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Introduction

Since the beginning of the 2010/11 academic year, research and broader scholarly activity within the Sport and Physical Activity Subject Quality Group have gathered further noteworthy momentum. A perusal of the output summary included in this report will reveal the range of research-pertinent enterprises to which the staff has been applying its recent endeavours. These include: the presentation of papers at national and international conferences; the leading of national seminars; the submission of papers for peer reviewed journals; the publication of articles in sport technical journals; the editing of journals; the reviewing of books and the contribution of chapters to edited volumes. It is of further note that, within this small, two year timeframe, output has not only been prolific but also highly diverse. Active research work has encompassed the fields of Physiology, Biomechanics, History, Media Studies, Sociology, Sociolinguistics, Cognitive and Social Psychology, Social Policy, Performance Analysis and Philosophy in addition to more conventionally applied, sport-specific areas such as coaching practice, coach education and physical activity and health. It is of some note that this period has also seen a significant increase in the conversion of high-quality student dissertation findings to conference proceedings and published papers; students from the S&PA quality group are marked with asterisks throughout the document to highlight their growing contribution to the research culture.

This document includes both a summary and detailed examples of the kinds of active and innovative research that have recently been – and are being - produced and disseminated by sport staff, and should thereby provide a useful overview for anyone interested in the work being done within the SQG.

Dr. Paul K. Miller
Research Coordinator, Sport & Physical Activity
January 2013.
## Outputs Summary, 2010-2012

<table>
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<th>Output</th>
<th>Number</th>
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<tr>
<td>Papers in Peer-Reviewed Journals</td>
<td>23</td>
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<tr>
<td>Chapters in Edited Volumes</td>
<td>5</td>
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<tr>
<td>Book Reviews</td>
<td>4</td>
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<td>Commissioned &amp; Consultancy Outputs</td>
<td>7</td>
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<tr>
<td>National/International Conference Proceedings</td>
<td>28</td>
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<td>Regional Conference Proceedings</td>
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<tr>
<td><strong>Total Outputs</strong></td>
<td><strong>87</strong></td>
</tr>
</tbody>
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1. Outputs: Published and In Press

A. Research Papers in Peer-Reviewed Journals

Note: Names marked with an asterisk (*) are students from the Sport and Physical Activity SQG.


B. Chapters in Edited Volumes


C. Book Reviews

1. **Christie, M.** (2012). The economics of sport, health and happiness: The promotion of well-being through sporting activities, *Journal of Interprofessional Care, 26*(6), 520.


D. Commissioned and Consultancy Outputs


2. Selected Papers Under Review


3. Academic Dissemination

A. National and International Conference Proceedings

Note: Names marked with an asterisk (*) are students from the Sport and Physical Activity SQG.


B. Regional Conference Proceedings

Note: Names marked with an asterisk (*) are students from the Sport and Physical Activity SQG.


4. Selected Publications

The effect of acute taurine ingestion on 3-km running performance in trained middle-distance runners

Thomas G. Babash - Theodore M. Bampouras - Timothy J. Barry - S. Andy Sparks

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Abstract. Limited research examining the effect of taurine (TA) ingestion on human exercise performance exists. The aim of this study was to investigate the effect of acute ingestion of 1,000 mg of TA on maximal 3-km time trial (3KTT) performance in trained middle-distance runners (MDR). Eight male MDR (mean ± SD; age 19.9 ± 1.2 years, body mass 69.4 ± 6.6 kg, height 180.5 ± 7.5 cm, 800 m personal best time 121.0 ± 5.3 s) completed TA and placebo (PL) trials 1 week apart in a double-blind, randomised, crossover design study. Participants consumed TA or PL in capsule form on arrival at the laboratory followed by a 2-h ingestion period. At the end of the ingestion period, participants commenced a maximal stimulated 3KTT on a treadmill. Capillary blood lactate was measured pre- and post-3KTT. Expired gas, heart rate (HR), ratings of perceived exertion (RPE), and split times were measured at 500-m intervals during the 3KTT. Ingestion of TA significantly improved 3KTT performance (TA: 6:06 ± 5:2 s and PL: 6:55:5 ± 5:6 s; $p = 0.01$) equating to a 1.7% improvement (range: 0.34–4.24%). Relative oxygen uptake, HR, RPE, and blood lactate did not differ between conditions ($p = 0.803, 0.364, 0.760$ and 0.302, respectively). Magnitude-based inference results assessing the likelihood of a beneficial influence of TA were 99.3%. However, the mechanism responsible for this improved performance is unclear. TA’s potential influence on exercise metabolism may involve interaction with the muscle membrane, the coordination or the force production capability of involved muscles. Further research employing more invasive techniques may elucidate TA’s role in improving maximal endurance performance.

Keywords. Oxygen uptake - Ergogenic aids - Time trial - Endurance running

Introduction. The sulphonic amino acid taurine (TA) is found in its free form in large concentrations in both skeletal and cardiac muscle and brain tissue (Hustache 1992). The high content of TA within these major organs has stimulated much research examining its role in modulating several physiological actions including neurotransmission, calcium content regulation, oxidative stress and subacidic oxidation, all of which are known to have particular relevance to exercise performance (for an extensive review, refer to Hustache 1992). To date, very little research has been conducted on the effect of acute or prolonged TA ingestion on endurance performance in humans (Rutherford et al. 2010). Existing research has produced inconclusive evidence on the use of TA prior to exercise. Running (Lee et al. 2003) and cycling (Zhang et al. 2004) time to exhaustion has been shown to significantly improve following TA supplementation. However, acute TA administration demonstrated no benefit to cycling performance (Rutherford et al. 2010).

The precise mechanisms underpinning how TA may affect human endurance performance are still largely
EFFECT OF DIFFERENT TYPES OF CONDITIONING CONTRACTION ON UPPER BODY POSTACTIVATION POTENTIATION

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ABSTRACT

Eisformes, J. Keenan, M.M. Moody, and Bampouras, T.M. Effect of different types of conditioning contraction on upper body postactivation potentiation. J Strength Cond Res 25(11): 1435-1440, 2011—Muscle contractions preceding an activity can result in increased force generation (postactivation potentiation [PAP]). Although the type of muscular contractions could affect subsequent strength and power performance, little information exists on their effects. The purpose of this study was to examine PAP effects produced by isometric (ISO), concentric (CON), eccentric (ECC), or concentric–eccentric (DYN) conditioning contractions on upper body force and power performance. Ten male, competitive rugby players (mean ± SD age 20.4 ± 0.8 years, height 197.0 ± 8.3 cm, body mass 902 ± 138 kg) performed a ballistic bench press throw (BPPPT) followed by a 10-minute rest and one of the conditioning contractions. After a 1.2-minute rest, the subjects performed another BPPPT (post-BPPPT). The conditioning contractions, applied on separate days and in counterbalanced randomized order, were a 7-second isometric bench press press for ISO and 1 set of 3 bench press repetitions at 3 repetition maximum for CON, ECC, and DYN (each repetition lasting 2 seconds for CON and ECC, 7 seconds for DYN). Peak power (\(P_{\text{peak}}\)), peak force (\(F_{\text{peak}}\)), maximum distance \(D_{\text{max}}\), and rate of force development (RFD) were measured using a linear position transducer. Electromyography (EMG) of thepectoralis major and triceps brachii was also recorded. The ISO produced significantly higher \(P_{\text{peak}}\), \(F_{\text{peak}}\), \(D_{\text{max}}\), and RFD than CON and DYN (p < 0.05), and no significant differences existed in \(P_{\text{peak}}\), \(F_{\text{peak}}\), \(D_{\text{max}}\), and RFD for ISO, CON, ECC, and DYN (p > 0.05). Finally, ISO was not significantly different between pre- and post-BPPPT. Key Words: complex training, power performance, upper body exercise

INTRODUCTION

Muscle performance is affected by the muscle’s contractile history, with increased muscular activity resulting in increased neuromuscular force (26). However, previous muscular activity can also enhance subsequent force generation and improve strength and power performance (17,23). The phenomenon where previous muscular contractions facilitate subsequent force generation is termed postactivation potentiation (PAP) (28).

The physiological mechanisms involved in PAP are unclear (29). Regulatory calcium phosphorylation and increased recruitment of motor units have been proposed as 2 potential mechanisms. In the first mechanism, sensitivity of the auto-catalytic interaction to Ca\(^{2+}\) release from the sarcoplasmic reticulum is increased, altering the structure of the myosin head, which results in a higher force generation state of the crossbridges (24). Previous muscular contractions may also increase the excitation potential resulting in increased motor unit recruitment. This excitation can last for several minutes, increasing postexercise potentials that lead to enhanced force generation (15). The small number of studies examining these 2 mechanisms and their respective methodological limitations present a conclusive answer (15).

Numerous studies have examined PAP effects on strength and power performance using different conditioning loads for review see Tillin and Bishop (20), showing improved performance in athletes that have used heavy load resistance exercise (e.g., 5 sets at 90% of 1 repetition maximum [RM]; 7,1 set at ~95% of RM [19.25]% before explosive movements. Studies that have used dynamic contractions have reported both an increase in performance (19.30) and no performance change (11.12). Similarly, studies that have used
Is maximum stimulation intensity required in the assessment of muscle activation capacity?

Theodoros M. Rampouras, Neil D. Reeves, Vasilios Baltzopoulos, David A. Jones, Constantinos N. Maganaris

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Electromyography
Interpolated twitch technique
Muscle stimulation intensity

ABSTRACT
Voluntary activation assessment using the interpolated twitch technique (ITT) has almost invariably been done using maximal stimulation intensity, i.e., an intensity beyond which no additional joint moment or external force is produced by increasing further the intensity of stimulation. The aim of the study was to identify the minimum stimulation intensity at which precessional ITT yields valid results. Maximal stimulation intensity and the force produced at that intensity were identified for the quadriceps muscle using precessional electrodes in eight active men. The stimulation intensities producing 15-60% (in 10% increments) of the force were determined and subsequently applied during isometric contractions at 90% of maximum voluntary contraction (MVC) via twitch discharges. Muscle activation was calculated with the ITT and peak scores were obtained for each stimulation intensity and compared to the respective value at maximum of voluntary activation. Muscle activation at maximal stimulation intensity was 94.0 (2.5%). The lowest stimulation intensity yielding comparable muscle activation results to maximal stimulation was 70.0 (3.9%). p < 0.05). Peak scores at maximal stimulation intensity was 6.6 (1.5) cm and it was significantly reduced at 60% stimulation intensity (5.7 (1.5) cm, p < 0.05) compared to maximal stimulation intensity. Stimulation can produce valid ITT results while reducing the discordant obtained by the subjects, allowing the assessment of ITT to situations where discomfort may otherwise impede maximal stimulation.

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1. Introduction
Muscle strength, measured as joint moment or force applied externally during a maximum voluntary contraction (MVC), is determined by a number of biological factors, including the size of the agonist muscles and their moment arms, the joint angle tested which affects muscle length, the specific tension of the muscle, and general muscle cross-section, and the load of the voluntary agonist muscle activation during the test. The assessment of this last factor, voluntary activation, requires the application of artifical stimulation and this has been mostly applied in several populations, including children (O'Brien et al., 2002, 2001), older individuals (Morris et al., 2002, Reeves et al., 2003), patients with musculoskeletal disorders (Rutherford et al., 1996), Suter et al., 1998) and in intervention studies involving various types of exercise training (e.g., Knights and Eames, 2001; Maffulli et al., 2000).

Selskoye, 1985) and disease (e.g., de Bree et al., 2007; Lomel et al., 2001; Silk et al., 1987). Voluntary activation is typically assessed by some variant of the interpolated twitch technique (ITT (Merton, 1954), according to the equation:

Activation level (S) = (1 - SI0) × 100

where, SI is the additional joint moment (or external force) produced by superimposing the electrical stimulation on the MVC and SI0 is the joint moment (or external force) produced by the same stimulators applied at rest. Investigators generally strive to use maximal stimulation for the ITT (Rahbari et al., 2003; Rampouras et al., 2000; Beher et al., 2001; de Serres and Etienne, 1998; Kent-Braun and De Leon, 1996; More et al., 2000; O'Brien et al., 2005) but there is often some confusion as to what maximality means and whether it is essential for the reliable estimation of voluntary activation. To obtain the maximum force from a muscle it is necessary that all motor units are activated and that they are stimulated at frequencies, generally in the order of 30-100 Hz (Gowers et al., 1999), that generate maximum force. However, stimulation of a large muscle such as the quadriceps is unlikely ever to activate

Page 20
Interpreting and exploring football fan rivalries: an overview
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Academic literature on football fans has shifted focus, away from the study of ‘exceptional fans’, most notably hooligans, towards ‘everyday fans’ and their experiences. Especially, the rivalry-related aspect of football fandom has been given growing attention. Gradually increasing literature has demonstrated that rivalries are unique and complex, underpinned by social, historical and cultural factors. This suggests that each rivalry must be studied in-depth in order to understand the underlying factors that shape oppositions and social identities. Although attempts have been made to sociologically explore rivalries in such a way, two fundamental issues have not been fully addressed: paucity of in-depth empirical evidence and lack of transparency in terms of research methodologies. Therefore, this essay, after locating football rivalries within the broader genre of fandom, proposes to use ethnographic research methodologies to elicit rich, qualitative data, thus providing empirically grounded interpretations of fans’ perceptions. Also, it calls for more open and detailed methodological and theoretical discussions which would aid our understanding of the unique and complex factors underpinning football fan rivalries.

Introduction
Aside from the extensive body of literature addressing football hooliganism, the study of football was traditionally characterized by relatively limited references to the phenomenon of rivalry, often with little attention given to the basis of inter-club tensions or the sociocultural factors which influence and reinforce them. However, in the past decade, academic literature on football fans began to shift focus, away from the study of ‘exceptional fans’, most notably hooligans, towards ‘everyday fans’ and their experiences. Especially, the rivalry-related aspect of football fandom has been given growing attention. As research on and around football fans was expanding, it became clear that each rivalry must be studied in-depth in order to understand the underlying factors and unique cultural properties which shape oppositions and social identities. Consequently, a few empirically grounded investigations have been carried out to conceptualize football fans and their social worlds, but there is scope for the extension of, and elaboration on such studies.

In this essay, we provide a review of the limited, but growing literature on football fan rivalry with the view to highlighting areas which are in need of further research, as well as some of the unique and complex factors which have been shown to underpin particular football rivalries. This we aim to achieve by locating football rivalries within the broader genre of fandom, providing an analysis of football fan rivalry literature and reviewing specific fan rivalries. Through this process,
The case for community conservation in cardiovascular health promotion in the North West: Evidence from the Lancaster ‘Greenfingers’ initiative

Mark Christie, Paul K. Miller, Tim Barry & Susan Dewhurst

Abstract
In this paper, a case is made for the greater promotion of regular cardiovascular exercise in the North West through the potential of a (hitherto under-utilised) resource that North Lancashire and Cumbria have in abundance: rural environments. Drawing upon extant literature and indicative data from pilot research from a recent community conservation initiative in Lancaster, it is argued that the embedded activities can encourage precisely the kinds of optimal, affordable and sustainable exercise that could play an important role in the region’s cardiovascular health.

Keywords
CVD; cardiovascular disease; conservation; fitness; Green Gym; exercise referral; health promotion.

1. Introduction
According to the British Heart Foundation Health Promotion Research Group:

Diseases of the heart and circulatory system...are the main cause of death in the UK and account for almost 181,000 deaths each year – one in three of all deaths.
(Scarborough et al., 2010, p. 14)

Moreover, between 2006 and 2008, cardiovascular disease (hereafter CVD) accounted for 28% of all premature deaths (i.e. deaths under the age of 75 years) in men and 20% women (ibid.). Among the nine English NHS regions, the age-standardized death rates among the under-75 age groups in the North West (25.46 per 100 000) were higher than all other regions bar the North East (26.35 per 100 000) and well above the national average of 19.69 per 100 000 (Scarborough et al., 2010, p. 29). The specific picture in the broad North Lancashire and Cumbria area is a little more mixed:

some Local Authority districts such as Copeland (28.12) Lancaster (24.63) Carlisle (22.21) show premature CVD death rates above the national average, while others such as South Lakeland (14.52) are well below (ibid.). There is a profusion of compelling evidence that regular aerobic exercise, i.e. that which increases breathing and heart rate, is a powerful preventative against CVD (see, for example, the seminal meta-analysis compiled by Berlin & Colditz, 1990). A corollary of this is the UK Chief Medical Officer’s recommendation that adults aged 19-64 years should exercise at a moderate (or higher) intensity for thirty minutes or more at least five times per week (Department of Health, 2004), recently rephrased as:

Adults should aim to be active daily. Over a week, activity should add up to at least 150 minutes (2½ hours) of moderate intensity activity in bouts of 10 minutes or more.
(Department of Health, 2011, p. 1).

The Cumbria Partnership Journal of Research Practice and Learning 2(1)
London 2012 Olympic legacy: a big sporting society?

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The Olympic Charter (International Olympic Committee [IOC], 2010. Olympic charter. Lausanne: IOC. Available from: http://www.olympic.org/Documents/Olympic%20Charter/Charter_en_2010.pdf [Accessed 13 July 2011]) asserts that ‘the practice of sport is a human right’ and outlines role 12 of the IOC as being ‘to encourage and support the development of sport for all’. This signals an aspiration to the right to sport for all. Notwithstanding this, the UK Conservative/Liberal Democrat coalition government has consolidated and extended a shift in UK sport policy from ‘sport for social good’ to ‘competitive sport for sport’s sake’. In December 2010, the government published ‘Plans for the Legacy from the 2012 Olympic and Paralympic Games’. The first of the four areas of focus is to harness ‘the United Kingdom’s passion for sport to increase grass-roots participation, particularly by young people’ and encourage ‘the whole population to be more physically active’. This appears to relate to sport for some, and physical activity for others. Nevertheless, the coalition has signalled a belief in ‘big society’ and democratic not bureaucratic accountability.

This article proposes a theoretical framework of a ‘big sporting society’ comprising three generations of sporting rights. This enables an evaluation of emergent sport policy in relation to the London 2012 Olympic Games legacy and the Olympic Charter. It is argued that the realization of the 2012 legacy relating to the IOC’s aspiration to sport as a human right for all, and consequent democratic sporting accountability, necessitates a ‘sport for all’ rather than ‘competitive sport for sport’s sake’ policy direction, and the development of all three generations of sporting rights, resulting in a ‘big sporting society’.

Keywords: three generations; human rights; sport policy; sport development; democracy; big society; sport for all

Introduction

This article aims to trace and critique shifts in the stated purpose of sport policy following the awarding of the 2012 Olympic Games to London and to introduce the concept of a ‘big sporting society’. This will be theorized within a conceptual framework of three generations of human rights, involving comprehensive sporting rights and resulting in big sporting democracy. The framework will then be used to evaluate the impact of emergent coalition sport policy on the London 2012 legacy, as that legacy pertains to sport as a human right for all.

UK sport policy has come full circle since 1995 when the Conservative policy document, Sport: raising the game (Department of National Heritage [DNH] 1995), was published. This strategy emphasized competitive team games and volunteering, and ignored the major contribution of local authorities to the national sporting infrastructure. When New Labour
Why females don’t do sport degrees

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©Journal of Hospitality, Leisure, Sport and Tourism Education

Abstract
In the UK, “sport” degrees attract a predominately male cohort. This study examined reasons behind this bias. One hundred and seventy females engaged in further education in the North of England were sampled. A series of statements designed to assess attitudes towards sport degrees were presented. Principal component analysis identified six factors: value/relevance; interest in sport, male dominated; suitability for females; academic value and career opportunities. Only the value/relevance factor could be considered pertinent. Participants were also asked to rate a series of sport degrees for their level of attractiveness and it was found that those which incorporated health and psychology were considered more attractive than those which focused on sport and exercise.

Keywords: higher education, attitudes, sport degree, gender

Introduction
Over the last 40 years the higher education (HE) demographic of the UK has changed dramatically. According to official figures, the number of students taking part in undergraduate study rose significantly between the early 1970s and present. UK government data indicates that in 1970/71 the number of undergraduate students, full-time and part-time, was approximately 560,000. By 1997/98, although not directly comparable with the 1970/71 data as the 1997/98 data was based on enrolments rather than attendances, the number of undergraduate students in the UK had risen to around 1.2 million (Office of National Statistics, 2010). This figure continued to rise and by 2009 was in the region of 2.5 million (Department for Children, Schools and Families, 2009).

As well as an increase in the total number of undergraduate students, there has also been a gender revolution with respect to female representation. Specifically, of the total 1.97/98 contingent of 560,000, the male to female distribution was roughly 65% male and 35% female (Office of National Statistics, 2010). In 2000, females accounted for approximately 55% of those enrolled on undergraduate programmes (Department for Children, Schools and Families, 2009). This increase in both undergraduate numbers and the level of female representation was not unique to the UK, with similar patterns also being observed in other Western nations such as the USA (Institute of Education Sciences, 2004). While some have voiced concerns about the scale of this initiative, claiming that this trend continued males...
Arsène Didn’t See It: Coaching, Research and the Promise of a Discursive Psychology

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ABSTRACT
For twenty years the discursive psychological perspective has been at the vanguard of innovative research in social psychology, producing high-detail, systematic analyses of dynamic, constructive language use in a wide range of practical settings. To date, it has found applications in the study of medical communication, racism, political discourse, emotion and accounts of success and failure in sport; to highlight but a few. Its lack of headway in the specific study of coaching is perhaps, therefore, somewhat surprising given the transparency (at least for the mediator of many naturally occurring verbal activities) in this domain. This article draws on salient literature and two brief case studies in illustrating some of the ways that the perspective can inform an approach to coaching interaction that does not draw on ontologically problematic cognitive assumptions regarding the relationship between thought and action. A foundational argument is then made for greater engagement with discursive psychology within the broader realm of coaching science.

Key words: Cognition, Conversation Analysis, Discursive Psychology, Language, Sports Coaching

INTRODUCTION
It has become something of a canonical truism for anyone who follows the English Premier League that Arsenal FC coach Arsène Wenger, whenever quizzed in a post-match interview about a possible misdemeanour committed by any of his own players during the preceding 90 minutes will most likely claim to have “not seen” the pertinent incident. For example, when asked to comment upon an on-field altercation between Arsenal teammates Emmanuel Adebayor and Nicklas Bendtner during a League Cup tie with local rivals Tottenham Hotspur in 2009, Wenger explicitly declared “I did not know anything about it. I didn’t see it,” at which point the questioning turned to other matters. Intuitively, as social scientists, we may well find ourselves questioning the veracity of this claim. Did Wenger, we might ask, really not see what happened, and was therefore unable to answer questions regarding the incident? Or, more insidiously, did he actually see everything and only claim ignorance such that he would not then have to answer questions regarding the incident? In order to unpick
Heuristic Reasoning and the Observer’s View: The Influence of Example-Availability on ad-hoc Frequency Judgments in Sport

PAUL K. MILLER, LOUISE ROWE, COLIN CRONIN, AND THEODOROS M. HAMPOURSAS

University of Cumbria

Drawing upon evidence from broader social psychology, and an illustrative study of frequency-estimation during a simple, sport-specific observe-and-recall task, this paper makes the case for the more thorough investigation of the availability heuristic (Tversky & Kahneman, 1973) on practical state-of-play reasoning in largely observational sporting activities. It is argued that this evidence particularly substantiates a need for a more robust body of research in two primary domains: (a) the gatekeeping tasks pertinent (and usually preliminary) to an individual’s sporting performance such as talent scouting, team selection, and substitution decisions, and (b) the business of officiating in high-tempo environments.

INTRODUCTION

Although not entirely ignored, cognitive heuristics—essentially metacognitive short-cutting strategies in judgement formation—have to date been relatively underexplored in sport psychology, certainly when compared to the rich body of work in the field emanating from mainstream social psychology (see Fox, 2006; Gigerenzer, 2004, 2006; McKelvie, 2000). Among the most commonly cited of these are the representativeness heuristic, which describes individuals’ tendency to judge the probability of a hypothesis by evaluating the degree to which that hypothesis resembles the data directly available (see Tversky & Kahneman, 1974), and the attitude heuristic, in which truth and falsity judgements tend to be directed by pre-existing positive and negative attitudes towards given personalities or issues (Prekternis, 1989). In terms of reasoning under conditions of contextual uncertainty, however, the most robustly demonstrated—and therefore the central focus of this paper—is the availability heuristic, first identified in a series of experimental studies in the early 1970s by Tversky and Kahneman (1977, 1974). This heuristic describes, in its most fundamental terms, the manner in which situated estimations of frequency or probability tend to be induced from the given information most cognitively salient to an individual (i.e., this order-of-judgement task is primarily informed by the task-relevant examples that can be easily recalled).

It is certainly the case that the limited corpus of sport-specific heuristics research that has hitherto been completed is concerned almost exclusively with matters of performance (Bennis & Pachur, 2006), and particularly performance in professional and elite sports (see, for example, Sobocki, Cabagno, Truelle, Trouilloud, & Maio, 2010). This is, in many respects, a logical line of focus. Successful skill execution in many forms of high-stage, sport-related
AGILITY PERFORMANCE IS CORRELATED TO POWER BUT NOT TO STRENGTH OR SPEED

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Introduction
Agility is an important physical component for successful performance in many opposition sports, combining perceptual and decision-making abilities and rapid change of direction (Sheppard et al., 2006; Young et al., 2012). Although previous studies have examined the relationship between agility and other physical attributes (Ivem et al., 2009; Young et al., 2012), the agility task used did not account for the decision-making component. Therefore, the aim of this present study was to investigate the relationship of agility to power strength, and speed.

Methods
Twelve male, competitive rugby players (mean±SD age 20.5±0.6 years, height 1.76±0.06 m, body mass 92.5±3.1 kg) performed an agility test (AGT), a half squat strength test (HSST), a power test (PT) and a rebound jump test (REBT), and a 1,000 m sprint test (SPT). PTs also, subjects ran in a 10 m course, passing through two sets of timing gates (Smartgate Timing Gates, Laser Sport, Brisbane, Australia). The first set was 5 m away from the start and the second 5 m away from the first set and this course end. The first left or right turns were unanticipated and the direction was indicated by a visual stimulus from the second set of timing gates once the first gate was broken (Oliver and Myer, 2009). All trials and total time was recorded. Strength was assessed by 1 repetition maximum for the HSST. PT took place on a contact (Smartgate) Laser Sport, Brisbane, Australia and power output was calculated. Finally, SPT was taken, 1,000 m, and total times were recorded.

Statistical analysis
As data was normally distributed, Pearson’s correlation (r) was used to examine relationships between these measurements, with significance level for any correlation set at 0.05.

Results
The means obtained from the various tests can be found in table 1. Table 1. Shown below are the agility (AGT distances), power test (PT distances), strength (HSST distances), and SPT distances (Table 1).

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>Agility (m)</th>
<th>Distance (m)</th>
<th>Power (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>1.66±0.17</td>
<td>1.66±0.17</td>
<td>12.2±1.8</td>
</tr>
<tr>
<td>2.0</td>
<td>1.66±0.17</td>
<td>1.66±0.17</td>
<td>12.2±1.8</td>
</tr>
<tr>
<td>3.0</td>
<td>1.66±0.17</td>
<td>1.66±0.17</td>
<td>12.2±1.8</td>
</tr>
<tr>
<td>4.0</td>
<td>1.66±0.17</td>
<td>1.66±0.17</td>
<td>12.2±1.8</td>
</tr>
</tbody>
</table>

Pearson’s correlation revealed a significant and high relationship between AGT 1-10 m and AGT total time (r=0.067, p=0.02) as well as a significant and moderate relationship between AGT 10-15 m and power output (r=0.02, p=0.06). No other significant correlation was revealed (p=0.05).

Discussion
These findings suggest that agility performance is related to quick decision-making. In addition, since that decision has been made, lower limb power is important to enable fast movement. Our findings disagree with previous studies reporting speed and strength as two factors related to agility performance (Jones et al., 2006; Sheppard et al., 2008). However, the use of decision-making in the current study could explain the discrepancies, leading to a significant role in agility performance (Sheppard et al., 2008; Young et al., 2012). Therefore, agility assessment should take this component into consideration.

References

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Democritus University of Thrace
Komitini, Greece, 20-22 May 2011
PREVIOUS DYNAMIC AND BALISTIC CONDITIONING CONTRACTIONS CAN ENHANCE SUBSEQUENT THROWING PERFORMANCE

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2 Cardiff School of Sport, University of Wales Institute, Cardiff, Cardiff, UK
3 Ios-Kefalos Athletic Club Ipsos, Athens, Greece

Introduction

Previous muscle activity can potentiate subsequent muscle performance, a phenomenon known as postactivation potentiation (Tillin and Bishop, 2006). Although heavy load dynamic exercise has been successfully used to acutely enhance subsequent explosive performance (Enformali et al., 2010), little information exists for ballistic activity as a conditioning contraction (CC). The purpose of this study was to determine whether throwing performance could be enhanced if preceded by heavy dynamic (DYN) or ballistic (BAL) CCs.

Methods

Eleven male, competitive rugby players (mean±SD: age 23.3±1.1, body mass 91.2±6.0 kg, height 199.7±1.7 cm) performed a ballistic bench press throw (BPP) at 45% of 1 repetition maximum (1RM) followed by a 6 cm sprint and nine of the CCs. The CCs, applied on separate days in a randomized counterbalanced order, were 1 set of 3 repetitions of bench press (DYN) at 80% of 1RM in BAL at 36% of 1RM. After a 4-minute rest, the subjects performed the other BPP (post-BPP). A schematic diagram of the experimental procedures can be seen in Fig. 1. Peak power (Peak), force (Fpeak), distance (Dist), and velocity (Vpeak) and rate of force development (RFD) were measured using a linear position transducer (Bartec Measurement System, Fitness Technology, Ski, South Australia, Australia).

Fig. 1. Schematic diagram of the experimental procedures, measures of performance during a ballistic bench press throw (BPP) were taken before (pre-BPP) and after (post-BPP); the conditioning contraction, which was either a 1 set of 3 repetitions of bench press at 45% of 1RM or a BPP at 30% of 1RM performed on separate days and in randomized, counterbalanced order.

Statistical analysis

As data were not normally distributed, Friedman’s test was employed to examine for differences within each variable, followed by Wilcoxon’s signed-rank test for pairwise comparisons. Any significant differences were identified. No correction for pairwise comparison was applied and significance level was set at 0.05.

Results

No significant differences were revealed for Peak, Fpeak, Vpeak, and RFD (P>0.05) for any CC (Table 1). However, significant differences were revealed for Peak power for the BAL only (P<0.05), and for Vpeak (P<0.05) and Fpeak (P<0.05) for both loadings (Table 1).

Table 1. Pre- and post-BPP performance variables scores (mean±SD) following heavy load dynamic (DYN) and ballistic (BAL) conditioning contractions.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre</th>
<th>Post</th>
<th>Pre</th>
<th>Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak (W)</td>
<td>378.7±68.5</td>
<td>436.8±71.5</td>
<td>390.1±118.7</td>
<td>451.5±160.2</td>
</tr>
<tr>
<td>Fpeak (N)</td>
<td>390.2±75.6</td>
<td>413.3±110.2</td>
<td>416.1±171.7</td>
<td>390.5±194.0</td>
</tr>
<tr>
<td>Vpeak (m/s)</td>
<td>0.3±0.05</td>
<td>0.25±0.05</td>
<td>0.35±0.14</td>
<td>0.26±0.05</td>
</tr>
<tr>
<td>RFD (W/kg)</td>
<td>1.4±0.7</td>
<td>1.5±0.6</td>
<td>4.0±0.6</td>
<td>4.5±0.6</td>
</tr>
<tr>
<td>Dist (m)</td>
<td>5.2±1.8</td>
<td>5.6±2.2</td>
<td>5.6±2.2</td>
<td>6.0±2.2</td>
</tr>
<tr>
<td>Vpeak (m/s)</td>
<td>4.0±0.6</td>
<td>4.5±0.6</td>
<td>4.5±0.6</td>
<td>5.0±0.6</td>
</tr>
<tr>
<td>RFD (W/kg)</td>
<td>1.4±0.7</td>
<td>1.5±0.6</td>
<td>4.0±0.6</td>
<td>4.5±0.6</td>
</tr>
</tbody>
</table>

* indicates significant pre-post difference (P<0.05).

Discussion

Our findings indicate that ballistic conditioning contractions can improve subsequent throwing performance while performance improvements that relate to velocity may not be enhanced by both ballistic and dynamic contractions. Although, on this occasion, the change in velocity was not sufficient to cause a change in power or indeed a shift of the power curve (Enformali et al., 2009), future studies should explore different loads and rest intervals, as power-adjusted changes have been shown to be of great importance in monitoring and performance.

References


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Previous high-intensity activity affects lower limb strength ratios

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Introduction: Lower limb strength ratios, used in assessing muscular imbalances, are typically derived from assessment of explosive, maximum effort activities (Jones and Bampouras, 2010; McElveen et al., 2010). Such assessment can be conducted with the use of functional tests (e.g. vertical single leg jump) or isokinetic dynamometry (Jones and Bampouras, 2010; McElveen et al., 2010), with both types of assessment presenting different limitations (Jones and Bampouras, 2010). In addition, the non-fatigued state and single-effort nature of these assessments does not provide information on muscular imbalance following contractions (Augustsson et al., 2006). Any such change could indicate an increased risk of injury after a period of activity, thus raising questions as to the correct procedure of muscle imbalance assessment. Therefore, the aim of the study was to assess muscle imbalances over repeated maximum effort cycling sprints.

Methods: Seventeen healthy, physically active young adults (females: n=4, height 1.62±0.03 m, body mass 68.0±6.5 kg; males: n=13, height 1.80±0.06 m, body mass 80.5±13.8 kg) performed five 6-s sprints with 24-s rest intervals on a Lode Excalibur bike with torque and power data recorded for each leg. Average, average maximum (average of maximum from each sprint) and peak torque (TAv, TAvM and TP, respectively) and power (PAv, PAvM and PP, respectively) were obtained for each leg. Ratios of these variables were calculated as (((strongest leg/weaker leg)×100) (Effingham et al., 2006).

Statistical Analysis: Data was assessed for normality. Normality was not confirmed, and a Wilcoxon test was used to compare torque and power variables between legs. Friedman test were used to compare ratios for all variables. Statistical significance was set to P < 0.05. All statistical analysis was completed using SPSS v.15 (Chicago, USA).

Results: Wilcoxon’s test revealed a significantly stronger leg (P<0.05) for all torque and power variables. Friedman’s test indicated a significant ratio increase between TAv (19.7±8.5%), and TAvM (4.8±3.5%; P=0.003) and TP (4.1±3.5%; P=0.003) (Fig. 1), as well as between PAv (8.8±5.6%) and PAvM (4.5±2.9%; P=0.003) and PP (4.2±2.6%; P=0.003) (Fig. 2) but not between TAvM and TP (P=0.421) or PAvM and PP (P=0.981).

Discussion: The ratio of average torque and power (measured over the duration of the sprints) was significantly higher than average maximum and peak torque and power, indicating that previous high-intensity activity increased lower limb strength imbalance. None of the ratio variables measured reached the ‘imbalance threshold’ of 15%, which appears to be the point beyond which muscular and functional performances are considered imbalanced (Knapik et al., 1991; McElveen et al., 2010), increasing the risk for impaired performance or injury. We posit that muscle imbalance assessment activities conducted at a rested state may not accurately reflect the true strength difference between limbs, leading to inaccurate training or rehabilitation programmes.

References

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Heuristic Reasoning and Sport Observers: Exploring the influence of Example-Availability on Ad-Hoc Frequency Judgments

Paul K. Miller, Louise Rowe, Colum Cronin & Thedoros M. Bampouras

Introduction: When performing everyday reasoning tasks ‘on-the-fly’, individuals rarely attempt a comprehensive examination of all relevant resources from social memory. More commonly, metacognitive ‘short-cutting’ strategies – judgemental heuristics – are employed to expedite these tasks. The most robustly demonstrated ‘heuristic’ is the availability heuristic (Tversky and Kahneman 1973; 1974). This heuristic, describes the manner in which estimations of frequency or probability tend to be inducted from the information most cognitively salient to an individual, i.e. task-relevant examples that can be easily recalled have a disproportionately high frequency/probability estimation. Incorporating ‘fame availability’ (Mekelvie 1997) the empirical focus of the study was on the ‘snap judgments’ made by observers of sport images.

Methods: Subjects (n=141) were shown a variety (50) of images of football, tennis, golf, netball, running athletes in action from the public domain. Images were grouped and divided into celebrity (high profile professional athletes in football, tennis, golf) and non-celebrity (low profile recreation athletes participating in netball and running). In a time-pressured environment, participants estimated the frequency of images observed for each sport. The scores of the five sports, consisting the two groups were averaged to provide a single participant value for celebrity and non-celebrity sports.

Results: Normality of data was checked using Kolmogorov-Smirnov and subsequently confirmed. A paired t-test was used to examine for difference between the two groups. Frequency scores for celebrity sports (17.0±3.3 times) were significantly more ($t_{136} = 7.394, P = 0.001$) than non-celebrity sports (9.9±3.3 times).

![Graph showing mean scores of celebrity and non-celebrity](image)

Discussion: Heuristics are an adaptive tool (Gigerenzer, 2006) which have the potential to produce effective on-the-spot judgements. However these results suggest that significant distortions of frequency may arise through the influence of heuristics when observing sport from the periphery. Given the contextual ambiguity influencing those centrally involved in sport (coaches, referees, participants, commentators) and the importance of decision-making under time constraints, further research on the influence of heuristics in the decision making of sport practitioners is recommended.

References:

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The Relationship Between Maximal Fat Oxidation Rates and Blood Lactate Thresholds in Runners

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Introduction

As aerobic exercise increases in intensity the relative oxidation rates of carbohydrate and fat have been shown to change (Van Loon et al., 2001). The ratio of maximal fat oxidation (Fatmax) has been shown to be closely related to the increase in plasma lactate during incremental cycle ergometer exercise (Achten and Jeukendrup, 2004). To date no studies have looked at this relationship in whole body exercise. The aim of this study was to evaluate the relationship between the exercise intensity which elicits Fatmax and three methods of determining blood lactate thresholds during treadmill running.

Method

Fifteen moderately endurance trained male recreational runners of mean (±SD) age 35.0±8.98 yr, body mass 75.2±5.21 kg and height 1.76±0.09 m, completed a discontinuous graded exercise test to exhaustion on a Woodway PRO-27 treadmill (Woodway, Waalwijk, USA) using 1km h⁻¹ increments every four minutes. Respiratory gases were measured throughout the test and used to calculate Fatmax via indirect calorimetry. Capillary whole blood lactate samples were collected at the end of each stage (Lactate Pro, Akray Inc, Kyoto, Japan), this is a reliable and accurate analyser (Tanner et al., 2010), for the determination of the exercise intensity (speed in km h⁻¹ and % of VO2peak) at which three thresholds LT, D-max (DM) and Modified D-max (MDM) occurred (ADAPT 1995).

Statistical Analysis

Normality was checked using Shapiro-Wilk tests. Correlation analysis was performed using Pearson’s and Spearman’s rank correlation coefficients for parametric and non-parametric data respectively. Differences were determined using T-tests. Significance was accepted at p<0.05.

Results

A maximal rate of fat oxidation of 0.59±0.18g min⁻¹ was reached at an exercise intensity of 69±10.44%VO2peak, corresponding to a running speed of 10.3±1.50km h⁻¹. The three blood lactate thresholds occurred at LT 1.84±0.09mmol L⁻¹, 11.6±1.59 km h⁻¹ and 76.95±11%VO2peak, DM 2.74±0.71mmol L⁻¹, 12.6±1.44km h⁻¹ and 84.3±3.93%VO2peak, MDM 4.35±0.78mmol L⁻¹, 14.1±1.48km h⁻¹ and 91.0±2.91%VO2peak. No significant correlations were observed between the speed at which Fatmax and the speed at which LT, DM or MDM occurred. There was however a significant correlation between Fatmax Speed and Fat Max %VO2peak (r² = 0.809, p<0.010) significant (r=0.534, p=0.04) moderate correlations between Fat Max %VO2peak and DM % of VO2peak (Figure 1a) and (r=-0.622, p<0.013) between Fat Max %VO2peak and MDM %VO2peak (Figure 1b). There were significant differences between the speed at Fatmax and LT (p<0.011) and Fatmax and LT %VO2peak (p<0.011).

Discussion

The exercise intensity at which Fatmax occurred was higher (69.9%VO2peak) than that reported by Achten and Jeukendrup (2004) with moderately trained cyclists/triathletes (63.9%VO2peak), but at a similar fat oxidation rate of 0.50 (runners) vs 0.48g min⁻¹ (cycling). This could possibly be attributed to the greater muscle mass utilised whilst running accounting for the increased oxygen cost, with the additional active tissues to oxidise more of the lactate produced. This trend for Fatmax to occur at a higher exercise intensity during running is supported by Cheniveire et al., (2010) who reported Fatmax occurring at 44%VO2peak during cycling and 57%VO2peak during running in moderately trained males an females.

Conclusion

In moderately trained endurance runners Fatmax occurs at a higher exercise intensity than in similarly trained cyclists, as Fatmax is significantly correlated with the %VO2peak at both DM and MDM, but not at LT.

References

DIFFERENCES IN MUSCULAR IMBALANCE RATIO CALCULATIONS USING FUNCTIONAL TEST DATA

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Introduction: Muscular imbalance (MI) assessment is important in identifying increased injury likelihood as well as performance deficit (Impellizzeri et al., 2007). Typically, MI ratio calculations include a reference value, which can be the assessment score of the left or right leg, the strong or weak leg, or the average of either. The selection of the reference value can affect the ratio calculation and may mask any MI differences (Zifchack et al., 2008), rendering the tests insensitive to detecting performance changes. Currently, limited comparisons exist between the various calculation methods to establish whether significant differences can occur. In addition, a new calculation method that does not require a reference value has been proposed (Zifchack et al., 2008). Our aim was to compare the MI ratio calculations from scores obtained from two functional tests.

Methods: Twenty healthy, physically active young adults (females: n=6, height 1.62±0.03 m, body mass 67.8±5.8 kg; males: n=14, height 1.79±0.07 m, body mass 80.2±13.3 kg), familiar with the tests, performed two trials of the 6m timed and triple jump alternate hops (Reid et al., 2007), with the best performance used for further analysis. MI ratios were calculated as \[\frac{(\text{side 1-side 2})}{\text{reference value}}\times 100\], where the reference value was a) left leg, right leg or average of the two, or b) weak leg, strong leg or average of the two (sideness). In addition, the symmetry angle was also calculated for both side combinations as \[\frac{(45° - \arctan((\text{Side1}/\text{Side2})))}{90°}\]×100. A repeated measures MANOVA was utilised with significance level set at p < .05.

Results: Results indicated significant interactions between test-sideness-MI ratio (p=.002), test-MI ratio (p=.001), and sideness-MI ratio (p=.002) but no significant interaction between test and sideness (p>.05). Further, no significant difference was found for test (p>.05), but significant differences were found for sideness (p=.001) with strong/weak overestimating by 3%, and MI ratio calculation (p=.001), with the SA overestimating MI by 9.3% for strong/weak comparisons for both tests and 5.6% and 5.9% for left/right comparisons for 6m timed and triple jump alternate hop, respectively. MI ratios can be found in Table 1.

Table 1: Muscular imbalance ratios calculated from the 6m timed and the triple jump alternate hops. Ratios were calculated as \[\frac{(\text{side 1-side 2})}{\text{reference value}}\times 100\]. The limb used as reference value is indicated. SA refers to symmetry angle.

<table>
<thead>
<tr>
<th>Muscular imbalance calculation (reference value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left leg</td>
</tr>
<tr>
<td>6m</td>
</tr>
<tr>
<td>0.6±7.9</td>
</tr>
<tr>
<td>Alternate</td>
</tr>
</tbody>
</table>

Discussion: Our findings indicate that test selection does not affect MI ratio calculations but sideness (i.e. left/right or weak/strong combinations selected) does. Ratio calculations also affected MI values, with the SA significantly overestimating MI ratio compared to all other ratio calculations. In particular, the difference in strong/weak comparisons by the SA could lead to different conclusions on the MI status of an individual. Future studies should examine relationships of ratios to sporting performance as an indicator of the more appropriate MI ratio calculation to be used, in order to assist in preventing an injury. Implications exist for researchers who should also be aware of these findings when making comparisons to published literature / norms.

References

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16th Annual Congress of the European College of Sport Science | 6th-9th July 2011 | Liverpool - England
Agility Performance is Correlated to Power but Not To Strength or Speed

Previous studies have examined the relationship between agility and other physical attributes, but the agility task used did not account for the decision-making component of agility. The aim of the present study was to investigate the relationship of agility to power, strength, and speed.

Twelve male, competitive rugby players (20.5±0.6 years, 1.86±0.06 m, 92.5±9.1 kg) performed an agility test (AGI), a half squat strength (1 repetition maximum) test (HS), a power test (5 rebound jumps test, 5RJ), and a 40m sprint test (SPRINT). For AGI, subjects run a 10m course, including an unanticipated turn directed automatically by the timing gates. 5m splits and total time was recorded. Finally, SPRINT 0-10m, 10-40m, and 0-40m times were recorded. Pearson’s correlation (r) was used to examine for relationships between these measurements.

AGI times were 1.99±0.18 s, 1.57±0.19s, and 3.55±0.38s for 0-5m, 5-10m, and 0-10m, respectively. 1RM for HS was 212.1±18.3kg. 5RJ power output was 1125.5±157.3W.

Finally, SPRINT times were 1.88±0.11s, 3.72±0.20s, and 5.70±0.37s for 0-10m, 10-40m, and 0-40m, respectively. AGI 5-10m was highly correlated with AGI total time (P=0.001, r=0.852) and moderately correlated with power (P=0.020, r=0.686). No other significant correlation was revealed (P>0.05).

These findings suggest that agility performance is primarily related to quick decision-making and subsequently to power. Although our findings disagree with previous studies reporting speed and strength related to agility, the discrepancy is attributed to the non-decision-making agility task used in these studies, indicating its significant role in agility performance.

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Effect of Four Types of Stretching Routines on Subsequent Sprinting Performance.

Stretching is recommended in warm-up to reduce injuries, but can also impair muscular performance. Most studies have investigated static stretching, usually held over a prolonged period but typically stretching includes a combination of static...
and dynamic stretching of shorter periods. The present study aimed to compare the effect of different stretching routines on subsequent sprinting performance.

Ten competitive, injury-free sprint and jump athletes (22.7±1.5 yr, 79.4±8.7 kg), performed a flying 20m sprint, following a standardised warm-up consisting of static stretching (hip flexors, quadriceps, hamstrings, hip extensors, gastrocnemius), dynamic stretching (leg swings, walking lunges, walking floor sweeps, heal-toe walking), static stretching followed by dynamic stretching, or no stretching, with each exercise lasting 30 seconds. The protocols were administered in a randomised order. Performance variables measured were sprint time, stride length, stride frequency, contact time, and sprint-specific power. A 4 x 5 repeated measures MANOVA was used to examine for differences between protocols, with significance set at 0.05.

Results showed no effect of the stretching routine (P=0.686) on any of the performance variables measured, indicating that performance was maintained, irrespective of the type of stretch used.

Our findings indicate that static or dynamic stretching and their combination do not affect performance. A decrease in 20m sprinting times following a bout of static stretching reported by Fletcher and Jones (2004) may be due to different stretching protocols and durations used. Future studies should examine whether stretching protocols that do not impair performance are sufficient to prevent injuries.

* Theodoros M. Bampouras, Colum Cronin & Paul K. Miller. *(Faculty of Health and Wellbeing, University of Cumbria)*

Notational Analysis and Inter-Role Relationships in Elite Sporting Practice.

Notational analysis is the process of recording and analysing the movement of athletes during performance (Lees, 2003). Research has reported a variety of notational analysis systems, which may influence coaching practice and athletic development. Notwithstanding the increasing research and use of notational analysis, there has been comparatively little empirical research thus far that pertains directly to the practical use of notational analysis by professionals.

The aim of this paper is to generate an exploratory analysis of the in-practice application of notational analysis. Participants were selected due to their extensive experience in the use of notational analysis. These included a sports scientist that had been working with an International standard martial arts athlete and his coach for over four years and had
developed the notational analysis system they used, a coach that had been implementing notational analysis for over three years in international hockey and a former Rugby League international athlete with similarly broad experience of notational analysis in-practice.

A list of systematic but open-ended questions was constructed to focus upon participants’ introduction to notational analysis, their experiences of its use and their views regarding its effectiveness. Data collected was analysed using systematic qualitative data analysis (Miles & Huberman 1984). Results confirmed the use of sport specific notational analysis across three distinct sports, but also highlighted that, despite athletes being the object and receiver of the process, they are themselves isolated from the process by the coach and sport scientist (who act as gatekeepers of yielded data). These results raise important issues regarding the role of athletes within the Notational Analysis process.

*Adam Benkwitz.*

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"The City is Ours": Football Fan Rivalry, Space and Territory in Birmingham.

Football’s ‘everyday fans’ and inter-club fan rivalry have come into academic focus in recent years. The tensions between ‘imagined communities’ of fans are based on unique and complex socio-cultural and historical factors, and therefore each rivalry is unique and complex. This paper is based on a broader ethnographic study exploring those factors underpinning an important 130-year rivalry in the heart of England’s second largest city between fans of Aston Villa and Birmingham City, which has not yet received any academic attention. It looks specifically at one of the key emerging themes, territory, finding that the struggle for control of space in the city represents a struggle for power and (perceived) superiority between the imagined communities, which creates tension and reinforces fan rivalry. This informs our sociological understanding of this case study and further provides an in-depth analysis of the role territory plays in rivalry between groups.

*Mark Christie.*

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The Physical and Psychosocial Impacts of the ‘Greenfingers’ Environmental Community Project.

The British Trust for Conservation Volunteers (BCTV) first piloted the ‘Green Gym’ concept in 2000, the aim of which was to highlight the health benefits of working
outdoors whilst undertaking conservation work. BTCV gathered useful data surrounding the physical, social and psychological benefits of involvement in such work, in addition to the employability skills gained by volunteering (Oxford Brookes University, 2006). Relating to this, CABE (2004) and Ferris et al (2001) stress the benefits that green spaces and community gardens can offer, claiming that access to nature promotes lowers blood pressure, improves mental wellbeing and facilitates social inclusion by providing opportunities for regular exercise and communal interaction. Wilkinson (1996) noted that where ‘social capital’ was strong, neighbourhoods were characterised by several linked quality of life factors, including collective action, social support and simply being ‘a good neighbour’ – and were healthier as a result.

The findings presented in this paper are derived from data pertaining to the physical and psychosocial benefits of participation in a community environmental project at Williamson Park in Lancaster. Local residents (n=23), responding to advertising, took part in two hours of voluntary work each week over a six month period (after successful completion of a pilot phase). Levels of engagement among this cohort varied for a range of reasons, though there was a dedicated core of volunteers (n=8) who regularly attended for the full duration of the project. Work included activities appropriate to the age and ability of the volunteers, who ranged from 19 to 67 years old, and were of both sexes. Students connected with the project also worked in small groups on a rotation basis.

A varied approach to data collection was incorporated. This included face-to-face semi-structured interviews using a camcorder; a quantitative survey applied to participants in their first week of participation, with midpoint and end point surveys applied in addition; heart rate monitoring over the course of one hour of physical activity connected with the project; and a focus group with four volunteers at the end of the project. Second year sports student volunteers helped to design the survey forms which were approved by the research advisor.

Data are in the process of being collated and analysed, but initial findings support the results of similar studies that point to the multiple benefits of involvement in outdoor environmental projects. The question remains as to whether these benefits are sustained for the long-term, and whether involvement facilitates a broader engagement or commitment to regular physical activity outside the confines of the project.

*
London 2012 Olympic Legacy - Marginalising the Movement Culture of Women and Girls?

The International Olympic Charter asserts that ‘the practice of sport is a human right’ and that ‘every individual must have the possibility of practising sport, without discrimination of any kind’. It further outlines role 12 of the International Olympic Committee as being ‘to encourage and support the development of sport for all’. An amalgamation of these two claims results in an aspiration to the right to sport for all. In 2007 the UK government published ‘Our Promise for 2012’ detailing the London 2012 Olympic Games legacy plans with three overarching priorities, two of which, mass participation and school sport, relate to the right to sport for all. However, the UK Conservative/Liberal Democrat Coalition government which came to power in May 2010 has consolidated and extended a change in UK sport policy direction from ‘sport for social good’ to ‘competitive sport for sports sake.’

In December 2010, Sport England reported on the full year results of the Active People Survey 4. The sports participation indicator measures the number of adults participating in at least 30 minutes of sport at moderate intensity at least three times a week. The number of male participants has increased, not statistically significantly, to 4.176 million (20.3%), however, there has been a statistically significant decline in participation among females from 2.787 million (13.1%) to 2.761 million (12.8%).

It will be argued that the government shift in policy direction will effectively disenfranchise girls and women from ‘sport’, relegate the movement culture of women to ‘physical activity’, and jeopardise the realisation of the 2012 legacy promises relating to sport for all.

Further, that the IOC’s aspiration of sport as a human right, and consequent democratic sporting accountability, necessitates a ‘sport for all’ rather than ‘competitive sport for sports sake’ policy direction, and the development of three generations of sporting rights, resulting in a democratic and inclusive ‘big sporting society’.

* 

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Gender Justice, Citizenship and Sport: An analysis of UK sport and physical education policy in the context of European gender equality directives, and sport policy.

This paper utilises feminist philosophy and citizenship theory to explore the extent to which the policy discourse of sporting citizenship and gender mainstreaming in
Europe and the UK, addresses gender justice.

It argues that despite, or even because of, the widespread adoption of gender mainstreaming, a discourse of gendered sporting citizenship has captured UK physical education and sport policy and practice. This is hindering further progress towards gender justice conceptualised not only as redistribution, recognition, representation; but also as reframing (Fraser 2009). A number of feminist and political theorists have mapped the contested landscape of gendered citizenship, gender justice, gender equality and gender mainstreaming. The three different approaches to gender justice are often conceptualised as: equality (redistribution), difference (recognition), and critical synthesis or transformation (emancipation).

Adapting this analysis it is argued that formal sporting citizenship rights might be accorded to all individuals and regarded as gender neutral, but that inequalities of opportunities and power derive from both the sexual division of labour, and the sexual division of play. Further, that women are more likely to be second class sporting citizens than men. Thus gender justice in sport policy could aim at a citizenship of equality but in relation to the normative universal sportsman; and/or a citizenship of difference involving port/movement parity (but a sexual division of play); or aim at a critical synthesis or transformation and a universal movement citizenship. Finally, it is argued that the focus on gender equality within competitive sport and ‘sport for sports sake’ represents a meta-political mis-framing of the subject of justice. Gender justice in contrast to gender equality requires an interrogation of the mapping of political space and a reframing of the subject of justice: from ‘sport for sports sake’ to ‘sport for all’.

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Motivation strategies of a case study primary school teacher during PE sessions.

Physical Education (PE) is often the subject of a discourse of crises (Marsden and Wesden 2007). Issues such as ineffective teacher education (Armour and Dunscombe 2004), increases in childhood obesity (Waters, Swinburn, Seidell and Uauy, 2010) and the increasing link between PE and sport suggest a developing subject in need of evidence-based practice (Kirk 2010).

One bourgeoning area of research in PE has been the facilitation of motivation amongst children by teachers (Bryan and Solomon 2007; Mandigo et al 2008; and Dupont et al 2009). Interestingly, government policy
(DCMS 2012) portrays PE as one of the vehicles for developing intrinsic motivation amongst pupils, which helps pupils to maintain participation in sport and physical activity beyond school and throughout later life. Consequently the aim of this study was to explore how a single case study primary school teacher, currently motivates pupils to engage in physical education and physical activity.

Observations using the Arizona State University Observation Instrument (Lacy and Darst 1984) and semi-structured interviews using a Grounded Theory (Glaser and Strauss 1967) approach were conducted. Observations highlighted the use of First Name (26.2%), Management (17.7%) and Questioning (12.8%) as the most common behaviours. The praise to scold ratio was 3.13:1. Positive modelling were 3.2% of behaviour. Themes identified from interviews:

1. Motivation and behaviour management were considered interchangeable terms.

2. Motivation/behaviour management strategies include providing extrinsic rewards, praise and modelling desirable behaviour.

3. Providing students with controlled choices, through questioning was seen as a powerful motivating tool and also seen as reward which could help manage behaviour.

Through the ‘choice strategy’, the findings add support for the use of Self Determination Theory (Deci and Ryan 1985, 2002) as a framework for motivation in PE. The findings also recognised the use of conditioning approaches such as extrinsic rewards to manage behaviour. The discussion considers that rewards may foster the development of Introjected Extrinsic Motivation (Vallerand 2001) amongst pupils. However long-term, this could have a negative influence on future participation rates when extrinsic rewards are no longer provided.

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The Paradox of ‘Ordinary Language Philosophy’: Ambiguous Expressions in Everyday Talk.

The influence of ‘ordinary language philosophy’ (OLP), such as that of John Austin and Ludwig Wittgenstein, has been felt throughout the social sciences over the last three decades, not least in its catalysis of the so-called linguistic turn and the rise of cultural studies. Since this original shockwave, a great deal of innovation and progress in the study of ordinary language itself has emanated from these social sciences. We contend, however, that these important movements have had limited
reciprocal impact within philosophical circles. In this paper, using the case of ‘ambiguous expression’, we explore how a range of insights from contemporary social scientific approaches to the use of everyday language (not least Conversation Analysis) might well have something to ‘give back’ to philosophy. Drawing on the analogous critique of Euclidean geometry advanced by Benoit B. Mandelbrot in *The Fractal Geometry of Nature*, we argue that the philosophy of language – as a whole – can be paralysed by its use of invented and ‘ideal’ cases which necessarily undermine its claim to provide insight into the ‘ordinary’ language that manifests in real social interactions.

To this extent, we conclude that in order to maintain relevance and dynamism today, OLP may have to either give up some of its claim to illuminate ‘ordinary’ language, or else relinquish some of its status as a full ‘philosophy’.

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Knowledge of exercise duration affects the pacing strategy in a Wingate Anaerobic Test.

**Purpose:** Despite a century of research, no single theory on the cause of human muscle fatigue during exercise has been agreed. The Central Governor Model (CGM) has challenged the traditional theory of peripheral fatigue and proposed a more complex, integrated model (Noakes et al 2005). Ulmer’s (1996) theory of teleoanticipation is a key component of the CGM with knowledge of exercise duration critical to the setting of a subconscious optimal pacing strategy (Wittekind et al 2011; Albertus et al 2005; Baden et al 2005 and Ansley et al 2004). This study aimed to investigate pacing strategies in maximal exercise ≤ 30s. Method: Ten physically active males completed four trials of the Wingate Anaerobic Tests (WAnT) with and without knowledge of duration. The trials consisted of 10s known (10k), 10s unknown (10u), 30s known (30k) and 30s unknown (30u). Peak power (PP), time to peak power (TPP), fatigue index (FI) and surface electromyography (EMG) were recorded for each trial. Data was analysed using magnitude of effect statistics (Hopkins 2003) and a repeated measures ANOVA (SPSS).

**Results:** Magnitude-inferences of the true effects showed that PP (81.8%) and FI (93.9%) are likely to be higher in 10k than 10u trials. In contrast, knowledge of duration in the 30 second trials resulted in the likelihood of lower PP (80.1%) and FI (75.1%). No statistical differences were found in PP, TPP, FI or EMG amplitude between the known and unknown conditions.
Conclusion: Knowledge of duration affects power output in maximal exercise lasting ≤ 30s, providing support for pacing strategies. It is uncertain whether this pacing strategy is regulated by teleoanticipation or by conscious control.

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Silent about Silence - The Ethical Importance of 'Non-Talk' in Qualitative Health Research.

One of the key tenets of ethically robust health research is the effective reproduction of what is said by participants, i.e. the preservation of a speaker’s original meaning, without misrepresentation or decontextualisation of verbal data to better fit a theoretical model or anticipated research outcome.

This principle is grounded in long-standing philosophical traditions in both moral philosophy and the philosophy of research itself (see Alexandra and Miller 2009; Schwartz, Preece and Hendry 2002). While this, appropriately, directs health researchers to take great care in the ways they ‘tidy up’ these kinds of data during transcription and presentation for qualitative analyses, the same attention is rarely accorded to the matter of participant silence. As Harvey Sacks (1992) observes, pauses, non-answers and extended silences in any verbal interaction are central to the understanding of its practical, contextual sense. Not speaking when one is expected to, for example, or delaying an answer to a question it rather than providing it instantly, are not simply absences of activity but highly meaningful interpersonal events. To delete or overlook such ‘non-talk’ in qualitative data is therefore, potentially, an act of misrepresentation. Using evidence from an empirical study of the diagnosis of depression in primary care, this paper explores (a) some of the practical ways in which orthodox qualitative data presentation measures, even when reporting exactly what is said, can radically alter the sense of those data by failing to consistently highlight where non-talk is significant, and (b) the direct ethical implications thereof.

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Sense and sensitivity: On situated questioning about self-harm and suicidal inclination in the primary care consultation.

The link between depression and suicide is, in modern medical knowledge, a 'given'. The canons of contemporary psychiatry, without exception, specify that ‘suicidal
ideation’ (like the physical acts of self-harm and actual suicide) is at once a symptom of the illness and, simultaneously, a ‘characteristic’ (if not inevitable) outcome (American Psychiatric Association, 1994; World Health Organization, 1994).

National Health Service directives in the UK, meanwhile, specify that, in any primary care consultation where a patient either demonstrably has - or is suspected to have - a depression, it is incumbent upon a General Practitioner to assess any danger they may present to themselves (National Institute for Clinical Excellence, 2009; NHS Centre for Reviews and Dissemination, 2002). Guidelines recommend this be done through ‘direct questioning’ of the patient (National Institute for Clinical Excellence, 2007) regarding their thoughts or activities relating to self-harm or suicide. Given that 'suicidal ideation' is itself not only classified as a ‘possible outcome' of depression but also a key symptom of the condition, such a question has, in some cases, to be asked pre-diagnosis as part of diagnostic assessment.

In this paper, examples of such questioning in three different consultations are explored in detail using Conversation Analysis (Sacks, 1992a; Sacks, 1992b; Silverman, 1997) with a view to describing some of the organised interactional methods employed by GPs, and patients, in negotiating this potentially highly 'tricky' activity. These observations are then used to highlight a range of issues pertinent to the formulation of ‘normative’ frames of ‘good practice with respect of handling such sensitive issues (Petit & Sederer, 2006; Tylee, Priest, & Roberts, 1996).

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The Relationship between Maximal Fat Oxidation Rates and Blood Lactate Thresholds in Runners.

Introduction: As aerobic exercise increases in intensity the relative oxidation rates of carbohydrate and fat have been shown to change (Van Loon et al., 2001). The rate of maximal fat oxidation (Fatmax) has been shown to be closely related to the increase in plasma lactate during incremental cycle ergometer exercise (Achten and Jeukendrup 2004). To date no studies have looked at this relationship in whole body exercise.

The aim of this study was to evaluate the relationship between the exercise intensity which elicits Fatmax and three methods of determining blood lactate thresholds during treadmill running.

Method: Fifteen moderately endurance trained male recreational runners of mean (±SD) age 35.0±8.98 yr, body mass
75.2±5.21 kg and height 1.76±0.05 m, completed a discontinuous graded exercise test to exhaustion on a treadmill, using 1km/h increments every four minutes. Respiratory gases were measured throughout the test and used to calculate Fatmax via indirect calorimetry. Capillary whole blood lactate samples were collected at the end of each stage for the determination of the exercise intensity (speed in km/h and % of VO2 peak) at which three thresholds LT, D-max (DM) and Modified D-max (MDM) occurred.

Correlation analysis was performed using Pearson’s and Spearman's rank correlation coefficients for parametric and non-parametric data respectively. Differences were determined using t-tests. Significance was accepted at p<0.05.

**Results:** No significant correlations were observed between the speed at Fatmax and the speed at which LT, DM or MDM occurred. There was however a significant correlation between Fat Max Speed and Fat Max % of VO2 peak (r= 0.608, p=0.016). Fat Max % of VO2 peak was significantly correlated to DM % of VO2 peak (r=0.534, p=0.04) and MDM % of VO2 peak (r=0.622, p=0.013). There were significant differences between the speed at Fat Max and LT (p=0.011) and Fat Max and LT % of VO2 peak (p=0.011).

**Conclusion:** In moderately trained endurance runners Fatmax is significantly correlated with the % of VO2peak at both DM and MDM, but not at LT.

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The Anthropometric and Physiological Characteristics of Female University Level Netball Players in Relationship to Playing Position.

**Introduction:** Netball is a non-contact, intermittent, invasion team game where seven players per team occupy a 30.5 x 15.25 metre court divided into three equal sections, each playing position has a specific area of the court to occupy. Physiological profiling is used within team sports to assess both the demands of the sport and provide evidence of position specific requirements (Geithner et al., 2006). Differences in positional demands have been found between playing positions within netball, the centre positions being the most active (McManus and Stevenson, 2007). To date there is limited data on the anthropometric or physiological characteristics of netball players. The aim of this study was to analyse the anthropometric and physical performance characteristics of university level netball players in three positional groups; attack (A), defence (D), and centre (C) players.
Method: Twenty one university level netball players (mean ±SD) age 20.2 ± 1.6yr, height 1.68 ±0.10m and body mass 63.61±8.62 kg). A battery of tests were used on each player, anthropometric tests; height, weight, sum of 7 skinfolds and physical performance tests; multistage fitness test, 20m sprint, 505 test, flexibility and countermovement jump (CMJ). Differences between positional groups were determined using one-way ANOVAs and significance accepted at p<0.05.

Results: There were no significant differences between positional groups for any variable. However, considering mean data alone, group D were tallest, 1.73 ±0.06m, had greatest body mass, 66.13 ±10.85kg, CMJ 3111.7 ±879.6W, flexibility 22.2 ±12.2cm and estimated maximum oxygen uptake, 39.1 ±8.6ml.kg⁻¹.min⁻¹. Group C, had the greatest sum of skinfolds 122.61 ±28.6mm, were fastest across split times at 5, 10m and overall 20m sprint time (1.16 ±0.11, 2.00 ±0.18, 3.53 ±0.33s) and the 505 agility test (2.64 ±0.12 and 2.75 ±0.25s for left and right legs respectively).

Conclusion: No significant differences were found between A, C or D playing positions. This study would suggest that there is no need for position specific training programs at this level in netball.

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Differences in Muscular Imbalance Ratio Calculations Using Functional Test Data.

Introduction: Muscular imbalance assessment (MI) is important in identifying increased injury likelihood as well as performance deficit (Impellizzeri et al, 2007). However, use of left /right or strong/weak legs, as well as the reference value used for ratio calculations, can affect the MI value obtained. These different values may mask any MI differences (Zifchock et al, 2008), rendering the tests insensitive to detecting performance changes. Currently, limited comparisons exist between the various calculation methods, while a new calculation method has been proposed (Zifchock et al, 2008). Therefore, our aim was to compare the MI calculations obtained from two functional tests.

Methods: Twenty healthy, physically active young adults (females: n=6, height 1.62±0.03 m, body mass 67.8±5.8 kg; males: n=14, height 1.79±0.07 m, body mass 80.2±13.3 kg) performed two trials of the 6m timed and triple jump alternate hops (Reid et al., 2007). The best performance was used for analysis. MI ratios were calculated as (side 1-side 2)/reference value*100, where reference value was left or right leg or average of the two when calculating left/right ratio, as well as strong
or weak leg or average of the two when calculating strong/weak comparison. The symmetry angle (SA, Zifchock et al, 2008) was also calculated for both side combinations. A repeated measures MANOVA was utilised with significance level set at $p < .05$.

**Results:** Results indicated no significant effect of test, or interaction between test and side combination ($p > .05$). However, significant interactions were found between test-MI ratio ($p = .001$), side combination-MI ratio ($p = .002$) and test-side combination-MI ratio ($p = .002$). Significant effects were found for side combination ($p = .001$) with strong/weak overestimating by 3%, and MI ratio calculation ($p = .001$), with the SA overestimating MI by 9.3% for strong/weak comparisons for both tests and 5.6% and 5.9% for left/right comparisons for 6m and alternate hop, respectively.

**Discussion:** Our findings indicate that test selection does not affect MI ratio calculations but side combination does. Ratios calculations affected MI values, with the SA significantly overestimating MI ratio compared to all other ratio calculations. In particular, the difference in strong/weak comparisons by the SA could lead to different conclusions on the MI status of an individual. Future studies should examine relationships of ratios to sporting performance as an indicator of the more appropriate MI ratio calculation to be used.

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**Background:** Over the last forty years, a corpus of social cognitive research has documented that when performing everyday reasoning tasks ‘on-the-fly’, individuals rarely (if ever) attempt a comprehensive examination of all relevant resources from social memory. More commonly, metacognitive ‘short-cutting’ strategies – judgemental heuristics – are employed to expedite these tasks. The most robustly demonstrated ‘heuristic’ is the availability heuristic (Tversky and Kahneman, 1973; 1974). This heuristic, in its most basic terms, describes the manner in which estimations of frequency or probability tend to be inducted from the information most cognitively salient to an individual, i.e. task-relevant examples that can be easily recalled have disproportionately high frequency / probability estimation. Incorporating ‘fame availability’ (Mekelvie, 1997) the empirical focus of the study was on the ‘snap judgements’ made by observers of sport images.

**Methods:** Subjects ($n = 141$) were shown fifty of images of football, tennis, golf, netball and running athletes in action from the
public domain. Images were grouped and divided into celebrity (high profile professional athletes in football, tennis, golf) and non-celebrity (low profile recreation athletes participating in netball and running). In a time-pressured environment, participants estimated the frequency of images observed for each sport. The scores of the five sports, consisting the two groups were averaged to provide a single participant value for celebrity and non-celebrity sports.

Results: Normality of data was checked using Kolmogorov-Smirnoff and subsequently confirmed. A paired t-test was used to examine for difference between the two groups. Frequency scores for celebrity sports (12.0±3.3 times) were significantly more (t136 = 7.394, P = 0.001) than non-celebrity sports (9.9±3.3 times).

Discussion: Results of this initial study indicated the strong influence of the availability on the frequency estimations of the sport spectators. Heuristics are an adaptive tool (Gigerenzer, 2006) which have the potential to produce effective on-the-spot judgements. However these results suggest that significant distortions of frequency may arise through the influence of heuristics at this peripheral site of sport involvement. Given the contextual ambiguity influencing those centrally involved in sport (coaching, refereeing, and participating) and the importance of decision-making under time constraints, further research on the influence of heuristics in the decision making of practitioners is recommended.

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Depression, physical activity and mental health: An Interpretative Phenomenological Analysis of General Practitioners’ attitudes to exercise referral schemes.

Depression is, today more than ever, a profoundly serious public health concern in the UK, impacting upon the lives of individuals from all social backgrounds and strata (Yohannes & Caton, 2010). Moreover, and contrary to the often-held stereotype of a relatively simple disorder of mood, the condition manifests in an additional array of psychological and somatic symptoms such as “…loss of interest and pleasure, loss of appetite, weight loss/gain, sleep disturbance, psychomotor agitation or retardation, energy decrease, sense of worthlessness, guilt, difficulty in concentrating, or thoughts of suicide.” (Legrand & Heuze, 2007, p.348)

In recent years a body of research has emerged dedicated to exploring the value and impacts of exercise in assisting individuals suffering from depression (see Callaghan, Khalil, Morres, & Carter, 2011;
Carter, Callaghan, Khalil, & Morres, 2012), and Exercise Referral Schemes (ERS) have been developed to provide access to structured programmes of physical activity.

Robust evidence indicates that such physical activity can have strong positive impacts upon the rehabilitation process, not least in terms of enhancing happiness with physical appearance and providing venues for social interaction (Daley, MacArthur, & Winter, 2007; Johnson & Taliaferro, 2011). Despite the well-documented success of various ERSs, and the relative affordability thereof when compared to CBT or pharmaceutical options, however, rates of such referral in cases of mild to moderate depression are low (Callaghan et al., 2011).

The research reported in this paper stems from a high-definition investigation of the attitudes of a small number of General Practitioners in the North West (N=4), utilising Interpretative Phenomenological Analysis (Pringle, Drummond, McLafferty, & Hendry, 2011; Smith, Flowers, & Larkin, 2009) to reveal how such attitudes are embedded in first- and second-hand experience of ERSs, with a view to illuminating why progress toward their wider use remains slow in the locale.

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skills, impressions of impact level varied, largely on account of many school staff asserting that knowledge and skill levels were already well-developed. This paper, however, is primarily focused upon the manner in which respondents reported that - as a latent impact of the project - a new and mutually supportive culture regarding mental health had arisen within and between schools which incorporated school staff, mental health workers, parents and students. This led, in turn, to three tangible zones of confidence improvement: (a) enhanced confidence among school staff to use knowledge and skills, (b) enhanced confidence and self-esteem among students, and (c) boosted professional confidence among TaMHS staff with respect to activities such as training provision and small group work.
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