# Lessons from Experiences with Rowing

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To put it mildly, the recent London 2012 Olympic Games represent one of the standout spectacles I've witnessed. Experiencing first-hand the sheer scale of this showpiece phenomenon in one of the world's great capitals was more than a little memorable having grown up obsessing over this celebration of sporting achievement and human performance. Widely acclaimed as the best-run Games to date, the ten days I spent there were everything I expected and more – like getting intoxicated on a new ensemble of sporting cocktail daily, each mixed with ripe, full-throttle competition, shaken with a cacophony of colour, noise and passion, served with several shots of grit, all laced with no-nonsense British know-how and thirstily downed in the cultural melting pot that is London.

Cast all this aside though because personally, everything paled in comparison to the sight of South Africa's lightweight men's coxless four (LM4-) rowing their bow-ball ahead in that last few-hundred metres of pure ecstasy. Sizwe Ndlovu, John Smith, Matthew Brittain and James Thompson became South Africa's (and Africa's) first rowing Olympic gold medallists as they surged to out-sprint crews from Great Brittain, Denmark and Australia in the closing stages of a tightly contested A-final. Their six minutes of precision and pain saw raw emotion swell and then explode amongst the small South African contingent at the Eton-Dorney rowing course and many, many more supporters back home. Hoarse throats and wet eyes were companions on an adrenalin-filled day that would take weeks to sink in. Knowing the effort and desire which fed these guys through the unglamorous toil of preparation long before that lung-busting exhibition of exactness suddenly made it all seem more than worth it. If ever I had questioned what high performance sport could offer above all else, here was the answer.

From the incredulous roller-coaster peaks of euphoric celebration and troughs of dazed amazement immediately after the race, to the purposeful reflection over these two months or so since then, I've been peppered with questions about the result and the processes leading up to it from colleagues to columnists. Naturally, many of these turned to the concept of sport science. Readers of prior posts may recall my comments on the many myths and misconceptions which pervade and persist in the exercise sciences. Well, it seems the same can be said about the application of science in sport, with administrators, managers, coaches, athletes and scientists often stumbling to find a position in which to place it and use it as we all clamber to bridge the science-practice chasm in sport. So I thought I'd illuminate a few key thoughts that have surfaced and share some of the lessons I've learnt about science in sport, not from formal study or scientific papers, but from my hands-on involvement with the national rowing squad during this last Olympic cycle, and before.

To be clear – I won't suggest that having a sport science input into the rowing programme made the difference between the title of Olympic champions or also-rans. There are many factors that culminate in the final outcome of a complex task like rowing and a massive event like an Olympic Games regatta, and deliberating on how much performance is won or lost by each factor is a futile exercise when margins are exceeding small and multiple factors overlap. Figure 1 highlights a few of these factors. But science can assist in systematically organizing those aspects which can contribute to improving performance and then suggesting and initiating ways of addressing each of them given the current state of affairs.

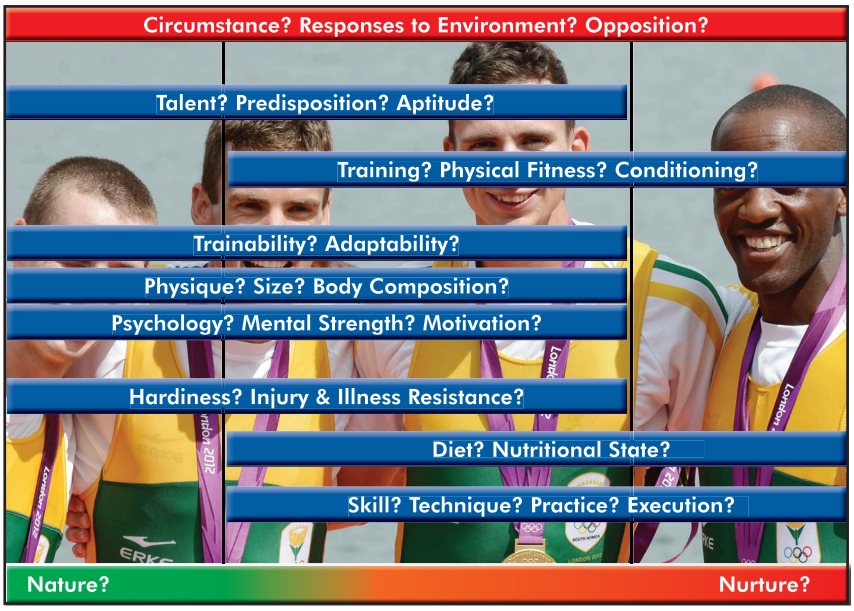


**Figure 1.** Selected factors impacting on sports performance and competitive outcome

In the rowing program, this required researching and considering the myriad factors impacting on rowing performance. Some factors are modifiable, others are not. Identifying and prioritizing those controllable factors assisted in directing valuable effort and scarce resources – at each point it's important to assess which factors will yield the greatest gains for a given input. For example, training load was identified early on as a major area linked to improved performance, was very much modifiable, and was therefore a big piece of the puzzle needing attention. Ultimately, everything can affect everything – maintaining increased training loads demands improved recovery for adaptation and sustained progression, a greater need to address injury and illness risk or maximize treatment outcomes, and a closer scrutiny of individual relative work load. So with time, these also became large items needing to be addressed. In this way, effort and resources were continually evaluated to ensure their direction toward the best sum-total given the situation.

Without a focused and planned support plan, especially in the face of limited resources, efforts in scientific support can oftentimes be misplaced. One needs to consider the stage of the sporting programme and provide support appropriate for that stage of the programme. It requires finding the holes in the system which are threats to current performance and systematically plugging the biggest holes first while plotting a plan for potential threats in the future. For example, there is ample scientific evidence supporting the use of various ergogenic (performance enhancing) methods in sport in general and rowing in particular. But one must consider the resource outlay v performance benefit, or else the 'science' effect risks being obscured by frankly more fundamental holes in the system. There must be some sporting sense before sporting science.

There seems to be a general misconception over what constitutes a scientific input. Definitively, science (from the Latin scientia, meaning 'knowledge') is considered an enterprise that builds and organizes knowledge to form testable explanations and predictions about the world. Fundamentally, science is about asking questions and solving problems. By its nature then, science does not hold all the answers. It's not simply a black box of secrets we open in order to tell people what to do. Rather, it is a mindset, a way of working towards answers, one which relies on formulating appropriate questions, generating and synthesizing ideas, and careful observation and assessment. White lab coats, clipboards and expensive equipment don't guarantee scientific input any more than the latest racing shell guarantees winning rowing races. They may be part of the

science, but they are not essential to it – what is essential is appreciation for a scientific method. Sport science has been marketed as a multi-disciplinary field concerned with the understanding and enhancement of sporting performance with the principle aims of ensuring athletes can undertake the rigorous training that is a prerequisite for success and that they are prepared for the demands of competition. Many of the traditional avenues for investigating and improving sporting performance are illustrated in Figure 2. Simply put, sport science can be thought of as using a scientific process to guide the practice of sport with the aim of improving performance. In such a setup, many of the boundaries in Figure 2 blur as overlaps and complements evolve.


**Figure 2.** Traditional categories of sport science service provision

Coaches (good ones) engage in scientific method themselves if they carefully plan, record, interpret and modify their practices. Scientific thinking is neither conferred by a degree nor dependant on one. Failure to appreciate science as a method rather than a commodity will perpetuate its sale as a service outsourced to those supposedly 'in-the-know' and do nothing to merge the current silos of research knowledge with scientists and practical sports performance knowledge with coaches. Mixing the expertise seems like a sensible way of pursuing meaningful scientific contribution to a sporting programme.

To borrow a colleague's frequent analogy, if you want to teach Johnny Greek, you must know Johnny, and you must know Greek. In short, there are two major facets to master when attempting to make significant interventions. On the one side, a thorough understanding of the individuals in the sporting setup (i.e. Johnny) helps tremendously. The bulk of the effort in this category involves getting to know the strengths and weaknesses (the profiles) of individual athletes with any number of available investigations (Figure 2). But crucially, these should be planned, purposeful, and ongoing. Health, fitness, technical and performance elements are commonly monitored. On the other side, understanding the activity in which the individuals need to function (i.e. Greek) is vital in creating a context around the individual profiles. Studying, analyzing and researching the sport are parts of this, but understanding the system, the bigger picture, is equally important. This may include the administrative structure, available resources, coaching methods and styles and history of scientific support. Many of the real sporting performance problems needing solving, or the questions science can help address, stem from getting to grips with this element. For a thorough understanding, science should ideally be part of that system.

Part-time involvement produces part-time results. Since profiling expertise tends to reside mostly in trained graduates and performance expertise mostly in experienced coaches, it makes sense that teams of individuals, immersed in the programme objectives will show the greatest development. Immersion of science within the programme requires constant availability, dialogue and contemplation. Fortunately this was possible in the rowing programme due to our home base at the High Performance Centre, University of Pretoria. Immersion and team work are crucial because the turnaround times needed are far shorter in high performance sport than in academia or research settings.

I've been asked by coaches why some form of scientific support should be incorporated into sporting programmes. Three reasons come to mind. First, winning is valued very highly. It's the ultimate purpose of competitive sport – determining a victor. From the athletes themselves to the nations they represent, winning

means a lot. I doubt the resources thrown into the science of athletic performance across the world would ever have materialized if first and last enjoyed the same status, same reward. Second, winning margins are very small. A single percentage point difference in performance these days is an eternity - international competitions are more frequently decided by fractions of percentages. Finally, winning is very difficult. Many aspects related to preparation and execution need to be honed simply to attain a competitive level, never mind win. Elite-level competition is brutal, ruthless, and the benchmarks are continually being set higher. There is no user manual for preparing medal winners as opposed to finalists or qualifiers, so clearly it is not easy.

Improving performance from scientific input is often the sum-total of many small inputs on a variety of fronts which together represent a significant contribution by a great many individuals. It remains people that make things happen, and so securing the best people to fill the right holes in an effective and trusted network which works closely together on a daily basis represents one way of accelerating development. The quality of the scientific input will largely be a function of the questions asked and the capacity and immersion of the people involved in answering them. Where tougher problems are faced, or where margins of victory and defeat become increasingly small, continuity of involvement helps secure an institutional memory, a working experience of success and failure which cannot be bought as a service or taught as a degree.

I don't doubt that a science has a role in competitive sport, but its nature, its extent and its contribution may well vary based on the maturity of the sporting programme. It would be senseless to demand its inclusion in the absence of sport performance fundamentals, like athletes with the capacity and desire to adapt, who work hard, compete to win, and who hate losing, or lack of prolonged, planned and deliberate preparation with excellent coaching and infrastructure to support this. As our programme matures and grows, so will the nature of the scientific support in an attempt to balance critique, continuity and progression.


**Figure 3.** Eight summary points on the use of scientific support from the 2009-2012 period with the South African national rowing squad

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