In the course of skilled motor behaviour, there are limits to how much information the brain can process at any one time. Performers must constantly decide where to look, what to attend to and how to coordinate fixated information with precisely controlled actions. Expert performers are frequently differentiated from their less-expert peers by their ability to: (a) focus on only the key sources of information; (b) make effective decisions; and (c) coordinate gaze and motor systems to optimise performance (Vickers, 2007). However, at times, even experts fail to perform optimally and, ironically, these disruptions often occur just when optimal performance is most important (Wilson, 2008). How do expert performers manage to maintain their attention on the critical components related to optimal performance? Why does this sometimes break down and how might training routines help athletes insulate themselves from the negative effects of stress? Research convened by Prof Joan Vickers, and presented at the 4th International Conference on Spatial Cognition, considers these questions.

The study I presented examined the influence of increased anxiety on attentional control in the performance of the basketball free throw. Seminal research (Vickers, 1996) has demonstrated that skilled performers use a very specific attentional strategy to optimise performance for this task. They direct a steady gaze to the target early in the aiming phase (the quiet eye), but do not look towards the target when their hands and the ball enter their field of view (location suppression). Vickers suggests such suppression of visual processing prevents interference from the moving hands and ball in the visual field, preserving the aiming commands derived from the quiet eye. Players of a lesser standard were more likely to adopt shorter quiet-eye periods and try and maintain visual processing while the ball occluded the target, with subsequent performance disruption apparent (see Figure 1). We came across additional support for this finding, demonstrating that even for a self-paced skill, the timing of visual processing is critical for successful performance.

We also proposed that anxiety may alter this optimal strategy for skilled players, based on the predictions of Attentional Control Theory (ACT: Eysenck et al., 2007). ACT is a detailed theory but, simply put, it suggests anxious individuals are less able to inhibit attentional capture from distracting stimuli. For the current task, this would be represented by increased attention to the distracting ball as it occluded the target. Using gaze-tracking technology (see Figure 2 overleaf), we found that a manipulation of anxiety did result in significant reductions in attentional control and free-throw success rate, thus supporting the predictions of ACT: Anxiety impaired goal-directed attentional control (suppressed vision) at the expense of stimulus-driven control (fixations to the ball and hands). The findings suggest ACT may be a useful theoretical framework for examining the relationship between anxiety and performance in visuomotor sport skills (Wilson, 2008). However, as a psychology consultant, I am interested in helping competitors give themselves the best chance of performing optimally, especially when it most matters. I am, therefore, currently examining the utility of attentional-control training programmes based on this type of gaze information, which may be used to help competitors maintain optimal attentional control while anxious. This is, perhaps, a different, more technique-focused approach than that frequently espoused by sports psychology literature. Rather than focus on dealing with either the emotions or cognitions surrounding the pressure environment, the intention is to redirect the performer to the critical cues required for successful performance. In this way, the approach is mechanisms-driven and focuses on what the performers know they can control.

Figure 1. Screen grabs using a Mobile Eye, showing: an early target fixation (top); a fixation to the ball during the later occlusion period (no suppressed vision – below). Note that gaze is represented by the small red circle, whereas the magenta circle represents background information about eye-movement characteristics.

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Hanin and Hanina (2009) have also recently suggested that interventions for “performance problems” do not always have to be emotion-focused; that is, designed to help the athlete find (and/or maintain) an optimal performance state in stressful conditions. Instead, “action-focused” coping is related to technical execution and requires the performer to understand more about how they perform well and why things may go wrong under pressure. The gaze-behaviour data we have gathered from a number of sporting tasks has been extremely illuminating in identifying sub-optimal attentional control and may be useful as part of a feedback session with performers. Therefore, we have recently started to develop quiet-eye training programmes for performers in two sporting tasks: basketball and golf putting. The aim is to better prepare individuals for dealing with pressure by guiding them to focus on their optimal visual cues for accurate performance. We have demonstrated that novices taught via a quiet-eye training programme learn more quickly and have more robust performance under stress than those trained using a traditional “movement-focused” training programme.

To conclude, I am excited about the possibilities for gaze-training protocols to expedite learning and help performers deal with stressful environments. Athletes are tuned into performance data and therefore seem to find the objective nature of gaze feedback intuitive. Furthermore, I have found that some performers find the technical focus on improving gaze control to be less negatively charged than discussing emotional concerns underlying their choking experiences. However, while I think that gaze data may be useful in providing performers with objective technical feedback and cues for optimal attentional control, clearly this is no panacea. We need to consider our clients as individuals who are more than cognitive-processing machines. As Andersen (2009) recently commented, very little of our work with an individual may be focused on performance-enhancement issues. This is why it is critical that those individuals offering gaze-training programmes have the skills to offer other forms of psychological support if appropriate. We are more than gaze-training technicians.

A week at the Winter Olympics 2010, Vancouver

A typical Friday at Loughborough University, where I’m in my first year studying sport science, would involve a lecture and a seminar in the morning, followed by some badminton later in the day. Today however, I’m several hours behind GMT and travelling on the Olympic shuttle bus from Vancouver to Whistler to watch the final of the women’s skeleton at the Whistler Sliding Centre. Downtown Loughborough, for a number of reasons, seems a long way away.

I’m lucky enough to be spending a week at the Winter Olympics as part of a package offered by a sports travel company. In my spare time I’m also a freelance sports photographer, which is another reason for coming here. And given that one of my modules for this semester is ‘Olympic Studies’, what better than a bit of practical experience!?

There’s a definite air of expectation among the Brits on the bus as we wind our way up the coast towards Whistler. And not without good reason – Bath’s Amy Williams is leading the field in the women’s skeleton going into tonight’s final.

I’d seen the women’s luge at Whistler a couple of days earlier, and what really strikes you about the track itself (and what television struggles to convey) is just how steep it is. Walking to the top leaves you not only out of breath but with renewed admiration for the competitors who are about to throw themselves down it head-first at 80mph. The story of how Williams won the gold medal has rightly enjoyed plenty of coverage, so I’ll not repeat it here, but suffice it to say that seeing a Brit winning Olympic gold at first hand is a pretty memorable experience. And very well timed too, given that it was my last night at the Games. Only when I was looking back at my photos of the flower ceremony after the finish did I notice another Brit who’d been there watching the drama unfold – Richard Branson.

Vancouver itself, where I was staying, is every bit as impressive as I’d been told before going. There’s no doubt I was seeing a wonderful city looking at its very best in time for the Olympics, but I can’t remember having been to a cleaner, friendlier or more welcoming place anywhere. After the concerns about the lack of snow for the snowboarding events, the weather for most of the time I was there was exceptional – clear blue skies and warm sunshine. Public transport was very well integrated and a pleasure to use. And the army of Olympic volunteers, in both Vancouver and Whistler, were unfailingly helpful. I don’t think I saw anything that justified the criticism levelled at the Games by the Guardian and other British newspapers. What would be more constructive would be for the LOCOC delegation that spent time in Vancouver observing the Games and ‘learning lessons’ to replicate in London what worked well in Vancouver. Time will tell whether that’s feasible.

Now back in Loughborough and sympathy for my jetlag is in short supply as I tell people I’ve just spent a week at the Winter Olympics. Somehow I can’t help thinking I wish I was back in Whistler to watch the bobsleigh...!

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References


