

Do Psychological Strategies for Performance Enhancement Actually Work?

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1. INTRODUCTION

Psychological interventions to enhance performance and well-being in sport, exercise and health contexts are being increasingly promoted by many academics and practitioners [1,2]. In sport, the aim of inducing "...psycho-behavioral change is the basis for psychological intervention with athletes..." [3]. Understanding of the physiological preparation for competition has developed to such an extent that the difference between success and failure can be a fraction of a percentile point in high level sport. Consequently, any competitive advantage is sought to enhance performance. Sport psychologists claim to enhance performance through the implementation of psychological skills training programmes. Psychological skill development has been defined as "...the formal, structured application of psychological techniques to enhance sport performance.." [4 p4]. The assumption that sport psychologists can teach and foster psychological skills to enhance sport performance is explicit in that such a definition implies "...processes and objectives similar to those with which sport performers are very familiar through their use of the term physical training" [4 p4].

Sport psychology is acknowledged as one of the youngest sub-disciplines of the sport and exercise sciences [5] and the theoretical and practical understanding in sport psychology that has occurred over the last two decades has been mostly from a cognitive perspective. Although there is some confusion in the literature over the exact role of a sport and exercise psychologist, there is agreement that intervention to enhance performance in competitive sport remains a primary concern [1]. Psychological skills which interventions aim to develop include the use of mental practice, goal setting, stress management and arousal regulation. It is generally accepted that published work on interventions by sport psychologists dates back to seminal work on imagery in 1972 by Richard Suinn [6]. Since that time there has been a proliferation of books, manuals and consultancies purporting to offer training in psychological skills for enhancing sport performance [7-11]. Given the relatively short period of time that sport psychologists have had to develop theoretical models of human behaviour in sport contexts, a question exists over the efficacy of these performance enhancement strategies.

2. EVIDENCE FOR SUCCESS

One of the most frequently quoted studies in the literature has provided statistical support for the efficacy of mental practice, widely regarded as one of the most important components of psychological skills training programmes. Feltz and Landers [12] performed a meta-analysis of the research findings from 60 published studies examining the relationship between psychological preparation and performance in sport. The published literature showed that implementing a strategy of mental practice prior to the performance of a task with a large cognitive component had a significant effect on the outcome and that a regulative strategy for increasing arousal facilitated performance in tasks requiring maximal effort.

There have also been some attempts by sport psychologists to elicit reports from successful and unsuccessful athletes on their cognitions, mental states and psychological strategies for competition and training. The goal has been to correlate performance outcomes with the psychological profiles reported by the athletes [13]. There is some evidence that successful performance is associated with the use of particular psychological skills and strategies. A good example of this work was by Orlick and Partington [14] who surveyed a sample of 235 Canadian athletes after the 1984 Olympic Games by interview and questionnaire. They sought information regarding their mental readiness for competition, their background in mental training and their mental state at the Games. The medal winners in the sample reported using psychological skills like goal setting, mental preparation for training as well as competition, a reliance on imagery training and attentional control procedures. These psychological skills had been learned during their athletic career.

By far the strongest inferences may be drawn from experimental studies in which interventions are administered with rigorous control of extraneous variables. Nevertheless, many experimental studies of interventions have relied on data from non-athletic samples of varsity students performing laboratory tasks. There have been comparatively few studies on sport participants with contextualised athletic performance measures. These studies obviously offer the most robust data for the success of psychological interventions in sport but are time consuming, expensive and intrusive. They also allow a causal relationship to be inferred between the psychological interventions and the performance outcomes obtained. Greenspan and Feltz [6] reviewed published experimental work on interventions in sport contexts. They focused only on studies which were conducted on samples of athletes competing regularly in formally-organised sport and which also included a sport performance measure to provide generalisable findings. Twenty three interventions in nineteen studies were found to suit these criteria. It was found that "...in general, the interventions used to enhance performance of athletes in competitive situations were associated with improvements" (p228). The most successful interventions were educational (74%) in nature rather than remedial. They focused on the development of relaxation skills and cognitive restructuring techniques such as stress inoculation and systematic desensitisation in collegiate and adult athletes. Vealey [3] provided a follow-up to the work of Greenspan and Feltz [6] and found published evidence of 12 more interventions which fitted their criteria. Seventy five per cent of these studies provided support for the efficacy of intervention techniques such as cognitive restructuring and cognitive-behavioural performance routines.

3. SOME CRITICISMS OF SPORT PSYCHOLOGY RESEARCH ON PERFORMANCE ENHANCEMENT

Despite the rapid expansion of the literature on performance interventions during the last decade, there has been a growing number of criticisms over the empirical evidence in favour of intervention techniques. There are two notable features of these criticisms. Firstly, they have focused on the theoretical and methodological bases of the studies in the area. Secondly, they have been made by prominent figures within the field [3,15-17]. At the beginning of the last decade Dishman [15] lamented the fact that "...the scientific method that has characterised sport psychology until now has lacked the rigor and impact evidenced by other exercise and sport sciences" (p152). Over a decade later Vealey [3] highlighted the "equivocal results" (p496) on the efficacy of intervention techniques in sport psychology. Murphy [17] used the same term to describe the state of the imagery literature. Vealey blames methodological rather than theoretical weaknesses for the equivocality by suggesting that the "generalizability of many findings to actual competitive sport settings are questionable" [sic] (p497).

Of the existing data which appear to provide support for the relationship between success in sport and the use of psychological skills, a number of issues still remain unresolved. For example, although Orlick and Partington [14] argued that their quantitative data from the sample of Olympic medal winners demonstrated "statistically strong links" (p123) between mental preparation techniques and successful performance, the importance of these psychological techniques is not at all clear. It is acknowledged that these psychological variables may only have accounted for a range between 8-32% of the variance explaining ranking at the Games. Moreover, coefficients significantly correlating successful performance with psychological skills such as attentional focus ($r=0.25$), mental readiness ($r=0.40$) and quality of mental imagery ($r=0.26$) were very low (although see below for alternative arguments). As Vealey [3] pointed out, there may well have been a significant problem of unknown moderator variables which were intervening within this relationship. Moreover, although there was a tendency of the successful athletes to report using mental preparation techniques which they had learned during their careers in sport, there was no evidence that formal, structured interventions by sport psychologists were responsible for the skill development.

3.1. Methodological Weaknesses in Experimental Research on Interventions

A number of other problems exist with the experimental research on the efficacy of psychological interventions in competitive sport. Firstly, the evidence which can be taken to imply the strongest inferential support for the intervention-performance relationship is somewhat weaker than typically acknowledged. In the study by Greenspan and Feltz [6] the authors only found evidence which could be taken to support a causal relationship between interventions and performance in under 50% of the 23 studies they reviewed. Most of the studies involved under 10 subjects, none of elite-level performance. Vealey's [3] work based on the same strategy found evidence of a causal relationship in just over 50% of the studies reviewed and only 3 studies were of elite-level performers.

Moreover, there were various methodological issues with these studies as summarised by Vealey [3]. A large proportion of experiments (35%) did not include controls. Therefore, it is unclear in these studies to what extent performance increments could be attributed to the placebo effect. Effective manipulation checks were also notable only by their comparative

absence. Greenspan and Feltz [6] found that 18% of studies contained only 'adequate' manipulation checks. Only one study provided a quantitative assessment with follow-up, 11-point Likert scales to report on the athletes' views on the effectiveness of the treatment. Maintenance of any benefits would seem to be a pre-requisite of intervention research in various clinical and educational contexts. For example, there has been an extensive debate on this issue in the psychotherapy literature, with some investigators recommending a minimal period of 6 months for observing the benefits of interventions [18,19]. Yet there is lack of data to support the view that psychological skills are being implemented by athletes over an extended period of time.

An additional criticism of sport psychologists purporting to provide intervention programmes is that they are too 'problem-driven' [20]. Although this criticism has been dismissed as a myth by some [21], there are often discrepancies in the way that educational and consultant sport psychologists view the behaviour of athletes. For example, in a textbook of academic sport psychology, Williams and Straub [5] offered the view that around 90% of athletes at all levels of performance were "...very stable psychologically" (p9). However, despite providing no evidence to the contrary, Murphy [1] in the introduction to a textbook on intervention strategies for consultant sport psychologists, provided a scathing criticism of this view. He argued that the opinion of Straub and Williams [5] represented an assumption which was 'dangerous' and 'naive' (p6). His pessimistic view was that "Athletes encounter a variety of problems in their sports participation, and the interventions described in this book have grown out of a need to help athletes with these problems" (p6). Interestingly, Weinberg and Gould [20] writing about intervention strategies from within an educational, rather than consultancy-based, framework have also estimated the proportion of the athletic population having mental problems of a clinical nature as being around 10 per cent. Research is needed on whether the different perspectives taken by sport psychologists influence their perception of athlete behaviour.

One of the other major problems is that the actual ratio of studies providing support for interventions against those finding no effects is not known. Typically, intervention studies which fail to support the link between success in sport performance and the use of psychological skills may not get published in sport and exercise psychology journals. That is, a systematic bias may be operating in the literature in favour of studies which provide statistically significant support for the intervention-performance relationship [3]. This tendency may be traced back to the views of editors and reviewers of sport psychology journals and may be a reaction to the concerns expressed by some leaders in the field on the perceived lack of scientific impact of sport psychology research [22]. However, Greenspan and Feltz [6], reported great difficulty in obtaining unpublished work and refrained from commenting on the role of journal administrators in perpetuating a systematic bias. They attributed the problem to authors deciding not to submit work reporting no statistical relationship between interventions and performance outcomes. Given the low subject numbers typically used in experiments on interventions and the difficulty in conducting work in sport contexts, this lack of a statistical relationship should not be taken to imply that no *meaningful* relationship exists. The overreliance on statistical outcomes in data analysis for publication decisions could work against the development of rigorous theoretical explanations and critical discussions which are essential for the maturation of a scientific sub-discipline. For example, although the meta-analysis by Feltz and Landers [12] seemed to suggest that mental practice and arousal

regulation techniques can work, the evidence only reflects the published database [see also 3,6].

3.2. Performance Enhancement Interventions: Techniques in Search of a Theory?

Perhaps the key issue is that despite its relative immaturity as a sub-discipline of the sport and exercise sciences, theoretical understanding in sport psychology has proceeded virtually 'hand-in-hand' with the development of practical techniques for performance interventions. There has not been enough emphasis on the development and validation of sound theoretical models of psychosocial behaviour in sport and exercise contexts prior to the development of practical techniques. For example, despite representing a potential alternative to established theories after being published in 1987, Hardy and Fazey's Cusp Catastrophe model of anxiety and performance has remained virtually unnoticed in the literature. This state of affairs recently led Hardy [23] to complain that the model had only "attracted modest attention" (p140) by researchers. Furthermore, of the "small number of empirical studies ..[that].. have been published that actually test its predictions... most... have been conducted by the model's originator and associates" (p140). Without adequate theoretical explanations for the mechanisms underlying psychological processes, the reasons why techniques succeed or fail, and the influence of moderator variables on performance, will not be fully understood. This point has not gone unnoticed in the field. Landers [24] commented that sport psychologists "... know some things work, although we haven't done extensive research on why or how they work." (p19).

Even in work with a theoretical rationale to link performance outcomes and psychological skills training, there seems to have been an uncritical acceptance of models of mind and behaviour from the traditional cognitive framework of psychology. Recently, the cognitive emphasis on the storage of information and stages of processing has come under attack from neuroscientists and biophysicists working on related fields such as human consciousness and motor coordination [25-27]. The main effect has been to re-emphasise the neurobiological basis of human behaviour at the expense of machine analogies such as the traditional computer metaphor. In the area of motor coordination, for example, the ecological psychology approach now represents a viable alternative to cognitive theories. This reconceptualisation of human movement behaviour has been found to have radically different implications for practical issues such as the role of the coach, the design of skill acquisition programmes and the nature of practice [28]. Since the ecological approach places a greater emphasis on processes of self-organisation in movement coordination, strategies of exploration and discovery in skill development are undergoing a renaissance. The implication of research evidence is that a 'hands-off' approach to coaching is advocated [28]. To summarise, in order to overcome the problem of equivocal results, it is desirable to develop a sound interdisciplinary, theoretical explanation for why psychological interventions work or fail in human performance contexts.

3.3. Psychological Doping

The tendency of the sport psychology literature to focus on data which support a positive relationship between psychological skills and sport performance rather than critically reflect on why some interventions fail may well be linked to the relative lack of theoretically-motivated research. Hoberman [29] has argued that the development of modern sport psychology, like its traditional framework cognitive psychology, can be traced back to militaristic interest in human behaviour and potential. That is, the primary motivation in the

development of both areas was the resolution of practical problems. In both world wars, the battlefield acted as the 'laboratory' for military psychologists interested in the association between resistance to fatigue and willpower and there was a tendency to compare the performance of the athlete and the soldier. There was an implicit assumption that, in particularly stressful contexts, humans could achieve 'abnormal' states of mind in order to perform exceptional feats. Hoberman [29] pointed out that German sport and military psychology was buoyant during the period between the two world wars, but the emphasis was very much on understanding human behaviour rather than manipulating it. In fact, at that time the implementation of psychological techniques to enhance performance by transcending typical states of mind was considered a form of psychological doping. Psychological doping was considered to occur when an individual was taught to rely on a psychological technique to enhance performance. It seems hard to imagine now but in fact the arguments concerning psychological doping continued until the 1970s [30]. The early emphasis on understanding performance gave way to a more results-oriented, interventionist approach which seems to have proliferated to such an extent during the 1980s that there has been less effort devoted to developing theoretical models. Whilst Hoberman's [29] position on psychological doping may be considered somewhat idealistic (for example should coaching interventions in competitive sport not be termed 'pedagogical doping?'), he has raised a legitimate concern with current practices in performance enhancement research. Is it ethical to promote psychological procedures for enhancing sport performance that are not fully understood? The evidence reviewed in this paper suggests a need to make theoretical understanding a primary research goal in sport psychology. The lack of empirical rigour on the efficacy of formalised, structured interventions suggests much more caution in implementing the current programmes which exist in the marketplace.

4. CONCLUSIONS

Whilst there is some evidence regarding the efficacy of psychological interventions in sport contexts, the numerous theoretical and methodological issues in the literature suggest the need for more rigorous testing of existing theoretical models. The current level of theoretical understanding in interventions research suggests that many practical programmes are based more on optimism than scientific rigour. A healthy lag between theoretical research and the development of practical techniques would benefit understanding of psycho-behavioural regulation of human behaviour in sport contexts. More research is needed on the reasons why interventions fail as well as the key variables which moderate the performance-intervention relationship. It can be concluded that the current evidence on psychological interventions is at best equivocal. Whilst many prominent sport psychologists have argued that this equivocality is due to methodological problems with existing research, very few have attempted to question the theoretical models which underpin the literature. It is argued here that there is a need for research on self-regulation in human behaviour from non-cognitive perspectives. In this respect, the neurosciences and paradigms of complexity, chaos and quantum mechanics need be considered as viable theoretical alternatives for modelling human behaviour in competitive sport.

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Discussion: Do Psychological Strategies for Performance Enhancement Actually Work?**A.D. Martin:**

If we have a whole series of studies in an area where 50 percent of them have positive findings, in one sense, you can say that is 50-50 and it is equivocal, but in another sense it may well be that those other 50 percent are poorly designed. There may be a power problem, and the majority of well-designed studies may in fact be positive.

K. Davids:

I agree. When I started to conduct this review, I wanted to make sure that I was fair and gave a balanced view of the literature. But the 50 percent that I talked about in the Greenspan and Feltz paper represent 12 studies, the 50 percent in Vealey's review represented 6 studies. So, in terms of absolute support, that is not a great proportion of the actual work that has gone on. Also, I think that that bears no relationship at all to the number of books, videos, tapes, training programs, manuals, etc. that suggest you can use this technique and that your performance will be enhanced.

J.P. Clarys:

You conclude that the theoretical basis as well as the methodological limitations of the literature are weak. What does this imply for the practitioner, and what do these conclusions mean for the practising sports psychologist?

K. Davids:

Quite frankly, I do not know. Since I do not work in the area of sports psychology interventions I cannot actually say: this is what they should be doing. We have just written a review paper in the Journal of Sports Sciences which summarizes our approach from a Motor Learning perspective. In it we argue that this is what perhaps coaches, practitioners, and teachers, etc. could do in terms of making sense of our criticisms. One of the things, for example, that we talk about, is to take a completely different view of the relationship between the performer and the environment. And, for us, one of the most radical things that we have suggested is that perhaps what the coach should do is back off. Allow self-organization processes to occur, allow the constraints of the task to actually work on the performer-environment relationship and then, from there, the coach would need to manipulate that relationship, but from a distance. In other words, there really needs to be a greater emphasis on what the athlete can input into a particular situation and perhaps what the coach ought to do is to come in at a certain stage where maybe the athlete is searching for a solution too widely or too narrowly and to manipulate the performance environment, manipulate the constraints, so that the athlete can search in a more appropriate task resolution area, in order to solve the task for themselves.

T. Reilly:

You pleaded for an interdisciplinary approach. This approach in practice is very difficult to do. I was wondering if you could call on any examples where psychological interventions were used alongside others, maybe nutritional interventions, to prove that interdisciplinary work is successful.

K. Davids:

Motor skills research may offer an example, and the work of Kelso stands out there. Kelso's argument is that if we view the performer from a systemic viewpoint as a complex system, then really we need to go to the disciplines of physics, math, chemistry, biology, and see how those scientists model complex systems. Perhaps there are processes there that we could then bring to our study of motor coordination. Unfortunately, I am not aware of any direct example of the sort that you mention.

D.P.M. MacLaren:

It seems to me that psychological strategies need to be different between individuals and groups. Maybe the problem is that in dealing with individuals who are very different there is no one strategy that works.

K. Davids:

I think that is right. One of the things that I have noticed from the symposium is that variability is everywhere. And I think that one of the problems that a sports psychologist would have to face in a team environment is that he or she would have to coordinate, or help in the coordination of the team effort. There may be a case where some individuals may suffer from anxiety. Others may have problems in setting goals. Others may have problems regulating arousal. So it may well be that a multiplicity of approaches will be needed. The issue that I really wanted to get across is that we do not understand any of the strategies, so it does not matter if it is an individual or a team based type of approach. We need to get a better understanding of all of the techniques that we use, and it may well be that the theoretical framework is wrong, rather than the fact that we implement them wrongly with athletes.