Original Article

Three myths about applied consultancy work

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Somebody has to have the last word. Otherwise, every reason can be met with another one and there would never be an end to it.
*(*Albert Camus, *Jean-Baptiste Clamance in the Fall, 1956)*

WHEN LEW HARDY delivered the 1996 Coleman Roberts Griffith Address, the FA Premiership Champions came from Manchester, the Cheltenham Gold Cup was won by a horse from Ireland and the man who started the year with his arms in the Green Jacket at Augusta came from Europe. Sixteen years later and you could be forgiven for thinking that some things never change. But if we reposition our lens, we can trace remarkable advances in science (e.g. mapping the human genome), technology (e.g. MP3, Wi-Fi) and social networking (e.g. Facebook, Twitter) that have transformed our social, economic and political lives. Borrowing this yardstick to measure advances in applied sport psychology (ASP), we question: How has our knowledge and understanding of ASP fared in the intervening years? We wanted to know if we could add more grist to the ASP mill by examining the literature related to the three myths about applied consultancy work since 1996.

In 1997, the *Journal of Applied Sport Psychology* published Lew Hardy's contribution alongside three rejoinders – one for each myth. The first myth stated that cognitive anxiety is always detrimental to performance and should, therefore, be reduced whenever possible. The second myth explained that outcome goals and ego orientations have a detrimental effect on a number of performance-related variables so that performers should be encouraged to set performance rather than outcome goals. The final myth stated that internal visual imagery is more beneficial to performance than external visual imagery, so performers should always be encouraged to use visual imagery from an internal perspective. For the present article, three authors were invited to re-examine these myths in light of the published literature over the past 15 years. The contributions are presented next. Finally, Professor Lew Hardy reflects upon these commentaries, his current position about the three myths and the lessons we have learned about applied sport psychology practice from this endeavour.

Myth 1. Cognitive anxiety is always detrimental to performance
(Dr Marc Wilson)

In his 1997 Coleman Roberts Griffith Address and subsequent article, Professor Hardy admitted to feeling somewhat anxious about how the audience would respond to his provocative three myths (Hardy, 1997). It is with equal trepidation that I attempt to re-examine his first myth, and discuss it in the context of what we know now; 15 years after Professor Hardy's thought-provoking suggestions. The literature on the influence of cognitive anxiety on performance has continued to grow and it is now arguably one of the largest fields of enquiry in sport psychology (Wilson, in press). Much of this

research has focused on explanations for choking under pressure; a pejorative colloquial term used to describe sub-optimal sporting performance under stressful conditions (Hill et al., 2010).

While famous examples of choking provide great media interest, for every example of a performer who did not cope with the pressures of performance (e.g. Rory McIlroy in the 2011 Masters) there are many who did (e.g. Rory McIlroy in the 2011 US Open). Notwithstanding the support for various explanations of choking (e.g. Beilock & Gray, 2007), the predicted negative influence of anxiety on sporting performance is less than would be expected. Indeed, as Hardy (1997) alluded to, it is notable that many athletes not only do not choke, but actually tend to perform better than usual under pressure (Otten, 2009). Otten defines such *clutch* performances as, 'any performance increment or superior performance that occurs under pressure circumstances' (p.584).

Hardy (1997) discussed two theoretical frameworks to explain these equivocal effects of anxiety on performance; the directional perspective (Jones, 1991) and processing efficiency theory (Eysenck & Calvo, 1992). The next section will briefly summarise these theories and discuss how research testing their predictions has progressed in the last 15 years. Finally, a recent theoretical development by Hardy and his colleagues; the three-dimensional model (Cheng et al., 2009) will be discussed, as it also focuses on the potentially adaptive impact of anxiety.

Potential theoretical explanations for Clutch or Choke

The directional perspective. Jones (1991) suggested that performers may not always interpret their anxiety symptoms as being *debilitative* towards performance, but may in fact feel that they are necessary for mental preparation and performance (i.e. *facilitative*). Jones and colleagues, therefore, questioned the utility of solely measuring anxiety in terms of *intensity* (how anxious one feels) and suggested that it was more important to consider whether the intensity of symptoms experienced were interpreted as positive or negative towards upcoming performance (see Jones, 1995, for an early review). Jones (1995) further explained his notion of facilitative and debilitative interpretations of anxiety symptoms using a control model based on Carver and Scheier's (1988) work. Performers who appraise that they possess a degree of control over a potentially threatening situation and can cope with their anxiety symptoms, thus achieving their goals, are predicted to interpret symptoms as facilitative to performance. In contrast, performers who appraise that they are not in control, cannot cope with the situation, and possess negative expectancies regarding goal attainment, are predicted to interpret such symptoms in a negative (debilitative) manner.

The construct validity of the term 'facilitative anxiety' has continued to be questioned; see Burton and Naylor's (1997) original response to Hardy's article, and a recent debate published in the *Sport and Exercise Scientist* (Mellalieu & Lane, 2009). However, there has been a great deal of support for the directional perspective, and a range of personal and situational variables have been investigated to further our understanding of the directional response (see Hanton et al., 2008, for a recent review). Furthermore, Hanton and colleagues have started to examine how performers might be trained in the psychological skills required to effectively use their anxiety symptoms in a productive way and to develop a rational appraisal process in relation to their experiences during competition (see Hanton, Thomas & Mellalieu, 2009).

Processing efficiency theory (PET). PET postulates that cognitive anxiety in the form of worry influences performance in two ways. First (and in common with *distraction* explanations for choking) worry is assumed to pre-empt storage and processing resources from working memory, producing perform-

ance decrements in tasks that impose high levels of mental demand (Eysenck & Calvo, 1992). Second, worry is also proposed to serve a motivational function. Concern over sub-optimal performance leads to the allocation of additional processing resources (i.e. effort) to tasks, or the initiation of alternative processing strategies designed to maintain performance (Eysenck & Calvo, 1992). Since Hardy's (1997) article, PET has continued to be of interest to sport psychologists seeking a mechanistic explanation for the often equivocal results relating to the influence of anxiety on sporting and motor performance (see Wilson, 2008, for a review of tests of PET in the sporting domain).

Eysenck and colleagues recently updated and extended PET with the development of Attentional Control Theory (ACT; Eysenck et al., 2007). Eysenck et al. (2007) suggest that anxiety is likely to cause a diversion of processing resources from task relevant stimuli toward task irrelevant (and particularly threatening) stimuli. This impairment in attentional control is proposed to occur irrespective of whether these stimuli are external (e.g. environmental distracters) or internal (e.g. worrying thoughts). The central prediction of PET; that anxiety impairs processing efficiency more than performance effectiveness, is still retained within ACT. The disruption to attentional control does not necessarily lead to decrements in performance effectiveness provided that anxious individuals respond by using compensatory or alternative processing strategies (Eysenck et al., 2007). As with PET, ACT was developed primarily for cognitive tasks, however, it has again been applied to sporting tasks by a number of researchers (see Wilson, in press, for a review).

Three-dimensional conceptualisation of performance anxiety. Cheng et al.'s (2009) framework is a recent attempt at reconceptualising performance anxiety, due in part to a concern that the adaptive nature of anxiety had been under-represented in the sport psychology literature. This conceptual framework contains three main dimensions of anxiety, characterised by five subcomponents: a cognitive dimension composed of worry and self-focused attention, a physiological dimension composed of autonomous hyperactivity and somatic tension, and a regulatory dimension indicated by perceived control.

Perceived control reflects the adaptive possibilities of anxiety within the framework and is defined as, 'the perception of one's capacities to be able to cope and attain goals under stress' (Cheng et al., 2009, p.273). Perceived control was also highlighted as a key mediator of 'clutch' performance by Otten (2009) and is an important element of both PET (Eysenck & Calvo, 1992) and Carver and Scheier's (1988) control-process model of anxiety. Carver and Scheier proposed that expectancies regarding success in a task were critical in determining responses to, and effects of, anxiety. Cheng et al.'s new three-dimensional model of performance anxiety represents a promising step towards providing a detailed explanation for the sometimes conflicting results found in the sport anxiety literature. However, more research is required to develop its factorial structure and measures by which to test it (see Cheng et al., 2011, for a recent test in tae-kwon-do).

Applied implications

As Hardy comments, it is perhaps not surprising that applied practitioners assume that cognitive anxiety, or worry, is detrimental to performance. After all, many of the interventions we espouse (e.g. thought stopping, cognitive restructuring, relaxation strategies) come from counselling psychology, where the aim is to help patients cope with the debilitating effects of intrusive negative thoughts on their everyday lives (Zinsser, Bunker & Williams, 2006). However, it is unrealistic to assume that what is appropriate for patients, is also appropriate for athletes performing under competitive pressure. As Hardy elucidates, '…such (negative) cognitions may be

precisely what is needed in order for such performers to muster the very high levels of motivation and commitment that may be necessary in order to perform at the absolute limits of their capabilities' (1997, p.280).

Based on the theories discussed, I suggest that the influence of anxiety might be considered over two time frames: *prior* to performance and *during* performance. Anxiety prior to a performance can be a useful motivating force if it is interpreted in a way that might be productive (or facilitative) for performance (e.g. Hanton et al., 2009). If this is the case, then performers should get anxious as early as possible before a major event to get the maximum motivational benefits during training (Hardy, 1997). For example, performers can use worry about upcoming threatening situations as an opportunity to develop and practice 'What if…?' strategies for how they would like to deal with the situation (e.g. Hardy, Jones & Gould, 1996, p.170). In this way, worry about negative consequences can be useful as a way to instigate constructive problem solving strategies (see also research by McCaul et al., 2007, on how increasing anxiety about consequences of smoking can be used to increase motivation to quit).

Oudejans and colleagues have also recently demonstrated that training with anxiety can lead to improved performance under future stressful circumstances (Oudejans & Pijpers, 2009; Nieuenhuys & Oudejans, 2010). In explaining these effects, Oudejans and Nieuwenhuys (2009) suggested that performers who train with anxiety might invest their increased mental effort more efficiently and effectively (as hypothesised by Eysenck and colleagues' PET and ACT). Individuals who have not trained with anxiety still invest increased effort when anxious but this is done less effectively and may not be directed to the right (goal-directed) targets or processes. The benefit of training with anxiety is therefore explicitly related to attentional control and a more effective and efficient use of limited attentional resources.

Finally, as the theories we have discussed implicate the importance of perceived control, it is important that 'in-event', performers focus effort on 'controlling the controllables' (e.g. Hardy et al., 1996; Wilson & Richards, 2010). Recent research has suggested that focusing on maintaining present/process-focused attention (via gaze training) can help individuals to perform better under pressure by maintaining focus on critical cues required for successful performance, rather than on dealing with either the emotions or cognitions surrounding the pressure environment (e.g. Vine, Moore & Wilson, 2011).

To conclude, it is clear that, while provocative, Hardy's (1997) contention that increased cognitive anxiety is a natural response to competitive pressure and is not necessarily detrimental to performance, is borne out by research findings in the subsequent years. Performers can make productive use of increased anxiety during the lead up to an event, and can also apply anxiety-induced effort in an effective way during competition.

Myth 2: Performers should set performance rather than outcome goals (Dr Richard Keegan)

If we are uncritical we shall always find what we want: we shall look for, and find, confirmations, and we shall look away from, and not see, whatever might be dangerous to our pet theories. In this way it is only too easy to obtain what appears to be overwhelming evidence in favour of a theory (Popper, 1957, p.135)

Myth 2 still permeates the assumptions of many practitioners, yet the history and research evidence regarding this myth are interesting, informative, and symptomatic of many of the problems faced by the field of sport psychology. This situation was the reason for choosing the introductory quote, by Popper – a philosopher of science. The following passage will briefly review this state of affairs, and offer some reflections.

Goal-setting is defined as: 'attaining [or seeking to attain] a specific standard or

proficiency on a task, usually within a specified time limit' (Locke et al., 1981, p.45). There are several theories attempting to explain how goals might work, but overall goals are proposed to: increase focus on a specific task/tasks (perhaps thereby reducing cognitive anxiety); increase effort and intensity; encourage persistence; boost self-confidence (when they are met, for example); and even enhance the quality of training (Locke et al., 1981; Locke, 1996). There are many ways of subdividing goal types, including, but not limited to: (a) subjective-versus-objective (Leith, 2003); (b) long, medium and short-term goals (Burton, 1992; Locke & Latham, 1990); (c) positively or negatively valenced (e.g. seeking something good or avoiding something bad – Elliott, 1999; Kirschenbaum, 1984); (d) explicit-versus-implicit (Hardy et al., 1996); and (e) outcome, performance and process goals (Burton, 1983, 1984, 1989). Categories (d) and (e) in the above list appear to have been pivotal in Myth 2 gaining such prominence, wherein Nicholls' (1989) Achievement Goal Theory (AGT) – which proposes an implicit (e.g. subconscious, personality trait) distinction between normative 'ego' goals and personal 'task' goals – and the rather similar distinction within Burton's (Burton & Naylor, 2002; Burton & Weiss, 2008) Competitive Goal-Setting (CGS) Model: 'outcome goals focus upon the end points of particular events and usually… involve interpersonal comparisons of some kind. Performance goals also specify the end products of performance, but this time…in terms of personal achievement (e.g. time, distance, level) and relatively independent of other performers… Process goals, on the other hand, specify the processes in which the performer will engage in order to perform satisfactorily (e.g. tasks, routines, procedures)' (Hardy, 1997, p.251). Ego goals are analogous to outcome goals, whereas task goals are assumed to mirror performance and process goals. It should be emphasised that these were originally two separate theories, with two separate bodies of research, and there has not been a significant attempt to establish, for example, whether individuals with trait 'ego' orientations are prone to adopting explicit outcome goals: intuitive sense is not the same as well-established science.

Strictly speaking, if the above two theories were attempting to explain precisely the same phenomena then, scientifically, they should be critically compared (with reference to research evidence) and only the 'best' theory should be used thereafter. However, Myth 2 seems to have been catalysed by combining the research that used CGS with the burgeoning body of research in AGT, which continually showed correlational links between 'ego' goals and maladaptive motivational outcomes (e.g. low intrinsic motivation, low enjoyment, high anxiety, high dropout, cheating and poor sportsmanship, and even reduced learning – reviewed in Harwood, Spray & Keegan, 2008). Now, it cannot be emphasised enough that correlation is not causation, and this applies to regression, structural equation modelling and cluster analysis just as much as simple correlation. However, upon observing these repeated correlations, particularly in research informed by AGT, many scholars and practitioners seem to have made the (perhaps forgivable) mistake of concluding: Outcome (and ego) goals are bad; performance/process (task) goals are good. There are just so many correlational studies (particularly in AGT) that one feels overwhelmed into reaching this conclusion – but correlation is not causation – and sport psychology as a field, tends to under-employ the carefully designed randomised control trials that would allow causation to be reasonably inferred.

In fact, even regarding the question of whether goals improve sporting performance, the research evidence remains surprisingly ambiguous and, as such, open to interpretation. Strictly speaking (cf. Gardner & Moore, 2006; Moore, 2007), the evidence regarding goal setting in sport does not allow us to conclude with clinical certainty that

goal setting improves sporting performance (let alone that it reduces anxiety, or improves confidence, motivation, concentration, etc.). Research in sport psychology has failed to establish consistently that setting goals is better than a placebo activity (e.g. stretching, reading athletes' autobiographies etc.) in improving sporting performance. This failure can be for various reasons: (a) omitting a placebo control group (and non-randomised allocation of groups); (b) failing to record the precise details of the intervention given (rendering it non-replicable, and very unhelpful); (c) using small samples; (d) neglecting to rigorously replicate key findings (an important step in science) and, all too often, (e) by using readily available undergraduate populations rather than the desired athlete populations (elite, youth, children, veterans/masters or special populations – cf. Gardner & Moore, 2006; Moore, 2003). Hence, before we consider which types of goal are better, this analysis alone should be enough to caution us that 'Myth 2' is not, and never was, justified by a sound evidence base.

In stark contrast, Burton and Weiss (2008, p.340) reached the conclusion that 'goals work', and this was repeated in Kingston and Wilson (2009, p.76). Three points need to be borne in mind: (1) this conclusion was not made with reference to the evidence-based practice model of Gardner and Moore (2006 – cf. Chambless et al., 1998; Chambless & Ollendick, 2001); in fact (2) the criteria for rating each study reviewed (strong, moderate or weak) are not explained anywhere in the Burton and Weiss chapter; and (3) what Burton and Weiss actually say is: (p.340) 'goals work, *although with varying degrees of success* (italics added)', which is so vague as to presumably include 'no success' – which renders such a statement uninformative and potentially misleading.

Rather than seeking to carefully answer this basic question (which may only take a small number of truly excellent studies), researchers in sport psychology have tended to keep producing large volumes of either correlational research (in the case of AGT), or (in the case of CGS) examinations of the ways that goals are set (difficulty, proximity, specificity and even whether setting collective goals is helpful – reviewed in Burton & Naylor (2002), and again by Burton & Weiss (2008)). This is where an impressive range of articles has been produced since 1997, but the issue seems to be that this approach is generating quantity rather than quality. For example, the review table in Burton and Weiss (pp.345–354) is very impressive on first glance. However, the onus is then on the reader to critically examine this extensive table – and the following, quite simple, questions may be helpful in this respect: What does the CGS theory (which Burton & Naylor (2002) 'modified' to incorporate AGT) hypothesise? How did each study set out to test this hypothesis? What exactly did each study find, and how does this relate to the predictions of the CGS? How is strong/moderate/weak 'support' being judged? Is this study actually providing support for the statement that: (a) 'goals works'; or (b) performance goals are better than outcome goals? It is arguably not possible to answer these very simple questions from the 88 studies reviewed, conducted over 30 years. What can be concluded is that goal-setting is actually very complex, and that the way research into goal-setting is generated is very complex: pragmatically and politically. What it means is that we should not be assuming our theories and models are 'true' and seeking 'support' for them, but rather, assuming they are 'false' and perpetually seeking to 'eliminate errors' from them (cf. Popper, 1963). If this reasoning grates at all, have a look at the nearest statistics book and you'll see that it is the null hypothesis being tested, not the alternates – even the statistics are asking: 'Is the theory wrong?' not 'Is it right?' yet is that how we interpret our findings? Arguably not. In fact, the act of combining theories (noted above) seems to presume both are 'true' and they will somehow be more 'true' together. The

product of this process is cumbersome, often untestable theories requiring entire books or chapters to explain them. This 'confirmatory attitude' ostensibly led to me being asked at a recent conference: 'Can't I just pick a theory I believe and study it?'

Disappointingly, very little of the above advances us beyond what Hardy originally argued in 1997 – it has either been restated (perhaps more firmly – e.g. Gardner & Moore, 2006), or largely ignored – because after all, it is incredibly inconvenient for researchers and practitioners not to be able to have confidence in one of our most prominent intervention techniques. So how do we move forwards in a safe, effective, ethical and progressive manner? As practitioners, in order to stay ethical and avoid making unsubstantiated claims with our clients, sport psychologists should arguably avoid: 'I guarantee goal setting will work' and instead adopt a more cautious: 'It might be nice to try some goal setting, it's not guaranteed but it seems appropriate to the problem you've described and I know some guidelines to help make your goals better'. As researchers, it is clear that we need to generate the 'gold standard' randomised control trial data that Gardner and Moore (2006) called for, as this is the only objective criteria we have for judging evidence. Technically, it would only take a very small number of high quality studies to establish whether or not goal setting works – quality over quantity – and *then* we could worry about which types of goals, in what combinations, with which athletes, in which situations 'work'. If there is a defensible 'consensus' regarding Myth 2 at this moment, it would probably be that a good mix of outcome, performance and process goals seems to be best, especially if they are linked such that processes should facilitate performance, and performance should facilitate outcome. In most, but not necessarily all, cases setting exclusively outcome goals would appear to constitute a risky strategy – whether explicitly taught or implicitly adopted.

Myth 3: Internal visual imagery is more beneficial to performance that external visual imagery
(Dr Dave Smith)

The 'Third Myth' of Lew Hardy's 1997 Coleman Roberts Griffith Address concerned the received wisdom at the time that athletes should use internal visual imagery rather than external visual imagery. Hardy argued that, in fact, most of the research findings did not support this idea, and that researchers had often confounded visual perspective with kinaesthesis. He provided evidence from recent studies suggesting that type of task was an important mediator of the effectiveness of the different perspectives, arguing that external imagery might be more suited to tasks where form is important. He also suggested that the imagery perspective preferences of performers should be considered.

The general thrust of this part of Hardy's presentation may have seemed almost heretical given that it contradicted much of the advice on imagery use that was prevalent at the time in academic texts and self-help books. However, this seminal work served as a stimulus for some very interesting research on this topic in the years following its publication. In the 15 years since this presentation, studies in the sport psychology, motor control and neuroscience literatures have examined the issue of visual perspective in one way or another. The aim of the current article is to revisit the issue of perspective in the light of all this new work. In doing so, I will not only explore the obvious question as to whether Hardy was right in his assertions, but also explore some other perspective-related issues that have been examined in the recent imagery literature.

Hardy (1997) perceptively noted that the confounding of visual imagery perspective and kinaesthesis was both commonplace and problematic. As the internal perspective is the viewpoint that the performer would experience whilst actually performing the task, the assumption has been made that only this perspective will be associated with feeling the

movement, or at least it will be much easier to generate the feeling of a movement when performing internal imagery than when performing external imagery (Hale, 1998; Jowdy et al., 1989; Mahoney & Avener, 1977). In addition, given that kinaesthesis is generally considered an important part of the sport imagery experience, this has also led to the assumption that athletes should be encouraged to use internal imagery rather than external imagery (e.g. Weinberg, 1988). The findings of Mahoney and Avener (1977), who found that more successful elite gymnasts used internal imagery more often than less successful elite gymnasts, are often cited to support this assertion. However, Mahoney and Avener themselves confounded visual imagery perspective and kinaesthesis in their operational definition, suggesting to participants that internal imagery involved kinaesthesis and external imagery did not. A subsequent, much less frequently cited study by Ungerleider and Golding (1991) found that successful track and field athletes used external imagery more than internal imagery, and had stronger kinaesthesis during their imagery than did unsuccessful athletes.

Hardy drew on the findings of White and Hardy (1995) to question the above-noted assumptions. White and Hardy found external visual imagery more effective in enhancing performance of a rhythmic gymnastics skill than an internal visual perspective. They concluded that external visual imagery may be better than internal imagery in enhancing the performance of tasks where the form of the movement is important, as it provides a model of performance from which key information about the form of the movement can be extracted. Hardy and Callow (1999) extended these findings, and suggested that different perspectives may be useful at different stages of learning (cf., Hale, 1994; Savoyant, 1988). They found that external visual imagery was superior to internal visual imagery in enhancing performance of a novel karate kata task. Interestingly, not only did they find that participants could combine kinaesthetic imagery with either visual perspective, but also that external visual-kinaesthetic imagery was superior to internal visual-kinaesthetic imagery in enhancing performance in both a novel gymnastics task and rock climbing. Accordingly, they suggested that during the initial stages of learning, performers may rely more on visual cues to perform the task, and therefore external imagery may be more useful. However, during later stages of learning, performers may rely more on kinaesthetic cues to aid performance. They therefore suggested that a combination of external and internal visual, together with kinaesthetic, imagery might be more beneficial than solely combining internal and kinaesthetic imagery.

In an examination of the relationship between the use of kinaesthetic imagery and the different visual perspectives, Callow and Hardy (2004) initially found no significant correlation between external visual imagery and kinaesthetic imagery ability, using the Vividness of Movement Imagery Questionnaire (VMIQ; Isaac et al., 1986) and the Movement Imagery Questionnaire (MIQ; Hall & Pongrac, 1983). However, they noted that the VMIQ asks performers to create internal visual images as if they were actually doing the tasks themselves, whereas the external visual imagery is of someone else performing the movements. To address this inconsistency, Callow and Hardy changed the wording of the external subscale instructions to ask respondents to image themselves rather than someone else. When this change was made, a significant, moderate correlation was found between external and kinaesthetic imagery. Interestingly, there was no significant correlation between internal and kinaesthetic imagery. The authors attributed this to the form-based movements that constitute the MIQ items, pointing out that internal imagery of such movements would lack information regarding the desired body shapes.

As well as supporting Hardy and Callow's (1999) findings, Callow and Hardy's (2004)

study also brought into focus another issue often conflated with visual perspective, that of agency. External visual imagery can be performed with either the self or another person as the agent of the action. So, I could image myself performing a golf putt from an external perspective, but I could also image Rory McIlroy doing the same. Though most people think of internal imagery as being of the self, this too can be performed with an 'other' agency. For instance, I could attempt to put myself in Rory McIlroy's shoes, imagining being in his body, putting on the 18th green in a major championship. The key question here, therefore, is whether the self or other agency is likely to be most effective. Recent neuroscience research (Anquetil & Jeannerod, 2007; Decety & Grèzes, 2006; Ruby & Decety, 2001) has revealed differences in neural activation between self- and other representations. For example, the junction of the right inferior parietal cortex and posterior temporal cortex processes information regarding the self, and can distinguish actions of the self from those produced by others (Blanke & Arzy, 2005). Holmes and Calmels (2008) argued that, given these areas' neural links with other brain areas of importance to motor control, such as visual, auditory and limbic areas, internal-self and external-self should be the preferred agency rather than 'other' when delivering imagery interventions with athletes. This concurs with the advice of Lang (1988), who argued that imagery should be performed as if the individual was actually experiencing the image. However, Holmes and Calmels also emphasised that we should, of course, consider the preferred agency of the individual. Jeannerod (2006) suggested that if an individual wants to use an 'other' agency in his or her imagery, that reading representations of the person's own actions in an external visual perspective may be best. This appears sensible advice for, as Callow and Hardy (2004) noted, imagery with an 'other' agency might make it difficult to perceive and develop kinaesthetic information in the imagery.

Another important issue that has been explored since Hardy's presentation is that of viewing angle. Both internal and external visual imagery might be performed from various viewing angles. This has been discussed in the literature as far back as 1978 (Kosslyn) but until recently had not been empirically examined, or even discussed, in the sport psychology literature. Holmes and Calmels (2008) raised this issue and suggested that future research could examine the effects of multiple-angle, rotated images. Callow and Roberts (2010) examined the angles athletes tended to use in their imagery by having participants use an arrow and a picture of a mannequin. The athletes reported performing their imagery from a variety of angles and suggested that future research could employ more accurate assessments of angle, such as using three dimensional pictures on computer. The importance of accurate measurement of angle is highlighted by the approach of Vogeley and Fink (2003), who distinguished between first and third person perspective imagery, analogous to the internal/external visual imagery distinction. They noted that first person imagery utilises an egocentric reference frame (i.e. the representation of object locations in relation to an individual) whereas third person imagery uses an allocentric reference frame (i.e. an object framework that is independent from the individual). Interestingly, switching between the two reference frameworks occurs at 135° (Waller & Hodgson, 2006), and therefore future research needs to examine the precise angle of external visual imagery.

Callow and Roberts (2010) also explored the important issue of imagery perspective preference, finding small but significant correlations between perspective preference and perspective ability. They concluded that practitioners should be mindful of the athlete's preferences when making suggestions as to which visual perspective to employ, and recommended more research on the interaction between perspective preference and the nature of the task. This

emphasis on taking into account factors such as the preferences of the athlete is also in line with one of the biggest developments in applied imagery work since the 'Three myths' presentation, that of Holmes and Collins' (2001) PETTLEP model. This model emphasises the importance of taking a bespoke approach to imagery interventions rather than an off-the-shelf one. The final letter of the PETTLEP acronym stands for Perspective, with the authors stating that:

> *'we suggest that the perspective debate be further advanced to consider the use of interactional perspectives appropriate for the individual and task. While the kinesthetic/internal visual perspective has been considered within this paper, evidence now exists to support research into the kinesthetic/external visual perspective and possibly others'* (p.77).

As noted above, these issues have indeed now begun to be considered by researchers. Interestingly, despite Holmes and Collins suggesting that external kinaesthetic imagery may be more effective for certain individuals and tasks, the research examining the efficacy of PETTLEP has tended to employ an internal visual perspective, even on tasks that are form-based, such as gymnastics (e.g. Smith et al., 2007). Although the research findings on PETTLEP to date are very encouraging, there seems to be room for a more subtle interpretation of Holmes and Collins' suggestions, and comparisons of the use of different visual perspectives within a PETTLEP framework would be a useful addition to the imagery literature.

Again on the subject of individual differences, an interesting study by Roberts et al. (2010) examined the interactive effect of different visual imagery perspectives and narcissism in dart throwing and golf putting tasks performed under conditions of low self-enhancement and high self-enhancement. They found that individuals high in narcissism using external visual imagery improved performance from the low to the high self-enhancement condition, whereas high narcissists using internal visual imagery did not change. Low narcissists performed consistently across self-enhancement conditions, regardless of perspective. These findings suggest that personality characteristics should be taken into account by researchers and practitioners when deciding on the appropriate perspective for an individual. More research examining different personality characteristics and how they interact with perspective effectiveness, perspective preference and imagery ability would be a welcome addition to the imagery literature.

In conclusion, with the benefit of 15 years' of hindsight, was Lew Hardy correct in describing the view that athletes should use internal visual imagery rather than external visual imagery as a myth? I would answer that as a qualified 'yes'. The subsequent evidence certainly supports the view that for some individuals, and some tasks, external visual imagery is preferable to internal visual imagery. I also concur with Hardy that kinaesthetic imagery is independent of perspective; it is possible to combine both imagery perspectives with kinaesthetic imagery. That said, we now have a much more nuanced understanding of perspective issues than we did 15 years ago. Hardy was right to raise the issue of confounding kinaesthesis with perspective, and since then other confounds (agency and viewing angle) have been explored and separated out from perspective. In addition, other crucial issues such as the individual's perspective preference, perspective ability and the influence of personality are becoming much better appreciated. Ultimately, it is probably oversimplistic to suggest an 'ideal' visual perspective or imagery intervention protocol for a task and/or individual; even if there was such a thing, if the athlete did not engage with the process and would have preferred a different perspective, agency or whatever, then such an intervention is unlikely to be successful. With imagery, as with other interventions in sport psychology, a 'one size fits all' or dogmatic 'this is the only way to do it' approach is inappropriate and likely ineffective. What has been particularly pleasing over the past 15 years has been the greater

understanding we now possess of many variables relating to the imagery experience, and particularly those mediating task- and person-related differences in this experience. I congratulate Lew Hardy on providing such a thoughtful stimulus for much of this work and hope that the next 15 years of imagery research will prove equally fruitful.

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