

## The components of the PETTLEP model

P – Physical. This is arguably the most important PETTLEP component. Rather than conceptualizing imagery as something entirely different from physical practice, here imagery is seen as a physical process with measurable physiological outcomes. For optimal benefits, imagery should be as physical an experience as possible. One obvious way of achieving this is to laden the imagery instructions with the performer's physiological responses. Indeed, research has shown that response-laden imagery instructions are more effective than ones lacking kinesthetic cues (Smith *et al.*, 2001). Other ways of making the imagery more physical include wearing the same clothes as during performance, and holding any associated implements (e.g. tennis racquet, golf club).

E – Environment. This relates to the place where imagery is performed. According to PETTLEP this should be as similar as possible to the performance environment. Indeed, we have found imagery to be most effective when it is performed in the actual competitive arena (Smith *et al.*, 2007). Of course, this is unlikely to be a practical option for most people's regular imagery training, and therefore the use of video and audio may be useful in aiding mental simulation of the venue. . Be innovative, as improvisation can pay great dividends. For example, in one study (Smith, Wright & Cantwell, 2008) we had golfers image their bunker shots whilst standing in a tray of sand. The golfers liked the fact that they could feel their golf shoes contacting the sand and that posture were identical to that adopted in the actual bunker. This was very effective in enhancing bunker shot performance.

T – Task. The content of the imagery should be appropriate to the skill level and the personal preferences of the athlete. For example, given that the attention focus of athletes in different sports and at different performance levels may differ in a number of ways, the content of the imagery needs to be specific to the performer. Indeed, we have found it very useful to quiz the athlete regarding his or her attention focus during performance when planning the imagery intervention.

T – Timing. This refers to the speed at which imagery is completed. Given that timing is often crucial when performing sports skills, the suggestion here is to have the athlete perform the imagery in 'real time' most of the time. We have found this approach effective with a wide range of athletes in various sports. However, more research is needed on the possible uses of slow motion imagery, as there are some interesting questions that remain to be explored, such as whether slow motion imagery could be useful in correcting errors in form-based skills.

L – Learning. This emphasis's that the content of the imagery should be adapted in response to learning, as the cognitions and feelings experienced during movement will change as an individual becomes more skilled. This PETTLEP component has not received a great deal of research attention to date. However, in a recently completed study examining the effects of imagery on muscle strength, we found that a longitudinal intervention involving the regular updating of imagery content to reflect the progress participants had made – was very successful in enhancing performance. Also, in consultancy work we have found that, without such updating, the imagery

will very quickly cease to effectively replicate real life. For instance, changes in physical condition, skill level and physical fitness can all be incorporated into the imagery.

E – Emotion. Sports performance is a very emotion-laden experience, and therefore imagery needs to be too if it is to be realistic. Indeed, Smith *et al.* (2007) found the PETTLEP interventions in their study to be more effective than imagery that was preceded by instructions to relax. The inclusion of realistic emotions in the imagery instructions makes the imagery much more evocative of the real-life scenario, and may therefore lead to a more vivid imagery experience. For example, Wilson, Smith, Holmes and Burden, (2010) found that personalized, emotion-laden imagery scripts led to greater muscle activity and higher self-rated imagery vividness compared to more generic interventions.

P – Perspective. This refers to the viewpoint of the performer during imagery. This can be internal (first person, i.e., through the eyes of the performer) or external (third person, i.e., seeing oneself performing as if watching on TV). Holmes and Collins recommend an internal perspective for the most part as it mimics the visual perspective experienced during performance, but recognize also that for some form-based skills, such as gymnastics, the external perspective can be very effective. Also, the issue of individual preference is absolutely crucial for successful interventions. Whilst it may be theoretically desirable, for instance, to adopt an internal visual perspective in many cases, some athletes may find internal imagery difficult or just prefer external imagery. In such cases, it is always preferable to accommodate the athlete's wishes as far as possible so that the athlete is comfortable with what he or she is being asked to do.

So what are the key take-home messages for practitioners from the last decade of PETTLEP research? The most obvious one is that PETTLEP imagery can be a potent means of enhancing sports performance. We have found it to work well with novices and experts, children and adults, and in other contexts too such as in helping student nurses perfect their nursing skills. Our research also strongly suggests that PETTLEP works best when used as an integrated whole rather than when only some components are used. Our findings also show the clear importance of personalizing imagery interventions, and of incorporating all the senses into the imagery experience. Current lines of research include trying to answer the questions of how much imagery is needed, and how often it needs to be performed, to produce optimal performance benefits.