Respondents are required to indicate their agreement with each item by selecting their preferred answer from the three categories of 'hardly ever', 'sometimes' and 'often'. Reverse scoring is used on certain items (e.g. 'Before I compete I feel calm') and overall test scores can range from 10 to 30. Unfortunately, although the SCAT appears to be quite reliable, it has limited utility because it does not distinguish between or measure adequately individual differences in cognitive and somatic anxiety.

Next, the SAS-2, which is a revised (15-item) version of the SAS, is a multidimensional instrument that purports to measure individual differences in somatic anxiety, worry and concentration disruption in children and adults. It contains 15 items that load onto *three sub-scales*, each comprising five items: somatic anxiety (e.g. 'my body feels tense'), worry (e.g. 'I worry that I will not play well') and concentration disruption (e.g. 'It is hard to concentrate on the game'). According to Smith et al. (2006), the SAS-2 not only correlates highly ($r = 0.90$) with its predecessor, the SAS – a sign of convergent validity – but also has strong reliability. For example, sub-scale reliabilities were estimated at 0.84 (for somatic anxiety), 0.89 (for worry) and 0.84 (for concentration disruption). In summary, the SAS-2 appears to be a reliable and valid measure of multidimensional anxiety in children and adults.

Third, the CSAI-2 is a popular test of cognitive and somatic anxiety in athletes. It comprises 27 items which are divided into *three sub-scales*, each containing nine items: cognitive anxiety (e.g. 'I am concerned about losing'), somatic anxiety (e.g. 'I feel nervous') and self-confidence (e.g. 'I am confident I can meet the challenge'). Respondents are required to rate the intensity of their anxiety experiences prior to competition on a four-point Likert scale (with 1 = 'not at all' and 4 = 'very

much so'). Doubts about the psychometric adequacy of the CSAI-2 were raised by Lane et al. (1999). For example, these authors pointed out that being 'concerned' about an impending athletic event does not necessarily mean that the performer is actually worrying about it. Thus items such as 'I am concerned about this competition' may not be valid indices of cognitive anxiety but may instead reflect the importance that the performer attaches to the event. Based on such arguments, and on a confirmatory factor analysis of the test, Lane et al. (1999) urged researchers to be cautious when interpreting data obtained from the CSAI-2. In response to some of these issues, the Revised Competitive State Anxiety Inventory (CSAI-2R) was developed by Cox et al. (2003). This 17-item scale purports to measure the intensity components of cognitive anxiety (five items), somatic anxiety (seven items) and self-confidence (five items). Unfortunately, according to Uphill (2008), the construct validity of this revised measure is also questionable.

Earlier, we mentioned the importance of cognitive appraisal processes in anxiety. In an effort to take account of such individual differences in athletes' perception of the personal meaning of anxiety symptoms, Jones and Swain (1992) recommended that a 'directional' measure of anxiety should be appended to scales such as the CSAI-2. Using this new measure of anxiety (which these authors called the CSAI-2(d)), respondents are required first to complete the CSAI-2 in order to elicit the *intensity* with which they experience the 27 symptoms listed in this test. Next, they are asked to rate anxiety *direction* by evaluating the degree to which the experienced intensity of each symptom is either *facilitative* or *debilitative* of their athletic performance. A seven-item Likert response scale is used, with values ranging from –3 (indicating 'very negative') to +3 (indicating 'very positive'). To illustrate, an athlete might respond with a maximum '4' to the statement 'I am concerned about losing' but might then rate this concern with a +3 on the interpretation scale. Through these scores, the performer is indicating that he or she feels that this concern about losing is likely to have a facilitative effect on his or her forthcoming performance. With this modification, CSAI-2(d) scores can vary between –27 and +27. The discriminative value of the CSAI-2(d) was supported in a study by Jones et al. (1993) which showed that high-performance gymnasts reported their cognitive anxiety symptoms as being more facilitative of, and less debilitating to, their performance than did low-performance counterparts – even though there were no significant differences between these groups in CSAI-2 anxiety sub-scale intensity scores.

REFERENCES

Cox, R.H., Martens, M.P. and Russell, W.D. (2003) Measuring anxiety in athletes: The revised Competitive State Anxiety Inventory-2. *Journal of Sport and Exercise Psychology*, 25, 519–533.

Fletcher, D., Hanton, S. and Mellalieu, S.D. (2006) An organizational stress review: Conceptual and theoretical issues in competitive sport. In Hanton, S. and Mellalieu, S.D. (eds) *Literature Reviews in Sport Psychology*. New York: Nova Science. pp. 321–373.

Hanton, S., Neil, R. and Mellalieu, S.D. (2008) Recent developments in competitive anxiety direction and competition stress research. *International Review of Sport and Exercise Psychology*, 1, 45–57.

Jones, J.G. and Swain, A.B.J. (1992) Intensity and direction as dimensions of competitive state anxiety and relationships with competitiveness. *Perceptual and Motor Skills*, 74, 467–472.

Jones, J.G., Swain, A. and Hardy, L. (1993) Intensity and direction dimensions of competitive state anxiety and relationships with performance. *Journal of Sports Sciences*, 11, 525–532.

Lane, A.M., Sewell, D.F., Terry, P.C., Bartram, D. and Nesti, M.S. (1999) Confirmatory factor analysis of the Competitive State Anxiety Inventory-2. *Journal of Sports Sciences*, 17, 505–512.

Lazarus, R.S. (1966) *Psychological Stress and the Coping Process*. New York: McGraw-Hill.

Martens, R. (1977) *Sport Competition Anxiety Test*. Champaign, IL: Human Kinetics.

Martens, R., Burton, D., Vealey, R.S., Bump, L.A. and Smith, D.E. (1990) Development and validation of the Competitive State Anxiety Inventory-2 (CSAI-2). In Martens, R., Vealey, R.S. and Burton, D. (eds) *Competitive Anxiety in Sport*. Champaign, IL: Human Kinetics. 117–190.

Martin, G.N., Carlson, N.R. and Buskist, W. (2009) *Psychology*. 4th edn. Harlow: Pearson Education.

Martinent, G. and Ferrand, C. (2007) A cluster analysis of precompetitive anxiety: Relationship with perfectionism and trait anxiety. *Personality and Individual Differences*, 43, 1676–1686.

Moss, S., Cochrane, K. and Burnton, S. (2008) Baffled by Beijing. *The Guardian* (g2 magazine), 19 August. Retrieved from www.guardian.co.uk/sport/2008/aug/19/britisholympicteam.olympics2008 on 25 October 2010.

Pijpers, J.R., Oudejans, R.R.D., Holsheimer, F. and Bakker, F.C. (2003) Anxiety-performance relationships in climbing: A process-oriented approach. *Psychology of Sport and Exercise*, 4, 283–304.

Smith, R.E., Smoll, F.L. and Schutz, R.W. (1990) Measurement and correlates of sport-specific cognitive and somatic trait anxiety: The Sport Anxiety Scale. *Anxiety Research*, 2, 263–280.

Smith, R.E., Smoll, F.L., Cumming, S.P. and Grossbard, J.R. (2006) Measurement of multidimensional sport performance anxiety in children and adults: The Sport Anxiety Scale-2. *Journal of Sport and Exercise Psychology*, 28, 479–501.

Spielberger, C.S. (1966) Theory and research on anxiety. In Spielberger, C.S. (ed.) *Anxiety and Behaviour*. New York: Academic Press. pp. 3–20.
Strahler, K., Ehrlenspiel, F., Heene, M. and Brand, R. (2010) Competitive anxiety and cortisol awakening response in the week leading up to a competition. *Psychology of Sport and Exercise*, 11, 148–154.
Thomas, O., Mellalieu, S.D. and Hanton, S. (2009) Stress management in applied sport psychology. In Mellalieu, S.D. and Hanton, S. (eds) *Advances in Applied Sport Psychology*. London: Routledge. pp. 124–161.
Uphill, M. (2008) Anxiety in sport: Should we be worried or excited? In Lane, A. (ed.) *Sport and Exercise Psychology*. London: Hodder Education. pp. 35–51.

2.7: Pre-performance Routines

Definition: A pre-performance routine is a preferred sequence of task-relevant thoughts and actions which athletes engage in systematically prior to their performance of specific sport skills.

Sport is a highly ritualised activity. For example, golfers tend to 'waggle' their clubs a consistent number of times before striking the ball and tennis players like to bounce the ball a standard number of times before serving. These preferred action sequences are called 'pre-performance routines' (PPRs) and involve task-relevant thoughts and actions which athletes engage in systematically prior to their performance of specific sport skills (Moran, 1996). Usually, PPRs are evident prior to the execution of self-paced actions (i.e. those that are carried out largely at one's own speed and without interference from other people) such as serving in tennis, free-throwing in basketball, putting in golf or place-kicking in American football or rugby. Such routines are used extensively by athletes, and recommended by coaches and psychologists, as a form of mental preparation both to improve focusing skills (see **4.19**) and to enhance

competitive performance. In short, according to Singer (2002), the purpose of a PPR is to 'put oneself in an optimal state immediately prior to execution, and to remain that way during the act' (p. 6).

Three main types of routines are evident among sports performers. First, *pre-event* routines are preferred sequences of actions that athletes habitually engage in prior to a competitive event. Included here are preferences for what to do on the night before, and on the morning of, the competition itself. Second, as mentioned above, *pre-performance* routines are characteristic sequences of thoughts and actions which athletes adhere to immediately preceding skill execution. Third, *post-mistake routines* are action sequences which athletes use in an effort to forget about setbacks, mistakes or missed opportunities so that they can re-focus on the task at hand. For example, a golfer may 'shadow' the correct swing of a shot that had led to an error. Of these three types of routines, PPRs have attracted the greatest amount of research attention in sport psychology (see Cotterill, 2010, for a comprehensive review of studies on this topic). Typically, the efficacy of PPRs has been investigated using a research design in which the performance of a control group is compared with that of an experimental group that has been taught and has practiced a designated pre-performance routine. Cotterill (2010) has summarised the results of 27 studies on PPRs using this experimental method. Although the findings from these studies are rather inconsistent, there is some evidence that routines facilitate performance. For example, Crews and Boutcher (1986) compared the performances of two groups of golfers – those who had been given an eight-week training programme of swing practice only and those who had participated in a 'practice-plus-routine' programme for the same duration. Results revealed that the more proficient golfers benefited more from using routines than did the less skilled players.

Research on the efficacy of pre-performance routines raises at least three key practical and theoretical questions. First, are athletes consistent in their implementation of a given PPR in different competitive situations? Second, can athletes' PPRs be distinguished validly from superstitious rituals? Third, what theoretical mechanisms underlie the effects of PPRs? Let us now consider each of these questions in turn.

To begin with, some studies have challenged the assumption that routines are always unwavering when executed by top-class athletes. For example, Jackson and Baker (2001) analysed the pre-kick routine of the prolific former British and Irish Lions rugby kicker, Neil Jenkins, who is Wales' highest-ever points scorer and who was the first player to score over 1,000 points in international matches. As expected, Jenkins reported using a

variety of concentration techniques (see **4.17**) as part of his pre-kick routine. However, what surprised Jackson and Baker was the discovery that Jenkins *varied* the timing of his pre-strike behaviour depending on the difficulty of the kick that he faced. This finding shows that routines are not as rigid or stereotyped as was originally believed. In a further investigation of this phenomenon, Jackson (2003) analysed over 500 goal-kicking attempts in the 1999 rugby World Cup. He found that players spent on average about 10 seconds in quiet contemplation before a typical kick. But they took several seconds longer when there was a narrow angle between the ball and the posts. In other words, they varied the duration of their pre-kick routine in accordance with the perceived difficulty of the task. More recently, Lonsdale and Tam (2008) examined the consistency of the pre-performance routines of a sample of elite National Basketball Association (NBA) players by analysing their 'free throw' shooting behaviour from televised match footage. Results showed that, contrary to expectations, the *temporal* consistency of the basketball players' pre-performance routines was not associated with accurate skill execution. However, there was evidence that the *behavioural* consistency of these routines *was* related to proficient performance. Specifically, Lonsdale and Tam found that the basketball players were more successful when they adhered to their dominant behavioural sequence prior to their free throws.

Turning to a second key issue in relevant scientific literature, are pre-performance routines merely superstitious rituals in disguise? It is well known that athletes are notoriously superstitious – perhaps because of the capricious nature of sport itself. Thus Rafael Nadal apparently must have two water bottles beside the court, perfectly aligned and with the labels facing the baseline, and Tiger Woods usually wears a 'lucky' red shirt on the last day of a golf tournament. At first glance, such superstitions (i.e. beliefs that, despite scientific evidence to the contrary, certain actions are causally related to certain outcomes; see Vyse, 1997) may be distinguished from PPR on the basis of two criteria: control and purpose. First, the essence of superstitious behaviour is the belief that one's fate is governed by factors that lie *outside* one's control. But the value of a routine is that it allows the player to exert complete control over his or her preparation. Thus athletes can shorten their pre-performance routines in adverse circumstances (e.g. if the time of a competition is brought forward unexpectedly). Unfortunately, the converse is true for superstitions. They tend to grow longer over time as performers 'chain together' more and more illogical links between their behaviour and the desired

outcome. The second criterion which helps us to distinguish between routines and rituals concerns the technical role of each behavioural step followed. Specifically, whereas each part of a PPR usually has a rational basis, the components of a superstitious ritual are invariably spurious in nature and randomly associated. Despite these neat conceptual distinctions, however, the boundaries between PPRs and superstitions in sport are often rather fuzzy. For example, consider how Serena Williams explained her defeat at the 2007 French Open tennis championship: 'I didn't tie my laces right and I didn't bounce the ball five times and I didn't bring my shower sandals to the court with me … I just knew fate, it wasn't going to happen' (cited in Hyde, 2009, p. 3). Interestingly, several studies have explored the impact of ritualised behaviour on athletic performance. For example, using a sample of basketball players, Foster et al. (2006) evaluated the effect of removing superstitious behaviour (e.g. kissing the tape covering a wedding ring on the shooter's hand) and introducing a pre-performance routine (of bouncing the ball, taking a deep breath, visualising the perfect shot and then using a cue word before executing the skill) before free-throw skill execution. Contrary to expectation, there was very little difference between the players' performance following either superstitious behaviour or a pre-performance routine – perhaps because many of the basketballers had been using superstitious behaviour for years prior to the study, whereas the routine was only a recent addition to their mental preparation repertoire. Similarly, Schippers and Van Lange (2006) analysed the psychological benefits of superstitious rituals among elite athletes. Based on an examination of the circumstances in which such rituals are displayed before games, these investigators concluded that superstitious behaviour was most likely to occur when games were perceived as especially important. In addition, these researchers reported that players with an *external* locus of control tended to display *more* superstitious rituals than those with an internal locus of control. More recently, evidence has emerged to suggest that despite their irrational origins, superstitions can sometimes be helpful to performers. Thus Damisch et al. (2010) conducted a series of experiments which appear to highlight some benefits of superstitions to motor and cognitive task performance. Specifically, they showed that playing with a ball described as 'lucky' seemed to improve participants' putting accuracy and that the presence of a personal charm enhances participants' performance on memory and anagram tests. In an effort to explain these results, Damisch et al.

postulated that good-luck superstitions may have increased participants' self-efficacy (or belief in their own ability to succeed on the tasks in question) which, in turn, may have improved their performance.

Finally, what theoretical mechanisms underlie the effects of pre-performance routines in enhancing performance? Although few studies have addressed this question empirically, it is plausible that they work because they consume working memory resources and hence prevent athletes from engaging in 'reinvestment' (Masters and Maxwell, 2008) – or devoting too much attention to the mechanics of one's automatic skills (see **2.8**). In other words, pre-performance routines may help to suppress the type of inappropriate conscious control that athletes tend to regress to in pressure situations. In this regard, an important challenge for applied sport psychologists is to help athletes to attain an appropriate level of conscious control over their actions before skill execution. Another reason why routines may enhance performance is that they encourage athletes to focus only on task-relevant information (Moran, 1996). Augmenting such arguments, empirical evidence to support the value of routines comes from case studies. For example, Cotterill et al. (2010) conducted in-depth interviews with a sample of amateur international golfers in an effort to understand the nature and perceived benefits of their use of PPRs. Results showed that these golfers used routines for attentional purposes such as attempting to 'switch on and off' (p. 55) and 'staying in the present and not dwelling on the past or engaging in fortune telling' (p. 55).

REFERENCES

Cotterill, S. (2010) Pre-performance routines in sport: Current understanding and future directions. *International Review of Sport and Exercise Psychology*, 3, 132–153.

Cotterill, S., Sanders, R. and Collins, D. (2010) Developing effective pre-performance routines in golf: Why don't we ask the golfer? *Journal of Applied Sport Psychology*, 22 (1), 51–64.

Crews, D.J. and Boutcher, S.H. (1986) Effects of structured preshot behaviours on beginning golf performance. *Perceptual and Motor Skills*, 62, 291–294.

Damisch, L., Stoberock, B. and Musseweiler, T. (2010) Keep your fingers crossed! How superstition improves performance. *Psychological Science*, 21, 1014–1020.

Foster, D.J., Weigand, D.A. and Baines, D. (2006) The effect of removing superstitious behaviour and introducing a pre-performance routine on basketball free-throw performance. *Journal of Applied Sport Psychology*, 18, 167–171.

Hyde, M. (2009) Obsessive? Compulsive? Order of the day at SW19. The *Guardian* (Sport), 1 July, pp. 2–3.

Jackson, R.C. (2003) Pre-performance routine consistency: Temporal analysis of goal kicking in the Rugby Union World Cup. *Journal of Sports Sciences*, 21, 803–814.
Jackson, R.C. and Baker, J.S. (2001) Routines, rituals, and rugby: Case study of a world class goal kicker. *The Sport Psychologist*, 15, 48–65.
Lonsdale, C. and Tam, J.T.M. (2008) On the temporal and behavioural consistency of pre-performance routines: An intra-individual analysis of elite basketball players' free throw shooting accuracy. *Journal of Sports Sciences*, 26, 259–266.
Masters, R.S.W. and Maxwell, J.P. (2008) The theory of reinvestment. *International Review of Sport and Exercise Psychology*, 2, 160–183.
Moran, A.P. (1996) *The Psychology of Concentration in Sport Performers: A Cognitive Analysis*. Hove: Psychology Press.
Schippers, M.C. and Van Lange, P.A. (2006) The psychological benefits of superstitious rituals in top sport: A study among top sportspersons. *Journal of Applied Social Psychology*, 36, 2532–2553.
Singer, R.N. (2002) Pre-performance state, routines, and automaticity: What does it take to realize expertise in self-paced tasks? *Journal of Sport and Exercise Psychology*, 24, 359–375.
Vyse, S. (1997) *Believing in Magic: The Psychology of Superstition*. New York: Oxford University Press.

2.8: Choking Under Pressure

Definition: 'Choking under pressure' is a phenomenon in which an athlete's normally expert level of performance deteriorates suddenly and significantly under conditions of perceived pressure.

At first glance, the term 'choking under pressure' is easy to define. Specifically, it refers to a phenomenon in which athletic performance deteriorates suddenly as a result of anxiety. On closer inspection, however, this definition has two main problems. To begin with, as Hill et al. (2010) pointed out, we must be sure that for any sub-optimal performance to be regarded as an example of 'choking' in sport, and not just a random

lapse, the athlete in question was *capable* of performing better than he or she did, was *motivated* sufficiently to succeed, and that he or she perceived the sport situation as being *important*. Second, Gucciardi and Dimmock (2008) have argued that the deterioration in performance that characterises choking should be *significant* – not trivial. And so, choking is probably best defined as a phenomenon in which an athlete's normally expert level of performance deteriorates suddenly and significantly under conditions of perceived pressure. Two other features of choking are notable. First, as the term 'anxiety' is derived from the Latin word *angere* which means 'to choke', it is clear that choking and anxiety in sport are inextricably linked. In addition, choking is an intriguing mental state because it reflects a motivational paradox. Specifically, the more effort the 'choker' exerts on his or her performance, the more it appears to deteriorate. In short, choking is paradoxical because it occurs when anxious people try *too* hard to perform well. Not surprisingly, this phenomenon has attracted considerable attention from psychologists – ranging from coverage in popular science (e.g. Beilock, 2010) to systematic reviews of relevant research (e.g. Hill et al., 2010).

Choking is ubiquitous among competitive athletes. As Tom Watson (the former world number one golfer) remarked, 'We all choke. You just try to choke last!' (cited in MacRury, 1997, p. 99). It is known as the 'yips' in golf, 'icing' or 'bricking' in basketball, 'dartitis' in darts and 'bottling' in soccer. Within such sports, choking is especially prevalent among performers of self-paced skills (i.e. actions that are executed largely at one's own speed and without interference from other performers). To illustrate, leading golfers like Greg Norman, Stewart Cink, Scott Hoch, and perhaps most famously, Jean van de Velde (who led by 3 strokes at the final hole of 1999 Open Championship at Carnoustie but who triple-bogied it before losing to Paul Lawrie in a play-off) have all admitted publicly that they have choked in major competitions (Dixon and Kidd, 2006). Choking has also precipitated dramatic collapses in tennis. To illustrate, consider what happened in the 1993 Wimbledon Ladies' Singles final between Jana Novotna (the Czech Republic) and Steffi Graf (Germany). Serving at 4–1 in the third set, with a point for 5–1, Novotna became anxious. She produced a double-fault and some wild shots to lose that game. Later, she served three consecutive double-faults in her attempt to increase her 4–3 lead over Graf. Interestingly, Novotna choked in a similar fashion in the third round of the 1995 French Open championship in Paris when she lost a match to the American player Chanda Rubin despite having nine match points when leading 5–0, 40–0 in the third set.

But choking is not confined solely to athletes engaged in individual sports. It is also evident in team games (e.g. soccer) when precise execution of a technical skill is crucial to the outcome of the match. To illustrate, many of the world's best footballers have crumbled under the pressure of penalty-taking. For example, Roberto Baggio (Italy) blazed his kick over the bar in a penalty shootout in the 1994 soccer World Cup final – a mistake that allowed Brazil to win the trophy. In attempting to explain this phenomenon of penalty misses by highly skilled players, Jordet (2009) discovered from analysis of video footage taken at major international soccer tournaments that publicly esteemed 'superstar' players (i.e. those who had received prestigious awards for their skills) tended to perform *worse* than less renowned players in penalty shootouts – presumably because of the additional pressure that they experienced in such situations.

What causes choking? Although most researchers agree that it is best regarded as an anxiety-based attentional difficulty, there is little consensus on the precise theoretical mechanisms underlying it. At present, two main attentional theories of choking are especially prominent in the research literature: *distraction* theories (e.g. processing efficiency theory or PET; Eysenck and Calvo, 1992) and *self-focus* theories (e.g. Masters, 1992; Beilock and Carr, 2001). In general, distraction theories postulate that perceived pressure induces anxiety which consumes working memory resources and causes inefficient processing of task-relevant information – thereby shifting attention away from task execution. By contrast, self-focus models of choking typically propose that anxiety increases athletes' levels of self-consciousness and causes them to focus their attention inwards. This shift to self-focused attention encourages athletes to attempt to consciously monitor and/or control their skill execution which may subsequently induce choking through a form of 'paralysis by analysis'. This term refers to skill failure that can occur when people think too much about actions that are usually executed automatically. As Beilock (2010) explained, just as thinking about where to place our feet as we rush downstairs may cause us to trip, focusing deliberately on activities that normally operate outside our conscious awareness can lead to choking.

One of the most influential distraction theories of choking is processing efficiency theory (PET) (Eysenck and Calvo, 1992). Briefly, PET distinguishes between processing *effectiveness* (the quality of task performance) and processing *efficiency* (the relationship between the effectiveness of performance and the effort or resources that have been invested in task performance). It predicts that the adverse effects of anxiety on performance effectiveness are often *less* than those on processing efficiency. This

prediction stems from the assumption that increased effort by the performer can compensate for the reduction in attentional resources that are typically caused by anxiety. According to PET, anxious athletes may try to maintain their level of performance by investing extra effort in it. Although this increased effort investment may appear to generate immediate benefits, it soon reaches a point of diminishing returns. At this stage, the athlete may conclude that too much effort is required, and so he or she gives up. Then, his or her performance deteriorates rapidly.

Turning to self-focus accounts of choking, two theoretical models are especially prominent: the 'conscious processing' or reinvestment hypothesis (CPH) (Masters, 1992; Masters and Maxwell, 2008) and the 'explicit monitoring' hypothesis (EMH) (Beilock and Carr, 2001). Although these two approaches share many ideas, they differ in at least one important issue (Hill et al., 2010): whereas the EMH suggests that athletic performance is disrupted by performers *monitoring* their step-by-step execution of the skill, the CPH postulates that the disruption is caused by athletes consciously *controlling* the skill involved. Either way, self-focus models explain choking by postulating that when people experience a great deal of pressure to perform well, they tend to think more about themselves and the importance of the event in which they are competing than they would normally. This excessive self-consciousness causes people to attempt to gain conscious control over previously automatic skills – just as a novice would do. As a result of this attempt to invest automatic processes with conscious control, skilled performance tends to unravel. Interestingly, according to some athletes, this unravelling of skill, which is caused by thinking too much about automatic movements, may happen more frequently as one gets older. For example, consider the golfer Ian Woosnam's experience of trying to correct his putting stroke. Specifically, he said that 'putting shouldn't be hard … but that's where the mind comes in. So much is running through your mind – hold it this way, keep the blade square – whereas when you're young, you just get hold of it and hit it. When you get old too much goes through your mind' (cited in White, 2002, p. 22). As yet, however, this hypothesis that ageing increases the proclivity to think too much about one's sport skills remains speculative. But one individual difference variable that *has* been shown to be a reliable moderator of choking in sport is 'dispositional reinvestment' or a person's tendency to attempt to consciously control a well-learned skill under pressure (Masters et al., 1993). In an effort to measure this personality dimension, Masters et al. developed the 20-item Reinvestment Scale and found that athletes who scored lower on this test tended to

perform better under pressure than counterparts who scored relatively higher. Similar results were reported by Jackson et al. (2006).

Overall, according to Gucciardi and Dimmock (2008), empirical support for distraction models of choking is strongest for tasks (e.g. mathematical computation) that depend heavily on working memory resources. By contrast, self-focus models of choking appear to be supported best by studies involving tasks that make few demands on working memory (e.g. golf putting). A good explanation for this finding comes from Beilock (2010). If we are performing a complex thinking task that drains our working memory resources, then anxiety alone can induce choking. But if we are performing a highly automatic motor skill, then worrying in itself will not lead to choking, but attempting to exert conscious control over one's automatic skills (which is a consequence of anxiety) *will* do so.

In summary, although choking under pressure is a pervasive problem in sport, no consensus has been reached as yet about the precise theoretical mechanisms that cause it. Nevertheless, most theories of this phenomenon agree that anxiety impairs performance by inducing the athlete to think too much, causing him or her to regress to an earlier stage of learning – effectively making him or her a beginner again.

How can we counteract choking under pressure? Until recently, little or no research had been conducted on theoretically-based interventions designed to alleviate this problem. However, this gap in the literature is gradually being filled. For example, Oudejans and Pijpers (2010) investigated whether or not exposing athletes to mild levels of anxiety (a form of simulation training) can help them to perform better under conditions that could give rise to choking. In this study, a sample of novices was assigned to one of two groups. In the experimental group, participants practiced darts throwing under experimentally induced levels of mild anxiety – achieved by requiring participants to hang high rather than low on an indoor climbing wall. In the control group, participants practised without any additional anxiety. Manipulation checks using heart-rate (an index of arousal/anxiety) were conducted to ensure that the anxiety manipulation had been effective. After training, participants were tested under conditions of low, mild and high anxiety. Results showed that despite systematic increases in anxiety, heart rate and effort from low to mid to high anxiety, the experimental group (i.e. the one that had trained under mild anxiety) performed equally well on all three tests, whereas the performance of the control group deteriorated in the high anxiety condition.

In summary, Oudejans and Pijper (2010) interpreted their results to indicate that training with mild anxiety may help to prevent performers from 'choking' under conditions of high anxiety. In a similar manner, Mesagno and Mullane-Grant (2010) examined which aspects of a pre-performance routine (PPR) (see also **2.7** and **4.19**) were most beneficial in alleviating choking among a sample of Australian football players. In this study, the footballers attempted kicks at scoring zones under conditions of low- and high-pressure. They were assigned to one of four different intervention groups which varied in the component of PPR used (e.g. diaphragmatic breathing, use of a 'trigger word', temporal consistency, and an extensive PPR) for 15-minute sessions. Results showed that the most effective pre-performance routine in alleviating choking was one that included psychological and behavioural components and that occupied the footballers' attention prior to kick-execution.

REFERENCES

Beilock, S.L. (2010) *Choke*. New York: Free Press.

Beilock, S.L. and Carr, T.H. (2001) On the fragility of skilled performance: What governs choking under pressure? *Journal of Experimental Psychology: General*, 130, 701–725.

Dixon, P. and Kidd, P. (2006) The golf pro who missed from 3ft and lost £230,000. *The Times*, 21 March, p. 5.

Eysenck, M.W. and Calvo, M. (1992) Anxiety and performance: The processing efficiency theory. *Cognition and Emotion*, 6, 409–434.

Gucciardi, D.F. and Dimmock, J.A. (2008) Choking under pressure in sensorimotor skills: Conscious processing or depleted attentional resources? *Psychology of Sport and Exercise*, 9, 45–59.

Hill, D., Hanton, S.M., Matthews, N. and Fleming, S. (2010) Choking in sport: A review. *International Review of Sport and Exercise Psychology*, 3, 24–39.

Jackson, R.C., Ashford, K.J. and Norsworthy, G. (2006) Attentional focus, dispositional reinvestment, and skilled motor performance under pressure. *Journal of Sport and Exercise Psychology*, 28, 49–68.

Jordet, G. (2009) When superstars flop: Public status and choking under pressure in international soccer penalty shootouts. *Journal of Applied Sport Psychology*, 21, 125–130.

MacRury, D. (1997) *Golfers on Golf*. London: Virgin Books.

Masters, R.S.W. (1992) Knowledge, 'knerves' and know-how: The role of explicit versus implicit knowledge in the breakdown of a complex motor skill under pressure. *British Journal of Psychology*, 83, 343–358.

Masters, R.S.W. and Maxwell, J.P. (2008) The theory of reinvestment. *International Review of Sport and Exercise Psychology*, 2, 160–183.

Masters, R.S.W., Polman, R.C.J. and Hammond, C.V. (1993) 'Reinvestment': A dimension of personality implicated in skill breakdown under pressure. *Personality and Individual Differences*, 14, 655–666.
Mesagno, C. and Mullane-Grant, T. (2010) A comparison of different pre-performance routines as possible choking interventions. *Journal of Applied Sport Psychology*, 22, 343–360.
Oudejans, R.R.D. and Pijpers, J.R. (2010) Training with mild anxiety may prevent choking under higher levels of anxiety. *Psychology of Sport and Exercise*, 11, 44–50.
White, J. (2002) 'Interview: Ian Woosnam'. The *Guardian*, 15 July, pp. 22–23 (Sport).

2.9: Coping Strategies

Definition: Coping strategies are plans of actions that people follow, either in anticipation of encountering a stressor or as a direct response to stress as it occurs.

Competitive sport is a stressful experience for many athletes, regardless of their ability or experience. For example, although Pádraig Harrington has won three golf Majors and represented Europe in six Ryder Cup teams since 1999, he admits that he always feels anxious on the tee-box at the start of this latter competition: 'It all goes into a blur because you're so nervous and eventually you just have to go hit it … it's the height of nervousness' (cited in Clerkin, 2010, p. 3). Given the ubiquity of such competitive anxiety in sport (see **2.5** and **2.6**), it is vital for psychology researchers and practitioners to understand the nature and efficacy of the coping strategies used by athletes to alleviate stressful experiences.

According to Lazarus and Folkman (1984), coping involves 'constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person' (p. 141). It is a dynamic ongoing process that can change from situation to situation and involves any methods that a

person uses in an effort to master, reduce or otherwise tolerate stress. This emphasis on the ever-changing nature of coping raises an interesting methodological issue for research in this field. Specifically, Nicholls (2008) pointed out that in order to study coping as a dynamic process, researchers should collect data from repeated measures of the same person over time. However, most research on coping in sport uses static 'snapshot' designs in which participants are required to provide a single retrospective report on their coping experiences. Clearly, in order to rectify this methodological problem, researchers should prioritise the use of longitudinal designs in future studies of coping strategies.

In psychology, a *coping strategy* is 'a plan of action that we follow, either in anticipation of encountering a stressor or as a direct response to stress as it occurs' (Martin et al., 2009, p. 765) in an effort to reduce the level of stress that we experience. In their seminal work, Lazarus and Folkman (1984) postulated two main types of coping responses: 'problem-focused' and 'emotion-focused' strategies. Whereas *problem-focused* coping strategies attempt to reduce stress by tackling the stressful event or situation directly, *emotion-focused* coping strategies attempt to regulate the emotional distress that is normally elicited by a given stressor. Typical problem-focused coping strategies include obtaining as much information as possible about the stressful situation to be faced, making a plan of action by setting specific and relevant goals, increasing one's effort in the situation, and trying to block out the source of stress (e.g. boxers on the way to the ring often listen to headphones in order to drown out crowd noise). By contrast, emotion-focused coping includes such strategies as seeking emotional support from others, engaging in physical relaxation exercises (Williams, 2010) and/or trying to change one's perception of the stressful event or situation (also called 'cognitive reappraisal'). To illustrate cognitive reappraisal in action, consider how Jack Nicklaus, who has won more golf major championships than any other player in history, changed the way he labelled the anxiety that he felt before competitions: 'Sure, you're nervous, but that's the difference between being able to win and not being able to win. And that's the fun of it, to put yourself in the position of being nervous, being excited. I never look on it as pressure. *I look on it as fun and excitement*' (cited in Gilleece, 1996, p. 7). A third general coping strategy proposed by Endler and Parker (1990) is *avoidance* or removing oneself from the stressful situation. Despite the negative (and possibly psychopathological) connotations of its name, avoidance coping may be helpful sometimes in competitive sport. For example, a tennis player who is worried about an impending match may seek to avoid meeting officials and other

players (including his or her opponent) before the game itself by warming up alone in an effort to avoid being distracted. Although problem-focused, emotion-focused and avoidance coping strategies are distinguishable from each other on theoretical grounds, they may overlap considerably when practised in everyday life. To illustrate, using an example from Richards (2004), imagine an athlete who has just received bad news about an injury going out for a drink with a friend. If this friend happens to be a physiotherapist, then the athlete may be regarded as using a combination of problem-focused coping (seeking advice on the injury from an expert), emotion-focused coping (seeking social support from a friend) and/or perhaps even avoidance (using alcohol as a temporary distraction from the stressful news).

Over the past two decades, a considerable amount of research has been conducted on coping processes in athletes. For example, 64 studies were included in a review by Nicholls and Polman (2007) of research in this field. It is difficult either to compare or integrate the results of these studies, however, as investigators varied considerably in their choice of coping measures. For example, Anshel et al. (2001) used the Coping Strategies Inventory; Pensgaard and Roberts (2003) used a version of the COPE inventory (Carver et al., 1989); and Johnson (1997) used the General Coping Questionnaire. Nevertheless, based on this review and on subsequent studies, the following insights have emerged into the nature and efficacy of coping strategies in sport.

To begin with, research suggests that athletes use a wide variety of problem-focused coping strategies in responding to stressful situations. These strategies include concentrating on goals, learning time management skills, learning about opponents, and practising. In a similar vein, commonly reported emotion-focused coping strategies include seeking social support, using mental imagery (see **4.17**), relying on humour, and attempting to remain confident in the face of stressful situations. Sometimes, age-related changes are evident in strategy use. For example, Reeves et al. (2009) investigated stress and coping in adolescent academy soccer players. They found that although problem-focused coping strategies were common among all ages of players, the middle adolescent footballers used more social support coping strategies than did their early adolescent counterparts.

Second, another issue addressed in the relevant research literature concerns the attempt to identify functional relationships between specific stressors and particular coping strategies. In this regard, Weston et al. (2009) used in-depth interviews to explore the stressors faced, and coping

strategies employed, by five single-handed, round-the-world sailors. Among the stressors experienced by these sailors were environmental hazards (e.g. isolation and sleep deprivation), competitive stressors (e.g. yacht-related difficulties) and personal issues (e.g. family problems). In response to these stressors, the sailors reported using a combination of problem-focused coping strategies (e.g. making detailed plans for what to do in various hypothetical scenarios) and emotion-focused coping strategies (e.g. relying on social support from family and supporters to counteract the isolation of single-handed sailing). Interestingly, Weston et al. acknowledged that their research did not establish specific causal or temporal links between the stressors experienced by these sailors and the resulting coping strategies adopted. However, they suggested that future research in this field could benefit from equipping participants with electronic diaries to log the time-course of their stressor-coping strategy interactions.

Third, there has been an upsurge of research interest in the coping strategies of elite coaches. For example, Olusoga et al. (2010) used in-depth interviews to investigate the responses to stress of, and coping techniques used by, a sample of world-class UK coaches from a range of sports (e.g. swimming, field hockey). Thematic analysis showed that the most frequently reported coping strategy was 'structuring and planning' – a problem-focused approach that involved using past experience to anticipate and circumvent likely stressors. Attending coaching courses and seeking continuous professional development were also widely cited as preferred coping strategies.

As a final theme in research in this field, some investigators have addressed the crucial issue of the *efficacy* of coping strategies in sport. According to Nicholls and Polman (2007), coping effectiveness refers to 'the extent to which a coping strategy, or combination of strategies, is successful in alleviating the negative emotions caused by stress' (p. 15). Unfortunately, there has been a dearth of theoretically-driven attempts to evaluate the efficacy of coping strategies in athletes. Nevertheless, some sport psychology researchers have tested Folkman's (1991) 'goodness of fit' proposal that problem-focused coping techniques should be used when people face personally *controllable* stressors (e.g. those arising from their own behaviour), whereas emotion-focused strategies may be more appropriate when the stressful situations are *uncontrollable* (e.g. in sport, those arising from an opponent's performance). This hypothesis was corroborated by Anshel (1996), who reported that high perceived controllability was linked to problem-focused coping strategies, whereas

low perceived controllability was associated with emotion-focused coping strategies in competitive athletes. Similarly, Kim and Duda (2003) discovered that when stressors were perceived to be controllable, athletes tended to use problem-based coping strategies. Despite such findings, little progress has been made in understanding the theoretical mechanisms underlying the apparent efficacy of problem-focused and emotion-focused coping strategies. Clearly, additional studies are required in which theoretically-derived hypotheses concerning coping strategies are tested using longitudinal research designs.

REFERENCES

Anshel, M.H. (1996) Coping styles among adolescent competitive athletes. *Journal of Social Psychology*, 136, 311–324.

Anshel, M.H., Jamieson, J. and Raviv, S. (2001) Cognitive appraisals and coping strategies following acute stress among skilled competitive male and female athletes. *Journal of Sport Behavior*, 24, 128–143.

Carver, C.S., Scheier, M.F. and Weintraub, J.K. (1989) Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology*, 56, 267–283.

Clerkin, M. (2010) 'Pressure makes diamonds and golfers like Harrington'. *Sunday Tribune*, 19 September, p. 2 (Sport).

Endler, N. and Parker, J. (1990) Multi-dimensional assessment of coping: A critical review. *Journal of Personality and Social Psychology*, 58, 844–854.

Folkman, S. (1991) Coping across the life span: Theoretical issues. In Cummings, E.H. and Karraker, K.H. (eds) *Life-span Developmental Psychology: Perspectives on Stress and Coping*. Hillsdale, NJ: Erlbaum. 3–19.

Gilleece, D. (1996) 'Breathe deeply and be happy with second'. *The Irish Times*, 27 September, p. 7.

Johnson, U. (1997) Coping strategies among long-term injured competitive athletes: A study of 81 men and women in team and individual sports. *Scandinavian Journal of Medicine and Science in Sports*, 7, 367–372.

Kim, K.A. and Duda, J.L. (2003) The coping process: Cognitive appraisals of stress, coping strategies, and coping effectiveness. *The Sport Psychologist*, 17, 406–425.

Lazarus, R.S. and Folkman, S. (1984) *Stress, Appraisal, and Coping*. New York: Springer.

Martin, G.N., Carlson, N.R. and Buskist, W. (2009) *Psychology*. 4th edn. Harlow: Pearson Education.

Nicholls, A.R. (2008) Coping in sport. In Kirk, D., Cooke, C., Flintoff, A. and McKenna, J. (eds) *Key Concepts in Sport and Exercise Sciences*. London: Sage. pp. 109–111.

Nicholls, A.R. and Polman, R.C. (2007) Coping in sport: A systematic review. *Journal of Sports Sciences*, 25, 11–31.

Olusoga, P., Butt, J., Maynard, I. and Hays, K. (2010) Stress and coping: A study of world-class coaches. *Journal of Applied Sport Psychology*, 22, 274–293.

Pensgaard, A.M. and Roberts, G.C. (2003) Achievement goal orientation and the use of coping strategies among Winter Olympians. *Psychology of Sport and Exercise*, 4, 101–116.

Reeves, C.W., Nicholls, A.R. and Polman, J. (2009) Stressors and coping strategies among early and middle adolescent Premier League academy soccer players: Differences according to age. *Journal of Applied Sport Psychology*, 21, 31–48.

Richards, H. (2004) Coping in sport. In Lavallee, D., Thatcher, J. and Jones, M.V. (eds) *Coping and Emotion in Sport*. New York: Nova Science. pp. 29–51.

Weston, N.J.V., Thelwell, R.C., Bond, S. and Hutchings, N.V. (2009) Stress and coping in single-handed round-the-world ocean sailing. *Journal of Applied Sport Psychology*, 21, 468–474.

Williams, J.M. (2010) Relaxation and energizing techniques for regulation of arousal. In J.M. Williams (ed.), *Applied Sport Psychology: Personal Growth to Peak Performance* (6th ed.) New York: McGraw-Hill. pp. 247–266.