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A RETROSPECTIVE EVALUATION OF ASSESSMENT IN PHYSICAL EDUCATION

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ABSTRACT

Assessment and reporting in Health and Physical Education (HPE) continues to evoke debate and confusion amongst Physical Education (PE) professionals. There is genuine concern that without objective measurement and evaluation of student learning and achievement, PE programmes could be placed in a vulnerable position during times of programme review, budget cuts and school restructuring. This paper revisits some of the fundamental assessment issues in PE and suggests guidelines for teachers to consider. A review of past practices reveals little consensus regarding the educational outcomes that should be measured, the levels of attainment expected to achieve a particular achievement grade, what degree of improvement or skill level was reached, and how PE teachers could derive and report meaningful assessment of student outcomes. An increase in public awareness of education has further emphasised accountability in all areas, including PE and has reinforced the demand for valid student measurement, evaluation and overall assessment. The problems identified through this evaluation were a catalyst in the development of an outcomes-focused approach by the curriculum authorities in Western Australian schools.

Key words: Assessment; Reporting; Physical Education.

INTRODUCTION

The physical education (PE) profession has long experienced a dilemma in assessment and reporting of student performance. The adequacy or inadequacy of assessment procedures in PE is an issue that arises regularly, especially when linked with curriculum change. There is genuine concern that without objective measurement and evaluation of student learning and achievement, PE programmes could be placed in a vulnerable position during times of programme review, budget cuts and school restructuring (Lund, 1992; Almond & McGeorge, 1998). A retrospective look will enhance an understanding of the PE evaluation process. A review of past practices reveals little consensus regarding the educational outcomes that should be measured, the levels of attainment expected to achieve a particular achievement grade, what degree of improvement or skill level was reached, and how PE teachers could derive meaningful grades (Lashuk, 1984). The problems identified through this evaluation were a catalyst in the development of an outcomes focussed approach in some schools.

It is expected that physical educators should develop a range of assessment approaches (McConachie-Smith, 1993) which are valid, reliable and consistent with the educational philosophy of the day. Naturally, assessment should determine whether the goals of the

programme have been achieved (Matanin & Tannehill, 1994) and whether grades accurately reflect the students' levels of achievement (Lund, 1992) according to some performance based

criteria. This paper revisits some of the fundamental assessment issues in PE and suggests some guidelines for teachers to consider.

THE PE LEARNING AREA

The importance and benefit of sport, physical activity and recreation has been well documented (Biddle & Chatzisantris, 1999; Siedentop & Tannehill, 2000) and more specifically, the physical and emotional benefits to adolescents engaged in these pursuits (Taggart & Sharp, 1997). Sport and fitness education have historically been seen as 'the cornerstones of PE' (Taggart, 1988). Until recently, it was considered that the main goal of PE was simply to improve physical fitness (Lashuk, 1984), rhythmic and sport skills, and knowledge of physical activity (Heitmann, 1988; Matanin & Tannehill, 1994). By comparison, contemporary PE aims to produce well rounded students who are able to perform complex skills, make decisions, assume leadership tasks and have an understanding of the facets of game play.

Assessment, according to Browne (1998) has generally provided quantitative and qualitative data through a variety of subjective skills and fitness testing procedures. Effective learning has relied on a systematic process, which begins with the identification of learning goals and culminates with judgements as to the successful attainment of these goals. Assessment is essential to the teaching-learning experience and effective education process (Ebel, 1980; Safrit, 1986; Veal, 1988; Hensley *et al.*, 1989; Hensley, 1990). Moreover, it is seen to enhance levels of awareness, interest, motivation and self-esteem of PE students (Veal, 1992; Radford *et al.*, 1995). In addition, assessment encourages a professional approach by PE staff, assists students to understand their performances, enables greater parental understanding, and facilitates analysis of teacher effectiveness (Hensley *et al*., 1989). Students increase effort and remain on-task if held formally accountable for a grade (Matanin & Tannehill, 1994), while the evaluation and assessment generally provides evidence from which PE teachers can award grades fairly (Radford *et al*., 1995). In turn, this enables a revision of the teaching strategies employed, students become more aware of the course requirements, and the relationship between effort and results is enhanced (Veal, 1992; Radford *et al*., 1995). In order to effectively evaluate both student and teacher performance, desired outcomes in terms of specific objectives need clear definition (Hensley, 1990). Physical education teachers are charged with preparation of these objectives and are required to provide evidence of the extent to which they had been achieved (Wood & Safrit, 1990). However, Matanin and Tannehill (1994) considered that maximum student participation and enjoyment have been given priority over student assessment and evaluation.

THE PE ASSESSMENT PROCESS: A RETROSPECTIVE EVALUATION

Objective grading or evaluation has been defined as the process of assigning marks to students based on a formal assessment of changes in student behaviour (Imwold *et al*., 1982) and information gathered by measurement techniques to judge the effectiveness of the educational experience (Wooden, 1984). According to Veal (1988) formal assessment is a pre-planned technique that produced a written record of performance, knowledge or behaviour. While Hensley *et al*. (1989) believed that grading should be guided by the extent to which students meet the learning objectives, others (Wooden, 1984; Matanin & Tannehill, 1994) claimed that

an effective PE programme should encompass the three processes of formal assessment;

namely, systematic evaluation, objective grading and a measure of accountability. However, these three processes were seen to be practised infrequently in PE (Morrow, 1978; Imwold *et al*., 1982; Hensley *et al*., 1989). Generally it was agreed that most of the attributes used for grading purposes are difficult to evaluate objectively (Safrit, 1986; Hellinson, 1993).

Formal assessment is avoided in some schools. Indeed, some PE teachers have been criticised for 'getting-by' without formally evaluating students and expending minimal effort to produce the minimal grades and reports required by school administrators (Lund, 1992). Several school systems reported that it was common for PE grades to be based exclusively on attendance, uniform and subjective skills tests (Matthews, 1963; Coker, 1972; Morrow, 1973). Comportment, defined by Lashuk (1984) includes; attitude, contribution, dress, attendance, cooperation, effort, eagerness, enthusiasm, social skills, politeness, self-discipline, work habits and active participation. Lashuk (1984) reported that comportment accounted for the highest proportion (41%) of final PE grades when surveying metropolitan Canadian high schools. Wooden (1984) reported that the majority of teachers (59%) in North American high schools, based half of the PE grade on the students attendance, attitude and 'dressing out'; while the majority of schools indicated that skills and knowledge tests contributed to a third of the student grade. When examining public high school PE programmes, Hensley *et al*. (1989) found that 36% of teachers used subjective ratings to assess their students and that the primary determinant of a student's final grade was 'participation/effort.' Furthermore, the next most frequently mentioned attributes were attitude, skill, attendance and being in PE uniform (Hensley *et al*., 1989). Frazier and Holland (1991), whilst determining the factors which influenced PE high school assessment, noted that nearly all of the teachers surveyed used attendance in their grade determinations. Attendance contributed between 15% and 50% of the student's final grade. Teachers evaluated effort and sportsmanship for up to 30% of the final grade (Frazier & Holland, 1991).

Previously, teachers, students and parents relied on these subjective measures being translated into a single comment or grade as a method of reporting PE (Doyle, 1986). Matanin and Tannehill (1994) found that PE assessment in high schools (n=11) was generally subjective, and skills testing had little impact on student grades. Moreover, student grades were derived predominantly from active participation, knowledge and skill performance. Physical education teachers frequently made subjective determinations regarding student achievement; and whilst they were seen as being quite competent at using informal, observational assessment (Veal, 1992), others believed that the more objective and reliable the measure the more valid the student grade (Morrow, 1978; Hensley, *et al*., 1989). Morrow (1973) suggested that student achievement should not be based only on attributes such as participation, conduct, attitude or uniform – when clearly PE had a broader overview. Hensley *et al.* (1989) agreed and claimed that subjective evaluation diminished the value of any systematic grading. Moreover, as objectivity was seen by some as imperative, skills and fitness tests were undertaken to provide meaningful feedback to students, parents and teachers. In contrast, some students were evaluated on behavioural or marginal factors, rather than fitness or skill achievement (Cotten & Cotten, 1985; Kovar & Ermler, 1991). Matanin and Tannehill (1994) found that high participation rates and enjoyment of activities were more important for most PE teachers than assessment of student progress. This points to the fact that, many PE teachers were not sure of what assessment was required or how it was best achieved. A list of general principles and practice attributes that should and should not determine student grades (Table 1) were found in most PE measurement texts (Morrow, 1978).

TABLE 1. **PROPOSED PLAN FOR GRADING**

COMPONENTS	WEIGHTINGS	INSTRUMENTS
Attitude (in terms of Attendance, Punctuality, Uniform and Participation)	5% to 25%	Attendance and other records Teacher observation
Skills (in terms of Form in Execution of Skill, Standard of Performance and Application in Game Situation)	20% to 35%	Objective tests Teacher observations Student evaluation
Physical Fitness (with emphasis on Muscular Strength and Endurance, Cardiovascular-Respiratory Endurance, Agility and Flexibility)	20% to 35%	Objective tests Teacher observation
Knowledge and Appreciation (of Skills, Strategy, Rules and History and Terms)	5% to 25%	Written tests Teacher observation
Behaviour (in terms of Social Conduct and Health and safety Practices)	5% to 25%	Teacher observation Student evaluation

Reference: Adapted from Bucher, C.A. & Koenig, C.R. (1983). *Methods and materials for Secondary School PE (6th ed.)*. St. Louis, MO: C.V. Mosby.

Although the pursuit and improvement of sport skills was an objective of school PE, standardised skills tests were infrequently used by teachers (Frazier & Holland, 1991). More than 80% of teachers used non standardised sports skills tests which they had created, to assess students' physical abilities in PE (Hensley *et al*., 1989; Veal, 1992; Veal, 1993). Whilst these tests were criticised for lacking reliability and validity (Frazier & Holland, 1991), they did allow teachers to clearly observe the skill, were directly related to the way the skill was taught, and could be administered in a relatively short amount of time (Veal, 1992). Conversely, there were problems associated with their delivery. It was acknowledged that it was difficult to assess sport skills using this method because performance usually consisted of several skills, each of which may have been fundamentally different from each other (Hensley *et al.*, 1990). Most tests combined several sport skills into a single measure and rarely used sufficient trials to ensure consistency (Hensley *et al*., 1990). In general, skills tests were not adaptable or relevant to the class needs (Veal, 1993), nor were they valid or reliable. They were difficult to prepare and administer, and often did not simulate game or competition conditions (Strand & Wilson, 1993). Due to the time needed to set up, administer and score skills tests, PE teachers often evaluated students' skills by scanning class participants (Hensley *et al*., 1989). Western Australian high school Health and Physical Education (HPE) teachers ranked the observation of student sport skills as the most important attribute that contributed to a PE grade (Doyle, 1986), but others criticised this approach, because it could hurt the feelings of some students (Veal, 1993). Veal (1993) reasoned that skills tests would be unfair on the lower skilled students, although he suggested the use of some baseline measure, followed by regular and on-going progress checks to boost self-esteem and confidence, could overcome this problem. It was also claimed that highly skilled students did

not need extra points for improvement as they were awarded the higher grades anyway (Veal, 1993). Nearly half of the teaching population regularly used knowledge examinations and a majority (57%) developed their own measurement tests for student assessment (Hensley *et al.*, 1989).

TABLE 2. **PROBLEMS IDENTIFIED BY PE TEACHERS, WHICH RESTRICT THE USE OF FORMAL MEASUREMENT AND EVALUATION TESTS**

Problems	Author(s)
1. Large and overcrowded class sizes	Fabricius *et al.* (1967), Solley (1967), Morrow (1978), Wooden (1984), Hensley (1990), Hensley *et al.* (1990), Veal (1988; 1992; 1993)
2. Facilities make measurement of validity difficult	Morrow (1978), Hensley (1990)
3. Lack of equipment and facilities available for testing programmes	Morrow (1978), Hensley (1990)
4. Lack of adequate class time and preparation time to set up equipment for a measurement session	Solley (1967), Wooden (1984), Veal (1988), Hensley (1990)
5. Departmental regulations concerning the measurement techniques to be used within a school	Morrow (1978)
6. Programme emphasis based on participation rather than learning and achievement	Wooden (1984)
7. Importance of coaching rather than teaching in the PE programme	Morrow (1978)
8. Psychological peer pressure amongst PE staff	Morrow (1978)
9. A narrow and negative view of assessment	Veal (1988; 1992)
10. Lack of professional preparation to implement formal assessment procedures	Wooden (1984), Veal (1988; 1992)
11. Inconsistency of student performance from day to day	Veal (1988; 1992)
12. Performance tests examine skills out of context of the game and do not predict student's playing ability	Veal (1988; 1992; 1993)
13. Frequent grading periods	Solley (1967)
14. Numerous and distinctly different objectives to be evaluated	Solley (1967)
15. Existing measurement techniques and devices are too complicated	Solley (1967)
16. Concentration of evaluation periods at the end of sport units	Solley (1967)
17. Little or no assistance	Hensley (1990)

Additional problems reported by PE teachers, which restrict the use of formal measurement and evaluation tests, can be viewed in Table 2. Interestingly, there appeared to be a gap between the measurement and evaluation techniques recommended by pedagogists and those

actually used by PE teachers. However, pedagogues failed to give attention to practical problems encountered universally at the school level (Fabricius *et al*., 1967). Furthermore, Morrow (1978) found that students on teaching practice had little opportunity to use the measurement techniques they learned in their teacher training courses. The reasons given were that nothing in PE classes was measured, the supervisory teacher rarely used measurement techniques, the school used another system, and grades were determined by participation and dress (Morrow, 1978).

Verducci (1980) and Hedlund (1988) highlighted the importance of a coordinated alliance between pedagogues and PE practitioners to revise measurement tools and techniques. Verducci (1980) recommended rating scales whereby each student is graded on several occasions and the results averaged for the final evaluation. In addition, the author recommended that these rating scales need to:

i. Determine the specific skills and attributes to be evaluated.
ii. Identify characteristics that represent success for the performance being evaluated.
iii. Determine the levels of success or ability for each skill.
iv. Define each category or ability level in terms of observable behaviour.
v. Devise a form or system that allows the immediate recording of the rating of the observed behaviour (Verducci, 1980).

Verducci (1980) warned that the PE teacher must recognise the potential influence of physical appearance, personality and previous ratings of the student. Adequate time to observe each student and the use of more than one person to rate the student was also recommended. Pre-service teacher education and teacher professional development was considered important to show how grading and evaluation methods could be modified to achieve validity and reliability, and provide students with worthwhile feedback. But, as Morrow (1978) says, this must be linked to existing formats for effective integration.

While the goals and objectives of PE programmes should be reflected in the grading methods used (Seefeldt & Vogel, 1990), PE teachers claimed this often was not the case. Indeed, the texualised goals of physical fitness, skill, personal and social development did not underpin the assessment criteria. Doyle (1986) made a point of changing from a one line PE report, to one incorporating student normative data regarding fitness and skill levels. Accordingly, the more detailed report greatly minimised parental questions and raised interest at parent teacher nights (Doyle 1986). Such inconsistencies between goals and grading practices were reported to undermine the attempts made by physical educators to justify PE as a legitimate area of content in the K-12 curriculum (Seefeldt & Vogel, 1990).

Physical fitness was regarded by most PE staff as the second most important objective of a PE programme (Hedlund, 1988), but secondary school physical educators ranked high achievement in physical fitness as the lowest in priority (Hedlund, 1988). It should be noted that, although physical fitness was not considered an important objective in the schools, it was the most common category measured and tested by PE staff. Physical fitness testing has been the most frequently used formal measurement test in PE (Hensley, 1990). Fitness testing was seen to serve other purposes. These include motivation for the students to improve on their results, to monitor school nutritional and health trends, and to identify possible students who need assistance with their general fitness and diet. However, it was questioned that these

benefits were often not realised, as the results were usually not reported to the students or

parents (Doyle, 1986).

Although many teacher education programmes included units in evaluation and measurement techniques, and general skill and fitness tests, PE teachers were criticised for not using valid and reliable systematic assessment instruments (Lund, 1992). Lund (1992) attributed this to the material being too theoretical and teachers experiencing difficulty when translating "T" scores and correlations to relevant and practical information needed for 30+ students in 50 minutes. Teachers have found these methods and tests too restrictive, irrelevant and time consuming, but pedagogues at this time had not provided alternatives. Hensley (1990) identified the need for theorists and PE practitioners to work together and devise techniques that are simple and can be used with large numbers, while maintaining adequate standards for reliability, validity and objectivity. Wood and Safrit (1990) agreed, confirming the need for researchers to be involved at the 'coalface' to more fully grasp the needs and demands of PE teachers.

A PERCEIVED NEED FOR CHANGE

A raised public awareness of education has placed increasing emphasis on accountability in all areas, including PE (Hensley *et al*., 1989; Hensley, 1990; Frazier & Holland, 1991; Veal, 1992). Hence, there has been a rekindled demand for valid student measurement, evaluation and overall assessment (Hensley *et al*., 1989; Hensley, 1990; Wood & Safrit, 1990). This is especially so in the affective domain which often has used a hybrid of descriptive behaviours such as attitude and participation to form a grade. Matanin and Tannehill (1994) reported that PE teachers placed more value on programmes that are enjoyable, relaxed, recreation-oriented and subjectively evaluated. This type of PE programme does not provide any indication of what students have actually learned, nor does it generate feedback to teachers concerning their own performances and the effectiveness of their programmes (Matanin & Tannehill, 1994).

Browne (1998) summarised the PE assessment findings:

i. Students are generally not held accountable for learning in PE.
ii. Teachers are not held accountable for assessment in PE.
iii. PE assessment is rarely 'game-authenticated' through games.

Gibbons and Bressan (1991) suggested that learning outcomes, as defined in performance terms, could be the lenses through which instructional objectives were viewed. Using the unique features of the school and local community, they suggested that teachers should develop their own list of outcomes. However, in doing so, they should consider the areas of application of thinking skills, attitudes and interests, appreciation and adjustment to the environment, as well the traditional cognitive and psychomotor outcomes. Furthermore, Melograno (1994) suggested that whilst assisting schools to define curriculum intent with greater clarity, student outcomes would allow the communication of student progress and provide a focus for teacher assessment of student performance. Demonstrating student achievement through a PE programme based on outcomes is also integral to the justification and evaluation of any educational programme (Matanin & Tannehill, 1994).

The assessment problems stated in this overview, were among the primary reasons why there is a global tendency towards an outcomes based approach to teaching and assessment. The

Western Australian Curriculum Framework is one such example. It is a holistic and integrated package, which emphasises the knowing, evaluating, participation in and determination of

one's sense and level of well being. The rationale demands the coordination and cross-curricular interaction of individual teachers, departments and the school policy/curricular administrators. It is defined by five major outcomes; Knowledge and Understanding, Attitudes and Values, Skills for Physical Activity, Self-Management Skills and Interpersonal Skills (Curriculum Council, 1998). The diversity of the framework by nature suggests a complexity of assessment and evaluation procedures.

Physical activity has always been, and must remain, an integral part of the curriculum in every school system. However, physical educators must adapt to changing values and needs of society. The high technology/sedentary society into which we are being thrust, demands that students have appropriately sequential, generic PE knowledge and skills to provide the cornerstone of an active, vibrant and healthy lifestyle. Appropriate evaluation and monitoring of progress in PE is as important as it is with the commonly regarded generic skills of literacy, numeracy and communication.

Anecdotal reaction to the framework is not all positive; indeed, to determine the relative acquisition of all of the knowledge, skills, attitudes and values as defined by the outcomes appears demanding, if not impractical. The next phase is to measure the same parameters under an outcomes approach and compare the results with the findings of this review. Then it will be possible to evaluate whether an outcomes approach resolves any of the above mentioned fundamental problems expressed by PE teachers. The consistent use of valid, reliable assessment and grading techniques is important, as it helps describe and enhance student achievement in PE (Matanin & Tannehill, 1994). It will also strengthen the philosophical basis and delivery of PE, particularly in times of budget cuts and school restructuring. Currently, schools are under ever-increasing demand for curriculum time and, at a time of high public awareness of the values of physical activity, fitness and healthy lifestyles, school PE programmes must equip students with these values and skills, and be able to demonstrate successful achievement objectively.

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COMPLIANCE WITH BEST PRACTICE GOVERNANCE PRINCIPLES OF SOUTH AFRICAN SPORT FEDERATIONS

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ABSTRACT

The heightened interest in sport shown by politicians, legislators, sponsors and government carries with it an inherent demand to justify long-term sustainability as well as compliance with best-practice corporate governance principles. A questionnaire based on the seven pillars of good corporate governance identified in the King II Report (Institute of Directors, 2002) was administered to the universum (n=90) of South African sport federations registered with the South African Sports Commission with the aim of measuring the compliance of these federations with the principles of good corporate governance on a five-point Likert scale. Results indicated an overall mean compliance score ($\bar{x}$) of 3.77 (maximum of 5.00) with the pillars of good corporate governance but a further detailed analysis of all 83 statements in the questionnaire revealed areas of serious concern regarding the sub-elements of accountability, transparency, social responsibility, independence, fairness and discipline.

Key words: Corporate governance; Pillars of good corporate governance; Compliance; Best-practice governance principles.

INTRODUCTION

The era of professional sport participation and governance has dawned in South African sport. The increased global and local attention sport receives from politicians, legislators, sponsors and government reflects a growing recognition of the importance of sport and the impact it has on society, culture, the economy and politics. This heightened interest, however, carries with it an inherent demand to justify long-term sustainability as well as show the ability to self-regulate (Burger, 2004). The ability to self-regulate is vested in an organisation's compliance with best-practice corporate governance principles. Corporate governance principles as well as their relevance to the sport industry have been debated and justified extensively in literature (Australian Sports Commission, 1999; Reed, 2000; Gaved, 2001; Governance in Sport Working Group, 2001; Rauter, 2001; Institute of Directors, 2002; Naidoo, 2002; Rossouw *et al*., 2003; Wilkinson, 2003; Burger, 2004).

PROBLEM STATEMENT AND AIMS

The sport industry and especially its governing bodies need guidelines for proper governance and self-regulation due to the increased interest in and [economic] impact of sport. The corporatisation of sport and increased professionalism have brought a need for proper business management and governance models within the sport industry (Australian Sports Commission, 1999). Common business practices constitute an inherent part of modern day sport due to employment and sponsorship contracts, financial audits, taxation and equity regulations as well as enhanced stakeholder activism. Enhanced stakeholder activism puts pressure on the principle of self-regulation. Unless sport governing bodies can demonstrate an ability to competently and responsibly govern themselves, they run the risk of the legislature issuing legislation that might contain a number of expensive and even cumbersome

requirements that will have to be adhered to. South African sport federations' responsibility to enforce and comply with good governance principles has already been emphasised by national government in 2001 (Balfour, 2001). It does, however, seem as if South African sport federations are not yet satisfactorily complying with the best-practice of corporate governance if scandals, conflicts and crises within South African sport (e.g. Boxing, Cricket, Rugby, Softball and Soccer) are taken as benchmarks (Burger, 2004). The aims of this study are therefore to determine the level of compliance with King II's (Institute of Directors, 2002) seven pillars of good corporate governance (best-practices) by South African sport governing bodies and if found lacking to propose recommendations for implementation by national sport federations to achieve optimum levels of compliance with principles of best-practice governance.

RESEARCH METHODOLOGY

Research instrument

A questionnaire based on the seven pillars of good governance as identified in the King II Report on Corporate Governance for South Africa (Institute of Directors, 2002; Naidoo, 2002; PricewaterhouseCoopers, 2003; Rossouw *et al*., 2003; Wilkinson, 2003) as well as the sport governance principles developed by the Governance in Sport Working Group (2001) was jointly developed by the University of Pretoria's Centres for Leisure Studies and Business and Professional Ethics. The initial questionnaire consisted of 13 biographical questions pertaining to the national federations as well as 83 statements measuring compliance levels with the 18 sub-elements of the seven pillars of good governance (refer to Table 1) on a five-point Likert scale with 1 being strong disagreement and 5 strong agreement. A high mean score (maximum=5) would thus indicate high levels of adherence whilst lower scores (minimum=1) would suggest low levels of adherence. The South African Sports Commission and Sport and Recreation South Africa endorsed the questionnaire. After a pilot study was done at a biennial general meeting of a national sport federation, the second part of the final questionnaire was adapted to 83 statements. Table 1 presents the distribution of the statements (n=83) over the 18 sub-elements of the pillars of good governance (Burger, 2004).

Scope of the research

This study is limited to South African national sport federations as defined in the Sports Commission Act 109 of 1998 section 1(x) (South Africa, 1998). National, zonal and local regulatory and macro-bodies overseeing the activities and actions of other sports bodies under their auspices such as the South African Sports Commission, South African Commonwealth Games Association (SACGA), United School Sports Association of South Africa (USSASA), South African Student Sports Union (SASSU), Masters Games Association of South Africa (MGASA) and the National Olympic Committee of South Africa (NOCSA) are excluded.

Disability Sport South Africa (DISSA) is, however, included as the South African Sports Commission considers it a national sport federation.

TABLE 1. **PILLARS, SUB-ELEMENTS AND ASSESSMENT STATEMENTS**

PILLAR OF GOOD GOVERNANCE	SUB-ELEMENT	NUMBER OF STATEMENTS MEASURING THE SUB-ELEMENTS
Accountability	Accountability of board members	4
	Organisational structure, responsibility and accountability	3
Responsibility	Delineation of responsibilities and roles of board members	4
	Recourse measures and organisational structure	4
Transparency	Transparent disclosure of information	5
	Transparent communication system	6
	Website existence and efficacy	3
Social Responsibility	Social responsiveness	8
	Recognition of broad stakeholder interests	4
Independence	Decisions and actions free from outside influence	5
	Objectivity of decisions	4
	Decision and appeals procedure	7
	Handling of conflicting interests	4
Fairness	Fairness in representation on board	5
	Democracy, elections and appointment procedures	10
	Solidarity with stakeholders	2
Discipline	Disciplined commitment to governance	4
	Ethics policy	1
		n=83

Research sample

Questionnaires were distributed to the universum of registered national sport federations (*n*=90). A response rate of 23.33% (*n*=21) federations and 36 questionnaires was obtained making the results valid (Thomas & Nelson, 1996). National sport federations could complete more than one questionnaire. Unresponsive federations were reminded by electronic mail but this yielded no further completed questionnaires.

Statistical interpretation of results

Descriptive statistics were used to interpret data and mean scores and frequencies for each pillar of good corporate governance were calculated.

RESULTS AND DISCUSSION

Respondent profile

The majority (44.44%) of respondents were members of the sport federation's executive or management board followed by full-time employees (33.33%). Ordinary members (registered coaches, officials, participants and trainers) constituted 16.67% and part-time employees 5.56% of the respondent profile. The average number of members per respondent federation amounted to 52 964.71 in a membership band between 300 and 700 000 whilst the average number of regional associations per national federation amounts to 10.62 within a band of 0-30. The mean governing board size of the respondent federations was 10.29 in a band between 4 and 25. The majority of the respondent federations (23.81%) indicated an executive board size of between five and seven members which is in accordance with the suggestions of Rauter (2001) on efficient governing board size.

Pillars of good governance

A key aspect of best-practice governance is adherence to the pillars of good governance (Institute of Directors, 2002; Naidoo, 2002; PricewaterhouseCoopers, 2003; Rossouw *et al.*, 2003; Wilkinson, 2003). Table 2 presents a summarised overview of the mean values ($\bar{x}$) of compliance for sub-elements, pillars of governance and the overall frequency (%) of non-adherence to good governance. It does not fall within the limited length of this article to present the mean value for each of the 83 statements but detailed results of each of the 83 statements are given in Burger (2004).

Accountability

From Table 2 it seems as if sport federations adequately ($\bar{x}$ =3.96) comply with the overall pillar of accountability, yet the detailed recorded responses indicate that in 16.67% of cases management of federations does not assume accountability for failed actions. Non-compliance with accountability was perceived as resulting from unclear lines of accountability, blame-shifting, not assuming accountability for financial success or failure, lack of formal hierarchical structures for accountability and management failing to answer queries as a result of shifting or negating accountability. Although the non-compliance rate (16.86%) seems low, authors (Van Heerden, 2001; Naidoo, 2002; PricewaterhouseCoopers, 2003) warn seriously against the cascading impact of even the slightest level of non-compliance in this regard. Providers of funds are placing ever-higher emphasis on the responsible and accountable management of funds. Adherence to the benchmarks of accountability is imperative to help reduce potential liability and limit future risks, elements that form the basis of long-term sustainability and good governance.

Transparency

From the results in Table 2, it can be concluded that the measure in which management makes appropriate information available in a candid, accurate and timely manner (transparency) is perceived to be inadequate in 18.00% of the recorded responses. Failure to disclose information hampers a federation's ability to attract outside funding (Van Heerden, 2001). Respondents have indicated that 22.86% of all information is not disclosed to members as it is deemed confidential. Even though sports federations are traditionally membership associations with a composition different to that of commercial enterprises (Gaved, 2001) and there is always a need for confidentiality, this non-compliance rate is worrying given that membership associations are owned and indirectly governed by members through a system of representation. This implies a right to be informed on all matters. Communication is a key element in establishing legitimacy for a governing body (Gaved, 2001; Rauter, 2001). Direct and open communication systems were perceived as lacking in 17.14% of responses. Website

efficacy is regarded as an indicator of transparency (Governance in Sport Working Group, 2001). The detailed analysis of the results obtained in this sub-element (Burger, 2004) indicated that information relating to federation finances and management matters was available in 54.54% of cases and that in 50.01% of the responses was information pertaining to day-to-day managerial matters available on the website. When the latter results are interpreted in conjunction with the reported 75.00% of regularly updated-websites, it seems as if federations are failing to include information relevant to the requirements of the principle of transparency.

Responsibility

The overall mean ($\bar{x}$ =3.74) recorded for adherence to responsibility is lower than the recorded value for accountability. This finding was anticipated given the non-compliance rate of accountability and the causal relationship between accountability and responsibility (Naidoo, 2002). The detail analysis of each of the sub-elements of responsibility revealed that the formalisation of roles and responsibilities of governing bodies was lacking (20.00%), inadequate organisational structures (22.86%), missing contingency plans (20.00%) and selected responsibility towards member groups (20.00%). Inadequacies pertaining to responsibility would obviously impact negatively on governing bodies' willingness and ability to institute actions to realign with chosen strategic courses (Institute of Directors, 2002; Naidoo, 2002). Table 2 recorded an overall non-compliance of 20.22% with the governance principle of responsibility. This finding implies that, in the event of mismanagement, members of the federation have limited recourse to ensure the future sustainability of the federation (Rauter, 2001; Rossouw *et al*., 2003). It is imperative that the physical structuring of the governing body allows for the institution of corrective actions as well as penalisation of mismanagement (Naidoo, 2002). The perceived inadequate organisational structures, selected responsibility towards member groups and missing contingency plans should therefore be areas of concern for sport governing bodies.

Social responsibility

A socially-responsive and responsible national sport federation is perceived to be non-discriminatory and non-exploitative with regard to environmental, social and human rights issues (Post *et al*., 2002). Respondents indicated that 20.00% of respondent federations are perceived not to have a well-defined view of their social responsibility. Failure to deal with

issues of social responsibility will have economic and financial implications (Institute of Directors, 2002; Ward *et al*., 2002) but results (Burger, 2004) nevertheless indicate that federations are oblivious of this reality given that 25.71% of respondents do not believe that human rights and environmental issues (as sub-elements of social responsibility) may impact on the sport federation economically.

TABLE 2. **MEAN VALUES FOR SUB-ELEMENTS AND PILLARS OF GOOD CORPORATE GOVERNANCE (*N*=36)**

PILLAR OF GOOD GOVER-NANCE	SUB-ELEMENT	MEAN ($\bar{x}$) FOR EACH SUB-ELEMENT	MEAN ($\bar{x}$) FOR EACH PILLAR	NON-ADHER-ENCE %
Accountability	Accountability of board members	3.91		

	Organisational structure, responsibility and accountability	4.02	3.96	16.86
Responsibility	Delineation of responsibilities and roles of board members	3.66		
	Recourse measures and organisational structure	3.82	3.74	20.22
Transparency	Transparency of policy statements	3.92		
	Transparent communication system	3.86	3.84	18.00
	Website existence and efficacy	3.66		
Social Responsibility	Social responsiveness	3.84		
	Recognition of broad stakeholder interests	4.03	3.91	19.48
Independence	Decisions and actions free from outside influence	3.81		
	Objectivity of decisions	3.81	3.72	22.78
	Decision and appeals procedure	3.69		
	Handling of conflicting interests	3.56		
Fairness	Fairness in representation on board	3.75		
	Democracy, elections and appointment procedures	3.51	3.65	27.06
	Solidarity with stakeholders	4.06		
Discipline	Disciplined commitment to governance	4.15	3.54	14.72
	Ethics policy	2.93		

Independence

Independence is measured in terms of four sub-elements: freedom from outside influences, objectivity of decision-making, independence of decisions and appeals and conflict handling procedures. Results indicate that in 27.78% of cases, situations arise in respondent federations where conflict of interests occurs as a result of outside influences (Burger, 2004). Outside influences may manifest themselves in political demands sponsors' requirements, media rights, broadcasting scheduling, affirmative action guidelines, human rights and even environmental demands. The National Sport and Recreation Act 110 of 1998 (South Africa, 1998) prescribes the inclusion of conflict resolution measures in the constituencies of sports federations yet 22.86% of respondents perceived such measures as being totally absent, 22.22% not readily accessible and 25.00% as insufficient (Burger, 2004). These results would undoubtedly impact on the objectivity and fairness of decisions as well as the overall credibility and legitimacy of sport governing bodies. An overall non-compliance rate of 22.22% regarding independence should be another area of concern as insufficient independence results in decreasing trust (Australian Sports Commission, 1999; Governance in Sport Working Group, 2001; Rossouw *et al*., 2003).

Fairness

An overall mean value of $\bar{x}$ =3.65 was recorded for compliance with fairness as pillar of good governance. From Table 2 it is also evident that the non-compliance rate of 27.06% is the highest in comparison with the other pillars of good governance. Fairness, as reflected in

equitable treatment of all stakeholders, was not perceived in 44.12% of the responses. The ongoing debates and controversies regarding quota systems in South African sport are probably the visible justification of this finding. The dilemma of outside political influence on team selections thus seems to contradict the principle of fairness. According to the Australian Sports Commission (1999) a sport governing body's board has a moral obligation to consider all matters on the basis of equity and transparency and in the interests of the sport as a whole and not given preference to any one or more stakeholder groups. The Governance of Sport Conference Report (Governance in Sport Working Group, 2001) has stressed that no ambiguity should exist in terms of voting rights and eligibility of members. Members should elect to office their choice of representatives by means of democratic election. Yet results (Burger, 2004) indicated that in 31.43% of the recorded responses details of nominated individuals were not disclosed in a transparent and timely manner. Similarly 42.86% of respondents perceived irregularities in the election procedures since vetting processes to assess the accuracy of the *curriculum vitae* of nominated individuals were absent. This might lead to situations where skills, abilities and qualifications to fulfil the necessary functions cannot be validated in a transparent and independent manner. The findings also indicated that the serving term of board members is fixed in only 42.85% of the cases and that only 25.71% of federations have documented the duration of the serving term, in contradiction to the guidelines proposed by the Governance in Sport Working Group (2001) which contends that all governing positions must be subject to a fixed term of office which the relevant period should be set out in writing, Non-adherence to these guidelines ultimately impacts on the validity and fairness of elections.

Discipline

Discipline implies the continuous commitment by management to adhere to all principles of good governance (Australian Sports Commission, 1999; Kikulis, 2000; DiPiazza, 2002; Institute of Directors, 2002). The detailed analysis of the respective sub-elements of discipline indicates that 13.89% of sport federations are not committed to the principles of good governance and 20.15% of federations do not consistently enforce good governance (Burger, 2004). If management does not continually promote and advocate good governance principles, it is reasonable to expect less than acceptable levels of best-practice governance. It was further recorded that 55.56% of respondents were aware of the existence of an ethics policy. Unfamiliarity with such a document might indicate either a lack of enforcement of guidelines or principles contained in such a document or an overall lack of adherence to established and/or required guidelines of ethical behaviour throughout the organisation. This might, in turn, manifest in insufficient promotion of principles contained in such a document or alternatively a complete absence of such a document. Non-adherence to or non-existence of an ethics policy might be the first step towards unfair and discriminatory practices as well as decreased social responsibility. It is evident that sport lags behind the corporate business environment where 75.00% of corporate companies adhere to the requirement of a documented ethics policy (Brand, 2003). Disciplined commitment to the principles of good governance is also influenced by the size of the governing board (Rauter, 2001). Results indicate that 71.43% of sport governing bodies exceed the size of five to seven recommended by Rauter (2001). Board sizes in excess of seven members may result in a "lost board" situation that impacts on the decision-making efficiency of the said board (Rauter, 2001: 3).

CONCLUSIONS AND RECOMMENDATIONS

Given the results discussed above, it can be argued that South African sport still has some way

to go before being regarded as fully compliant with the principles of good corporate governance and the needs of modern day professional sport. The plethora of controversies, debacles and sagas in South African sport (e.g. selection procedure for national rugby coach, accusations of racism in rugby, the Hansie Cronje investigation in cricket, political involvement and prescriptions in team selections, suspension of national soccer coach, controversies in NOCSA, fraud charges and subsequent convictions of boxing officials) are symptomatic of insufficient adherence to the principles of good corporate governance. A combined overall compliance rate of 3.77 for all seven pillars of good governance might seem satisfactory at first glance. However, the possible biased influence of members of executive or management boards (as formulators and implementers of good governance principles) on the mean value of each pillar must be noted as 44.44% of respondents could be classified in that group. When, however, it is taken into account that 75.00% of South African sport federations demonstrate best-practice corporate governance, it becomes evident that, if South African sport wants to claim professionalism and credibility in the business environment, it will have to take pro-active and dedicated action to ensure that the principles of flexibility and self-regulation remain unchallenged and the principles of best-practice corporate governance are instilled. Sport governing bodies are subject to increasing levels of performance scrutiny. In responding to these challenges, the following definite areas of governance improvement must be addressed:

Not all sport governing bodies share the same business model or governance structure and the adoption of one single model is not feasible. However the need to conform to a structure that allows for the clear delineation of accountability and responsibilities of the respective office bearers is non-negotiable irrespective of the business model or physical structuring of the sport governing body. For the sake of clarity in accountability and duty, this structure should be clearly documented and disclosed to all members and legitimate stakeholders. Doing so lessens the possibility of overlapping and gaps in power and accountability as well as responsibility abdication by members of management.

There should be a clear separation of powers and duties between the governing role and the managing role of the governing body.

Governing board size and available positions on the board should be based on skills and not on representation. Through a democratic, fair and transparent process, sports federations should have access to individuals with skills best suited to the strategic intent of the organisation so as to ensure long-term sustainable profitability and growth and appointments should not be based on a system of representativity. The board should, of course, be broadly reflective of its key stakeholders but not at the expense of board skills mix. When members do represent a constituency they must never allow representation to become advocacy at the expense of the organisation as a whole.

Members of the governing body should serve according to a staggered rotation system with a maximum serving term to ensure board renewal whilst retaining corporate memory.

The ultimate power to govern a sport federation is vested within, and directly or indirectly exercised through a system of representation by members of the sport federation. In theory elected members are the representatives of the members decided upon through majority vote. To ensure that this remains true, elections and election procedures must be free and fair. There should be no ambiguity in terms of nominating procedures, voting rights and eligibility of members.

All sport federations should give immediate attention to codes of ethics. Such codes

should clearly address two main areas of concern namely managerial mischief (illegal, unethical or questionable practices) and moral mazes (daily ethical dilemmas with regard to corruption, bribery, dishonesty, potential conflicts of interest, wrongful use of resources, mismanagement of contracts and agreements of financial interest).

Independent, rotating external auditors are cardinal to good corporate governance.

Given the uniqueness of sport, and even more so the unique composition and situational factors presented to each individual sport governing body, it is not possible to build a single uniform model of best-practice governance. Sport and its constituents must, however, assume the responsibility to adhere pro-actively to higher levels of compliance through the development of governance systems and structures based on the pillars of best-practice governance.

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INFLUENCES ON THE SOCIALISATION OF SOUTH AFRICAN ELITE ATHLETES

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ABSTRACT

Within the different phases of being socialised into the formation of an athletic identity, socialisation agents (including the 'self') make significant contributions. A self-constructed questionnaire was completed by 123 South African elite athletes who competed in the 8th All Africa Games in Abuja (2003). They represented 17 different sports codes, the majority (n=74, 60%) of which competed in team sports and 49 (40%) competed in individual sports. The gender composition of the sample consists of 69 (56%) men and 54 (44%) women. The findings reflect the shifting nature and dominant role of significant others as socialising agents, the influence of

environmental factors, and socio-cultural and economic aspects. The social worlds and career paths of elite athletes is further constructed through ideological and subjective schemes, which translate into needs and perceptions that should be understood and addressed in the development of elite athletes in the South African context.

Key words: Elite athlete; Socialisation; Sport; South Africa.

INTRODUCTION

Through identity formation as an integral part in the socialisation process, athletes consciously and unconsciously acquire a set of dispositions that orientate them towards a particular understanding and interpretation of the role that they are fulfilling in their social world (Vaugrand, 2001; Schinkel & Tacq, 2004). Career orientation and pathes of an elite athlete is constructed by the socialisation process in which socialisation agents (significant others), socio-cultural influences, the 'self' and the environment have significant roles to play (Stevenson, 1990; Phillips, 1993). On the one hand the athlete is acquiring the role and identity of being acknowledged as 'an athlete' and on the other hand he/she is actively involved through meaningful interaction in the socialisation process.

An individual is thus reciprocally involved in the socialisation process as Coakley (2003: 98) explains: "socialisation is an active process of learning and social development, which occurs as we interact with one another and become acquianted with the social world in which we live". The interaction between athlete and socialising agent changes over time as is evident in the different phases of becoming involved. First, individuals are introdued to sports participation. Then they experience a deepening involvement, and become entangled and committed until the athletic identity is internalised (Prus & Irini, 1980; Salema, 1994). Desocialisation entails the phase of becoming disengaged in the particular role and includes the formation of a new identity, namely that of ex-participant in terms of elite participation in athletics.

Bandura's social learning theory demonstrates the effect of identity formation and learning through the observation of models as represented by significant others (parents, family members, the coach, peers or team members) (Stroot, 2002). Within the cognitive development theory, Brustad (1992) discusses the influence of parental socialisation patterns on children's self-perception and orientation towards achievement. Identity formation and the creation and confirmation of the role identities of elite athletes are substantially 'sponsored' by significant others (parents, peers, siblings and coaches) (Stevenson, 1990; Kohl, 2000). Family members, especially the father or same-sex older siblings (Raudsepp & Viira, 2000), seem to exert the strongest influence on athletes under the age of 14, whereas the influences of peers seem to dominate during later adolescence (Nowacki, 2000).

Two major influences that contribute to athletes' pursuing an athletic career are, according to Stevenson (1990), success and positive support from significant others. Success in youth sport is rewarded and recognised, and thus impacts on the creation of a positive self-image – a condition that is internalised and reaffirmed through continued participation, positive experiences and recognition from others (parents, coaches, peers and external agents).

Parents' own involvement (Melnick *et al.*, 1981), socio-economic status and urban locality (Maksimenko & Baruschimana, 1978) as well as their educational level (especially the mother's) (Givi, 1984) are conducive to the successful introduction and sustained involvement

of children in competitive sport. Other factors such as the birth order also impact on the social worlds of athletes in the sense that first borns are relatively more dependent on the parents as socialising agents, whereas later borns are relatively more dependent on older siblings for support in their sporting roles (Ebihara *et al.*, 1983). Reseach findings also indicate dependency on siblings for support and social influence in sports participation among ethnic minorities from relatively poor socio-economic backgrounds (Phillips, 1993).

Moderate pressure from significant others (parents and coaches) to compete successfully and pursue a sporting career is perceived relatively positively by athletes in early adolescence. Over-involvement and unrealistic expectations may result in a 'reversed-dependency trap', where the self-worth of the adult (parent and/or coach) depends on the sporting success of the child (Coakley, 1993; Wiersma, 2000). Managing the competitive career of athletes requires special guidance, encouragement and coaching. Coaches treasure the socialisation aspect of the athlete-coach relationship and are aware of its shaping the lives of young athletes (Goncalves, 1996). The competitive emphasis, lack of enjoyment and coaching style are main contributing factors to early retirement from competitive sports participation (Greendorfer, 1986). Parents mainly transmit the orientation and ideology of upward social mobility through successful sports participation to children. The strife for fame and social recognition is often over-emphasized by parents and not equally shared by the athlete (Oliver, 1980). Especially in the poorer sections of society, this is an important consideration for motivating children to follow a career in sport (Harris, 1994).

Successful athletes indentified the encouragement of peers as very important in motivating them to continue competitive participation in sport (Stevenson, 1990). Young athletes around the age of 15 who are increasingly 'entangled' in sport establish frienships with co-players and are thus influenced by other athletes (peers within the athletic fraternity) (MacPhail *et al.*, 2003). As young as age five, children seem to be ready to develop loyalties towards a team (James, 2001). Social identity formation, team cohesion and shared commitment are strong motivators for social bonding in team sport during the phase of 'deepening commitment' (Prus & Irini, 1980).

Environmental factors that are of significance include favourable geographic conditions such as the availability of the sea for surfing. Access to expert coaching and economic factors impact on athletes' opportunities to excel in 'expensive' sports such as golf, rowing or equestrian sport. The availability of facilities, coaching and competition can be translated into opportunities that are perceived to be a 'cause' determining the level of participation and success in sport (Phillips, 1993). In addition to opportunity, Carlson (1993) identified the importance of a favourable sports culture, club environment (support and positive long-term athlete-coach relationship) and multi-sport involvement during childhood for the success of national athletes in Sweden. Lee *et al*. (1990) reported the influence of similar socio-environmental factors in their study of Korean medallists in the 1988 Seoul Olympic Games.

Broad cultural influences conductive to promoting sport and developing sporting talent are essential in the creation of a sporting culture and role models who provide norms, values and a frame of reference for developing athletes (Phillips, 1993). Awareness of a sports culture (Lankford *et al*., 2000) and the role of the school and community in facilitating such norms and values (Ikhioya, 1999) are directly linked to socialising athletes into the 'sport ethic' and the role of being an athlete (Figler & Whitaker, 1995).

Ideological and structural barriers inherent in different societies result in discriminatory practices. Sponsorship-driven or commercial sports and social stratification based on age, gender and/or race may negatively affect continued sports participation (Bruening, 2000). Part of broader socio-cultural influences is the role that role models and the media play in motivating athletes to follow an athletic pathway (Coakley, 2003). Research by Maccobny (1959) illustrates the fact that the impact of role models as an influence on children's choices to follow a sport career is directly related to the intensity of the relationship with the person (athlete) being socialised. More recent research by Phillips (1993) confirms this reality and illustrates the need for personal involvement and contact to utilize role models as potential socialising agents.

Probably the most significant influence on the identity formation of the athlete and central to the construction and understanding of his/her social world (life style and associated mindset) is the 'self', which includes the inherent interpretation of the atheletic identity, role, success and aspirations of the individual (Johansson, 1992; Coakley, 2003). It is the athlete's personal goals and perception of potential and success that inform the athletic identity, which impacts positively on the continuation of a sporting career (Balague, 1999; Stroot, 2002).

The following model has been developed by the author and is based on the changing nature of dominant influences of social agents and the integration of the ideology and experiences of athletes across the different socialisation phases – from the initial phase of being introduced to a sport until the 'self' features predominate in the athletic identity and sport has become an obligation.

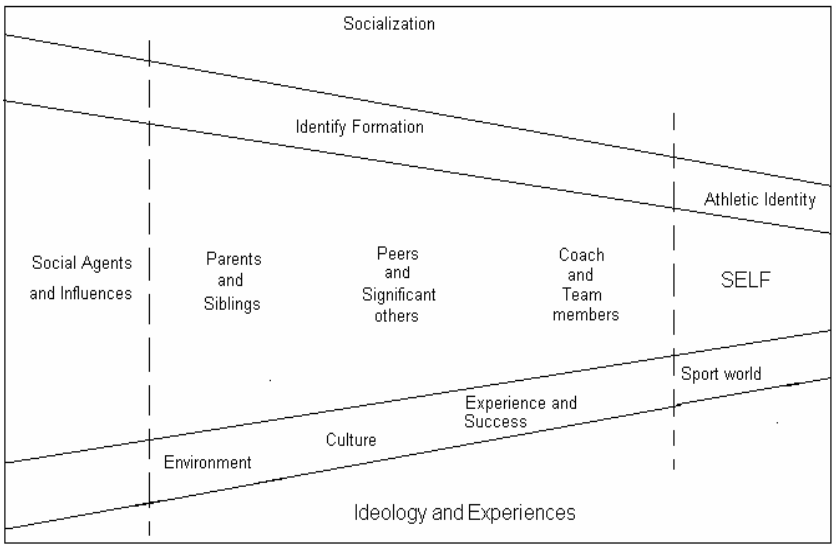

FIGURE 1. **ATHLETIC IDENTITY SOCIALISATION MODEL**

As sport takes place within the context of society's significant symbols, it influences the athlete's self-perception, self-esteem and self-worth of being identified (social recognition) and self-identification (self-recognition) as an elite athlete (athletic identity) (Weiss, 2001). The athletic identity is an integral part of an athlete (in the 'obligation phase') in that the 'persona' is built around the athletic accomplishments of the individual. Major 'ego adjustments' of such athletes are required on retirement from active competition (Blinde &

Greendorfer, 1985).

The aim of this paper is to reflect on the socialisation process and career pathways of South African elite athletes who took part in the 8th All Africa Games in Abuja in 2003, which represents the core of the South African sporting talent. Understanding the sporting world and athletic identity (through the eyes of the athletes), stakeholders could be informed to optimalize circumstances and influences for the humane and successful development of sporting careers – as athletes - or offer alternative career pathways.

METHOD

A total of 123 South African athletes who competed in the 2003 All Africa Games held in Abuja completed a questionnaire, which was initially developed in 1999 to determine the psycho-social profiles of elite athletes who competed in the 7th All Africa Games (Burnett, 2003). The latter research included extensive qualitative data which could be utilised for analysis. Interviews was however not possible in this research as the researcher was not allowed entry into the athletes' villiage in Abudja and as the questionnaires was anonymously completed, no follow-up interviews were possible. 'Open categories' in previous research were developed as 'closed' ones based on the responses provided by 343 African athletes who previously completed the questionnaire.

Researchers were restricted and only allowed to approach athletes at the competition venues. The cooperation of coaches and managers was elicited and the majority of athletes answered the questionnaire during more convenient times at the Athletes' Villiage or back in their countries, in which case the questionnaires were to be posted by the manager. This resulted in a relatively low return rate of return of 53.5% (123 out of 230).

The sample of the athletes represented athletes from 17 (74%) of the sports codes offered at the All Africa Games. A relatively higher representation was represented of athletes from team sports (n=74, 60%), compared to athletes who competed in individual sports (n=49, 40%). The gender composition was representative of the larger population as 69 (56%) were men and 54 (44%) were women. Participation in the research was voluntary and the researcher had no control on the selection of the sample and thus not on providing for representation in various aspects.

RESULTS

The majority of athletes were from an urban *environment* (n=97, 79%) where they had access to relatively superior resources such as expert coaching, better quality facilities, transport and training opportunities as compared to their rural counterparts who made up 21% (n=26) of the sample. This corresponds to the findings of Maksimenko and Baruschimana (1978), Lee *et al.* (1990) and Phillips (1993).

The athletes identified themselves as representing all four major racial and/or ethnic groups in South Africa. The majority (79, 64%) considered themselves to be from minority groups reasoning mainly from the persepective of number representation (n=84) and/or racial representation (n=49), having access to political power (n=23) or economic resources (n=9) or a dominant religious affiliation (n=10). A similar rationale was presented in Burnett's (2003) study.

An elite athletic career is often glorified and highlighted in terms of the lucrative contracts and/or earnings ('fortune') or relative stardom ('fame') and social status of the athletes, yet the downside and hardships seldom receive the same exposure. Inherent in the social worlds of athletes are the discrimination, degradation and abuse they suffer in their sporting careers. *Discriminatory experiences* link mainly to the relative 'low status' of their sport (compared to better resourced professional sports) (n=60); their amateur status (n=39); racial (n=23), gender (n=33) and 'majority group' (n=20); or 'political discrimiation' (n=11). Racial stacking patterns (Coackley, 2003) and gender discrimination (Bruening, 2000) are well documented in literature.

Socio-political-based discrimination is further evident in perceived discriminatory practices being reported by athletes such as not being from the 'right' club (n=15), or being either too 'young' (n=15) or too 'old' (n=13). Athletes who are too outspoken also experience that they are discriminated against due to their 'personalities' (n=13). Several athletes (n=5) indicated that they had experienced 'sexual harassment' in their sporting careers, which also relates to the relative powerlessness and vulnerability of athletes and the possible control the perpetrators might have over the victim.

It is clear that *economic resources* are essential for facilitating participation in sport at elite level. Due to the relative small number of professional (10, 9%) and semi-professional (45, 40%) athletes, the family or household is mainly responsible for providing essential funding. This aspect is reflected in the fact that the majority of athletes indicated that they grew up in households, the socio-economic status of which is identified by them as either 'above average' (n=29, 24%) or 'average' (n=63, 53%). Only 12 (10%) indicated that they were from 'poor households'.

Access to special resources seems to be essential in the preparation and training for international and major sporting events where First World countries often afford athletes superior opportunities (Gould *et al*., 1999). This reality is evident in the fact that some athletes (n=35, 29%) had trained for more than three months in 'other countries', thus tapping into international resources and expertise from European countries (n=28). Two athletes from martial arts also trained in Japan prior to the 2003 All Africa Games.

The socio-economic status of the household is inevitably linked to the educational status of the prime care-givers (mother and/or father) of the athlete, and/or the athlete who is already economically productive or professional (Givi, 1984). The literacy level of the fathers and/or male guardians of athletes is relatively high with the majority (n=80, 71%) having a matric (Form 5 or Grade 12) or post-matric qualification. The same is true of the female guardians or mothers who (n=84, 71%) hold similar qualifications. Despite the fact that a relatively high percentage of athletes in the sample identified themselves as 'students' (n=58, 51%) and are thus still in the process of qualifying for a career, most (n=111, 92%) of the economically active athletes in the sample have already obtained a matric (Form 5 or Grade 12) or post-matric qualification.

The mean age of the *specialization* of athletes in the sport in which they competed at international level during the 8th All Africa Games, is 15.7 years. As the mean age of the athletes in the sample is 25.6, it represents an average of 10 years of participation, preparation and specialization to reach the present elite level of competition. Thus, it seems that the last four phases from 'deepening commitment' to 'obligation' (Prus & Irini, 1980) entail a process that stretches over approximately one decade.

Athletes indicated that they *initially became involved* in sport due to the fact that they enjoyed participation, and because they had the talent to achieve success during competitions (see Figure 2). Internal motivation and positive experiences linked to a sense of achievement are thus essential drawcards during the early stages of sports participation (Stevenson, 1990). The next set of attracting factors is relatively secondary and relates to the influence of parents and family members, coaches, role models, friends and teachers (Kohl, 2000; Stroot, 2002). Perceived spin-offs in terms of physical health, fitness and psychological well-being are also recognised. More peripheral influences relate to the status of the sport, external rewards, opportunities (availability and accessibility of resources), and the most distant factor seems to be the media, which were mentioned by only 25 respondents (see Figure 2). Similar results were reported by Phillips (1993) and disclaim the popular belief of the perceived persuasive value of the media.

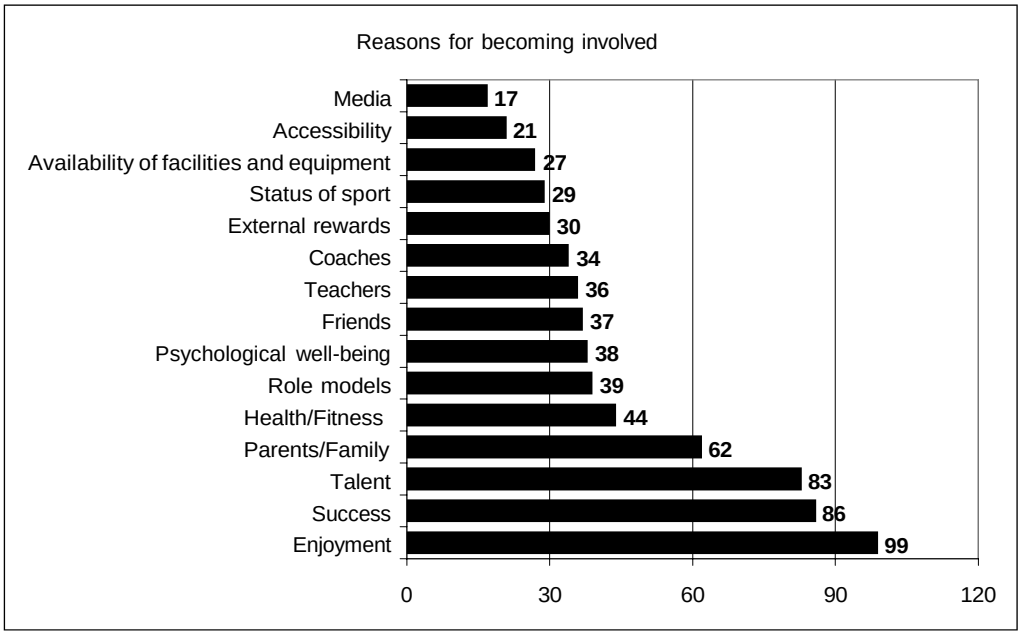

FIGURE 2. **REASONS GIVEN BY ELITE ATHLETES IN THE SAMPLE FOR BECOMING INVOLVED IN SPORT**

Positive experience and success in competing are carried over into the second phase of *specialization* in a sport (Prus & Irine, 1980). Athletes rank achievement, the recognition of their talent, and the desire to win and thus compete successfully as major components in the formation of their athletic identity and indicators of possible future success as an elite athlete (see Figure 3). Perceived external rewards such as travelling and gaining experience as well as internal rewards in terms of personal development, self-actualisation and self-belief are recognised as main reasons for continued specialisation in sport – findings that correspond to those of Johannson (1992) and Weiss (2001). Upward social mobility in terms of recognition, status and prestige are recognised as factors that contribute to sustainable involvement.

The fact that elite athletes acquire an athletic identity and spend a substantial amount of time practising, training and competing results in the fact that they would choose to remain

involved in elite sport in the 'desocialisation process' (Balague, 1999). The majority (n=86) indicated that they viewed sports coaching as the number one option for a possible future career (see Figure 4). Only a relatively small number of athletes (n=36) viewed a 'career outside sport' as a future option when their active competitive days are over. Continued active participation in competitive sport (n=40) or in recreative sport (n=55) seems to be an inevitable choice for athletes who have internalised the role of being an athlete with an active and/or competitive life style over many years. The attitude of wanting "to give back to the sport what it has given to me" (as expressed by a South African track and field athlete) is evident in the desire to transfer from an active participant to a coaching role or a role in sports development. A sports-related career is thus a favourable choice for athletes who also indicated the fields of sports management (n=46), sports medicine (n=16) and sports journalism (n=16) as additional future options (see Figure 4).

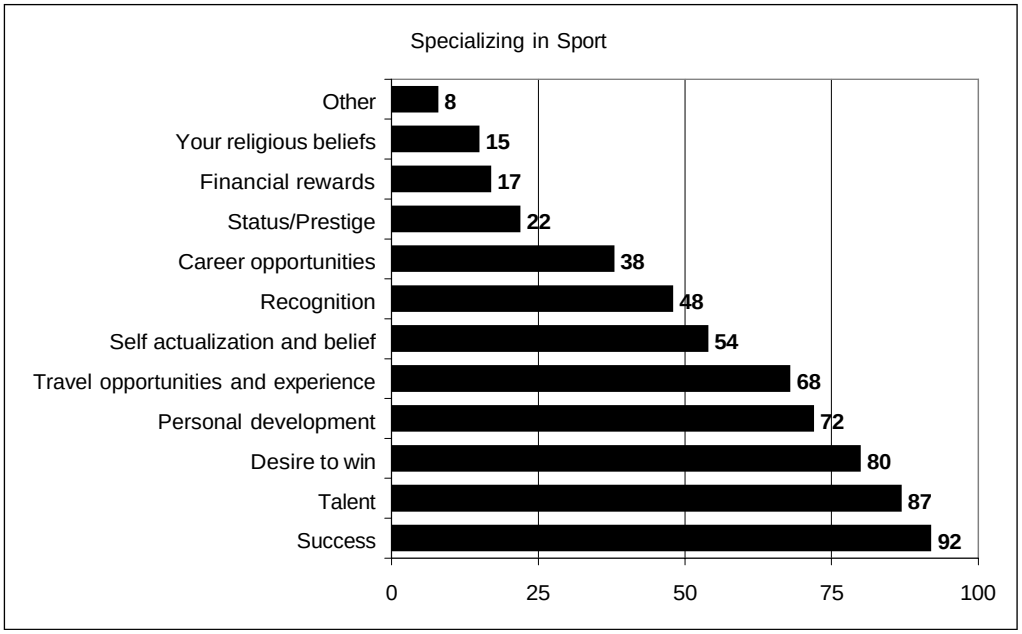

FIGURE 3. **REASONS GIVEN BY ELITE ATHLETES IN THE SAMPLE FOR SPECIALISING IN SPORT**

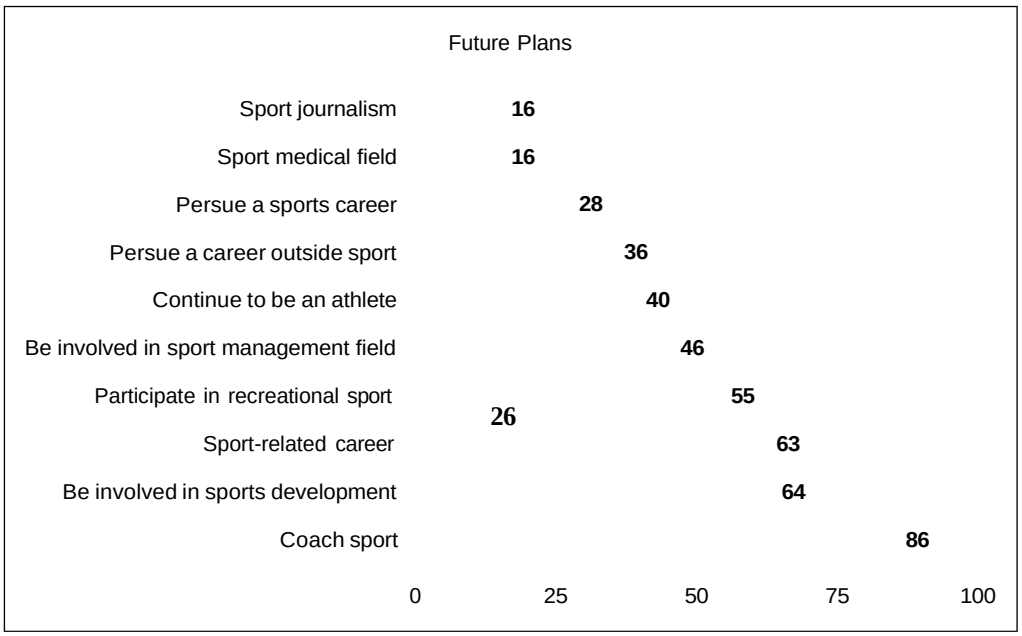

FIGURE 4. **FUTURE PLANS OF ELITE ATHLETES IN THE SAMPLE**

From a very young age, athletes are provided opportunities to participate and compete at local clubs and/or schools in which different stakeholders and agents have an influential role to play. The fact that only 46% (n=56) indicated that they had specifically been recruited as an athlete indicates service delivery by various agents of sports development. The local sports club (n=26) and coach (local/n=22, regional and/or national, n=19) have been identified as main recruiters by the athletes, followed by tertiary institutions (n=15) and schools (n=10). This demonstrates the significant role of these agencies and agents as well as the expertise and resources needed to play such a vital role in screening and developing elite athletes (Carlson, 1993). This scenario reflects negatively on various structures and agencies that claim to be funding and optimally facilitating sports development, as the evidence points in the direction of traditional structures and the coach as the main socialisation agents in this regard. However, governmental initiatives are recognised by 40% (n=48) of the athletes who perceive themselves as 'products of government programmes'.

The most profound impact on socialising athletes in aquiring an athletic identity by introducing and supporting their sustained involvement and development seems to be significant others with whom athletes form intimate, interactive and supporting relationships (Ebihara *et al*., 1983; Wiersma, 2000). Elite athletic participation requires athletes to trust and believe in themself, which contributes to a postive, well-established self-concept (Stroot, 2002). Self-trust and confidence are mentioned by 115 elite athletes in the sample as ensuring the most influential 'relationship' in pursuing a sporting career (see Figure 5). An elite athletic career requires substantial support from the prime care givers (parents and family members) who often make sacrifices in order to facilitate their child and/or family member optimally to pursue a sporting career. They often make substantial financial and emotional contributions to offer continued support and resources for elite participation. This is recognised by the majority of athletes (n=116) who identified the positive influence of family members in their sporting lives. Other influential people in order of rank are the coach (n=112) and other team members (n=106) who are mostly instrumental in the athlete's performance and status within the team and/or sport. Friends (n=91) and spouses or partners (n=83) also fulfil supportive roles, whereas representatives of sporting bodies (n=76) and teachers (n=65) are also recognised as positive influences (see Figure 5).

It seems that older and/or same-sex siblings do not play a dominant role in socialising younger siblings into sporting roles, as the majority of the elite athletes are eldest children (see Figure 6). The fact that the second highest representation of athletes are middle children indicates that older siblings do have a role to play in socialising younger family members into sports participation, regardless of the sex of the athletes (see Figures 6 and 7). Similar findings are reported by Raudsepp and Viira (2000).

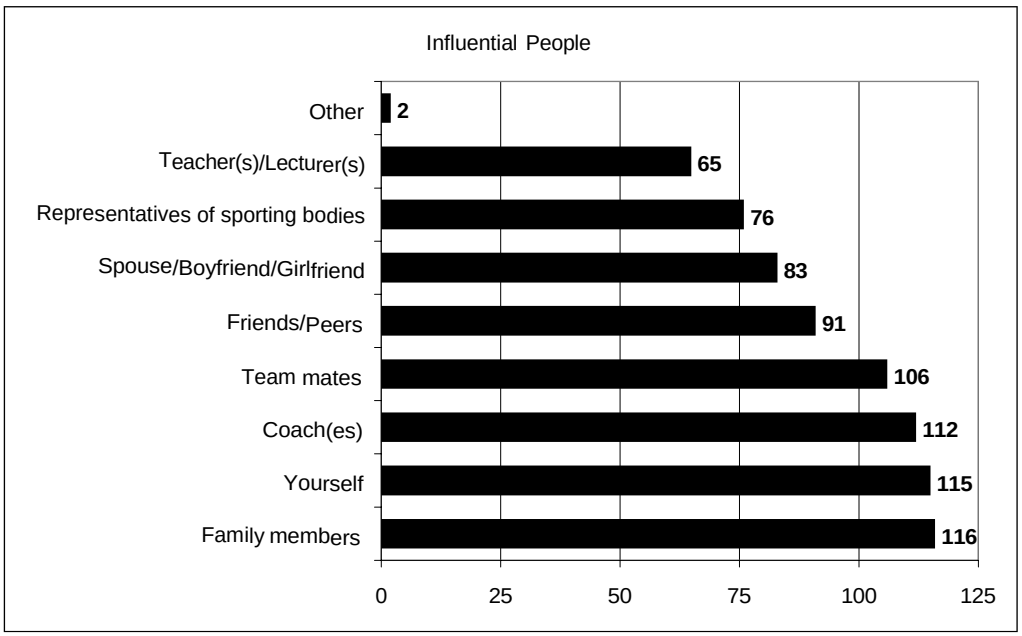

FIGURE 5. **INFLUENTIAL PEOPLE IN THE SOCIALISATION OF ELITE ATHLETES IN THE SAMPLE**

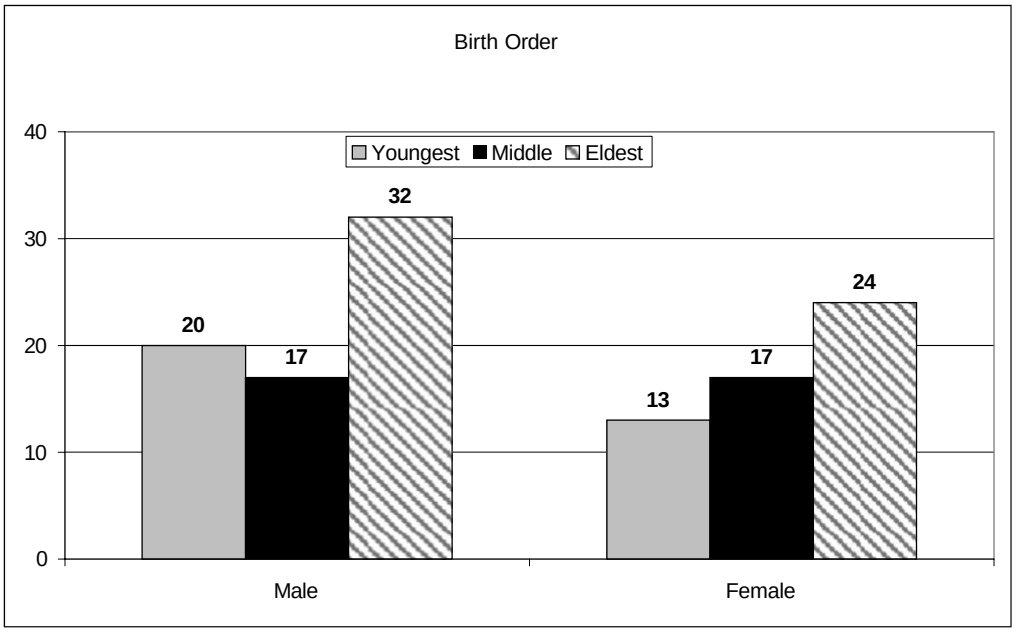

FIGURE 6. **BIRTH ORDER AND GENDER OF ELITE ATHLETES IN THE SAMPLE**

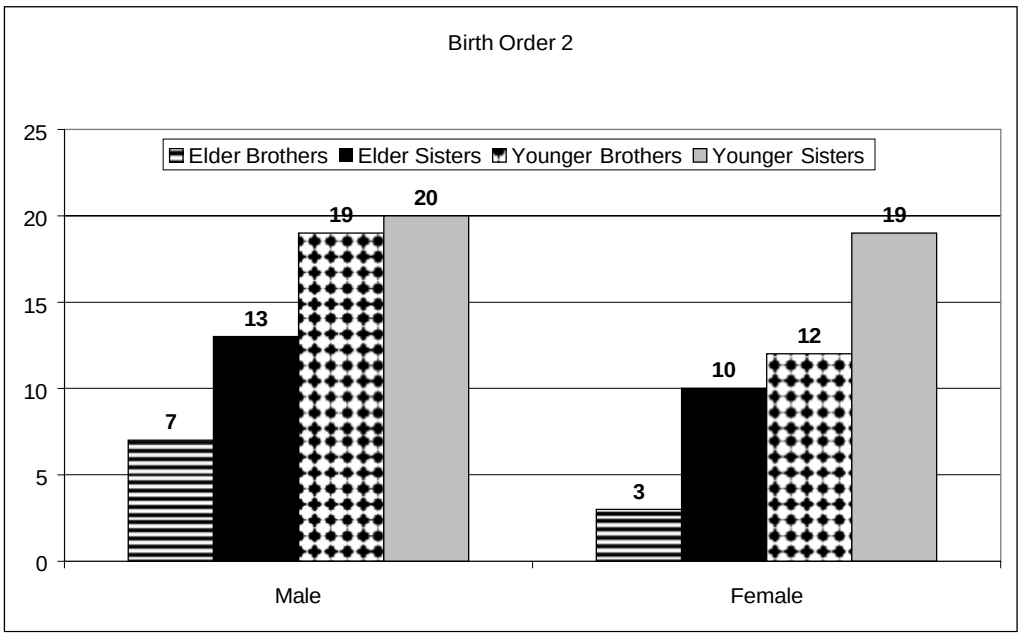

FIGURE 7. **BIRTH ORDER AND GENDER OF SIBLINGS AND ELITE ATHLETES IN THE SAMPLE**

Elite level sports participation affects *social relationships* between the athletes and their prime caregivers. The majority of athletes (n=86, 74%) indicated that their sports participation had resulted in creating closer family ties. Due to the relatively long hours of training, competing and being away from home for international competitions, some athletes were of the opinion that their sports participation tended to place some strain on social relationships (n=44, 38%).

Positive spin-offs from being recognised as an elite athlete lie in the perceived increase in the respect and admiration they receive (n=103, 87%), and the popularity they enjoy (n=62, 52%). A slight majority observed that people behave differently towards them due to their athletic status (n=61, 51%). Belonging to a close-knit sports fraternity means that they form special bonds with other team members (n=103, 87%) and that they are fortunate to meet 'famous' people such as other athletes and role players (n=103, 85%). The main obstacle they experience relates to the financial burden of affording essential resources (n=71, 64%). Most significant in the life cycle of becoming economically independent and professional preparation are the sacrifices elite athletes make in terms of pursuing 'sure' or 'other' careers (n=82, 75%), educational progress (n=65, 60%) and/or business opportunities (n=64, 62%). The majority of athletes indicated that they had made major personal (n=102, 92%) and financial sacrifices (n=92, 85%).

On a psycho-social level, the elite athletes indicated a need for mentorship, supportive social relations and assitance by indicating specific needs for emotional (n=120, 69%) and social support (n=128, 73%) as a prerequisite ('to a very large extent') for greater success in their sport. Prominent areas in which support and resources are required relate to opportunities for

training (n=190, 99%), financial support (n=180, 89%), competitive opportunities (n=150, 75%), scientific assitance (n=118, 72%) and expert coaching (n=130, 66%).

CONCLUSION

Central to the socialisation and career development of South African elite athletes is their changing reliance on the support of, and interaction with, significant others in accordance with the phases of socialisation into the role of an elite athlete. The change relates to human developmental phases and athletic role attainment where athletes demonstrate dependency first on parents and family members, and then on the coach, peers, and they ultimately become relatively independent by 'depending' mainly on the 'self'. This self-reliance represents a gradual process of emancipation through which athletes have internalised the work ethic of high level sports competition that entails hard work, sacrifice, a continued strife for excellence and success. The formation of an athletic identity is often indistinguisable from the perception of self-worth in that elite athletes seek to perpetuate their athletic status by pursuing a sports-related career after retirement from high level competition. Stakeholders should take cognisance of the dynamics and the socialisation of elite athletes in order to provide meaningful assistance and create an optimal nurturing climate and resources for the multi-faceted development of athletes in the South African context.

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REDES VIR SPORTDEELNAME VAN HOËRSKOOLLEERLINGE

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ABSTRACT

The purpose of this study was to investigate the reasons that motivate high school pupils to participate in sport. Four hundred and seventy eight pupils (211 boys and 267 girls) from four high schools in the Potchefstroom district participated in the study. The Participation Motivation Questionnaire (PMQ) was used. Data analysis was performed using Statistica 2000 for Windows 1998. One-way analyses of variance together with the Tuckey post hoc HSD test were used to indicate differences between variables. Practical significance was established with effect size. The results of the study showed the reasons that motivate youths to participate in sport as: doing something you are good at, develop the body, teamwork, learn new skills and meet new people. The least important reason for participation was to release energy. A factor-analysis was performed and six factors were identified: adventure/pleasure, recognition/achievement, team spirit/affiliation, ability/physical apearance, competition/challenges and energy release. T-tests and a one-way factorial analysis of variance were applied to determine whether gender, race and age had an effect on the reasons for sport participation. The results showed that gender and race had an effect on some of the factors, but not age.

Key words: Sport participation; Motives; Reasons; Youth sport; Motivation; Participation.

INLEIDING

Gereelde aktiwiteit, oefening en sport het volgens verskeie navorsingsbevindinge ’n positiewe invloed op ’n verskeidenheid gesondheidsaspekte van ontwikkeling by kinders en adolessente (Biddle *et al*., 1998, Baranowski *et al*., 1999). Buiten die gesondheidbevorderende waarde daarvan, hou deelname aan sport of gereelde fisieke aktiwiteit ook psigologiese voordele in soos vermindering van depressie en stres en versterking van die selfkonsep (Pratt *et al.,* 1999). Ten spyte van die oorweldigende bewyse van die voordele verbonde aan sportdeelname en fisieke aktiwiteit, het die aantal deelnemers en die frekwensie en intensiteit van sportdeelname onder jeugsportlui wêreldwyd gedurende die afgelope twee dekades afgeneem (Freedson & Rowland, 1992; Armstrong & McManus, 1994; Kolt & Capaldi, 2001). Volgens Gill en Overdoff (1994) is hierdie tendens ’n bewys dat die voordele van fisieke en psigologiese gesondheid en welstand nie sterk genoeg redes blyk te wees vir volgehoue gereelde deelname aan fisieke aktiwiteite of sport nie. Die redes wat jeugsportlui motiveer om aan sport deel te neem, word gevolglik deur verskeie navorsers as een van die mees kritieke areas in jeugsport-navorsing beskou (Stern *et al*., 1990; Weiss, 1993; Kolt *et al.,* 1999).

Uit die literatuur blyk dit dat die redes vir sportdeelname vanuit verskillende teorieë of raamwerke verklaar en bestudeer kan word. Die bekendste teorieë in die sportmilieu is die kompetisieteorie (Harter, 1981), die prestasie-doel-georiënteerde teorie (Maehr & Nicholls, 1980) en die prestasiemotiveringsteorie of selfdetermineringsteorie (Deci & Ryan, 1985). Volgens Scholtz (1979) is die prestasiemotiveringsteorie (intrinsiek/ekstrinsiek) die belangrikste model vir die verklaring van sportdeelname. Motivering verwys na die kragte of

faktore wat menslike gedrag inisieer, rig en volhou (Iso-Ahola, 1999). Intrinsieke motivering verwys na die uitvoer van ’n aktiwiteit vir die doel of satisfaksie van deelname aan die aktiwiteit self en eksterne motivering impliseer dat deelname gesien word as ’n middel tot ’n doel en nie ter wille van die handeling self nie (Deci, 1975). Wanneer ’n persoon intrinsiek gemotiveer is, doen hy/sy die handeling ter sprake uit vrye wil en sonder eksterne motivering. Intrinsiek gemotiveerde persone word gedurende kompetisies hoofsaaklik gemotiveer deur die verband tussen die aktiwiteit self en die genot daarvan, terwyl ekstrinsiek gemotiveerde persone deelneem ter wille van beloning (Weinberg *et al.,* 2000). Volgens Gould *et al*. (1985) hang die vlak van motivering af van die interaksie tussen persoonlike faktore, behoeftes en situasiefaktore. Gould *et al*. (1985) is voorts van mening dat ten einde volgehoue sportdeelname te verseker, dit noodsaaklik is om kennis te dra van die spesifieke redes waarom daar aan sport deelgeneem word.

Verskeie navorsers het die afgelope ses dekades navorsing gedoen om te bepaal wat die belangrikste motiveerders is vir die jeug se deelname aan kompetisiesport. Alderman (1976) het een van die eerste ondersoeke op 425 yshokkiespelers uitgevoer en sewe motiveerders vir sportdeelname geïdentifiseer, naamlik ter wille van onafhanklikheid, erkenning, mag, beheer, opwinding, status en as uitlaatklep vir aggressie. In ’n ander ondersoek het Sapp en Haubenstricker (1978) gevind dat genot, vaardigheidsontwikkeling en fiksheid die belangrikste redes vir deelname aan atletiek was. Een van die volledigste ondersoeke wat gedoen is oor die redes vir jeugsportdeelname, is die studie van Gill *et al.* (1983). In hierdie studie is die motiveringsredes van 1 138 Amerikaanse kinders (8-18 jaar) ondersoek. Die redes wat die hoogste geplaas was, is “die verbetering van vaardighede, genot, uitdaging om nuwe vaardighede aan te leer en om fiks te word”. Gill en medewerkers het voorts deur middel van ’n faktorontleding die onderskeie redes gegroepeer en het agt faktore/dimensies onderskei, naamlik: prestasie, statusmotivering, spanoriëntasie, fiksheid, energie-ontlading, vaardigheidsontwikkeling, samehorigheid, genot en ’n veelsydigheidsfaktor.

Latere navorsing het soortgelyke bevindings gerapporteer en gevind dat geslag, ouderdom, ras en kultuur, asook die tipe sportsoort waaraan deelgeneem word, ook ’n invloed op motiveringsredes vir sportdeelname uitoefen (Gill *et al.,* 1983; Longhurst & Spink, 1987; Morris *et al.,* 1996).

Uit die literatuur blyk dit dus dat daar ’n dalende tendens in jeugsportdeelname voorkom en dat geslag, ras en ouderdom ’n invloed op die redes vir sportdeelname kan uitoefen. Hoewel heelwat internasionale literatuur beskikbaar is oor die redes wat jong sportlui motiveer om aan sport deel te neem, is daar onvoldoende kennis beskikbaar oor die redes wat die Suid-Afrikaanse jeug motiveer om aan sport deel te neem. Ten einde hierdie leemte aan te spreek, was die doel van hierdie ondersoek om te bepaal wat die redes is wat adolessente in die Potchefstroom-distrik motiveer om aan skoolsport deel te neem. Voortspruitend hieruit wou bepaal word of daar ’n verband bestaan tussen die redes vir sportdeelname en ouderdom, geslag en ras. Inligting hieroor kan vir die onderwyser, sportafrigter en sportwetenskaplike

van groot waarde wees in hul poging om die sportmilieu so te struktureer dat dit aan die behoeftes van jong sportlui voldoen.

METODE VAN ONDERSOEK

Steekproef

Die ondersoekpopulasie het bestaan uit 478 hoërskoolleerders tussen die ouderdomme 14 en 18 jaar, uit oorwegend middel tot lae sosio-ekonomiese statusskole. Die respondente was op grond van 'n beskikbaarheidsteekproef uit vier skole in die Potchefstroom-distrik gekies. Die ondersoekpopulasieverspreiding was soos volg: 13-jariges, *n*=38 (7.95%); 14-jariges, *n*=88 (18.41%); 15-jariges, *n*=95 (19.87%); 16-jariges, *n*=92 (19.25%); 17-jariges, *n*=82 (17.15%); 18-jariges, *n*=61 (12.76%) en bo 18 jaar, *n*=23 (4.81%). Die gemiddelde ouderdom was 16 jaar. Die rassegroepe wat betrek is, was swart, *n*=151 (33%); wit, *n*=159 (33%); Kleurling, *n*=116 (24%) en Indiër, *n*=48 (10%). Die aantal dogters en seuns wat aan die studie deelgeneem het, was 211 (44%) en 267 (56%) onderskeidelik.

Meetinstrumente

Die meetinstrument wat gebruik was om die redes vir sportdeelname te bepaal in die volgorde van belangrikheid, is die "*Participation Motivation Questionnaire"* (PMQ) van Gill *et al.* (1983). Die vraelys se geldigheid en betroubaarheid is in talle studies bevestig (Gould *et al*., 1985; Flood & Hellstedt, 1991; Gill & Overdoff, 1994; Kolt *et al*., 1999). Die vraelys bestaan uit 30 vrae en respondente moes aandui hoe belangrik die verskillende redes vir hulle is ten opsigte van sportdeelname: baie belangrik (3), matig belangrik (2) en onbelangrik (1). In die verwerking van die resultate is gemiddelde waardes hiervan bereken.

Statistiese Prosedure

Data is met behulp van die rekenaarprogram SAS (SAS Institute, 1999) verwerk. 'n Eksploratiewe faktorontleding is gedoen om faktore in die data te identifiseer. Die betroubaarheid van die betrokke faktore is met behulp van Cronbach Alfa-waardes bepaal (Anastasi, 1998). Beskrywende statistiek is gebruik vir die bepaling van die rangorde vir die redes vir sportdeelname, asook om rekenkundige gemiddeldes, standaardafwykings, maksimum- en minimumwaardes vir die seuns en dogters van al vier die etniese groepe te bepaal. Daar is van t-toetse gebruik gemaak om vas te stel of die faktore verskil ten opsigte van geslag en ouderdom, terwyl eenrigtingvariansieanalise (ANOVA's) gebruik is om die rangordes van die verskillende etniese groepe te bepaal. 'n Post hoc-toets is gebruik om betekenisvolle verskille by die faktorontleding van die etniese groepe te bepaal. Effekgroottes is gebruik om praktiese betekenisvolheid van verskille tussen groepe te bepaal.

RESULTATE EN BESPREKING

Vyf en tagtig persent (406 leerders) van die ondersoekgroep het aangedui dat hulle aan een of meer sportsoorte deelneem. Slegs hierdie leerlinge se resultate is bereken. Die sportsoorte waaraan deelgeneem is, is atletiek, rugby, netbal, tennis, karate, sokker, gimnastiek, krieket, judo en tafeltennis. Die vlak van deelname was hoofsaaklik dié van skool (1ste, 2de en 3de spanne) en klubvlak. Slegs 1% van die leerlinge het aangedui dat hulle op provinsiale vlak deelneem.

Die eerste stap in die analisering van die redes waarom die leerlinge in hierdie ondersoek aan sport deelneem, was om 'n voorkeurrangorde uit die onderskeie vrae of toetsitems te bepaal. In Tabel 1 word hierdie rangorde wat deur die groep toegeken is, voorgestel.

TABEL 1. **RANGORDE VAN BELANGRIKHEID VAN DIE REDES WAAROM DAAR AAN SPORT DEELGENEEM WORD**

Toetsitems	Rangorde	Gem	SA
Ek hou daarvan om iets te doen waarin ek goed vaar	1	2.846	0.42
Ek wil my liggaam ontwikkel	2	2.724	0.52
Ek hou van spanwerk	3	2.706	0.52
Ek wil nuwe vaardighede/dinge aanleer	4	2.698	0.51
Ek hou daarvan om met nuwe mense kennis te maak	5	2.653	0.58
Ek hou van spangees	6	2.651	0.58
Ek wil fiks word	7	2.641	0.59
Ek wil my sportvaardighede verbeter	8	2.637	0.58
Ek hou daarvan om te wen	9	2.621	0.64
Ek wil pret hê	10	2.614	0.62
Ek wil na ’n hoër sportvlak beweeg	11	2.610	0.61
Ek hou van opwinding	12	2.609	0.57
Ek hou daarvan om deel te wees van ’n klub/span	13	2.562	0.63
Ek hou daarvan om my met iets besig te hou	14	2.519	0.60
Ek hou van uitdagings	15	2.506	0.61
Ek hou daarvan om te oefen	16	2.495	0.61
Ek hou van aksie	17	2.474	0.63
Ek hou van kompetisie	18	2.460	0.67
Ek hou van beloning	19	2.413	0.76
Ek hou daarvan om na oefeninge en kompetisies te ry	20	2.370	0.74
Ek wil by my vriende wees	21	2.338	0.73
Ek hou daarvan om belangrik te voel	22	2.304	0.76
Ek wil spanning verlig	23	2.301	0.69
Ek hou daarvan om raakgesien te word/erkenning te kry	24	2.287	0.76
Ek hou daarvan om met die apparaat te oefen	25	2.286	0.74
My ouers/vriende wil hê ek moet aan sport deelneem	26	2.246	0.76
Ek hou daarvan om uit die huis te kom	27	2.177	0.78
Ek hou van die afrigters	28	2.146	0.75
Ek wil populêr wees	29	1.961	0.80
Ek wil ontslae raak van energie	30	1.814	0.84

Uit Tabel 1 blyk dit dat die vyf belangrikste redes vir sportdeelname wat die ondersoekgroep aangedui het, was: om iets te doen waarin hulle goed vaar, om hul liggame te ontwikkel, omdat hulle van spanwerk hou, om nuwe vaardighede/dinge aan te leer en om met nuwe mense kennis te maak. Die bevinding dat “om iets te doen waarin hulle goed vaar”, die belangrikste rede vir sportdeelname is, kon nie deur ander studies gestaaf word nie, hoewel ander navorsers wel gevind het dat dit onder die 10 belangrikste redes vir sportdeelname lê (Gill *et al*., 1983; Wold & Kanna, 1993; Kolt *et al*., 1999; Kolt & Capaldi, 2001). “Om die liggaam te ontwikkel, deel van ’n span te wees en nuwe vaardighede/dinge aan te leer”, is wel onder die vyf belangrikste redes in studies van Weinberg *et al.* (2000); Kolt *et al*. (1999); Klint en Weiss (1987); Ryckman en Hamel (1993) en Kirkby en Kolt (1999) gevind. Sportdeelname ter wille daarvan om van energie ontslae te raak, is in hierdie studie sowel as in verskeie ander studies as die onbelangrikste rede vir sportdeelname aangedui (Gould *et al*., 1985; Klint & Weiss, 1987; Longhurst & Spink, 1987; Kirkby & Kolt, 1999; Kolt & Capaldi, 2001).

Die motiveringsredes vir deelname verskaf egter slegs beskrywende inligting oor die individuele redes vir sportdeelname. Volgens Gill *et al.* (1983) is dit funksioneel om die individuele redes volgens dimensies of faktore te groepeer ten einde ’n fyner ontleding van die resultate te kan doen. Ten einde ’n meer volledige beeld te verkry was die tweede logiese stap dus om die vrae volgens algemene kategorieë te groepeer deur middel van ’n faktorontleding en sodoende te bepaal wat die effek van geslag, ras en ouderdom op die redes vir sportdeelname is.

’n Varimax faktorrotasie is gebruik om die hoeveelheid veranderlikes te verminder en spesifieke kategorieë vir redes vir sportdeelname te identifiseer. ’n Eksploratiewe faktorontleding is eerste gedoen wat sekere vrae onder sekere faktore gegroepeer het. Afsonderlike faktoranalises is vir die groep gedoen, asook vir geslag en ras. Slegs Eigenwaardes van groter as 0.4 is in ag geneem. Uit ’n geroteerde transformasiematriks is sewe faktore geïdentifiseer, naamlik avontuur/genot, erkenning/prestasie, spangees/affiliasie, vaardigheid/fisieke voorkoms, kompetisie/uitdagings, en energieontlading. In Tabel 2 word die faktorlading en kommunaliteit vir elke faktor voorgestel.

TABEL 2. **FAKTORLADING VAN DIE ITEMS VAN DIE PMQ-VRAELYS**

Items	Faktorlading	Kommunaliteit
Faktor 1: Avontuur/genot		
Ek wil pret hê	0.73	0.55
Ek hou van aksie	0.61	0.50
Ek hou van opwinding	0.65	0.53
Ek hou daarvan om met nuwe mense kennis te maak	0.47	0.32
Ek hou daarvan om my met iets besig te hou	0.43	0.36
Ek wil by my vriende wees	0.46	0.44
Ek hou daarvan om uit die huis te kom	0.51	0.34
Faktor 2: Erkenning/prestasie		
Ek hou daarvan om te wen	0.65	0.50
Ek hou van beloning	0.70	0.56
Ek hou daarvan om belangrik te voel	0.79	0.64
Ek hou daarvan om erkenning te kry vir wat ek doen	0.66	0.56
Ek wil populêr wees	0.73	0.59
Faktor 3: Spangees/affiliasie		
Ek hou van die afrigters	0.71	0.57
Ek hou daarvan om met die apparaat te oefen	0.35	0.32
Ek hou daarvan om deel te wees van ’n klub/span	0.57	0.52
Ek hou van spangees	0.53	0.46

Ek hou van spanwerk	0.48	0.48
Faktor 4: Vaardigheid/fisieke voorkoms		
Ek wil my sportvaardighede verbeter	0.58	0.51
Ek wil fiks word	0.50	0.46
Ek wil na ’n hoër sportvlak beweeg	0.60	0.50
Ek hou daarvan om te oefen	0.52	0.47
Ek wil my liggaam ontwikkel	0.55	0.51
Ek hou daarvan om na oefeninge en kompetisies te ry	0.51	0.46
My ouers/vriende wil hê ek moet aan sport deelneem	0.44	0.34
Faktor 5: Kompetisie/uitdagings		
Ek wil nuwe dinge aanleer	0.42	0.35
Ek hou van uitdagings	0.41	0.42
Ek hou daarvan om iets te doen waarin ek goed vaar	0.59	0.46
Ek hou van kompetisie	0.64	0.49
Faktor 6: Energie-ontlading		
Ek wil spanning verlig	0.60	0.49
Ek wil ontslae raak van energie	0.75	0.58

Hierdie ses faktore het 47.5% van die variansie van die vraelys verklaar. Faktor een het 10.31% van die variansie uitgemaak, faktor twee 10.22%, faktor drie 7.82%, faktor vier 7.80%, faktor vyf 6.44% en faktor ses 4.93%. Cronbach Alfa-waardes is vir elke faktor bepaal en die waardes hiervan was soos volg: avontuur/genot (0.71), erkenning/prestasie (0.79), spangees/affiliasie (0.67), vaardigheid/fisieke voorkoms (0.64), kompetisie/uitdagings (0.53) en energie-ontlading (0.39). Die Cronbach Alfa-waardes wat vir die ses faktore bereken is, het dus gewissel van 0.79 tot 0.39, met ’n gemiddeld van 0.62. Aangesien faktor 6 se Cronbach Alfa-waarde (0.39) te laag was vir betroubaarheid, is faktor ses nie in verdere verwerkings in berekening gebring nie. Die twee vrae wat by hierdie faktor betrokke is, is ook in die onderhawige studie heel laaste gerang en was dus nie as ’n belangrike motief vir sportdeelname beskou nie.

Om vas te stel of ’n verband bestaan tussen die redes vir sportdeelname en geslag, ras en ouderdom, is die verwerkings volgens die geïdentifiseerde faktore gedoen. Die individuele vrae is ook afsonderlik vir verbande ontleed, maar dié data is slegs gerapporteer indien dit die resultate van die faktorontleding beter kan toelig.

TABEL 3. **DIE VERBAND TUSSEN DIE REDES VIR JEUGSPORT-DEELNAME EN GESLAG**

Veranderlikes	Geslag	n	Gem	SA	d
Faktor 1	Seuns	211	2.4604	0.4366	0.1060
Avontuur/genot	Dogters	267	2.5067	0.3658	
Faktor 2	Seuns	211	2.3197	0.5704	0.0035
Erkenning/prestasie	Dogters	267	2.3177	0.5339	

Faktor 3	Seuns	211	2.5019	0.4080	0.1366
Spangees/affiliasie	Dogters	267	2.4440	0.4238	
Faktor 4	Seuns	211	2.5764	0.3870	0.2098
Vaardigheid/ fisieke voorkoms	Dogters	267	2.4952	0.3787	
Faktor 5	Seuns	211	2.6363	0.3943	0.9483**
Kompetisie/uitdagings	Dogters	267	2.2624	0.3443	

d=0.2 klein effek; d=0.5 medium effek*; d=0.8 groot effek en prakties betekenisvolle verskil** (Steyn, 1999)

Uit Tabel 3 blyk dit duidelik dat geslag nie ’n belangrike effek het op die redes waarom die ondersoekgroep aan sport deelneem nie. Hierdie bevinding is in ooreenstemming met ander navorsing (Gill *et al*., 1983; Gould *et al*., 1985; Longhurst & Spink, 1987). Slegs by faktor 5 (kompetisie/uitdagings) was daar ’n prakties betekenisvolle verskil, waar die kompetisie/uitdagingselement ’n groter motiveringsrede vir seuns as vir dogters is. Uit ander studies het dit ook geblyk dat die kompetisie/uitdagingselement ’n groot verskil tussen seuns en dogters se motiveringsredes vir sportdeelname is (Gould *et al.,* 1985; Kolt & Capaldi, 2001). Die feit dat die leerlinge van hierdie ondersoekgroep aan verskeie skoolsportsoorte deelneem en dat die deelname op ’n lae kompetisievlak is (slegs skoolvlak) kon moontlik ’n rol gespeel het waarom daar so min geslagtelike verskille by die ander faktore was.

In Tabel 4 word die effek van ras op redes vir sportdeelname aangedui. By faktor 1 (avontuur/genot) het die Indiër-leerlinge van die ander leerlinge met ’n matige effek verskil. Die Indiër-leerlinge het die vrae wat onder faktor 1 geklassifiseer is: *pret; aksie; opwinding, hou daarvan om besig gehou te word; met nuwe mense kennis te maak; by vriende te wees en om uit die huis te kom* oor die algemeen hoër gerang, dus is hul deelname aan sport eerder ter wille van die avontuur en genot daarvan. By faktor 2 (erkenning/prestasie) het swart leerlinge ook met ’n matige effek van wit leerlinge verskil. Uit die analise van die individuele vrae het dit geblyk dat redes soos *hou daarvan om te wen; hou van beloning; hou daarvan om belangrik te voel; hou daarvan om raakgesien te word/erkenning te kry en om populêr te wees,* vir die swart leerling as belangriker redes vir sportdeelname geag word as vir die wit leerlinge. Dit wil dus voorkom of sportdeelname vir die swart leerlinge ’n geleentheid vir prestasie en erkenning is, terwyl die wit leerlinge wat aan die studie deelgeneem het, in ’n mindere mate sport vir die genot en sosiale aspek daarvan beoefen het.

TABEL 4. **DIE VERBAND TUSSEN RAS EN SPORTDEELNAME**

Veranderlikes	Ras	n	Gem	SA	d
Faktor 1	Swart	151	2.3928	0.4372	S/W=0.49*, S/K=0.06, S/I=0.58*
Avontuur/genot	Wit	159	2.6049	0.3598	W/K= 0.07, W/I=0.70*
	Kleurling	116	2.3663	0.3679	K/I= 0.76*
	Indiër	48	2.6444	0.3220	
Faktor 2	Swart	151	2.4935	0.5069	S/W= 0.50, S/K=0.46, S/I=0.33
Erkenning/prestasie	Wit	159	2.2174	0.5519	W/K=0.07, W/I= 0.10
	Kleurling	116	2.2563	0.5153	K/I=0.04
	Indiër	48	2.2840	0.6398	

Faktor 3	Swart	151	2.5414	0.3992	S/W=0.27, S/K= 0.32, S/I=0.04
Spangees/affiliasie	Wit	159	2.4242	0.4296	W/K=0.03, W/I=0.22
	Kleurling	116	2.4130	0.4060	K/I=0.25
	Indiër	48	2.5220	0.4390	
Faktor 4	Swart	151	2.6722	0.3618	S/W=0.74*, S/K=0.39; S/I=0.24
Vaardigheid/ fisieke voorkoms	Wit	159	2.3779	0.3984	W/K=0.38, W/I=0.52*
	Kleurling	116	2.5310	0.3449	K/I=0.16
	Indiër	48	2.5866	0.3142	
Faktor 5	Swart	151	2.6445	0.3893	S/W=0.06, S/K=0.13, S/I=0.11
Kompetisie/uitdagings	Wit	159	2.6212	0.3718	W/K=0.08, W/I=0.17
	Kleurling	116	2.5929	0.3541	K/I=0.26
	Indiër	48	2.6862	0.3104	

d=0.2 klein effek; d=0.5 medium effek*; d=0.8 groot effek en prakties betekenisvolle verskil** (Steyn, 1999)

By faktor 3 (spangees/affiliasie) is geen prakties beduidende verskille tussen die rassegroepe gevind nie. By faktor 4 (vaardigheid/fisieke voorkoms) was daar verskille (matige effek) tussen die wit en swart leerlinge en tussen die wit en Indiër-leerlinge. In die ontleding van die individuele vrae het dit geblyk dat die swart leerlinge *sportvaardigheidsverbetering* eerste gerang en die Kleurling-leerlinge dit negende gerang het, terwyl die wit leerlinge dit sestiende gerang het. “Ek wil na ’n hoër sportvlak beweeg”, het die swart leerlinge vierde en die Kleurling-leerlinge agtste gerang terwyl die wit leerlinge dit as agtiende belangrikste rede gerang het. ’n Moontlike verklaring vir hierdie variasies kan wees dat die blanke leerlinge waarskynlik van jongs af meer geleenthede gehad het om aan sport deel te neem, teenoor die ander bevolkingsgroepe, en dat, om hulle sportvaardighede te verbeter, dus nie meer so ’n belangrike rede vir hul sportdeelname is nie. By faktor 5 (kompetisie/avontuur) is geen prakties betekenisvolle verskille tussen die rassegroepe gevind nie.

In totaliteit gesien, het ras dus wel ’n medium effek gehad op die ondersoekgroep se redes vir sportdeelname. Hierdie resultate is in ooreenstemming met ander studies (Van Deventer, 1998; Weinberg *et al.*, 2000). Dit wil egter voorkom of die leerlinge van al die rassegroepe positief ingestel is teenoor sport. Die prakties betekenisvolle verskille wat by faktor 4, tussen swart en wit deelnemers voorgekom het, kan moontlik daarop dui dat sportgeleenthede en prestasie reeds in die blanke kultuur gevestig is, terwyl die swart deelnemers groter behoefte daaraan het om sport vir prestasie, erkenning en moontlik ook as middel tot opheffing uit swak lewensomstandighede, te beoefen.

In Tabel 5 word die verband van ouderdom met die onderskeie faktore voorgestel. Die ouderdomverspreiding is in twee groepe verdeel, naamlik ’n junior groep met ’n gemiddelde ouderdom van 14 jaar en ’n senior groep met ’n gemiddelde ouderdom van 16 jaar.

TABEL 5. **DIE VERBAND TUSSEN OUDERDOM EN SPORTDEELNAME**

Veranderlikes	Ouderdom	n	Gem	SA	d
Faktor 1	Junior	126	2.5407	0.3917	0.1414
Avontuur/genot	Senior	330	2.4853	0.3870	

Faktor 2 Erkenning/prestasie	Junior Senior	126 330	2.3300 2.3078	0.5397 0.5561	0.0400
Faktor 3 Spangees/affiliasie	Junior Senior	126 330	2.5158 2.4517	0.4069 0.4164	0.1539
Faktor 4 Vaardigheid/ fisieke voorkoms	Junior Senior	126 330	2.5858 2.5129	0.3538 0.3746	0.1946
Faktor 5 Kompetisie/uitdagings	Junior Senior	126 330	2.6287 2.6367	0.3563 0.3612	0.0221

d=0.2 klein effek; d=0.5 medium effek*; d=0.8 groot effek en prakties betekenisvolle verskil** (Steyn, 1999)

Uit Tabel 5 blyk dit ook dat geen prakties betekenisvolle verskille voorgekom het tussen die redes vir sportdeelname en die onderskeie ouderdomsgroepe nie. Ouderdom het dus nie ’n betekenisvolle rol gespeel in die belangrikheid van die redes waarom hierdie ondersoekgroep aan sport deelneem nie. ’n Moontlike verklaring kan wees dat daar nie so ’n groot ouderdomsverskil was tussen die deelnemers nie (14 tot 18 jaar).

GEVOLGTREKKINGS

Die eerste doel van die studie was om spesifieke redes te identifiseer wat jeugsportlui motiveer om aan sport deel te neem. ’n Rangorde van belangrikheid is bepaal en die vyf belangrikste redes was: *ek hou daarvan om iets te doen waarin ek goed vaar; ek wil my liggaam ontwikkel; ek hou van spanwerk; ek wil nuwe dinge aanleer; en ek hou daarvan om nuwe mense te ontmoet.* Wanneer hierdie redes vanuit ’n ontwikkelingsperspektief beskou word, is dit duidelik waarom hierdie redes vir die hoërskoolleerlinge, wat in die adolessente fase is, van belang is. Die adolessent ondergaan fisieke veranderinge tydens puberteit, seksuele volwassenheid word bereik, en verandering vind plaas op die gebied van kognitiewe vermoëns, sosiaal-emosionele groei en sosiale konteks (Brooks-Gunn & Reiter, 1990). Omdat die adolessent nog besig is om ’n eie identiteit te ontwikkel, sal dit vir hom belangrik wees om aan aktiwiteite deel te neem waarin hy goed vaar. Om die liggaam te ontwikkel, is ’n verdere belangrike faset vir die adolessent omdat aanvaarding en goedkeuring van dieselfde, asook teenoorgestelde, geslag in hierdie ontwikkelingstadium baie belangrik is. Hierdie rede verklaar ook waarom spanwerk en om nuwe mense te ontmoet, vir hierdie groep belangrik is.

Ten tweede is ’n faktoranalise onderneem om uit die 30 toetsitems, spesifieke faktore of kategorieë wat sportdeelname kan beïnvloed, te klassifiseer. Uit ’n geroteerde transformasie is ses faktore geklassifiseer, naamlik avontuur/genot, erkenning/prestasie, spangees/affiliasie, vaardigheid/fisieke voorkoms, kompetisie/uitdagings en energieontlading. Deur middel van t-toetse is bepaal of geslag, ras en ouderdom ’n effek het op die geïdentifiseerde faktore (wat saamgestel is uit die redes vir sportdeelname soos in Tabel 1 uiteengesit). Resultate uit die faktorontleding het getoon dat daar nie ’n betekenisvolle verskil is tussen die seuns en dogters se siening van die belangrikheid van die redes wat hulle motiveer vir sportdeelname nie, behalwe by die kompetisie-/avontuur-faktor. Die seuns was meer kompetisie-/uitdagings as die dogters. Hierdie bevinding impliseer dat sportprogramme en aktiwiteite op basies dieselfde wyse ontwikkel en aangebied kan word, maar met die groot verskil dat seuns se programme meer avontuur en uitdagingselemente moet bevat.

Hoewel ras ’n effek gehad het op die redes vir sportdeelname, was dit nie prakties betekenisvol nie. Daar was enkele verskille met ’n matige effek by faktor 1 (avontuur/genot) waar dit geblyk het dat die Indiër-sportdeelnemer ’n hoë premie op avontuur en genot as redes vir sportdeelname plaas. Ouderdom het ook nie ’n prakties betekenisvolle effek op die deelnemers se siening van die belangrikheid van die redes wat hul motiveer vir sportdeelname gehad nie.

Opsommend blyk dit dus dat daar spesifieke redes is wat hoërskoolleerlinge motiveer om aan sport deel te neem en dat geslag, ras en ouderdom nie so ’n groot rol speel by die spesifieke redes waarom die jeug/hoërskoolleerlinge aan sport deelneem nie. Afrigters van jeugsportlui behoort kennis te neem van hierdie redes, en dit positief aan te wend om strategieë en werkwyses te ontwikkel om die jeug te motiveer om in sportdeelname te volhard.

LEEMTES EN AANBEVELINGS

Alhoewel daar in alle studies gepoog word om veralgemeenbaarheid te optimaliseer, kom tekortkominge in hierdie studie voor wat in verdere studies van dié aard moontlik onder die loep geneem kan word. Derhalwe word die volgende tekortkominge uitgelig en aanbevelings in dié verband gedoen:

Vanweë eksterne faktore moes van ’n beskikbaarheidsteekproef gebruik gemaak word, en ongelykheid van deelnemergetalle het by groepe voorgekom. Hierdie ongelykheid van getalle kon moontlik die resultate beïnvloed het.

Die tipe sportsoorte asook die vlak van kompetisiedeelname, kan moontlik tot ander resultate lei. Respondente van hierdie studie het op ’n lae kompetisievlak deelgeneem en

sportdeelnemers wat op provinsiale en nasionale vlak deelneem se redes vir deelname kan moontlik ander bevindinge tot gevolg hê.

SUMMARY

Reasons for sport participation of high school pupils

Physical and psychological healths have both shown to benefit from regular participation in physical activities. Motives related to health, physical appearance, competition and excitement, fun and enhanced competence, are a few reasons for taking part in sport. There are differences between individuals in perceived benefits, which might explain some of the differences in sport participation. These perceptions of benefits, or motives to participate, are influenced by several factors, such as, for example, age and gender. If an experience of sport participation is perceived to be meaningful, a person will be more motivated to participate in such activities, but what is perceived as meaningful by one individual might not be perceived as such by another. Findings from past studies suggest several things about relationships among various agents of socialisation, institutions, and sport participation. Several studies have indicated that family is an important factor in people's decisions to participate in sport. Encouragement from peers, teachers, and coaches has also been shown as influencing people's sport participation. Some researchers have studied the relationship between people's athletic self-perceptions and sport participation. These researchers have concluded that people with

high levels of confidence in their athletic abilities may be most likely to participate in sport.

A large number of studies and surveys show that the percentage of individuals participating in sport is low and has been declining during recent years. Understanding youth motives to participate in sports or physical activities has been a subject of interest for many researchers and practitioners in recent years. Numerous studies have examined the question of whether there are differences in youth motives across sports, age, gender, and culture and suggest that children or adolescents are subject to the environmental influences in their motivation to participate in certain physical activities. Thus, investigating the diversities in motivation of participation may shed light on the underlying reasons of why children or adolescents take part in various forms of physical activity or sports

The purpose of this study was to explore the reasons that motivate youths to participate in sport. The results of the study showed that the five main reasons why high school pupils participate in sport are: "to do something I am good at, to develop my body, teamwork, to learn new skills and to meet new people". These results are in accordance with other studies (Gill *et al.*, 1993; Wold & Kanna, 1994; Kolt *et al.*, 1999; Kolt & Capaldi, 2001). Conceptual relationships among participation motivation are likely to be based on factors or dimensions of participation motivation, rather than on specific reasons. For this reason a factor analysis was conducted and six factors were labelled: adventure/fun, achievement/acknowledgement, team spirit/affiliation, skill development/physical appearance, competition/challenge and energy release. These factors were used to determine whether there was a relationship between the reasons for sport participation and gender, race and age. In general the similarities between girls' and boys' responses in the current study were more striking than the differences that suggests that there need not be differences in the coaching of boys and girls on high school level. Only moderate effects were found in the relationship between race and sport participation. Practical significant differences were found between the boys and girls with regard to the competition factor. Gender did not have an effect on the other factors. Race had a medium effect on the reasons for sport participation whereas age showed no effect. Findings of the study can provide those who are involved in the world of sport, an awareness and literacy of the reasons why high school pupils participate in sport.

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DIE IDENTIFISERING VAN SPORTPRESTASIEFAKTORE DEUR DIE GEBRUIK VAN REGRESSIE-ANALISE

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ABSTRACT

The objective of this investigation was to establish which factors contribute the most to sporting performance. A total of 198 athletes/players from different fields of sport were selected to participate in the research (88 males and 111 females). The coaches/trainers of the athletes/players were also involved in the project (10 males and 14 females). From a literature study, 22 factors which affect performance, were chosen. A process of elimination was used to select a final nine factors, which, according to the candidates, contributed most to sporting performance: coach/trainer, motivation, setting objectives, self-confidence, interest, concentration, communication, ability and diet. Null-hypotheses were then formulated to determine the correlation between these nine factors and sports performance. In each case, the null-hypothesis could be rejected on the 1% level of significance, which implied that

a positive correlation exist between the different factors and sporting performance. A systematic regression analysis was then undertaken to establish which of the factors measured in the questionnaire, represented the greatest proportion of variation in sporting performance. From the regression analysis it became clear that ability, self-confidence, diet, coach/trainer, motivation and communication are the most significant variables related to sporting performance and account for approximately 49% of the variation in sporting performance.

Key words: Sporting performance factors; Regression analysis; Variation in sporting performance.

INLEIDING

Elke atleet/speler wat aan 'n sportsoort, hetsy 'n spansport of individuele sport deelneem, wil graag presteer. Reeds in 1976 het Scholtz (p.3) die volgende omtrent prestasie gesê: “Die strewe na prestasie word beskou as 'n fundamenteel menslike behoefte of drang. Dis wat in 'n mindere of meerdere mate in alle mense teenwoordig is”. Volgens die skrywer omvat prestasie "letterlik alles wat die mens doen en wat op een of ander wyse aan 'n standaard van voortreflikheid gemeet kan word" (Scholtz, 1976: 36). Deesdae oorheers die wenmotief in enige sportsoort, en sport bied gevolglik geleenthede waar mense hul strewe na prestasie tot die uiterste kan beproef. Eersug en die strewe om ten alle koste te wen, kan vry algemeen by kompetisies waargeneem word. Die oorspronklike, aangename mededinging tussen sportdeelnemers het dus plek gemaak vir ’n uiters kompeterende gees, met oorwinning as die enigste einddoel. Jennings (1993: 29) verduidelik dit soos volg: "Everyone wants to be a winner. Being a winner in sport is defined in an extremely ruthless manner. Achieving the gold medal at the end of the race becomes the sole focus of the media, the public, the coach and the players".

Druk word van oral af op atlete/spelers uitgeoefen om te presteer - deur ouers, onderwysers, toeskouers en ondersteuners. Op internasionale vlak kan groot roem deur sport verwerf word, en daar moet deeglik rekening gehou word met die waarde van sport as ’n propagandamiddel. Daar word nie meer aan sport deelgeneem ter wille van sport nie, maar ter wille van prestasie. Die gesegde: "Dit is nie belangrik of jy wen of verloor nie, maar hoe jy speel", geld nie meer nie. "Winning has become such an overwhelming objective Competition no longer includes co-operation. It has become a life and death battle - on which jobs depend, scholarships hang, salaries hinge, and status comes and goes" (Neal, 1978: 116).

Ten spyte van die verskynsel dat die prestasiemotief allesoorheersend is, staan dit vas dat elke deelnemer aan sport nie altyd as 'n wenner uit die stryd kan tree nie. Sommige deelnemers presteer byvoorbeeld tydens 'n spesifieke byeenkoms uitstekend, maar tydens 'n volgende byeenkoms swakker. Dit dui daarop dat atlete/spelers se voeding, hul motivering, die weersomstandighede, ensovoorts, ’n invloed op hul prestasie kan uitoefen. 'n Ondersoek na die faktore wat die grootste bydrae tot sportprestasie lewer, blyk dus sinvol te wees.

ONTLEDING VAN DIE PROBLEEM

Mense regoor die wêreld ondersteun en moedig hul atlete en spelers aan en verwag ook van hulle om te wen. Wanneer twee internasionale rugby- of krieketspanne byvoorbeeld op die veld draf, sit miljoene mense regoor die wêreld vasgenael voor die televisie om te kyk wie as wenners uit die stryd gaan tree. Groot druk word sodoende op atlete/spelers geplaas. "In a culture where winning is billed as the 'only thing', the pressure to succeed is enormous. Not

only do athletes place upon themselves their own high personal demands, but the expectations of others make finishing anywhere other than first unthinkable" (Gough, 1989: 32). Sport het die eiendom van die massas en die media geword. Sportskares wil opwinding, prestasie, sensasie, rekords, oorwinnings en perfeksie hê. Gevolglik streef atlete/spelers daarna om aan hierdie hoë verwagtinge te voldoen.

Aanleg sal heel waarskynlik deur baie mense beskou word as een van die vernaamste faktore wat sportprestasie bepaal. Aanleg kan omskryf word as die potensiaal waaroor 'n persoon beskik, wat hom/haar in staat stel om 'n bepaalde vermoënsvlak te bereik met 'n gegewe hoeveelheid opleiding of oefening (Jacobs, 1998: 59). Aanleg dui verder op die peil van vaardighede en bekwaamhede wat 'n persoon in staat is om te bereik. Aangesien sommige sportdeelnemers altyd beter as ander presteer, kan daar geredeneer word dat sommige atlete/spelers in 'n spesifieke sportsoort oor 'n beter aanleg beskik, en dus 'n beter kans staan om in dié spesifieke sportsoort te presteer.

Goeie atlete/spelers se *liggaamsbou* is gewoonlik atleties van aard. 'n Oorgewig sportdeelnemer word selde gesien. Wanneer 'n persoon nie goed presteer nie, kan die probleem moontlik gesetel wees in die deelnemer se liggaamsbou en word soms opgemerk dat "die persoon nie gebou is vir (byvoorbeeld) atletiek nie". In hierdie verband merk Neal (1978: 85) die volgende op: "The body build of an athlete should be taken into consideration because it can limit his/her potential in a particular sport".

Motivering is ook 'n belangrike bydraende faktor tot sportprestasie. Hieroor maak Kirkendall *et al*. (Strand & Wilson, 1993: 3) die volgende uitlating: "Motivation is a force that leads individuals to ultimate achievement". Motivering kan beskou word as 'n interne meganisme

wat gedrag inisieer, reguleer en in stand hou. Aangesien motivering 'n interne proses is, kan dit nie altyd direk bestudeer word nie. Tog kan daar wel aannames oor 'n persoon se gemotiveerdheid gemaak word.

Wat opvallend is, is dat dieselfde atlete/spelers op verskillende tye verskillend presteer. Dieselfde atleet of span kan byvoorbeeld tydens een kompetisie uitstekend vaar en maklik wen, terwyl hulle by 'n volgende geleentheid vele foute begaan of uiters swak vaar. Indien 'n span of individue wen, meld hulle dikwels dat hulle gemotiveerd was. Indien hulle egter verloor, skryf hulle dit toe aan gebrekkige motivering.

Dit is moontlik dat atlete/spelers se prestasies deur die *afrigting* wat hulle ontvang, asook deur die sportafrigter, beïnvloed kan word. Moderne sportafrigting is vandag dwarsoor die wêreld in die hande van talle professionele deskundiges wat hul ten doel stel om atlete/spelers tot maksimumprestasie te dryf. Labuschagne (1994: 1) som die vele eienskappe van 'n suksesvolle afrigter soos volg op: "… dit wissel van die vermoë om leiding te gee en entoesiasme, kennis en doelgerigtheid oor te dra, tot die vermoë om menslike oefenfisiologie te begryp en op atlete toe te pas. Die afrigter word ook beskryf as 'n persoon wat weet wat om te doen wanneer atletiekbeplanning skeefloop en die atleet nie na wense presteer nie".

Vir die deelnemer aan sport is die keuse van 'n afrigter van groot belang. As daar byvoorbeeld gekyk word na die Springbok-rugbyspan en die groot bohaai wat oor die keuse van die spanlede en die afrigter gemaak word wanneer die span 'n wedstryd verloor, moet die afrigter van die atleet/speler uiteraard as 'n oorwegende faktor beskou word wat sportprestasie positief of negatief kan beïnvloed. Die belangrike rol wat die afrigter vertolk, word soos volg deur

Labuschagne (1994: 1) beklemtoon: "Uit watter hoek daar ook al na die saak gekyk word, die feit bly staan dat die afrigter 'n sleutelposisie beklee ten opsigte van die sukses van die atleet".

Daar bestaan geen "towerkos" wat 'n atleet/speler in staat stel om beter te presteer nie, maar *dieet* is nietemin vir die deelnemer aan sport belangrik, aangesien enige fisieke aktiwiteit energie vereis, en dié energie word voorsien deur dit wat die persoon eet. 'n Atleet/deelnemer moet daarteen waak om gewig op te tel, omrede dit sy/haar prestasie negatief kan beïnvloed. In hierdie opsig is dit vir atlete belangrik om gesonde en gebalanseerde maaltye te nuttig. Die inname van die korrekte voedselsoorte is noodsaaklik om hul liggame gesond te hou: "Inadequate diets or excesses of any kind can certainly limit and diminish performance or may lead to a nutritional status where the performer is infection- or injury prone" (Ogden *et al.*, 1990: 58).

Die wenmotief is soms so sterk teenwoordig by sommige deelnemers aan sport dat hulle enigiets in hul vermoë sal doen om beter te presteer. As bewys hiervan kan verwys word na die groot aantal atlete/spelers wat hul tot verbode middels wend. Vir die verwerwing van bekendheid en roem sal atlete/spelers dus min dinge ontsien. Ten spyte daarvan dat streng reëls bestaan teen die gebruik van verbode middels en dat die sportdeelnemer wat hom/haar hieraan skuldig maak, lewenslange skorsing in die gesig staar, wend vele deelnemers hul steeds tot dié uitweg.

Ouerbeïnvloeding is 'n belangrike faktor vir sportprestasie (veral by kinders). Ouers kan hul kinders onder geweldig baie druk plaas om te presteer. Labuschagne (1994: 85) sê die volgende hieroor: "Op 'n jeugdige ouderdom is die verwagtinge wat aan die kind gestel word

en die ondersteuning wat hy ontvang, baie belangrik. Baie van die kind se prestasies, hetsy akademies of op sportgebied, is daarop gerig om goedkeuring en ondersteuning uit die omgewing, veral van sy ouers, te verkry". Ouers is geneig om hoë verwagtinge aan hul kinders te stel en kinders is gretig om aan hierdie verwagtinge te voldoen. Hierdie verwagtinge kan egter té hoog aangeslaan word. As die kind voortdurend bewus is daarvan dat hy/sy swakker presteer as wat die ouer van hom verwag, lei dit tot gevoelens van teleurstelling, mislukking en angs by die kind.

Belangstelling vorm deel van die totale persoonlikheid van die mens. Belangstelling is nie 'n vaste gegewe nie, maar kan met verloop van tyd verander. Volgens Oosthuizen (Jacobs, 1998: 87) kan belangstelling omskryf word as "'n persoonlikheidsaspek wat verband het met die voorkeur of afkeur van 'n sekere aktiwiteit of voorwerp". Indien 'n atleet/speler gedwing word om deel te neem aan 'n item of aktiwiteit waarin hy/sy geen belangstelling toon nie, kan dit sy/haar prestasie in dié item of aktiwiteit nadelig beïnvloed.

Lombardo (1986: 130) identifiseer die volgende faktore wat sportprestasie beïnvloed:
1. Genetiese samestelling.
2. Vlakke van fiksheid wat deur fisieke toestand, dieet, slaap en omgewing soos klimaat, hoogte bo seespieël en besoedeling beïnvloed word.
3. Vaardighede en tegnieke.
4. Afrigting.
5. Psige wat doelwitte en opponente insluit.
6. Geluk.

De Villiers (2002: 11-52) onderskei op haar beurt die volgende faktore wat sportprestasie kan

beïnvloed: aanleg, dieet, verbode middels, geslag, motivering, ouerbeïnvloeding, afrigting, selfgesprek, stres en streshantering, aktivering, selfvertroue, doelwitstelling, belangstelling, visualisering, persoonlikheid, konsentrasie, kognitief-geestelike taaiheid (*mental toughness*), lokus van kontrole, kommunikasie en vergoeding.

Uit die voorafgaande blyk dit duidelik dat verskeie ('n magdom) faktore die prestasie van die sportman/sportvrou beïnvloed. Uiteindelik sal dit nodig wees om hierdie groot verskeidenheid faktore af te skaal tot enkele faktore wat die belangrikste bydraes tot die atleet/speler se sportprestasie lewer. Derhalwe kan die volgende vraag gestel word: *Watter faktore dra die meeste by tot sportprestasie in die algemeen?* Om hierdie vraag na te vors, moet 'n regressie-analise van verskeie sportprestasiefaktore gedoen word om daardie faktore te identifiseer wat persentasiegewys die grootste bydrae tot sportprestasie lewer.

EMPIRIESE ONDERSOEK

Altesaam 198 atlete/spelers (verteenwoordig deur studente en hoërskoolleerlinge) van verskillende sportsoorte is op ewekansige wyse geselekteer om aan die ondersoek deel te neem (88 manlik en 111 vroulik). Die sportsoorte is rugby, atletiek, hokkie, netbal, krieket, swem en tennis. Die afrigters van die atlete/spelers is ook by die ondersoek betrek (10 manlik en 14 vroulik). Uit ’n literatuurstudie is die volgende 22 faktore geselekteer wat ’n invloed op prestasie in sport kan uitoefen naamlik: dieet, verbode middels, geslag, motivering, afrigter, ouerbeïnvloeding, selfgesprek, stres, aktivering, selfvertroue, doelwitstelling, belangstelling, visualisering, persoonlikheid, konsentrasie, aggressie, krisishantering, kommunikasie,

kognitief-geestelike voorbereiding, intimidering, aanleg en angstigheid. Hierdie faktore is by ’n vraelys ingesluit en aan die respondente voorgelê. Hulle is gevra om die belangrikheid van die bydrae van hierdie faktore tot prestasie in sport op ’n 9-punt-skaal te beoordeel (1= minder belangrik; 9= baie belangrik). Verder moes die respondente ook elke keer die drie belangrikste faktore (na hulle mening) selekteer en in orde van belangrikheid rangskik. Die respondente is ook in ’n tweede vraelys gevra om hul aanleg in sport en hul sportprestasies op ’n 9-punt skaal te beoordeel (1=baie swak; 9= baie goed). Die afrigters is in ’n aparte vraelys gevra om die aanleg en prestasies van die respondente op ’n 9-punt-skaal te beoordeel (1= baie swak; 9= baie goed). Die gemiddelde punt van die atleet/speler en afrigter is as finale punt vir aanleg en prestasie in sport geneem.

Deur ’n proses van eliminasie is nege faktore (uit die 22) geselekteer wat, volgens die respondente, die belangrikste bydrae tot prestasie in sport lewer. Die faktore is: afrigter, motivering, doelwitstelling, selfvertroue, belangstelling, konsentrasie, kommunikasie, aanleg en dieet. Ten opsigte van die geïdentifiseerde faktore is ’n nul-hipotese gestel om die verband tussen hierdie nege faktore en prestasie in sport te bepaal: *Daar is geen beduidende verband tussen die geselekteerde faktore en sportprestasie nie.* Die resultate van ’n korrelasie-analise verskyn in Tabel 1.

TABEL 1. **DIE VERBAND TUSSEN NEGE GESELEKTEERDE FAKTORE EN SPORTPRESTASIE**

Faktore	r
Afrigter	0.395
Motivering	0.476
Doelwitstelling	0.429

Selfvertroue	0.461
Belangstelling	0.438
Konsentrasie	0.349
Kommunikasie	0.186
Aanleg	0.620
Dieet	0.257

Vir alle gevalle is $p<0.01$ (N=198)

Volgens die berekende korrelasie-koëffisiënte kan die nul-hipotese vir al die faktore op die 1%-peil van beduidenheid verwerp word. Die hoogste korrelasie is dié tussen *aanleg* en sportprestasie (r=0.620). Aanleg is die potensiaal waaroor 'n atleet beskik wat hom/haar in staat stel om 'n bepaalde prestasievlak te bereik. 'n Atleet wat dus aangelê is vir 'n spesifieke sportsoort, beskik oor die vermoë om te presteer in daardie sportsoort. Tussen die faktore *motivering, doelwitstelling, selfvertroue en belangstelling* aan die een kant en sportprestasie aan die anderkant word matige korrelasies aangeteken (sien Tabel 1). Volgens Potgieter en Steyn (1988: 53) is die sleutel tot volgehoue motivering volgehoue sukses. Indien 'n persoon dus sukses behaal, sal hy/sy ook neig om gemotiveerd te wees. Wanneer 'n persoon gemotiveerd is, is sy/haar kans om sukses te behaal, goed. Die bevindinge van die ondersoek ondersteun hierdie aanname. Die positiewe effek van doelwitstelling is reeds goed ondersteun deur navorsing wat op die gebied van sport gedoen is (Potgieter & Steyn, 1988: 51). Die proses van doelwitstelling bied talle voordele aan die atleet, byvoorbeeld beter kommunikasie

tussen die atleet en sy/haar afrigter en die handhawing van motivering by die atleet en die skep van positiewe toekomsverwagtinge. Doelwitstelling bied aan 'n atleet 'n plan van aksie om fisiek te kan werk en sy/haar ideale te bereik. Hoe hoër 'n sportpersoon se selfvertroue dus is, hoe beter sal hy/sy kan presteer. Volgens Hodge (1995: 19) het 'n sportpersoon met selfvertroue 'n realistiese persepsie van en geloof in sy/haar vermoëns, wat vir hom/haar tot hulp kan wees met die bereiking van goeie prestasies. Die bevindinge van die ondersoek ondersteun dus hierdie verband tussen 'n sportpersoon se selfvertroue en prestasie. In die literatuur word na belangstelling verwys as 'n positiewe ingesteldheid teenoor 'n bepaalde aktiwiteit. Indien 'n sportpersoon positief ingestel is teenoor die sportsoort waaraan hy/sy deelneem, sal dit ook lei tot sterker gemotiveerdheid, 'n behoefte om hard te werk om sukses te behaal, ensovoorts. Groter belangstelling in 'n sportsoort kan dus lei tot beter prestasie in dié sportsoort.

Die faktore *afrigter* (wat verwys na die verhouding tussen atleet/speler en afrigter). *konsentrasie en dieet* korreleer laag met sportprestasie (sien Tabel 1). Uit die literatuur het dit geblyk dat die sukses wat 'n atleet behaal, grootliks afhang van die atleet-afrigter-verhouding. Die kennis en vaardighede wat die afrigter aan sy/haar atlete oordra en die atleet se vertroue in die afrigter lei die atleet dus tot beter prestasie. 'n Persoon wat in staat is om goed te konsentreer, kan alle onnodige en oorbodige gedagtes uitsluit en sodoende slegs op 'n spesifieke situasie, in 'n sportman/sportvrou se geval sy/haar kompetisie, fokus. Die vermoë om goed te konsentreer, lei daartoe dat die persoon kalmer is en gevolglik in staat is om beter te presteer. Uit die literatuur (Ogden *et al.*, 1990: 60) blyk dit dat 'n atleet se dieet 'n belangrike bydrae lewer tot sy/haar prestasie. Oefensessies en kompetisies vereis inspanning van atlete, en hul dieet behoort aan hulle die nodige energie te verskaf sodat hulle op hul beste kan funksioneer. Die bevindinge van die ondersoek ondersteun die belangrikheid van die atleet se dieet vir beter sportprestasie. Van die geselekteerde faktore korreleer *kommunikasie* die laagste met sportprestasie (r=0.186). In die literatuur word verwys na die belangrikheid van die verhouding tussen 'n atleet en sy/haar afrigter. Sonder sinvolle, gereelde en effektiewe

kommunikasie is geen behoorlike verhouding moontlik nie. Indien die kommunikasie tussen ’n atleet en sy/haar afrigter effektief is, verhoog dit die atleet se vermoë om te presteer.

Uitvoering van ’n regressie-analise

’n Stapsgewyse regressie-analise is uitgevoer om vas te stel watter van die genoemde faktore die grootste proporsie van die variansie in sportprestasie verklaar. Sportprestasie is gebruik as die afhanklike veranderlike. As onafhanklike veranderlikes is dié veranderlikes (faktore) gebruik wat op sigself ’n beduidende verband met sportprestasie getoon het. Dié veranderlikes (faktore) is afrigter, motivering, doelwitstelling, selfvertroue, belangstelling, konsentrasie, kommunikasie, aanleg en dieet.

Die eerste veranderlike wat in die regressie-analise opgeneem is, is aanleg. Aanleg verklaar die grootste proporsie van die variansie in sportprestasie, naamlik 38.5%. R^2 is beduidend met F (1.196)=122.6; p<0.01.

Die volgende veranderlike wat in die regressie-analise opgeneem is, was selfvertroue. Saam met aanleg verklaar selfvertroue 42.4% van die variansie in sportprestasie. Selfvertroue verklaar met ander woorde 4% meer van die variansie in sportprestasie wat nie alreeds deur aanleg verklaar word nie. R^2=0.424 is beduidend met F (2.195)=71.63; p<0.01.

Die insluiting van dieet veroorsaak ’n verandering van R^2 van 0.424 tot 0.462. wat impliseer dat 46.2% van die variansie in sportprestasie verklaar kan word deur aanleg, selfvertroue en dieet gesamentlik. R^2=0.462 is beduidend met F(3.194)=55.41; p<0.01.

Die insluiting van afrigter as veranderlike veroorsaak ’n verandering in R^2 van 0.462 tot 0.479. Dit impliseer dat 47.9% van die variansie in sportprestasie gesamentlik verklaar kan word deur aanleg, selfvertroue, dieet en afrigter. R^2=0.479 is beduidend met F(4.193)=44.33; p<0.01.

Die oorblywende twee onafhanklike veranderlikes (motivering en kommunikasie) verklaar ongeveer 1% meer van die variansie in sportprestasie wat nie deur die eerste vier veranderlikes verklaar word nie. R^2 het van 0.479 tot 0.486 (48.6%) verander met die insluiting van bogenoemde veranderlikes.

Uit die regressie-analise kan afgelei word dat aanleg, selfvertroue, dieet, afrigter, motivering en kommunikasie die vernaamste veranderlikes is wat met sportprestasie verband hou en ongeveer 49% van die variansie in sportprestasie verklaar.

TABEL 2. **PROPORSIE VAN DIE VARIANSIE IN SPORTPRESTASIE AS VERANDERLIKE DEUR ONAFHANKLIKE VERANDERLIKES**

Stap	Veranderlike	R^2	F	df
1	Aanleg	0.385	122.6	(1.196)
2	Selfvertroue	0.424	71.63	(2.195)
3	Dieet	0.462	55.41	(3.194)
4	Afrigter	0.479	44.33	(4.193)
5	Motivering	0.482	36.04	(5.192)
6	Kommunikasie	0.486	30.10	(6.191)

Vir alle gevalle is p<0.01

GEVOLGTREKKING

Die ondersoek het aangetoon dat die volgende faktore volgens die menings van atlete/spelers en hul afrigters die grootste bydrae lewer tot sportprestasies: afrigter, motivering, doelwitstelling, selfvertroue, belangstelling, konsentrasie, kommunikasie, aanleg en dieet. Verder is aangetoon dat daar ’n positiewe verband tussen hierdie faktore en prestasie in sport bestaan. ’n Regressie-analise van hierdie faktore het aangetoon dat aanleg die grootste proporsie van die variansie in sportprestasie, naamlik 38.5%. verklaar. Ten slotte kan uit die regressie-analise afgelei word dat aanleg, selfvertroue, dieet, afrigter, motivering en kommunikasie die vernaamste veranderlikes is wat met sportprestasie verband hou en ongeveer 49% van die variansie in sportprestasie verklaar.

AANBEVELING

Hoewel die studie ’n waardevolle bydrae tot die verklaring vir sportprestasie lewer, is verdere navorsing nodig om die faktore te identifiseer wat die orige ongeveer 49% van die variansie in sportprestasie sal verklaar.

SUMMARY

The identification of sporting achievement factors by means of factor analysis

The objective of this investigation was to establish which factors contribute the most to sporting performance. A total of 198 athletes/players from different fields of sport were selected to participate in the research (88 males and 111 females). The coaches/trainers of the athletes/players were also involved in the project (10 males and 14 females). From a literature study, the following 22 factors which affect performance were chosen: diet, stimulants, gender, motivation, coach/trainer, the influence of parents, self-respect, stress, activation, self-confidence, setting goals, interest, visualisation, personality, concentration, aggression in sport, communication, cognitive-spiritual preparation, intimidation in sport, ability and anxiety in sport.

These factors were included in a questionnaire which was handed to the participants. They were asked to rate the importance of these factors in sporting performance on a 9-point scale (1 = less important; 9 = very important). Furthermore, they had to (in their opinion) select the three most important factors every time and arrange them in order of importance. They were then given a second questionnaire in which to evaluate their sporting ability and their sporting performance on a 9-point scale (1 = very poor; 9 = very good). Their coaches/trainers were asked in a separate questionnaire to evaluate the performance of the athletes/players on a 9-point scale (1 = poor; 9 =very good). The average score of the athlete/player and the coach/trainer was then taken as the final score for ability and performance.

A process of elimination was used to select a final nine factors (from a total of 22), which, according to the candidates, contributed most to sporting performance: coach/trainer, motivation, setting objectives, self-confidence, interest, concentration, communication, ability and diet. A null-hypothesis was then formulated to determine the correlation between these nine factors and sports performance: *There is no significant correlation between the selected factors and sporting performance.* The results of a correlation analysis appears in Table 1.

In each case, the null-hypothesis is rejected on the 1% level of significance, which implied that a positive correlation exist between the different factors and sporting performance. The highest correlation is found between *ability* and sporting performance (r=0.620). Between the *factors motivation, goal setting, self-confidence and interest* on the one side and sporting performance on the other side, a moderate correlation exist. A low to very low positive correlation exist between the factors *coach* (which refers to the relationship between athlete/player and coach), *concentration, diet and communication* and sporting performance.

Performing a regression analysis

A systematic regression analysis was undertaken to establish which of the factors measured in the questionnaire represented the greatest proportion of variation in sporting performance.

Sporting performance was used as the dependent variable. The independent variables were those variables (factors) which showed a significant correlation with sporting performance. These factors were the coach/trainer, motivation, setting objectives, self-confidence, interest, concentration, communication, ability and diet.

The first variable recorded in the regression analysis was ability. Ability accounted for the greatest proportion of the variation in sporting performance, namely 38.5%. The following variable recorded in the regression analysis was self-confidence. Together with ability, self-confidence accounted for 42.4% of the variation in sporting performance. In other words, self-confidence accounted for 4% more of the variation in sporting performance not already represented by ability.

The inclusion of diet resulted in a change in R^2 of 0.424 to 0.462, which implied that 46.2% of the variation in sporting performance can be accounted for by ability, self-confidence and diet together.

The inclusion of coach/trainer resulted in change in R^2 of 0.462 to 0.479. This implied that 47.9% of the variation in sporting performance can be accounted for by ability, self-confidence, diet and coach/trainer together.

The two remaining variables (motivation and communication) accounted for approximately 1% more of the variation in sporting performance than the first four variables. R^2 changed from 0.479 to 0.486 (48.6%) with the inclusion of the above-mentioned variables.
From the regression analysis it can be concluded that ability, self-confidence, diet, coach/trainer, motivation and communication are the most significant variables related to sporting performance and account for approximately 49% of the variation in sporting performance.

Recommendation

Although this study made a valuable contribution to explaining sporting performance, further research is necessary to identify what could account for the approximately 49% of variation remaining in sporting performance.

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EXPLORING THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY, PSYCHOLOGICAL WELL-BEING AND PHYSICAL SELF- PERCEPTION IN DIFFERENT EXERCISE GROUPS

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ABSTRACT

The value of various forms of physical activity, exercise and sport in health promotion is universally acknowledged. This research compared psychological well-being and physical self-perception of persons who regularly engage in various forms of physical activity, exercise and sport with a control group of non-exercisers. Different physical activities selected included health club exercises (mainly resistance training), hockey (a team sport), and running (mainly aerobic exercise). Main findings were that persons engaging in regular physical activity perceived themselves as having more autonomy, personal growth, environmental mastery, purpose in life, positive relations with others, self-acceptance, sport competence and conditioning than non-exercisers. Regular exercisers also attached more importance to sport, conditioning, body attractiveness and strength than non-exercisers. Hockey players perceived themselves as having more positive relations with others and sport competence than either health club members or runners. The relevance of these findings and further implications for health and sport psychological research and interventions were discussed.

Key words: Physical activity; Psychological well-being; Physical self-perception.

INTRODUCTION

The value of various forms of physical activity, exercise and sport for the promotion of health

in general and mental health in particular has been emphasised in recent research and intervention programmes (Fox, 2000a; Edwards, 2003). From an international perspective, since about 1980, there seems to have been less emphasis on international dominating types of competitive physical activity as in the Olympic Games, and more recognition given to physical activity as a multifaceted social enterprise, where the meaning and motive of the physical activity are based on the choice of a specific exercise or sport setting (Stelter, 2003). The terms exercise and sport refer to organised forms of physical activity that take place in various contexts for competitive, play, health, well-being, recreational and other reasons. The terms overlap considerably and are conveniently defined in terms of personal reasons chosen for the activity and the contexts in which such activities occur. For example, hockey might be meaningfully defined as a competitive sport for one provincial player trying to be selected for the national team and as an activity undertaken for exercise, health and social reasons by another.

Sport and exercise psychology refer to two interrelated yet distinct sciences of human behaviour, with particular theoretical and practical applications in sport and exercise contexts respectively. As academic and professional disciplines, sport and exercise psychology have developed rapidly over the past 30 years. In their related concerns with the psychology of sport and exercise, they are often treated together for convenience as evident in the official journal of the European Federation for Sport Psychology (FEPSAC), the *Psychology of Sport and Exercise*, first published in 2000 and official journal of the International Society for Sport Psychology, the *International Journal of Sport and Exercise Psychology*, first published even more recently in 2003. This latter journal reflects the beginning of comprehensive academic and professional reflexivity, experienced by those fortunate to attend the Tenth World Congress of Sport Psychology in Skiathos, 2001, in articles tracing the history of the society, as well as training, selection and competencies required of sport and exercise psychologists (Morris *et al*., 2003; Morris, Hackfort & Lidor, 2003; Tenenbaum *et al*., 2003).

Psychological well-being and its subset of physical self-perception

In 1946, the World Health Organization (WHO) defined health in terms of not merely the absence of disease, but also as state of complete physical, mental and social well-being (WHO, 1946). Positive mental health and/or psychological well-being have been the subject of extensive research (Jahoda, 1958; Wolman, 1965; Wissing & van Eeden 1998; Cowan, 2000; Edwards, 2002; Wissing & van Eeden, 2002). While mental health generally implies some experience of psychological well-being, in the context of the present research "psychological well-being" also refers to a particular empirical construct, conceptually and theoretically grounded on various research traditions which lead to the establishment of a specific measurement scale (Ryff, 1989). It should therefore be distinguished from the popular neo-Adlerian concept of wellness, which refers to a general approach for improving quality of life through healthy and integrated styles of living (Sweeney & Witmer, 1991).

Although illness and well-being are typically conceptualised as existing on a continuum, general and psychological well-being may also be considered as independent dimensions, distinct from illness. From phenomenological, cognitive and positive psychological and public health perspectives, there is clear evidence that positive and negative aspects of experience are best conceptualised in terms of two distinct systems, that it is important to consider both in

understanding health, that absence of the negative (or positive) is different from presence of the positive (or negative) and that prevention and promotion principles and strategies respectively apply. That is to say that, along with preventing distressing experiences, psychological well-being research and practice is concerned with the promotion of positive experiences, health, strength, resources, supplies, competencies and skills. Secondly, conceptualisations of psychological well-being in the literature have been very diverse, which is understandable when we consider that it is a transient situation, which is multi-factorial in etiology, process and promotion. For example, factors that define psychological well-being will differ at different ages and in different circumstances. Thirdly, psychological well-being has multidimensional personal, transactional and environmental determinants, which become more complex as the human life cycle progresses. Environmental factors also include non-psychological factors such as housing, food and employment. Fourthly, it is better to promote psychological well-being than prevent factors impeding well-being. Fifthly, in that there are various conceptual routes to psychological well-being, there are various methods to measure

and promote it (Jahoda, 1958; Wolman, 1965; Wissing & Van Eeden 1998; Cowan, 2000; Edwards, 2002; Wissing & van Eeden, 2002).

Ryff's (1989) objective, standardised scale of Psychological Well-Being (PWB) was theoretically grounded on Maslow's (1968) conception of self-actualisation, Rogers' (1961) view of the fully functioning person, Jung's (1933) formulation of individuation, Allport's (1961) conception of maturity, Erikson's (1959) psychosocial stage model, Buhler's (1935) basic life fulfillment tendencies, Neugarten's (1973) descriptions of personality change in adulthood and old age and Jahoda's (1958) six criteria of positive mental health (Keyes *et al*., 2002; Ryff, 1989). The scale is presently regarded as the best objective, standardised measure of psychological well-being (Conway & Macleod, 2002) and, in view of methodological weaknesses and lack of consensus concerning the measurement of psychological well-being in physical activity research (Biddle *et al.,* 2000), its use is recommended in future research to facilitate comparisons across studies in exercise and sport contexts.

The PWB scale includes six subscales of psychological well-being in self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth. These subscale dimensions are essentially the same as the criteria elicited by Jahoda in her extensive review (Jahoda, 1958). Four of the dimensions are essentially the same: self-acceptance, autonomy, personal growth and environmental mastery. While Ryff's (1989) dimensions of positive relations with others and purpose in life are given distinct status, rather than Jahoda's (1958) broad criteria of personal integrity and perception of reality, these dimensions are basically different combinations of Jahoda's (1958) criteria in the light of subsequent theory and research.

Research with the PWB scale has revealed that psychological well-being develops through a combination of emotional regulation, personality characteristics, identity and life experience (Helson & Srivastava, 2001), increases with age, education, extraversion and consciousness and decreases through neuroticism (Keyes *et al*., 2002). Similar to Erikson's (1959) theoretical perspective, each psychological well-being dimension can be viewed as articulating a form of life challenge; self-acceptance of personal strengths and limitations, developing and maintaining positive relations with others, mastering the environment so as to

meet needs and desires, seeking autonomy through self-determination and personal authority, finding personal meaning through purpose in life and optimising unique abilities and talents through personal growth. In both Jahoda's (1958) and Ryff's (1989) research the most commonly occurring theme centers around various perspectives on the self, which is especially meaningful if credence is given to Leahey's (1980) view of the history of psychology as humanity's attempt to understand the self.

While most human beings have some experience of self, as a fundamentally complex concept, the self is essentially socio-culturally constructed. The term self-acceptance implies some sense or perception of self, leading to the related more abstract and evaluative terms of self-concept and self-esteem respectively. The self can be conceptualised in various forms. William James (1890) distinguished between self as subject and self as object, as well as referring to different forms of material, social and spiritual selves. Yogis' view a goal of yoga as union of personal and universal self (Reid, 2001). Post-modern conceptualisations of human functioning include multiple selves–in-context (Sparkes, 1997). The focus of this research is on physical self-perception.

Physical self-perception may be viewed as a sub-set of global self–concept. Physical self-esteem, which refers to the evaluative element of self-concept, may be viewed as sub-set of global self-esteem, psychological well-being, health and life (Fox, 1990; Fox, 1997; Fox, 2000a). Fox (1990) has developed a Physical Self-Perception Profile (PSPP), which describes self-perception in terms of five categories. Sport competence refers to perceptions of sporting ability, ability to learn sport skills and confidence in a sporting environment. Physical conditioning includes perceptions of level of physical condition, stamina and fitness, ability to maintain exercise and confidence in the exercise setting. Body attractiveness refers to perceived attractiveness of physique, ability to maintain an attractive body and confidence in appearance. Physical strength includes perceived strength, muscle development and self-assurance in situations requiring strength. Physical self-worth or self-esteem is a general measure of physical self-perception, which includes global feelings of happiness, satisfaction, pride, respect and confidence in the physical self. The PSPP includes a Perceived Importance Scale that is used to assess the degree of meaning associated with the individual's sport competence, physical condition, body attractiveness and physical strength. Perceived importance is linked to self-perception and has an impact on an individual's overall self-worth (Fox, 1990; Fox, 1997). The PSPP is an indicator of psychological health and well-being of particular relevance in various health, physical activity, exercise and sport settings.

Psychological well-being and physical self-perception in exercise and sport

Research has demonstrated that psychological well-being is promoted through regular exercise and sport, which occurs for at least twenty minutes a day, three or more times a week (Sinyor *et al*., 1983; Pate *et al.*, 1995; Scully *et al.*, 1998; Biddle *et al.*, 2000; Yiannakis *et al*., 2001; Edwards, 2002). Regularly exercising health club members were found to be more psychologically well than irregular exercisers (Edwards, 2003). Similar improved psychological well-being has been found with swimming, yoga and fencing (Berger & Owen, 1998), rugby (Maynard & Howe, 1987), karate, weight training and jogging (McGowan *et al*., 1991). In addition, Krawczynski and Oszewski (2000) were able to demonstrate the longitudinal effectiveness of a physical activity programme on the psychological well-being of

persons over sixty years of age.

Psychological explanations of why exercise enhances psychological well-being include the following: enhanced feelings of control, improved self-concept, self-esteem and self-efficacy and more positive social interactions (Scully *et al.*, 1998). The role of social agents as additional determinants of psychological well-being indicates the need for health workers to promote social exercise and team sport in particular. Furthermore exercise has been found to increase academic performance, assertiveness, confidence, emotional stability, intellectual functioning, internal locus of control, memory, perception, positive body image, self-control, sexual satisfaction, well-being and work efficacy and decreases: absenteeism at work, alcohol abuse, anger, confusion, depression, headaches, hostility, phobias, psychotic behaviour, tension, type A behaviour and work errors (Weinberg & Gould, 1999).

Many research studies involving randomised controlled trials addressing the effect of exercise on physical self-perceptions have produced sound evidence that regular physical activity can improve physical self-perceptions in various age groups and contexts, although the association with global self-esteem is weak and inconsistent (Fox, 2000b; Fox, 2000c). Physical activities researched in relation to physical self-perception have included various team and individual,

endurance and resistance activities such as physical education classes, jogging, running, swimming, gymnastics, volleyball, yoga, weight training, specific aerobic sessions, progressive relaxation, walking, tai chi, back exercises, cross country cycling (Asci *et al*., 1998; Chow & Tsang, 2001; Fox 2000b; Fox, 2000c; Newsham, 2001; Goni & Zulaika, 2000). The intimate relationship between exercise and physical self-perception in elite sport has been demonstrated in a one year study following the Sydney Olympics where athletes in transition out of competition showed decreased physical self-esteem and global self-esteem during an adjustment stage of six months before a period of adaptation and increase in physical and global self-esteem (Stephan *et al*., 2003).

PSPP norms also show that males generally have higher perceptions of body attractiveness, physical conditioning, sport competence and strength than females (Caglar *et al*., 2001; Hayes *et al*., 1999). Maschette and Sands (2001) research findings indicated that males and females focus on different areas of the body after exercising. Having a shapely body is an important motivating factor for many women who exercise (Minarikova & Stackeova, 2001) and Silva *et al*. (2001) found that girls have higher fat perception and body dissatisfaction than boys. Although high levels of self-confidence result in greater sporting performance, no significant difference in body image between exercisers and non-exercisers has been found (Silva *et al*., 2001; Vealey *et al*., 2001).

An extensive review of the literature has revealed that, while there are exceptions and some contradictory results, most research studies have indicated that both individual and team, resistance and aerobic activities are generally related to improved mental health, well-being and physical self perception (Biddle *et al*., 2000*;* Edwards, 2002; Fox, 2000a; Fox, 2000b; Fox, 2000c; Scully *et al*., 1998; Weinberg & Gould, 1999). However, studies on physical activity and psychological well-being have lacked both clarity on this concept as well as an objective, standardised measure of psychological well-being. No research has specifically examined the relationship between psychological well-being, physical self-perception and

regular physical activity involving both individual and team, aerobic and resistance activities. It was considered that such a study could yield valuable scientific information of practical value in exercise and sport psychological interventions.

AIM

The specific aim of this research was to compare the psychological well-being and physical self-perception of persons involved in various forms of regular physical activity, exercise and sport, with a control group of students, who exercised irregularly and did not participate in organised sport. Physical activities were selected to represent aerobic exercise (running), resistance training (health club activities) and a team sport (hockey).

HYPOTHESES

Firstly, it was hypothesised that persons who engage in regular physical activity of whatever form would have significantly higher psychological well-being and physical self-perception scores than irregular exercisers. Secondly, it was expected that compared to other forms of physical activity, health club members, hockey players and runners would score differentially higher on strength, sport competence and conditioning respectively.

Subsidiary hypotheses were that men would score higher than women on the Physical Self-Perception Scale (PSPP) scale, as has been evident in earlier research, and that the Psychological Well-being (PWB) and PSPP scales would be positively correlated, as physical self-perception is conceptualised as a component of psychological well-being.

METHOD

Participants

The total sample consisted of 277 participants, 183 women and 94 men. This consisted of convenience samples of 169 regular exercisers (69 health club members, 60 hockey players and 40 runners) and a control group of 108 non-exercising students from the Universities of Natal and Zululand in South Africa. Regular exercise was defined as occurring at least 30 minutes a day, at least three times a week**.** The mean age of the sample was 25.2 with a standard deviation of 8.7 and range of 16 to 64 years. The mean age of the women was 25.7 and the men 24.2 years. Home language distribution consisted of 109 Zulu, 39 English, 30 Siswati, eight Xhosa and two Afrikaans speakers.

This essentially exploratory study was based on the assumption that these convenient samples of physical activities would in fact represent aerobic exercise (running), resistance training (health club activities) and a team sport (hockey) and that sufficient sample sizes would cancel out any possible confounding of variables through selection of individuals who represented either or both of the other activities. Clearly such relatively small sample sizes constitute a research limitation, which is discussed in the results section.

Measuring instruments

Ryff's (1989) short standardised 18 item scale of objective psychological well-being was used to assess the participants on the six dimensions of well-being: self-acceptance, positive relations, autonomy, environmental mastery, purpose in life and personal growth.

This scale has also been standardised through comparisons with subjective measures of psychological well-being (life satisfaction, positive and negative affect), is significantly linked to personality factors (Schmutte & Ryff, 1997) and has been cross-culturally validated (Staudinger *et al*., 1999).

The six subscales have high levels of internal consistency: positive relations with others .88, autonomy .83, environmental mastery .86, personal growth .85, purpose in life .88, and self-acceptance .91. The six subscales have high levels of correlation with the 20-item parent scale: positive relations with others .98, autonomy .97, environmental mastery .98, personal growth .97, purpose in life .98, and self-acceptance .99. The scale has a .89 level of AGFI (adjusted goodness-of-fit index) suggesting that it is a very-good-fitting model. The combined scores on the six dimensions can also be used for an overall well-being percentage (Ryff**,** 1989).

Fox's (1990) Physical Self-Perception Profile (PSPP) was used to assess participants on five subscales each composed of six questions. These subscales are: sports competence, physical condition, body attractiveness, physical strength and physical self-worth. Each of the 30 questions is divided into two sub questions. Respondents were required to answer the sub

question which most related to them, ticking off either "sort of true for me" or "really true for me". The PSPP has a high internal consistency of .81 for males and .92 for females. The item total correlation score for all the subscales is .69 for females and .63 for males.

The Physical Self-Perception Profile has wide cross-cultural applicability, internal consistency and reliability and has been translated into various languages (Asci *et al*., 1999; Thogersen & Fox, 2001; Van de Vliet *et al*., 2002). The Perceived Importance Profile that was constructed to accompany the PSPP was used to assess perceived importance of the physical self-perception of the participants on the same subscales.

Procedure

A well-being questionnaire, which included the PWB and PSPP, was used to collect biographical data as well as type, frequency, intensity and duration of main exercise and sporting activities. An SPSS statistical programme was used to analyse data. In the following results tables, dependent variables from the Ryff and Fox scales are coded as follows: autonomy (a), personal growth (pg), environmental mastery (em), purpose in life (pl), positive relations with others (pr), self acceptance (sa), sport competence (sp), conditioning (co), body attractiveness (bo), strength (st), physical self worth (psw), sport importance (spi), conditioning importance (coi), body importance (boi) and strength importance (sti). The single (*) and double asterisks (**) indicate significant findings at the five and one percent level of significance respectively. Non-significant findings are designated as NS.

RESULTS AND DISCUSSION

Table I refers to the mean scores on dimensions of the PWB and PSPP scales of 169 regular exercisers (69 health club members, 60 hockey players and 40 runners) and control group of 108 non-exercisers**.** Analysis of variance of this data supported hypotheses in revealing that regular exercisers scored significantly higher than controls on 11 of the 15 dimensions of psychological-well-being and physical self-perception. The specific F ratios for the dimensions were as follows: autonomy (11.3**), personal growth (35.4**), environmental mastery (9.6**), purpose in life (149.2**), positive relations with others (81.6**), self acceptance (50.4**), sport competence (41.3**), conditioning (28.1**), body attractiveness (.2 NS), strength (.1 NS), physical self worth (3.7 NS), sport importance (11.7**), conditioning importance (28.1**), body importance (31.0**), strength importance (.6 NS).

Inspection of Table 1 reveals that the mean scores of two of the four insignificant comparisons (body attractiveness and strength importance) are in the expected direction of exercisers scoring higher than controls. In view of the general pattern of other significant trends, the unexpected higher mean scores of non-exercisers on strength and physical self-worth could be simply due to overestimation of non-exercisers and/or underestimation of exercisers in their perceptions of these variables.

Further analysis of variance with Tukey HSD multiple comparisons between the different exercise types, revealed that health club members scored significantly higher than controls on autonomy, personal growth, environmental mastery, purpose in life, positive relations, self acceptance, sport competence, conditioning, conditioning importance and body importance. Hockey players scored significantly higher than controls on personal growth, purpose in life,

positive relations, self acceptance, sport competence, conditioning, sport importance, conditioning importance and strength importance.

TABLE 1. **MEAN SCORES OF REGULAR EXERCISERS (HEALTH CLUB MEMBERS, HOCKEY PLAYERS AND RUNNERS) ON DIMENSIONS OF PSYCHOLOGICAL WELL-BEING AND PHYSICAL SELF-PERCEPTION**

	a	**pg**	**em**	**pl**	**pr**	**sa**	**sp**	**co**	**bo**	**st**	**psw**	**spi**	**coi**	**boi**	**sti**
Exercisers (N=169)	13.7	15.5	13.3	14.1	13.7	14.6	16.4	16.8	15.4	15.3	16.2	5.9	6.2	6.0	5.8
Health (N=69)	13.9	15.6	13.6	13.9	12.5	14.3	15.2	16.3	15.9	15.1	16.1	5.4	6.1	6.2	6.0
Hockey (N=60)	13.5	15.5	12.4	14.5	14.6	15	18.3	17.8	15	15.6	16.5	6.2	6.2	5.7	5.3
Runners (N=40)	13.9	15.3	13.9	13.9	14.3	14.6	15.6	16.2	15.1	15.2	15.6	6.2	6.3	6.1	6.2
Control (N-108)	12.5	13.6	12.0	9.6	9.9	12.2	13.3	14.4	15.1	15.5	17	5.2	5.2	5.0	5.6
Women (N= 183)	13.1	14.6	12.8	11.9	11.9	13.4	14.3	15.1	14.7	15.2	16.4	5.4	5.6	5.5	5.8
Men (N=94)	13.5	15.1	12.8	13.2	12.8	14.2	16.9	17.3	16.4	15.8	16.7	6.0	6.1	5.8	5.7

Runners scored significantly higher than controls on autonomy, personal growth, environmental mastery, purpose in life, positive relations, self acceptance, sport competence,

conditioning, sport importance and conditioning importance.

Significant comparisons between the three types of physical activity indicated that hockey players and runners scored higher than health club members on positive relations, hockey players scored higher than both health club members and runners on sports competence and runners scored higher than hockey players on strength importance.

The second main hypothesis was thus partially confirmed in the differentially higher scores of the hockey players on sports competence, but no significantly higher scores of the health club members on strength or runners on conditioning were recorded. This could be due to confounding variables in the design of the questionnaire, which simply asked participants for their main type of exercise or sport. It is conceivable that many of the exercisers also participated in one or both of the other two types of sport in the present investigation. For example, it is possible that the finding that runners scored higher than hockey players on strength importance could be related to perceptions based on more actual resistance training amongst runners. Such limitations could have been better controlled for with more specific questions that ruled out the presence of other activities and/or the use of larger samples.

The insignificant results could be due also to the possibility that the chosen physical activity categories of health club and running do not sufficiently reflect resistance and aerobic training respectively. The failure of the health club members to score higher on strength could simply be due to sample members de-emphasising resistance training in their health club activities. On the other hand the choice of hockey as an example of a team sport seems to have been vindicated. The fact that hockey players also scored higher on positive relations with others indicates that hockey players in this sample perceived themselves to be generally more social

and team orientated than participants engaging primarily in health club or running activities. In view of the current very limited scientific evidence base, further research is needed to determine the impact, interaction or specific contribution of social and team factors in promoting psychological as well as physical and social well-being in social exercise and team sport contexts. Similarly, the recent Chief Medical Officer's report in the United Kingdom is of the opinion that the impact of physical activity on social outcomes is greater than the limited evidence base suggests and has also called for more research in this area (Department of Health, Physical Activity, Health Improvement and Prevention, 2004).

In comparisons amongst the three forms of physical activity, hockey players have generally scored higher on psychological well-being and physical self-perception than health club members or runners. Their higher scores on the variable of positive relations with others and the social nature of team sports relates to research on the importance of social support in the promotion of mental health (Orford, 1992; Edwards, 2002). Furthermore although running and health club activities have been generally distinguished as individual sports in this research, both also provide considerable social support to exercisers. Previous research found that regularly exercising health club members scored significantly higher than irregular exercisers on a standardised scale of fortitude, which included many social support items. Further exercise and sport research, which included a specific social support scale such as that of Procidano and Heller (1983) would be valuable in further investigating this relationship.

The value of various forms of physical activity, exercise and sport for the promotion of mental health has been emphasized in recent research and intervention programmes (Fox, 2000a; Edwards, 2002; Edwards, 2003). The findings support and extend earlier studies on the general beneficial, effects of aerobic, resistance and team sport orientated, physical exercise on mental health and psychological well-being (Sinyor *et al*., 1983; Roth & Holmes, 1985; Hayes & Ross, 1986; Stephens, 1988; Berger, 1994; Pate *et al*., 1995; Anshel, 1996; Berger, 1996; Scully *et al*.1998; Summers, 1999; Biddle *et al*., 2000; Fox, 2000a; Berger, 2001; Biddle & Faulkner, 2001). These findings provide further motivation for the recommendation that health professionals in general and mental health workers in particular should routinely consider referrals of persons with mental health and/or stress related problems to health clubs as well as recommending regular, moderate exercise, suitable for and enjoyed by the particular client or patient concerned.

Previous research established the benefits of regular over irregular exercise and that health club members were more mentally healthy and/or psychologically well than non-members (Edwards, 2003). The present results provided further support for the vital role that health clubs and regular exercise play in the promotion of mental health and well-being. In particular, the present research also emphasised the value of running and hockey, as regular social and team orientated sport, in the promotion of mental health.

No previous research has investigated the relationship between health club activities, hockey, running and psychological well-being. While no causal inferences or directions can be made, as the research was correlational in nature, enhanced perceptions of psychological well-being and physical self-perception related to health club activities, hockey and running were clearly evident in comparison with the non–exercising control group. In addition to the need for randomised controlled trials to demonstrate the specific effect of various forms of physical activity on psychological well-being as measured on standardised scales, future research

should also not neglect qualitative inquiry in order to continue to research best practice models of empathically fitting individualised physical activity interventions appropriate for specific people and contexts. Such limitations in the present research have also been addressed elsewhere (Fox, 1997; Stelter, 1998; Fox, 2000b; Fox, 2000c; Stelter, 2000; Edwards, 2001; Stelter, 2001; Edwards, 2002; Stelter, 2003).

As previously mentioned this study was based on the assumption that these convenient samples of physical activities would in fact represent aerobic exercise (running), resistance training (health club activities) and a team sport (hockey) and that sufficient sample sizes would cancel out any possible confounding of variables through selecting individuals who represented either or both of the other activities. While the hypothesis related to hockey was confirmed**,** confounding variables and relatively small sample sizes were probable reasons that health club members and runners did not score differentially higher on strength and conditioning respectively. In practice, health club members are typically involved in both aerobic and resistance training, and many runners complement their running programmes with resistance training in the form of home gyms or at least dumbbells. Future research investigating these associations further needs to exclude any such possible confounding variables.

Analysis of variance of sex differences supported the findings of earlier research (Fox, 1990) with regard to men scoring higher on sport (*F*=27.2**), conditioning (*F*=20.1**), body (*F*=13.3**), sport importance (*F*=7.2**) and conditioning importance (*F*=6.3**). This first subsidiary hypothesis was further supported with multivariate analysis to investigate the influence of gender on physical activity, which indicated significant differences between men and women on 10 of the 15 subscale dimensions, namely autonomy, personal growth, environmental mastery, purpose in life, positive relations with others, self-acceptance, sport competence, conditioning, conditioning importance and body importance. Further multivariate analyses, with regularity and type of exercise as fixed factors and gender, age and language and covariates, confirmed these findings while correcting for any independent effects of gender, age and language on regularity and type of exercise. In this latter analysis, while no significant influences of age or language were observed, gender was related to perceptions of sport competence (F=9.3**), conditioning (F= .0**), and body attractiveness (F=13.5**).

Other findings with regard to multivariate analyses performed on the data, which need brief reporting as relevant but peripheral to the present study were the significant influences of frequency of exercise on conditioning; of duration on self-acceptance, sport competence, conditioning and strength, and of intensity on positive relations with others, sport competence and perceptions of the importance of sport, conditioning, body attractiveness and strength.

From Table 2, it can be observed that out of a total of 105 possible correlations amongst the subscales of the two measures, there were 99 positive correlations, 65 of which reached significance. None of the six small negative correlations were significant. Table 2 therefore provided general support for the second subsidiary hypothesis that subscale dimensions would be positively correlated with each other.

TABLE 2. **CORRELATIONAL MATRIX OF PSYCHOLOGICAL WELL-BEING AND PHYSICAL SELF-PERCEPTION DIMENSIONS**

	a	pg	em	pl	pr	sa	sp	co	bo	st	psw	spi	coi	boi	sti
a															
pg	**.39****														
em	**.36****	**.39****													
pl	**.28****	**.47****	**.33****												
pr	**.38****	**.42****	**.39****	**.46****											
sa	**.28****	**.39****	**.36****	**.42****	**.40****										
sp	**.02**	**.17****	**.01**	**.20****	**.20****	**.22****									
co	**.03**	**.10**	**.07**	**.19****	**.17****	**.13***	**.70****								
bo	**.05**	**.07**	**.10**	**.00**	**.06**	**.01**	**.40****	**.50****							
st	**.02**	**.03**	**.07**	**-.03**	**.08**	**.04**	**.51****	**.52****	**.50****						
psw	**.07**	**-.01**	**.11**	**-.01**	**.02**	**-.01**	**.37****	**.52****	**.60****	**.58****					
spi	**.05**	**.09**	**.03**	**.14**	**.15***	**.18****	**.36****	**.27****	**.19****	**.21****	**.10**				
coi	**.16**	**.17****	**.21****	**.24****	**.27****	**.19****	**.26****	**.34****	**.13***	**.14***	**.10**	**.40****			
boi	**.10**	**.17****	**.12**	**.23****	**.20****	**.24****	**.20****	**.15***	**.15***	**.12*.10**	**-.03**	**.37****	**.41****		
sti	**.12***	**-.00**	**.10**	**.06**	**.10**	**.13***	**.09**	**.11**	**.15***	**.26****	**.08**	**.37****	**.44****	**.54****	

As expected the six well-being dimensions all correlated positively and significantly with each other. Similarly positive significant correlations were found amongst the nine physical self-perception measures. Weaker, mostly positive correlations were found across the two scales. Out of a possible 54 cross scale correlations, there were 21 significant, positive correlations.

Table 2 revealed the following significant positive correlations across the two scales: autonomy correlated significantly with conditioning importance (.16) and strength importance (.12), personal growth correlated significantly with sport competence (.17), conditioning importance (.17), and body importance (.17); environmental mastery correlated significantly with conditioning importance (.21); purpose in life correlated significantly with sport competence (.20), conditioning (.19), conditioning importance (.24), and body importance (.23); positive relations correlated significantly with sport competence (.20), physical conditioning (.17), sport importance (.15), conditioning importance (.27) and body importance (.20), and self-acceptance correlated significantly with sports competence (.22), conditioning (.13), sport importance (.18), conditioning importance (.16), body importance (.16) and strength importance (.13).

No previous research has used both the Ryff (1989) and Fox (1990) scales of psychological well-being and physical self-perception concurrently. These standardised scales were found to be brief, easy to use, reader friendly and comparable. The results generally indicated the two scales were moderately positively correlated. This supported the second subsidiary hypothesis and was expected in view of conceptualisation that physical self-perception is a component of psychological well-being.

CONCLUSION

The value of various forms of physical activity, exercise and sport for the promotion of mental health has been emphasised in recent research and intervention programmes. The present research was conducted to investigate the relationship between different types of regular exercise: health club activities, hockey and running when compared to a non-exercising control group and in relation to components of psychological well-being and physical self perception as standardised by Ryff (1989) and Fox (1990).

Data analysis revealed moderate positive correlations within and between the two scales, supporting the conceptualisation that physical self-perception is a subsystem of the more general construct of psychological well-being. As in previous research, men generally scored higher than women on the physical self-perception scales and the influence of gender on physical activity was also indicated through significant differences between men and women on 10 of the 15 subscale dimensions, namely autonomy, personal growth, environmental mastery, purpose in life, positive relations with others, self-acceptance, sport competence, conditioning, conditioning importance and body importance.

Comparisons between health club members, hockey players, runners and a control group of non-exercising students revealed that all three forms of physical activity were associated with higher scores on the psychological well-being and physical self-perception scales than the control group. More specific findings were that persons engaging in regular physical activity perceived themselves to be having more autonomy, personal growth, environmental mastery, purpose in life, positive relations with others, self-acceptance, sport competence and conditioning than non-exercisers. Regular exercisers also attached more importance to sport, conditioning, body attractiveness and strength than non-exercisers. The findings highlighted the importance of the relationship between social or team sport factors and physical activity. Hockey players perceived themselves as having more positive relations with others and sport

competence than either health club members or runners. These findings support and extend health promotion research on the general beneficial effects of team and individual, aerobic and resistance orientated physical activity, exercise and sport on mental health, psychological well-being and physical self-perception.

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A METHOD FOR THE COMPARISON OF THE BOWLING PERFORMANCES OF BOWLERS IN A MATCH OR A SERIES OF MATCHES

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ABSTRACT

The combined bowling rate (CBR) has been developed (Lemmer, 2002) as a single measure

to assess the bowling performance of a bowler. Its calculation makes use of O, the number of overs bowled, R, the number of runs conceded and W, the number of wickets taken. It was, however, mentioned that it might be desirable to weight the wickets of top order batsmen higher than those of lower order batsmen. This is especially important if one wants to compare the bowling performances of the bowlers in a single match because it is far more difficult to get a top quality batsman out than a tail-ender. Normally a bowler claiming the top three batsmen's wickets ought to get much more credit than one who gets the three tail-enders' wickets. This can be accomplished by giving weights to the wickets and replacing W, the number of wickets taken, in the CBR formula by W, the sum of the weights of the wickets taken by the bowler. This paper develops suitable weights and uses these to rate the bowlers who were involved in the 2003 npower Test series between South Africa and England. From the results the need is observed for a measure that is more sensitive to a bowler's ability to take wickets and this is resolved by means of a modification of CBR. The dynamic bowling rate (DBR) is defined and is used to give the final ratings.*

Key words: Bowlers; Bowling performance; Combined bowling rate; Cricket; Comparison of bowlers; Dynamic bowling rate; Weights in the calculation of CBR and DBR.

INTRODUCTION

In the development of the combined bowling rate (CBR), it was emphasised (Lemmer, 2002) that a bowler must have bowled a sufficient number of overs (say at least 100) before reasonable comparisons can be made. The rationale was that if a bowler has bowled a large number of overs and taken many wickets, he would have bowled against batsmen of various abilities (top and lower order batsmen) under a variety of circumstances on all kinds of pitches and in different countries. This would have resulted in a balancing-out effect of most factors determining the success of the bowler. But in the case of a small number of overs bowled, these arguments are not realistic. It is therefore necessary to weight the wickets taken by the bowler.

In the selection of a team it is not only useful to compare bowlers by means of measures such as CBR based on career figures, but it is also very important to take into account each bowler's recent form, i.e. how he has bowled in his last one or two matches. There is therefore a need to adjust CBR to be applicable after an individual match or a short series of matches.

The main purpose of this study is to provide a useful yet simple aid for selecting teams. The bowling measure must enable selectors to use simple match statistics. It must be easy to apply and make the use of complicated calculations unnecessary.

METHODS

In W, each wicket has a weight of one – one simply counts the number of wickets taken by the bowler. A method will be described to determine the weights of the different wickets. Weights will be allocated according to the batting positions of the batsmen. Theoretically, it would be desirable to attach a weight to each batsman individually, e.g. by making use of BP, a measure developed by Lemmer (2004) to assess the batting performance of a batsman, but this will make the procedure much too complicated for practical use. It will be much simpler to use BP to attach weights to batsmen according to their batting positions and use these weights regardless of the specific batsmen involved.

A pragmatic way to allocate weights could be to reason that the top four or five positions are occupied by specialist batsmen, the sixth to eighth positions by all-rounders and positions nine to eleven by specialist bowlers. It can thus be expected that the top four or five batsmen would be equally good and the rest would show a systematic decline in batting ability. If the top batsmen were equally good, it is fair to reason that the opening batsmen will not perform as well as those following them because the former have to face the new ball and fast bowlers who are still fresh. Although the two opening batsmen perform the same function in the team, batting statistics (shown later in Figures 1 and 2) indicate that the one who faces the first ball (occupying batting position one) does not perform as good than the other one. It would thus be natural that there will be a gradual increase in performance from the first until the fourth or fifth batsmen and then a gradual decline further down the batting order. To allocate weights, however, remains a problem and should rather be solved by making use of batting performance data.

A data set consisting of the batting statistics of all the current one-day international (ODI) players was taken from Cricinfo (2003a) on 23 July 2003. Those who have batted in at least 20 ODI innings each – a requirement for the calculation of BP – were taken from the data set. For each of these 142 players, the following statistics were calculated: the average batting position (AVEPOS), the median batting position (MEDPOS), the modal batting position (MODPOS) and the batting performance (BP). These statistics were used to calculate weights for the different batting positions.

CALCULATION OF WEIGHTS

For each player the average, median and mode were calculated for his batting position. Due to the fact that the mode is always an integer and the median almost always (it is sometimes a value halfway between two integers), it was not surprising to find that for the vast majority of players, MEDPOS and MODPOS were equal and AVEPOS close to this joint value. Plots of BP against each of these measures yielded very similar results. From a statistical point of view (Kenney & Keeping,1954: 53), the average is the best measure to use. It was then decided to pursue the work on AVEPOS only.

By looking at a plot of BP against AVEPOS, it was difficult to judge the functional form underlying the relationship between BP and AVEPOS. By making use of distance-weighted least squares in Statistica, a curve was fitted to the data. In this method a polynomial (second- order) regression is calculated for each value on the X variable scale to determine the corresponding Y value such that the influence of the individual data points on the regression decreases with their distance from the particular X value. This method has been developed in three-dimensional space where the height of a surface is given at a number of points. The points are assumed to be completely arbitrary and not arranged on a rectangular or other mesh. The interpolation method uses a weighting technique with weights depending on the distances of the data points; however the weights do not determine the height directly, but are used with a least squares fit to find the coefficients of a quadratic polynomial to act as an approximation to the surface. For a detailed description see McLain (1974). Looking at the curve in Figure 1, it appears as if there is an almost linear relation from positions one to four and again from positions five to eleven. Due to its construction, however, no explicit formula can be given for this curve.

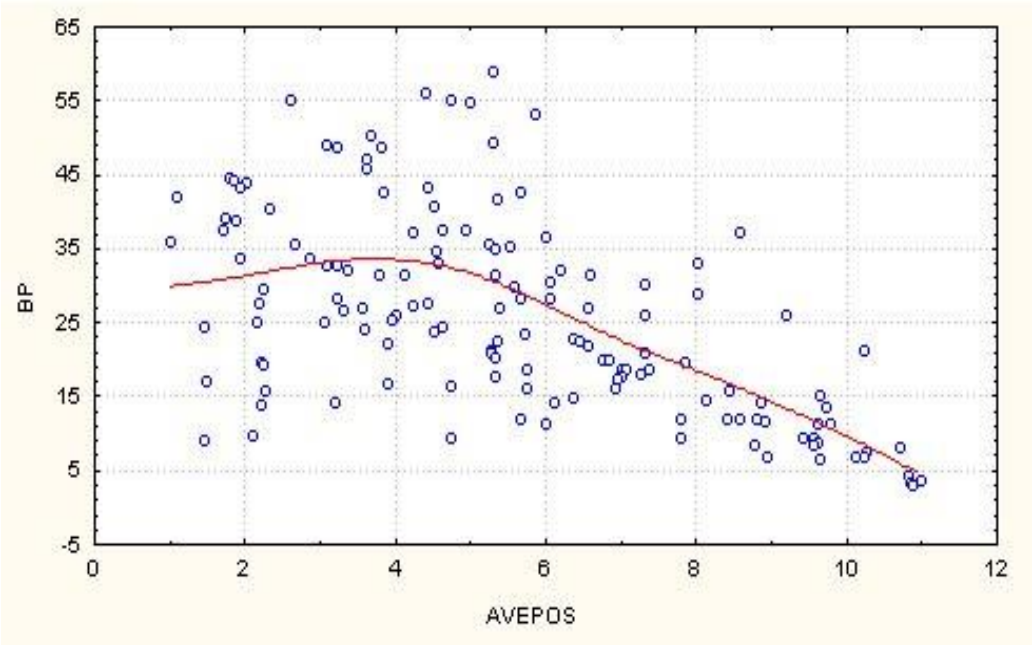

FIGURE 1. **RELATIONSHIP BETWEEN BP AND AVEPOS IN THE CASE OF ONE- DAY INTERNATIONALS**

Various mathematical functions have also been fitted to the data, e.g. a second, third, fourth and fifth degree polynomial and an exponential curve. None yielded satisfactory results. The third, fourth and fifth degree polynomials gave vastly different weights to the two opening batsmen. The second-degree polynomial gave a very low weight to batsman eleven – less than one fifth of the weight allocated to batsman number ten. From all the figures drawn, it was

clear that the distance-weighted least squares curve was the best one to use. Then a program was written to fit a straight line up to a change-point at 4.5 and a second straight line thereafter, i.e. two straight lines with a change-point. This yielded much more satisfactory results. According to the coefficient of determination r^2 this line gave a better fit than all the other curves and also lead to weights in accordance with the pragmatic approach mentioned before. Although $r^2 = 0.41$ does not indicate a very good fit, this comprehensive method is obviously better than simply calculating averages per batting position. The weights allocated were found by scaling down the estimated BP values obtained from the curve such that the weights add up to eleven, as shown in the first three columns of Table 1.

TEST MATCHES

The same procedure was followed for a data set consisting of all the current Test players taken on 23 July 2003 from Cricinfo (2003b). Players from India, Pakistan and Sri Lanka could not be included because their BP values could not be calculated due to the unavailability of their strike rates. The data set consisted of 90 players who had played at least 20 test innings each.

The distance-weighted least squares curve of BP against AVEPOS is given in Figure 2. This curve

again appeared to provide the best description. The polynomial fits again yielded unacceptable results, including negative weights allocated to some low order batsmen!

TABLE 1. **WEIGHTS OF WICKETS ACCORDING TO THE BATTING POSITION**

Batting Position	One-Day Internationals		Test Matches	
	Estimated BP value	**Weight**	**Estimated BP value**	**Weight**
1	30.1621	1.30	33.2701	1.20
2	31.3295	1.35	36.3794	1.31
3	32.4969	1.40	39.4886	1.42
4	33.6643	1.45	42.5979	1.53
5	31.9607	1.38	40.9890	1.47
6	27.3861	1.18	34.6621	1.25
7	22.8115	0.98	28.3352	1.02
8	18.2369	0.79	22.0082	0.79
9	13.6623	0.59	15.6813	0.56
10	9.0877	0.39	9.3544	0.34
11	4.5131	0.19	3.0275	0.11
Total	255.3111	11.00	305.7936	11.00

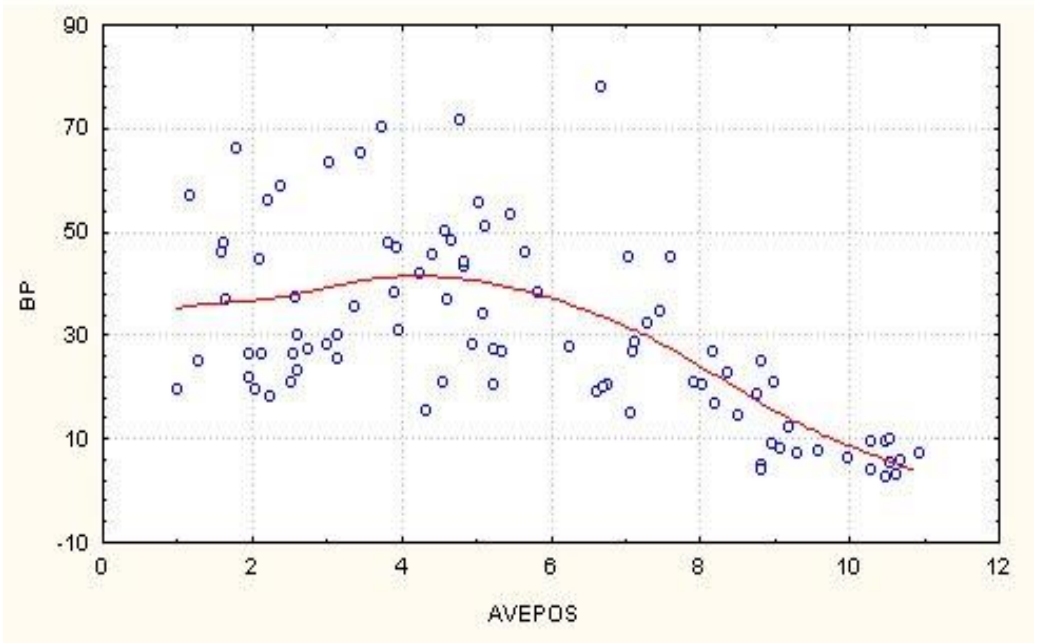

FIGURE 2. **RELATIONSHIP BETWEEN BP AND AVEPOS IN THE CASE OF TESTS**

A change-point straight line fit was again used with a change-point at 4.5 (using a change- point at 5.5 gives batsman number ten a weight more than ten times that of batsman number eleven!). The

weights allocated are given in Table 1.

APPLICATION

The bowling results of the npower Test series between South Africa and England played in July, August and September 2003 has been used to examine the effect of the weights proposed in this article.

In the formula of

$$CBR = 3R/(W + O + W.R/B)$$

where B = 6 **x** O, the legitimate number of balls bowled, the number of wickets taken is denoted by W and now the total weight of those wickets is denoted by W*. The combined bowling rate based on these weights is given by

$$CBR^* = 3R/(W^* + O + W^*.R/B)$$

The bowlers of both teams have been ranked according to CBR* in every individual Test match played. Despite the desirable results obtained from the use of the weights, it was found that CBR* still gave ratings very similar (but not necessarily identical) to the economy rate E, as was the case with CBR. In personal communication with cricket experts, including Andrew Samson, official statistician of the United Cricket Board of South Africa, it was agreed that a modified version of CBR would be useful (Samson, 2003).

In the construction of CBR the approach was that the average, A=R/W, the economy rate, E=R/O, and the strike rate, S=6 x O/W, were equally important and should therefore have equal weights (before going through the process of standardisation described in Lemmer, 2002). Using weights in the ratio 1:1:1 for the standardised values of A, E and S it has been shown (Lemmer, 2002: 39-40) that CBR is a weighted average between A, E and S:

$$CBR = (W.A + O.E + T.S)/(W + O + T)$$

with T = W.R/B. In order to get a measure that would be less sensitive to E but more sensitive to S, it was decided (after very extensive investigations) that E should be scaled down by 50% and the weight of S should be doubled, resulting in weights 2:1:4 for the standardised values of A, E and S. Define

$$DBR = (2W.A + O.E + 4T.S)/(2W + O + 4T)$$

$$= 7R/(2W + O + 4W.R/B)$$

which will be called the dynamic bowling rate, and DBR* =

$$7R/(2W^* + O + 4W^*.R/B)$$

for use in the case of fewer than one hundred overs bowled per bowler. In the case of Test matches a bowler's ability to take wickets is very important because a match can only be won if all the opponent's wickets are taken. Therefore the dynamic bowling rate is a better measure to use than CBR. In the case of limited overs matches, however, CBR could be used because then the number of

runs conceded must be kept low even though not all wickets are taken.

ILLUSTRATIVE EXAMPLES

The first Test match was played at Edgbaston, Birmingham from 24 to 28 July 2003 and ended in a draw. The bowling results obtained from Cricinfo (2003c) are given in Table 2. For each bowler, the number of wickets taken is given under W, the position numbers of the batsmen claimed by the bowler are given under 'wickets' and the total weight of those wickets is given under W*. The combined bowling rate based on these weights is given by CBR* and the dynamic bowling rate by DBR*. The economy rate of each bowler is given under E. All the bowlers who had bowled are included in the comparison, but those who had bowled fewer than twenty overs in a test are not included in the ranking, which is done according to DBR*. The requirement of at least twenty overs bowled is intended to exclude from the ranking those bowlers who had bowled very few overs compared to the rest.

TABLE 2. **COMPARISON OF BOWLERS IN FIRST TEST MATCH**

Rank	Name	O	R	W	Wickets	W*	CBR*	DBR*	E
1	Pollock	34.4	57	2	4,8	2.32	4.58	9.59	1.66
2	Peterson	35	90	1	2	1.31	7.32	15.80	2.57
3	Willoughby	20	46	0	-	0	6.90	16.10	2.30
4	Pretorius	35	135	4	2,5,6,7	5.05	9.35	16.27	3.86
5	Giles	50	198	4	1,1,3,5	5.29	10.11	18.59	3.96
6	Gough	25	88	1	4	1.53	9.63	19.46	3.52
7	Harmison	33	138	2	3,5	2.89	10.92	20.63	4.18
8	Ntini	32	152	4	1,3,9,10	3.52	11.90	21.20	4.75
9	Anderson	26	129	1	2	1.31	13.63	27.40	4.96
10	Flintoff	27	113	0	-	0	12.56	29.30	4.19
Too few overs	Vaughan	8	26	1	2	1.31	7.79	13.52	3.25
Too few overs	Butcher	2	15	0	-	0	22.5	52.50	7.5

The reader might be surprised that Ntini is down in position eight. Compare him with Pretorius, who also took four wickets with a weight of 5.05 compared to Ntini's 3.52. Furthermore, Pretorius was more economical than Ntini – he conceded fewer runs than Ntini despite bowling more overs. In all respects, Pretorius bowled better than Ntini. Pollock, on the other hand, was extremely economical and although he took only two wickets, he was ranked first among all the bowlers. Economy is his main strength. If he bowls from one side and Ntini from the other, cricket commentators have repeatedly pointed out that the batsmen are restricted from scoring by Pollock and then try to score from Ntini, which often leads to risky shots that claim their wickets. Ntini's strength is his strike rate, which is very good and compensates to some extent for his high economy rate.

The second Test match was played at Lord's, London from 31 July to 3 August 2003 and was won by South Africa by an innings and 92 runs. The bowling results obtained from Cricinfo (2003c) are given in Table 3.

Ntini shared the Man of the Match award with Graeme Smith because he took 10 wickets albeit at

the expense of an economy rate of 4.58 runs per over. Had the ranking been done according to CBR*, Ntini would have been in position six, which could not be seen as very realistic. This was part of the motivation in favour of DBR*. Andrew Hall did exceptionally well by taking five wickets at an economy rate of 2.47. According to DBR* he performed even better than Ntini. That this conclusion is fully justified can be seen by also looking at the other two individual measures. Let A*=R/W* denote the adjusted average and S*=6 **x** O/W* the adjusted strike rate. Then A*=12.88 for Hall, which is much better than A*=21.51 for Ntini, while S*=31.29 for Hall is nearly as good as Ntini's S*=28.15. This and other similar comparisons give convincing evidence that DBR* has the desired effect of giving sufficient prominence to strike bowlers without distorting the balance between A, E and S.

The third Test match was played at Trent Bridge, Nottingham from 14 to 18 August 2003 and was won by England by 70 runs. The bowling results obtained from Cricinfo (2003c) are given in Table 4.

TABLE 3. **COMPARISON OF BOWLERS IN SECOND TEST MATCH**

Rank	Name	O	R	W	Wickets	W*	CBR*	DBR*	E
1	Hall	34	84	5	2,3,4,5,8	6.52	5.83	10.18	2.47
2	Ntini	48	220	10	1,4,6,8,10,1,2,6,7,10	10.23	9.99	15.44	4.58
3	Pollock	43.4	133	4	5,9,3,9	4.01	8.07	15.62	3.06
4	Anderson	27	90	2	1,6	2.45	8.76	16.87	3.33
5	Flintoff	40	115	1	5	1.47	8.18	17.59	2.88
6	Giles	43	142	1	4	1.53	9.39	20.11	3.30
7	Adams	23.1	93	1	7	1.02	11.25	23.35	4.03
8	Harmison	22	103	1	2	1.31	12.70	25.11	4.68
9	Gough	28	127	0	-	0	13.61	31.75	4.54
Too few overs	McGrath	11	40	1	3	1.42	9.04	16.20	3.64
Too few overs	Butcher	6	19	0	-	0	9.50	22.17	3.17
Too few overs	Pretorius	7	36	0	-	0	15.43	36.00	5.14

TABLE 4. **COMPARISON OF BOWLERS IN THIRD TEST MATCH**

Rank	Name	O	R	W	Wickets	W*	CBR*	DBR*	E
1	Pollock	53.4	104	8	2,4,1,2,4,7,8,11	8.8	4.80	8.83	1.95
2	Kirtley	47.2	114	8	3,5,1,3,6,7,9,10	8.68	5.76	10.16	2.42
3	Adams	26.3	46	2	6,10	1.59	4.87	10.28	1.75
4	Anderson	39.5	119	7	4,6,8,9,10,4,5	7.47	7.04	12.00	3.01
5	Hall	30	94	5	1,7,8,3,5	5.9	7.23	12.16	3.13
6	Harmison	28	66	2	2,2	2.62	6.26	12.37	2.36
7	Flintoff	50	145	3	1,7,8	3.01	7.99	16.41	2.90
8	Kallis	37	128	2	5,6	2.72	9.30	18.39	3.46
9	Ntini	46	165	3	3,9,9	2.54	9.89	20.21	3.59
Too	Vaughan	1	0	0	-	0	0	0	0

few overs									
Too few overs	Giles	10	24	0	-	0	7.20	16.80	2.40

Kirtley was awarded Man of the Match. The only logical explanation could be that he performed well in his first test match. He took eight wickets (weight = 8.68) but Pollock also

took eight wickets with a weight of 8.8. Pollock bowled more overs than Kirtley but conceded fewer runs. Kirtley's strike rate was better than Pollock's, but according to every other bowling criterion, Pollock did better than Kirtley.

The fourth Test match was played at Headingley, Leeds, from 21 to 25 August 2003 and was won by South Africa by 191 runs. The bowling statistics obtained from Cricinfo (2003c) are given in Table 5.

TABLE 5. **COMPARISON OF BOWLERS IN FOURTH TEST MATCH**

Rank	Name	O	R	W	Wickets	W*	CBR*	DBR*	E
1	Kallis	37.1	92	9	1,3,5,2,3,4,7,8,9	10.72	5.282	8.44	2.48
2	Ntini	31.2	102	5	2,7,8,1,6	5.57	7.687	13.11	3.27
3	Bicknell	49	125	4	2,4,1,9	4.6	6.750	13.25	2.55
4	Flintoff	40	118	4	7,8,5,7	4.3	7.627	14.48	2.95
5	Kirtley	51.3	145	5	1,11,2,4,11	4.26	7.556	14.96	2.83
6	Ali	36	136	5	3,5,6,3,10	5.9	8.944	15.19	3.78
7	Hall	45.4	141	4	9,10,5, 10	2.71	8.543	17.49	3.11
8	Anderson	34	119	2	9,6	1.81	9.684	19.91	3.50
9	Pretorius	28	127	1	6	1.25	12.618	25.93	4.54
Too few overs	Rudolph	2	1	1	4	1.53	0.820	1.26	0.50
Too few overs	Vaughan	5	13	0	-	0	7.8	18.20	2.60
Too few overs	Zondeki	1.5	10	0	-	0	20	46.47	6.67

Kallis bowled extremely well and took nine wickets with a weight of 10.72. According to all the bowling criteria, he was by far the best bowler. Note, however, that Rudolph had a DBR* value of 1.26, which was the best, but this was obtained after only two overs. Obviously it would not be fair to compare his figure with those of bowlers who had bowled more than 40 or 50 overs.

The fifth and final Test match was played at the Oval in London from 4 to 8 September 2003 and was won by England by nine wickets. The series was drawn with two each. For the bowling statistics obtained from Cricinfo (2003c), see Table 6.

Harmison and Bicknell were responsible for getting the South Africans out cheaply in their second innings by taking four wickets each. Although Bicknell took six wickets in the match compared to

four by Harmison, the latter was so much more economical that he ranked first compared to Bicknell's second place. In this match, Ntini's aggressive bowling resulted in a very bad economy rate and he could get only one wicket.

TABLE 6. **COMPARISON OF BOWLERS IN FIFTH TEST MATCH**

Rank	Name	O	R	W	Wickets	W*	CBR*	DBR*	E
1	Harmison	46.2	106	4	3,4,8,11	3.85	6.172	12.41	2.29
2	Bicknell	44	155	6	6,7,1,6,7,9	6.3	8.611	15.20	3.52
3	Pollock	45	126	3	2,6,9	3.12	7.625	15.46	2.8
4	Hall	35	111	2	3,5	2.89	8.448	16.57	3.17
5	Kallis	39.2	142	3	4,8,2	3.63	9.462	18.00	3.62
6	Giles	39	138	2	2,3	2.73	9.552	18.98	3.54
7	Anderson	35	141	3	5,11,2	2.89	10.620	20.33	4.03
8	Flintoff	25	101	2	9,5	2.03	10.670	20.48	4.04
9	Ntini	39	175	1	1	1.2	12.775	27.23	4.49
10	Adams	20	99	1	7	1.02	13.586	27.28	4.95
Too few overs	Rudolph	6	28	0	-	0	14.000	32.67	4.67
Too few overs	Vaughan	5	24	0	-	0	14.400	33.60	4.8
Too few overs	Butcher	3	18	0	-	0	18.000	42.00	6

TABLE 7. **TEST SERIES: RANKING ACCORDING TO ADJUSTED AVERAGE**

Rank	Name	O	R	W	W*	A*	E	S*
1	Kirtley	98.5	259	13	12.94	20.02	2.63	45.67
2	Kallis	113.3	362	14	17.07	21.21	3.20	39.82
3	Pollock	176.2	420	17	18.25	23.01	2.38	57.93
4	Hall	144.4	430	16	18.02	23.86	2.98	48.08
5	Bicknell	93	280	10	10.9	25.69	3.01	51.19
6	Ntini	196.2	814	23	23.06	35.30	4.15	51.05
7	Anderson	161.5	598	10	15.93	37.54	3.70	60.83
8	Harmison	129.2	413	9	10.67	38.71	3.20	72.65
9	Pretorius	70	298	5	6.3	47.30	4.26	66.67
10	Giles	142	502	7	9.55	52.57	3.54	89.21
11	Flintoff	182	592	10	10.81	54.76	3.25	101.02
12	Adams	69.4	238	4	3.63	65.56	3.43	114.71
13	Gough	53	215	1	1.53	140.52	4.06	207.84

Finally, the bowling figures of all five Test matches are combined in order to compare the performances of the bowlers in the series as a whole. The three bowling criteria used by cricket authorities are shown firstly, but instead of using W, the number of wickets taken, the adjusted number of wickets, W*, is used.

Who was the best bowler in the series? Was it Ntini, who took the most wickets - 23? What about the

bowlers who did not play in all the test matches, like Kirtley who only played in two test matches and took 13 wickets? In a comparison like this, one should be more sophisticated

and base one's decision on rational criteria. This study will provide rankings according to the three customary bowling criteria separately, and finally according to the dynamic bowling rate, DBR*, which will be the final answer.

Firstly, the bowlers are ranked according to the adjusted average, A* = R/W* – see Table 7.

Kirtley comes out best, followed by Kallis, Pollock, Hall, Bicknell, Ntini, Harmison, Pretorius, Giles, Flintoff, Anderson, Adams and Gough.

The economy rate E = R/O needs no adjustment because it does not depend on W* and is also given in the table. The ranking according to E is: Pollock, Kirtley, Hall, Bicknell, Kallis, Harmison, Flintoff, Adams, Giles, Anderson, Gough, Ntini, Pretorius.

The adjusted strike rate S* = 6 **x** O/W* is also given in Table 7. According to S* the order is Kallis, Kirtley, Hall, Ntini, Bicknell, Pollock, Pretorius, Harmison, Giles, Anderson, Flintoff, Adams, Gough.

TABLE 8. **TEST SERIES: RANKING ACCORDING TO DBR***

Rank	Name	O	R	W	W*	DBR*	DBR
1	Pollock	176.2	420	17	18.25	12.16	12.39
2	Kirtley	98.5	259	13	12.94	12.33	12.31
3	Kallis	113.3	362	14	17.07	13.79	14.81
4	Hall	144.4	430	16	18.02	13.92	14.46
5	Bicknell	93	280	10	10.9	14.34	14.73
6	Harmison	129.2	413	9	10.67	16.68	17.38
7	Anderson	161.5	598	10	15.93	17.99	20.30
8	Flintoff	182	592	10	10.81	18.25	18.53
9	Ntini	196.2	814	23	23.06	18.61	18.63
10	Giles	142	502	7	9.55	19.14	20.37
11	Adams	69.4	238	4	3.63	19.61	19.25
12	Pretorius	70	298	5	6.3	20.76	22.15
13	Gough	53	215	1	1.53	25.00	26.08
Too few overs bowled							
	Rudolph	8	29	1	1.53	13.76	16.35
	Ali	36	136	5	5.9	15.19	16.25
	Peterson	35	90	1	1.31	15.80	16.27
	Willoughby	20	46	0	0	16.10	16.10
	McGrath	11	40	1	1.42	16.20	18.15
	Vaughan	19	63	1	1.31	17.99	19.00
	Butcher	11	52	0	0	33.09	33.09
	Zondeki	1.5	10	0	0	46.67	46.67

Who was the best bowler? According to the present study, the answer is given in Table 8.

The requirement for bowlers in this comparison is that they should have bowled at least 50 overs. This number seemed reasonable taking into account that some bowlers had bowled close to 200 overs. For comparison purposes, the ordinary DBR is also given. DBR* should be used for a small or moderate number of overs bowled, but for more than 200 overs the much simpler DBR can be used. The top bowlers were Pollock, Kirtley, Kallis, Hall and Bicknell. Each one took 10 or more wickets. Ntini (rated eighth) took the most wickets, but he conceded by far the most runs.

In the case of ODI's the procedure is exactly the same except that the weights in column 3 (instead of 5) of Table 1 are used. A bowler may only bowl 10 overs per match. CBR* or DBR* can be calculated for every bowler irrespective of the number of overs bowled, but it is up to the reader to decide whether to include one who had bowled fewer than two or three overs in a ranking.

CONCLUSIONS

Ideally speaking, weights should be allocated to individual batsmen instead of to the positions in which they bat. This would, however, in every application require the calculation of BP for each batsman – a value based on all his scores and his strike rate - and then the calculation of suitable weights for the different batsmen. This could be done, but would require the availability of a very extensive and up to date data set. Secondly, for players who had not played at international level before, the values of BP are not available, and for those who had played fewer than twenty innings at this level, the BP values are not reliable. Furthermore, for players from India, Pakistan and Sri Lanka the test match strike rates are not readily available, which means that their BP values cannot be calculated. Therefore, it was decided to allocate weights to batting positions, thereby keeping the calculations simple enough for selectors and coaches – those for whom this measure was intended in the first place.

In order to standardise the procedure, the position of a batsman will be determined by the order in which he goes out to bat, as also reflected in the score card. Selectors may, however, for their own purposes use their discretion when comparing their team's bowlers if a player has batted out of his normal batting position, as in the case of a night-watchman.

DBR* and CBR* can be very useful criteria to measure the performance of a bowler in a single match or a short series of matches because they take into account the weights of the wickets taken by the bowler.

The argument mentioned in Lemmer (2002) that the use of weights was unnecessary in the case of large numbers of overs bowled was confirmed by the fact that the values of CBR* and CBR (not shown here) were very similar. The values of DBR and DBR* were also very similar (see Table 8) in the case of bowlers who had bowled more than 150 overs.

DBR* has the desired effect of giving more prominence to bowlers' wicket taking abilities than CBR*. It is suggested that DBR*/DBR should be used in the case of unlimited overs matches, where wicket taking is very important, while CBR*/CBR should be used in limited overs matches, where economy is very important.

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GESONDHEIDSRISIKOGEDRAG VAN HOËRSKOOL SPORTDEELNEMERS EN NIE-DEELNEMERS

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ABSTRACT

The first aim of the study was to establish whether the health risk behaviour of sports participants and non-participants differed. Secondly the aim was to determine whether these differences are gender and race specific or not. The research group was selected on the basis of an availability sample and consisted of 470 high school pupils (boys n=205; girls n=265) of different racial groups (white n=158; Coloureds n=114 and Indian n=48) between the ages of 13 and 18 years of age, living in the Potchefstroom district in the North West Province. The Youth Risk Behavior Survey (YRBS) questionnaire was used for the study. The questionnaire was completed during specific school hours after informed consent had been obtained. Descriptive statistics were used to describe the data. Two-way tables were used to describe percentage participation. Effect sizes were applied to determine the practical meaningfulness. From the results it is clear that participants in sport have a higher percentage participation in four of the six health risk behaviour activities, namely violence, smoking, alcohol, drugs and sexual behaviour than the non-participants. Non-participants showed higher percentage participation with regard to inactivity and suicidal thoughts. This tendency is also reflected with regard to gender and race. Although the sport participants showed a higher percentage participation in health risk behaviour than non-participants, these differences were not practically meaningful. The sport participants and non-participants of this research group therefore did not differ from each other meaningfully. No correlation was found between health risk behaviour, and gender and race.

Key words: Health risk behaviour; Adolescents; Violence; Substance; Sexual activity; Physical activity.

INLEIDING

Gereelde oefening, gesonde dieet, voldoende rus, ontspanning en doeltreffende streshantering is aspekte wat volgens Pender (1990) bydra tot ’n gesonde lewenstyl, veral gedurende adolessensie. Volgens Ginzberg (1991) en Millstein *et al.* (1992) is daar rede om bekommerd te wees oor die gesondheidstatus van die adolessent, aangesien daar in hierdie ontwikkelingstadium van die mens groter blootstelling aan risikogedragsaktiwiteite soos rook, alkoholmisbruik, dwelmgebruik, seksuele wanpraktyke, ongesonde dieet en fisieke onaktiwiteit voorkom. Jessor (1984) is dit hiermee eens en gaan van die standpunt uit dat daar erns gemaak moet word met die risikogedrag van adolessente, aangesien dit ’n nadelige effek kan hê op die adolessent se toekoms en lewenstyl.

’n Afname in fisieke aktiwiteit en ’n ongesonde lewenswyse word deur verskeie navorsers beskou as een van die primêre redes vir morbiditeit en mortaliteit in die hedendaagse samelewing (Rowland, 1990; Karvonen, 1996; Richmond *et al.*, 1998). Volgens Aldana *et al.*

(1996) is fisieke aktiwiteit geïdentifiseer as een van die effektiefste wyses om fisiologiese en selfopgelegde psigologiese stres te verminder. Volgens die "Health Education Authority" (1997) is die korttermynvoordele vir adolessente wat aan sportaktiwiteite deelneem, 'n verminderde kans op hartsiektes, laer vlakke van obesiteit en 'n beter lewensgehalte.

Sport maak 'n integrale deel uit van die eietydse samelewing en het 'n groot invloed op die lewens van jong kinders en adolessente (Armstrong & McManus, 1996; Hare, 1997). Pate *et al.* (2000) se mening in hierdie verband is dat deelname aan sport en fisieke aktiwiteite, die adolessent teen negatiewe invloede van die portuurgroep wat tot jeugmisdaad en deelname aan risikogedrag kan lei, beskerm. Aangesien sportdeelname ook dikwels geassosieer word met gesonde dieetgewoontes en lewensgewoontes, soos die vermyding van rook en substansgebruik, word sportdeelname ook geassosieer met 'n gesonde en gebalanseerde lewenswyse, aldus Winnail *et al.* (1997).

Tomori en Zalar (2000) het gevind dat adolessente wat sport beoefen, minder geneig is om depressief te wees en aan selfmoord te dink (Craft & Landers, 1998; O'Neal *et al.,* 2000), terwyl Magil en Ash (1979) ook vind dat sportdeelname 'n positiewe invloed op adolessente se selfkonsep het.

Hoewel die meeste navorsers die verband tussen 'n gesonde leefwyse en sportdeelname onderskryf, is daar enkele studies wat wel gevind het dat sportdeelname geassosieer word met hoëfrekwensiedeelname aan risikogedrag onder adolessente (Skolnick, 1993; Smith & Caldwell, 1994; Aaron *et al.,* 1995). Die siening dat sportdeelname as 'n beskermende faktor teen ongewenste of gesondheidsrisikogedrag dien, word algemeen in die Amerikaanse kultuur aanvaar (Eitle *et al*., 2003). Die sienswyse dat sportdeelname as 'n veiligheidsnet dien, word gerugsteun deur die weerhoudingshipotese ("deterrence hypothesis"). Volgens hierdie weerhoudingshipotese beskerm deelname aan sport die deelnemer teen betrokkenheid by ongewenste gedrag en word hierdie aanname op die volgende gegrond (Eitle *et al.,* 2003: 194):

- Sportlui assosieer met ander sportlui wat ook uitnemendheid en 'n gesonde leefwyse nastreef.
- Daar bestaan 'n positiewe verband tussen sportprestasie en skoolprestasie.
- Sportdeelnemers kry die geleentheid om hulle identiteit uit te leef en hulle stempel deur middel van sportprestasies af te druk, in plaas daarvan om aan risiko-aktiwiteite deel te neem om daardeur vir die portuurgroep aanvaarbaar te wees.

In die internasionale literatuur word dus melding gemaak van navorsers wat die siening huldig dat sportdeelnemers uitsluitlik met 'n gesonde leefwyse geassosieer word, terwyl ander navorsers bevind dat sportdeelnemers wel in 'n groot mate by gesondheidsrisikogedragsaktiwiteite betrokke is (Guthrie, 1986: 11; Thorlindsson *et al.,* 1990: 554; Smith & Caldwell, 1994: 72). In 'n uitgebreide literatuursoektog kon geen literatuur opgespoor word wat handel oor die gesondheidsrisikogedrag van die Suid-Afrikaanse sportdeelnemers nie. Die navorsingsvraag wat met hierdie studie beantwoord wou word, is of

gesondheidsrisikogedrag van sportdeelnemers en nie-deelnemers verskil? Voortspruitend hieruit wou bepaal word of hierdie verskille geslag en/of rasspesifiek is, al dan nie.

METODE VAN ONDERSOEK

Ondersoekgroep

Altesaam 470 adolessente (seuns n=205; dogters n=265) van verskillende rassegroepe (wit n=158, swart n=150, Kleurling n=114 en Indiër n=48) tussen die ouderdomme 13 en 18 jaar, woonagtig in die Potchefstroomdistrik in die Noordwes Provinsie, is by die studie betrek. Die respondente is deur middel van 'n beskikbaarheidsteekproef uit ses skole in die Potchefstroomdistrik geselekteer.

Meetinstrument

Die Youth Risk Behaviour Survey (YRBS) selfrapporteringsvraelys is vir die studie gebruik (National Center for Cronic Disease Prevention and Health Promotion, 2001). Navorsers van die CDC (Center for Disease Control and Prevention) in Atlanta, VSA, het risikogedragsaktiwiteite van adolessente geïdentifiseer wat 'n negatiewe uitwerking op adolessente se latere gesondheid het (National Center for Cronic Disease Prevention and Health Promotion, 2001). Ses gesondheidsrisikogedragsaktiwiteite is geïdentifiseer, naamlik geweld (dra van 'n wapen, fisieke gevegte en selfmoord), rook, alkohol en dwelmgebruik, seksuele gedrag, ongesonde eetgewoontes en fisieke onaktiwiteit (National Center for Cronic Disease Prevention and Health Promotion, 2001). Hierdie vraelys is al in verskeie studies gebruik waardeur die geldigheid en betroubaarheid daarvan bevestig is (Kann *et al.,* 1995; Pate *et al.,* 1996; Pate *et al.,* 2000). Die vraelys is ook in Afrikaans vertaal en vir die Suid-Afrikaanse populasie aangepas, waardeur die geldigheid en betroubaarheid van die vraelys ook bevestig is (Coetzee & Spamer, 2003).

Statistiese prosedure

Vir die dataverwerking is van die "Statistica for Windows version 6"-rekenaarprogram (Statsoft, 2003) gebruik gemaak om die ingesamelde data te verwerk. Beskrywende statistiek is gebruik om die data te beskryf. Daar is van tweerigting frekwensietabelle gebruik gemaak om die persentasiedeelname te bepaal. Aangesien 'n ewekansige steekproefneming nie hier gebruik is nie, is van effekgroottes gebruik gemaak om te toets of die genoemde verbande in die praktyk betekenisvol is (Steyn, 2002). Praktiese betekenisvolheid van die verband word weergegee deur die effekgroote $w = \sqrt{\frac{X^2}{N}}$ waar X^2 die gebruiklike Chikwadraat toetsstatistiek is en N die grootte van die populasie (Steyn, 2002).

RESULTATE EN BESPREKING

Inligting oor die samestelling van die ondersoekgroep word in Tabel 1 voorgestel om die uiteensetting van die groepindeling toe te lig.

Uit die resultate van die studie blyk dit dat die sportsoorte waaraan die leerlinge deelgeneem het atletiek, rugby, netbal, tennis, karate, sokker, gimnastiek, krieket, judo en tafeltennis is. Die vlak van kompetisiedeelname was hoofsaaklik op skoolvlak (1ste, 2de, en 3de spanne). Slegs een persent van die leerlinge het aangedui dat hulle op provinsiale vlak deelneem.

TABEL 1. **UITEENSETTING VAN RESPONDENTE**

Groepe	Sport- deelnemers n=336	Nie-deelnemers n=134

Geslag		
Seuns	172	33
Dogters	164	101
Ouderdom		
14-15 jaar	160	58
16-18 jaar	176	76
Ras		
Swart	111	36
Wit	120	39
Kleurling	72	43
Indiër	33	16

Hoewel die Youth Risk Behavior Survey-vraelys uit 88 items bestaan en leerlinge die volledige vraelys ingevul het, sal daar in die bespreking van die resultate slegs oor tersaaklike vrae vir die studie gerapporteer word. Hierdie vrae word in Tabel 2 weergegee. Ander tersaaklike inligting wat nie in die tabelle vervat is nie, word in besprekingsvorm aangebied.

TABEL 2. **VRAE UIT DIE YRBS WAT IN VERDERE VERWERKINGS GERAPPORTEER IS**

Geweld

Dra jy gereeld ’n wapen soos ’n geweer, mes of knuppel by jou?

Was jy die afgelope drie maande in ’n fisieke geveg betrokke?

Het jy gedurende die afgelope ses maande enige pogings aangewend om selfmoord te probeer pleeg?

Rookgewoontes

Rook jy gereeld? Dit wil sê, ten minste een sigaret elke dag vir 30 dae?

Alkoholgebruik

Het jy meer as agt drankies in die afgelope 30 dae gehad?

Dwelmgebruik

Het jy gedurende die afgelope 30 dae dagga/marijuana gebruik?

Seksuele gedrag

Het jy al ooit geslagsgemeenskap gehad?

Fisieke aktiwiteite

Het jy ten minste drie van die afgelope sewe dae oefening gedoen of aan fisieke aktiwiteite vir ten minste 20 minute deelgeneem, wat jou laat sweet en hard asem laat haal het, soos korfbal, sokker, hardloop, lengtes swem, vinnig fietsry, vinnig dans of soortgelyke aërobiese aktiwiteite?

Die eerste stap was om te bepaal wat die persentasiedeelname aan gesondheidsrisikogedrag van die sportdeelnemers en nie-deelnemers was. In Tabel 3 word hierdie deelnameprofiel voorgestel.

TABEL 3. **GESONDHEIDSRISIKOGEDRAG VAN SPORTDEELNEMERS EN NIE-DEELNEMERS**

Gesondheidsrisikogedrag: Geweld, rook, alkohol, dwelms, seksuele gedrag en fisieke onaktiwiteit	Sportdeelnemer n=336 %	Nie-deelnemer n=134 %	Effek grootte w
Dra 'n wapen	18	6	0.15
Fisieke geveg	33	22	0.10
Poging tot selfmoord	12	14	0.04
Rook daagliks	14	11	0.05
Alkohol gebruik	40	38	0.10
Gebruik gereeld dagga/Marijuana	7	2	0.10
Seksueel aktief	22	19	0.03
Fisiek onaktief	18	48	0.32

w = Effekgrootte: 0.1 = geen effek; 0.3 = effek, maar nie betekenisvol in praktyk nie;
>0.5 = prakties betekenisvol*

Uit Tabel 3 blyk dit dat sportdeelnemers meer betrokke was by die onderskeie risikogedragsaktiwiteite as die nie-deelnemers, behalwe by fisieke onaktiwiteit en poging tot selfmoord. Die grootste verskille tussen die groepe het by die onderskeie aspekte van geweld (dra van 'n wapen en fisieke gevegte) en fisieke onaktiwiteit voorgekom. Pate *et al.* (2000), sowel as Coetzee en Spamer (2003), het dieselfde tendense in hul studies gevind. Kleiner verskille het ook tussen die groepe voorgekom met betrekking tot rookgewoontes, alkoholgebruik, marijuanagebruik en seksuele gedrag, waar sportdeelnemers 'n hoër persentasiedeelname getoon het as die nie-deelnemers. Soos te verwagte, is die sportdeelnemers se deelname aan hoëintensiteitoefening hoër as by die nie-deelnemers. Daar is ook uit die YRBS vrae gestel oor deelname aan matig fisieke aktiwiteite en tyd voor die TV deurgebring. Kleiner verskille is gevind tussen die groepe ten opsigte van deelname aan matige oefening (sportdeelnemers 65% en nie-deelnemers 57%) en aantal ure voor die televisie deurgebring (sportdeelnemers 56% en nie-deelnemers 60%). Coetzee en Spamer (2003) het in hul studie dieselfde tendens gevind aangaande die verskille tussen groepe met betrekking tot fisieke onaktiwiteit en aantal ure voor die televisie deurgebring.

Uit die literatuur het dit geblyk dat sportdeelnemers 'n hoë aansien geniet onder hulle portuurgroep, wat daartoe lei dat hulle aan meer gesondheidsrisikogedrag blootgestel word en deelneem as die nie-deelnemers (Coetzee & Spamer, 2003). Hierdie tendens is ook in hierdie studie bevestig.

Praktiese betekenisvolheid van die verskille tussen die gesondheidsrisiko-gedragsaktiwiteite van sportdeelnemers en nie-deelnemers is bereken en geen betekenisvolle verskille is gevind nie. Dit beteken dus dat die verskille wat tussen sportdeelnemers en nie-deelnemers voorgekom het, nie in die praktyk betekenisvol is nie.

TABEL 4. **GESONDHEIDSRISIKOGEDRAG SE VERBAND MET GESLAG**

Gesondheidsrisikogedrag:	Seuns		Dogters	

Geweld, rook, alkohol, dwelms, seksuele gedrag en fisieke onaktiwiteit	sd n=172 %	nd n=33 %	Effek-grootte w	sd n=164 %	nd n=101 %	Effek-grootte w
Dra ’n wapen	31	21	0.08	4	1	0.10
Fisieke geveg	43	36	0.05	23	18	0.06
Poging tot selfmoord	12	15	0.04	12	14	0.03
Rook daagliks	16	30	0.14	13	4	0.15
Alkoholgebruik	42	41	0.06	38	37	0.10
Gebruik gereeld dagga/Marijuana	12	0	0.10	3	3	0.00
Seksueel aktief	30	36	0.05	14	14	0.00
Fisiek onaktief	17	37	0.20	12	52	0.40

sd = sportdeelnemers; nd = nie-deelnemers

w = Effekgrootte: 0.1 = geen effek; 0.3 = effek, maar nie betekenisvol in praktyk nie; >0.5 = prakties betekenisvol*

’n Tweede stap was om te bepaal of die persentasieverskille tussen sportdeelnemers en nie-deelnemers geslagspesifiek was. Uit Tabel 4 blyk dit dat seuns wat aan sport deelneem persentasiegewys meer betrokke is by die dra van wapens, by fisieke gevegte en alkohol- en marijuanagebruik as seuns wat nie aan sport deelneem nie. Pate *et al.* (2000) het ook gevind dat seuns wat aan sport deelneem, meer dwelms (marijuana) as nie-deelnemers gebruik. Seuns wat aan sport deelneem, rook minder, is minder geneig tot selfmoord, en is seksueel minder aktief. Dogters wat aan sport deelneem, is meer betrokke by die dra van wapens, fisieke gevegte, rook- en alkoholgebruik en is ook minder geneig tot selfmoord. Pate *et al.* (2000) het daarenteen in hul studie gevind dat dogters wat aan sport deelneem, minder rook as nie-sportdeelnemers. Geen verskille in persentasiedeelname het voorgekom by seksuele aktiwiteite en marijuanagebruik tussen dogters wat aan sport deelneem en die wat nie aan sport deelneem nie. Seuns- en dogtersportdeelnemers neem meer deel aan hoëintensiteit fisieke aktiwiteite as nie-deelnemers, soos ook bevind in die studie van Pate *et al.* (2000) asook by Coetzee en Spamer (2003).

Dit blyk dus by albei geslagte dat die sportdeelnemers die hoogste risikogedrag toon. As die seuns- en dogtersportdeelnemers vergelyk word, is dit duidelik dat die seunsportdeelnemers wel ’n hoër risikogedragsdeelname toon as die dogtersportdeelnemers. Dit is opmerklik dat die kleinste verskille voorgekom het by rook, drank en fisieke onaktiwiteit. Veral die eerste twee genoemdes, rook en alkoholgebruik, het tradisioneel in die manlike domein geval, maar dit wil voorkom of daar tans nie meer geslagtelike verskille in die gebruik daarvan voorkom nie.

Praktiese betekenisvolheid van verskille binne die geslagsgroepe tussen die sportdeelnemers en nie-deelnemers is bereken, maar geen betekenisvolle verskille is tussen die sportdeelnemers en die nie-deelnemers van die geslagte gevind nie. In werklikheid beteken dit dus dat die seuns- en dogtersportdeelnemers en nie-deelnemers nie van mekaar verskil met betrekking tot hul deelname aan risikogedrag nie.

TABEL 5. **GESONDHEIDSRISIKOGEDRAG SE VERBAND MET RAS**

Gesondheidsrisikogedrag:	Swart			Wit		
Geweld, rook, alkohol, dwelms, seksuele gedrag en fisieke onaktiwiteit	sd n=71 %	nd n=43 %	w	sd n=119 %	nd n=39 %	w
Dra ’n wapen	88	12	0.14	10	6	0.07
Fisieke geveg	83	17	0.10	39	33	0.05
Poging tot selfmoord	15	19	0.06	43	57	0.13
Rook daagliks	8	3	0.08	63	37	0.13
Alkoholgebruik	28	31	0.18	25	75	0.10
Gereelde dagga/Marijuana	8	0	0.15	10	12	0.12
Seksueel aktief	30	36	0.06	46	54	0.20
Fisiek onaktief	20	50	0.30	19	81	0.30
Gesondheidsrisikogedrag:	Kleurling			Indiër		
Geweld, rook, alkohol, dwelms, seksuele gedrag en fisieke onaktiwiteit	sd n=101 %	nd n=36 %	w	sd n=15 %	nd n=33 %	w
Dra ’n wapen	87	13	0.30	90	10	0.30
Fisieke geveg	75	25	0.20	71	29	0.02
Poging tot selfmoord	31	69	0.05	25	75	0.04
Rook daagliks	94	6	0.30	80	20	0.10
Alkoholgebruik	18	82	0.30	70	30	0.20
Gereelde dagga/Marijuana	42	58	0.15	33	67	0.20
Seksueel aktief	84	16	0.30	90	10	0.23
Fisiek onaktief	26	74	0.30	24	76	0.24

sd = sportdeelnemers; nd = nie-deelnemers; w = Effekgrootte: 0.1 = geen effek; 0.3 = effek, maar nie betekenisvol in praktyk nie; >0.5 = prakties betekenisvol*

Uit Tabel 5 blyk dit dat die grootste verskille tussen die sportdeelnemers en nie-deelnemers van die Kleurling- en Indiër-groepe voorkom. By die swart, Kleurling- en Indiër-leerlinge is veral groot persentasieverskille ten opsigte van die dra van wapens gevind. Pate *et al.* (2000) het ook in hul studie gevind dat daar ’n verband bestaan tussen ras en die dra van wapens.

Ten opsigte van rookgewoontes is dit duidelik dat die sportdeelnemers van al die rassegroepe eerder gewoonterokers is as die nie-deelnemers. Dit is in teenstelling met die studie van Pate *et al.* (2000) wat gevind het dat sportdeelnemers minder rook as die nie-deelnemers. Dit is opmerklik dat slegs ’n klein persentasie swart sportdeelnemers asook nie-deelnemers gewoonterokers is. Dit kan moontlik toegeskryf word aan die feit dat die swart rassegroep aangedui het dat hulle ook snuif, wat impliseer dat hulle tog tabak inasem.

Ten opstige van alkoholgebruik het die grootste verskille in die persentasiedeelname by wit en Kleurling-sportdeelnemers teenoor nie-deelnemers voorgekom. Die feit dat die Indiër groep heelwat kleiner was as die ander groepe, kon uitvallers moontlik die resultate beïnvloed het. Nie-sportdeelnemers van die verskillende rassegroepe het ’n hoër gebruik van dwelms getoon as die sportdeelnemers van verskillende rasse. Dieselfde tendens is in die studie van Pate *et al.*

(2000) gevind. Persentasieverskille tussen swart en wit sportdeelnemers en nie-deelnemers wat seksueel aktief is, is klein terwyl die Kleurling- en Indiër-sportdeelnemers persentasiegewys seksueel baie meer aktief is as die nie-deelnemers. In Pate *et al.* (2000) se studie was die swart leerlinge wat aan sport deelgeneem het, seksueel opmerklik meer aktief as die swart nie-deelnemers. Ten opsigte van fisieke onaktiwiteit het die sportdeelnemers van al die rassegroepe 'n hoër deelname aan hoë fisieke aktiwiteite gerapporteer as die nie-deelnemers. Geen betekenisvolle verskille is gevind tussen die sportdeelnemers en nie-deelnemers in die verskillende rassegroepe nie.

In heelwat studies is kommer uitgespreek oor die jeugdige ouderdom waarop adolessente begin eksperimenteer met gesondheidsrisikogedrag (Coetzee & Underhay, 2003), en hierdie aspek is ook in hierdie studie onder die loep geneem.

TABEL 6. **OUDERDOM WAAROP ENKELE GESONDHEIDSRISIKO-GEDRAGSAKTIWITEITE 'N AANVANG GENEEM HET**

Gesondheids-risikogedrag: Rook, alkohol, dwelms en seksuele gedrag	9-10 jaar		11-12 jaar		13-14 jaar		15-16 jaar		17 jaar en ouer	
	sd %	nd %	sd %	nd %	sd %	nd %	sd %	nd %	sd %	nd %
Rook	6	3	14	10	20	15	28	19	25	17
Alkoholgebruik	3	0	12	10	25	19	23	19	17	9
Marijuana of dagga gebruik	0	0	2	0	3	1	7	3	5	2
Seksueel aktief	0	0	1	1	3	1	5	5	4	2

sd = sportdeelnemers; nd = nie-deelnemers

Uit Tabel 6 blyk dit dat die sportdeelnemers reeds vanaf 'n jong ouderdom persentasiegewys meer aan gesondheidsriskogedrag deelgeneem het. By die meeste gesondheidsrisikogedrag is

'n stygende lyn in die deelnameprofiel van die gesondheidsrisikogedrag vanaf 11 jaar tot 17 jaar waargeneem. Die grootste frekwensiedeelname aan risikogedrag blyk tussen 13 en 17 jaar te wees. Coetzee en Underhay (2003) het ook 'n stygende lyn met deelname aan gesondheidsrisikogedrag gevind. Uit die resultate van Tabel 6 blyk dit dat rook en alkoholgebruik die hoogste persentasiedeelname toon. Hierdie tendense verdien verdere navorsing ten einde vroeë intervensie hieroor van stapel te stuur.

SAMEVATTING

Die Youth Risk Behaviour Survey (YRBS) vraelys is in die studie aangewend om die gesondheidsrisikogedrag van hoërskoolleerlinge wat aan sport deelneem teenoor nie-deelnemers van verskillende geslags- en rassegroepe te bepaal. Die gesondheidsrisikogedrag wat ondersoek is, is geweld, rook, alkohol- en dwelmgebruik, seksuele risikogedrag en fisieke onaktiwiteit.

'n Groot persentasie van die ondersoekgroep (71%) het gerapporteer dat hulle aan skoolsport deelneem, wat daarop dui dat sportdeelname 'n belangrike rol speel in die jeugkultuur van hoërskoolleerlinge in die Potchefstroomdistrik. Uit die resultate het dit voorts geblyk dat

sportdeelnemers ’n hoër persentasiedeelname aan vier van die ses gesondheidsrisiko-gedragsaktiwiteite toon. Nie-deelnemers was fisiek meer onaktief en het meer pogings tot selfmoord gerapporteer. Hoewel persentasieverskille tussen sportdeelnemers en nie-deelnemers se gesondheidsrisikogedrag voorgekom het, was dit nie prakties betekenisvol nie. Daar is voorts gevind dat gesondheidsrisikogedrag nie ’n verband getoon het met geslag en ras nie.

Hierdie bevindinge ondersteun dus studies wat bevind het dat sport as sodanig nie die deelnemers teen gesondheidsriskogedrag beskerm nie. Dit is nodig dat afrigters, onderwysers, sportwetenskaplikes en ander betrokkenes kennis neem van die tendens dat sportdeelnemers meer geneig is om aan gesondheidsrisikogedrag deel te neem as nie-deelnemers. Dit het ook uit die studie geblyk dat geslag en ras nie ’n betekenisvolle verskil getoon het ten opsigte van sportdeelnemers en nie-deelnemers nie. Die sportdeelnemers het egter binne die geslags- en rassegroepe telkens die hoogste persentasiedeelname getoon. Dit het ook uit die studie na vore gekom dat sportdeelnemers op ’n jonger ouderdom met gesondheidsrisikogedrag begin eksperimenteer as nie-deelnemers. Hierdie bevindinge is kommerwekkend en verdien verdere navorsing.

LEEMTES EN AANBEVELINGS

Leemtes uit die studie wat moontlik die resultate kon beïnvloed het, was die ongelykheid van die groepe (sportdeelnemers = 336; nie-deelnemers = 134) asook die feit dat die sportdeelname slegs op ’n lae kompetisievlak was. Hoër kompetisievlakke kan moontlik andersoortige resultate meebring.

Die volgende aanbevelings vir verdere studies kan gemaak word op grond van ander leemtes wat deur hierdie studie geïdentifiseer is:

- Toekomstige studies kan die potensieel belangrike rol van die sosio-ekonomiese en kulturele faktore ondersoek met betrekking tot deelname aan gesondheidsrisikogedrag.

- Gesondheidsrisikogedrag van sportdeelnemers van verskillende sportsoorte behoort ondersoek te word aangesien die sportsoort waaraan deelgeneem word, moontlik ’n effek kan uitoefen op die gesondheidsrisikogedrag van die deelnemers.
- Die gesondheidsrisikogedrag van deelnemers wat op ’n hoër kompetisievlak deelneem (provinsiaal en nasionaal), behoort ook ondersoek te word aangesien dit waarskynlik andersoortige bevindings kan oplewer.

SUMMARY

Health risk behaviour of high school sport participants and non-participants

Adolescence encompasses a time when various health related beliefs, attitudes, and behaviours are adopted and consolidated. Adolescents have increased freedom and greater access to many health-compromising materials and experiences such as drugs, alcohol, and sexual risk taking, as well as too many health-enhancing experiences such as regularly scheduled exercise and healthful diets. Therefore, adolescence is a period in which many healths related behaviors are developed and internalised. To monitor certain priority health-risk behaviours of adolescents, the CDC (Center for Disease Control and Prevention)

developed the Youth Risk Behavior Surveillance System (YRBSS), and subsequently, a study documented the reliability of the YRBS questionnaire for use with high school adolescents. The YRBSS attempts to determine the extent to which adolescents are putting their health and well-being at risk. The Youth Risk Behavior Survey (YRBS) encompasses six categories of behaviours that contribute to the leading causes of morbidity and mortality in the United States: unintentional and intentional injuries; tobacco use; alcohol and other drug use; sexual behaviours contributing to unintended pregnancy; unhealthy dietary behaviours; and physical inactivity. These youth risk behaviours, which frequently interrelate, are often established during youth and extend into adulthood.

Sport participation has long been thought to provide youth with a prosocial environment that fosters basic values, such as fair play, competitiveness, and achievement. Sports may also help to protect participants against negative influences that can lead to delinquency and drug abuse. Because sports participation typically involves substantial amounts of physical activity, the health benefits of regular exercise would be expected to accrue to young athletes. Although there are evidence that youthful sport participation manifests better health habits than no participants, the health benefits of sport participation have been questioned recently and some studies have found sport participation to be associated with certain risk-taking behaviours.

The Youth Risk Behavior Survey (YRBS) questionnaire was applied in this study in order to establish the health risk behaviour of high school pupils who participate in sport, opposed to non-participants of different gender and racial groups. The health risk behaviour that was investigated was violence, smoking, alcohol and drug use, sexual risk behaviour and physical inactivity.

A large percentage of the research group (71%) reported that they participate in school sports, which indicates that participation in sports plays an important role in the youth culture of high school pupils in the Potchefstroom district. Furthermore it was evident from the results that

the sports participants had a higher percentage of participation in four of the six health risk behaviour activities. Non-participants were physically more inactive and reported more suicide attempts. Although percentage differences occurred between the health risk behaviour of sports participants and that of non-participants it was not practically meaningful. Furthermore it was found that no correlation was established between health risk behaviour, gender and race.

These findings therefore support studies that sports as such do not protect participants against health risk behaviour. It is necessary for coaches, teachers, sport scientists and others involved to take cognisance of the fact that sports participants are more inclined to take part in health risk behaviour than are non-participants. It was also obvious from the study that gender and race did not make a meaningful difference with regard to the risk behaviours of sports participants and non-sports participants. The sports participants, however, repeatedly showed the highest percentage participation within the gender and racial groups. It also came to the fore in the study that sports participants started experimenting with health risk behaviour at a younger age than is the case with non-participants. These findings are disconcerting and deserve further research.

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FISIEKE FIKSHEID, FISIEKE AKTIWITEIT EN FISIEKE AKTIWITEITSPATRONE VAN PLAASWERKERKINDERS: FLAGH-STUDIE

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ABSTRACT

The aim of this study was to analyse the physical activity patterns, physical activity levels and physical fitness of 4- to 16-year-old children (37 children; 19 girls and 18 boys) of farm workers, living on a farm in the North-West Province and attending the farm school. Descriptive statistics and analysis of variance (ANOVA), followed by a Tukey-post hoc-test, t-testing and the SAS-statisical program were used to analyse the data. With reference to physical fitness, their performance in the modified sit-and-reach, handgrip (left and right), pull-ups, bent armhang, standing long jump and the bleep tests (Wood, 1997; Docherty, 1996; Brewer et al., 1988) were determined. The 9 to 16-year-old group also completed a physical activity recall (PDPAR0

questionnaire (Trost et al., 1999) to determine their physical activity levels and patterns. Body size and body composition were analysed by means of anthropometric variables (height, mass, BMI and sub scapular and triceps skinfolds). From the results it seems that the farm environment where the children grew up does have an influence on their physical activity, indicating a reasonably high (a moderate physical activity classification) in the 9 to 16-year-old group. The analysis of their physical activity patterns indicated that this activity levels could largely be ascribed to walking, daily chores, work tasks they have to perform on the farm, games they play and few TV viewing hours. With regard to the relationship between physical activity and physical fitness, no significant relationships were found. However, low fat percentages and BMI values were found, which may have affected their physical fitness.

Key words: Physical fitness; Physical activity; Children; Farm worker; Sosio-economic status.

INLEIDING

Met die Thusa-studie (Transition and Health during Urbanisation in South Africa) (Vorster *et al*., 2000) is plaaswerkers in die Noordwes-provinsie as 'n kwesbare groep geïdentifiseer ten opsigte van hul voedingstatus, asook fisieke en psigiese gesondheid. Verdere navorsing is aanbeveel ten einde die voorgenoemde agterstande te probeer ophef. Kinders van plaaswerkers word meestal die volgende generasie werkers op die plase, derhalwe is dit ook belangrik om na hulle welstand en gesondheid om te sien. Henneberg *et al*. (2001) rapporteer in die verband dat 'n relatief swak fisieke vermoë onder kinders vanuit lae SES omgewings tot in hulle laat tienerjare voorkom, en dat die tendens waarskynlik sal voortduur tot in hulle volwassenheid. Hierdie swak fisieke vermoëns gekombineer met 'n swak opvoedingspeil by kinders wat uit landelike gemeenkappe kom, kan hulle toekomstige rolle in die ekonomie negatief beinvloed aangesien die meeste van hulle werksgeleenthede sal kry in sektore waar fisieke hande arbeid en 'n groot mate van handbehendigheid benodig sal word, waarvoor hulle nie noodwendig opgewasse sal wees nie. Laer energievlakke word ook by sodanige kinders deur die navorsers gerapporteer wat hulle fisieke aktwiteitspatrone kan beïnvloed.

Fisieke aktiwiteit kan die fisieke fiksheid en die gesondheid van kinders en volwassenes beïnvloed (Emiola *et al*., 2002). Lae fisieke aktiwiteit en fiksheid word met verskeie gesondheidsrisikofaktore geassosieer (Shropshire & Carrol, 1998; Cooley & McNaughton, 1999; Pate *et al*., 1999). In die verband word verbande tussen liggaamsamestelling en fisieke fiksheid aangedui (Riddoch & Boreham, 1995; Raudsepp & Jürimäe, 1996; Engelbrecht *et al*., 2001; Leslie *et al*., 2001). Faktore soos geslag, ouderdom, sosio-ekonomiese toestande, etnisiteit en kultuur kan egter 'n rol in kinders se fisieke aktiwiteit speel (Myers *et al*., 1996; Pate *et al*., 1997; Prista *et al*., 1997). Kinders vanuit laer sosio-ekonomiese asook landelike omgewings beskik meestal oor hoë fisieke-aktiwiteitsvlakke wat grootliks daaraan toegeskryf kan word dat hulle ook huishoudelike werksaktiwiteite moet verrig (Corlette & Mokgwathi, 1986; Prista *et al*., 1997). Volgens Kriska (2000) is aktiwiteite soos om te loop na bestemmings, familieversorging en die uitvoer van huishoudelike take kenmerkend van kinders van laer sosio-ekonomiese groepe. Dit blyk dat in gemeenskappe waar daar min tyd vir speel is, kinders tyd daarvoor maak deur speletjies met hulle alledaagse werkstake te integreer (Hughes, 1999; Peltzer *et al*., 2002).

Daar is min Suid-Afrikaanse studies beskikbaar waar fisieke aktiwiteit en fisieke fiksheid van

kinders uit ’n lae sosio-ekonomiese omgewing en veral geïsoleerde omgewings soos plase met betrekking tot hierdie veranderlikes ontleed word. Met hierdie artikel word beoog om die fisieke fiksheid en fisieke-aktiwiteitsvlakke van plaaswerkerkinders te ondersoek asook moontlike verbande daartussen. Dit was in die verband ook belangrik om hulle fisieke-aktiwiteitspatrone in meer besonderhede te bestudeer, aangesien inligting daaromtrent fisieke aktiwiteitsvlakke sowel as die stand van hulle fisieke fiksheid beter kan toelig. Indien tekortkominge gevind word en intervensie moontlik benodig sou word wat uit die studie bepaal wil word, kan die aktiwiteitspatrone van die kinders riglyne bied van moontlike aktiwiteite wat in sodanige intervensieprogramme aangespreek moet word. Alhoewel die groepe vir vergelykingsdoeleindes klein is, is geslagsverskille met betrekking tot fisieke fiksheid, fisieke aktiwiteitsvlakke en aktiwiteitspatrone ook ontleed.

METODES EN PROSEDURES

Navorsingsontwerp

Die studie vorm deel van ’n multidissiplinêre navorsingsprojek (FLAGH-studie - Farm Labour And General Health) wat deur die Fakulteit Gesondheidswetenskappe aan die Noordwes-Universiteit (NWU) se Potchefstroom Kampus uitgevoer word en deur die etiekkomitee van die Universiteit goedgekeur is (nr. 00M21). Plaaswerkers en hulle gesinne in die Noordwes-provinsie is vir hierdie navorsingsprojek geïdentifiseer. Die teikenpopulasie sluit alle mense in wat op die geselekteerde plaas woon (die boer, sy werkers en hulle familie, en ander). ’n Plaasgemeenskap is in drie kategorieë verdeel, naamlik ’n groot kommersiële plaas (dit verwys na ’n minimum van 20 huishoudings per plaas), klein kommersiële plase (dit verwys na minder as 20 huishoudings per plaas) en kommunale plase (dit verwys na ’n

tradisionele boerdery onder die leiding van ’n stamleier). Daar word met die FLAGH studie beoog om kinders op verskillende plase in die onderskeie kategorieë te toets. Dié projek het ’n aanvang in die Potchefstroom-area geneem op ’n groot kommersiele plaas met twee gemeenskappe bestaande uit ongeveer 80 huishoudings wat op die plaas woonagtig is. ’n Multi-dissiplinere gesondheidspan bestaande uit maatskaplike werkers, sielkundiges, fisioloë, voedingkundiges, verpleegkundiges, kinderkinetici en navorsers van verbruikerswetenskappe het verskeie vorme van inligting by die plaasgemeenskap bekom. Die gedeelte wat in hierdie artikel gerapporteer word, is slegs op die kinders wat in die gemeenskap leef en skoolgaan van toepassing, en die inligting is deur Kinderkinetici van die Skool vir Biokinetika Rekreasie en Sportwetenskap ingesamel. Hierdie studie kan beskou word as ’n loodsprojek van die FLAGH studie aangesien basislyn inligting eerstens deur die onderskeie navorsers in die projek benodig is voordat verdere navorsing beplan kon word.

Proefpersone

Die ondersoekgroep het bestaan uit die 37 plaaswerkerskinders (19 dogters en 18 seuns) tussen die ouderdom van vier en 16-jaar wat op die plaas woonagtig is en skoolgaan. Die jonger kinders in die studie word daagliks in ’n dagsorgsentrum wat langs die skool aangebring is, versorg.

Meetinstrumente

Fisieke-fiksheidstoetsbattery en liggaamsamestelling

Gesondheidsbevorderende fisieke fiksheid sluit meestal krag, soepelheid, aërobiese uithouvermoë en liggaamsamestelling in. Die volgende aspekte is in die verband by die groep getoets:

Gebuigde armhang (slegs dogters) wat die kraguithouvermoë van die boarm, skouer en borsspiere in sekondes meet (Wood, 1997).

Optrekke (slegs by seuns) wat die krag van die boarm, skouer en borsspiere in hoeveelheid optrekke gedoen meet (Wood, 1997).

Linker- en regterhandgreepkrag (kg), gemeet deur die Lafayette-handgreepdinamometer (Wood, 1997).

Die gemodifiseerde sit-en-reik-toets wat die soepelheid van die lae rug en hampese deur middel van ’n standaardkas en –maatstok meet (Docherty, 1996).

Die Bleep-toets wat ’n indirekte meting van VO_2-maks. is. Die aërobiese kapasiteit word bepaal volgens die 20m-wisselloopvlak waarby ’n proefpersoon nie meer die progressiewe pasverhoging kan haal nie (Brewer *et al*., 1988). In die studie word indirekte waardes van VO_2-maks. gebruik omdat ’n hoë korrelasie (r=0.79) tussen die direkte en indirekte VO_2-maks. gerapporteer word (Ramsbottom *et al*., 1988).

Liggaamsamestelling, liggaamslengte, liggaamsmassa, vetpersentasie, triceps velvou, subskapulêre velvoue, LMI (Liggaamsmassa indeks) en aantal TV-kykure is bykomend vir die interpretasie van fisieke-fiksheidsresultate gemeet. Die vetpersentasie-bepalingsformule van Boileau *et al*. (1985) is gebruik.

Die Previous Day Physical Activity Recall (PDPAR)

Die vrealys, saamgestel deur Trost *et al*. (1999), is gebruik om die fisieke aktiwiteitsvlakke sowel as die fisieke aktiwiteitspatrone van die kinders te ontleed. ’n Relatiewe energiewaarde is gebruik om die intensiteit van die aktiwiteite as ’n metaboliese (MET) waarde uit te druk. Die waarde van een MET verteenwoordig die energieverbruik wat met rus geassosieer word en is gelyk aan 1 kkal/kg/uur of 3.5 ml O_2/kg/min.

Met die PDPAR-vraelys (herroepingsvraelys oor 24 uur) is inligting ingewin wat verband hou met die kinders se fisieke aktiwiteite van ’n voorafgaande weekdag en een dag gedurende die naweek. Die vraelys word ingedeel in intervalle van 30 minute waar die kinders die aktiwiteite moet invul wat hulle in daardie tydsperiode op die betrokke dag gedoen het.

Die proefpersone is gevra om terug te dink aan wat hulle die vorige dag gedoen het. Die aktiwiteitsintensiteit van die aktiwiteite wat hulle vermeld, word dan as hoog (3), matig (2) of laag (1) gekategoriseer. Kinders word soos volg volgens hulle aktiwiteitsvlakke geklassifiseer:

Hoog aktief is wanneer daar een periode of meer periodes van 30 minute elk met ses METS-waardes gekodeer is.

Matig aktief is wanneer daar twee of meer periodes van 30 minute met drie METS-waardes gekodeer is.

Laag aktief is as daar nie aan die hoog of matige aktiwiteitstandaarde voldoen word nie (Pate *et al*., 1997).

Dit was nodig om sekere byvoegings met betrekking tot die aktiwiteite te maak om sodoende by die Suid-Afrikaanse kultuurverskille aan te pas. Enkele tradisionele spele van Tswana-

kinders met die METS-waarde van elke aktiwiteit, is tot die lys van aktiwiteite gevoeg (Engelbrecht, 2001).

Die PDPAR-meetinstrument is deur Weston *et al*. (1997) as 'n betroubare en geldige meetinstrument getoets (toets-hertoets-betroubaarheidskoëffisiënt = 0.99; $p<0.01$) en is reeds met welslae deur verskeie navorsers (Pate *et al*., 1997; Prista *et al*., 1997) gebruik.

Navorsingsprosedure

Navorsing is op 'n groot kommersiële plaas uitgevoer wat ongeveer 50 km buite Potchefstroom geleë is. 'n Kind is vir toetsing ingesluit, nadat die toestemming van die betrokke skoolhoof of dagversorger verkry is en ingeligte toestemmingsvorms deur die ouers vir goedkeuring van deelname voltooi is. Die navorsing het tydens skoolure plaasgevind, en daar is van opgeleide tolke gebruik gemaak om te verseker dat die kinders al die vrae verstaan. Die metings van liggaamsamestelling [tricepsvelvou, subskapulêre velvou, liggaamsvetpersentasie, massa, lengte, LMI (Liggaamsmasa indeks)], fisieke-fiksheid (gemodifiseerde sit-en-reik, handgreepkrag (links en regs) en staande verspring (Brewer *et al*., 1988; Docherty, 1996; Wood, 1997) is op al 37 kinders (19 dogters en 18 seuns) uitgevoer. Die meting van gebuigde armhang is slegs op dogters uitgevoer en die van optrekke op seuns (23 kinders waarvan 11 dogters en 12 seuns het dit uitgevoer). Die fisieke-aktiwiteitsvraelys (Trost *et al*., 1999) en die bleep toets ('n indirekte VO_2-maks.- toets) is deur slegs 19 kinders in die groep (nege dogters en 10 seuns) tussen die ouderdom van nege en 16-jaar voltooi,

aangesien die jonger kinders nie in staat is om vraelysinligting op 'n betroubare wyse weer te gee nie, terwyl die bleep toets ook nie aanbeveel word vir toepassing op baie jong kinders nie. Sosio-ekonomiese status (SES) is bepaal deur inkomste, behuising, water en elektrisiteit en hiervolgens kan die groep se SES as laag beskou word.

Statistiese ontleding

Die data is met behulp van die rekenaarprogram, Statistica for Windows (StatSoft Inc. SA, 2002), verwerk. Beskrywende statistiek is gebruik om rekenkundige gemiddeldes, standaardafwykings en maksimum en minimum waardes te bepaal. 'n Variansie-ontleding (ANOVA) opgevolg met Tukey-*post hoc*-toetse asook verdere onafhanklike t-toetse is gebruik om die fisieke-fiksheidsresultate mee te ontleed. Praktiese betekenisvolheid is bereken wanneer 'n statistiese betekenisvolle verskil gekry is, waar 'n EG >0.8 (groot), EG >0.5 (medium) prakties betekenisvolle verskille aandui. Aktiwiteite waaraan die kinders deelgeneem het, is deur middel van die SAS-rekenaarprogram volgens gemiddelde halfure en in volgorde vir ontledingsdoeleindes, gerangskik (SAS, 1991).

RESULTATE EN BESPREKING

Kinders is vir besprekingsdoeleindes in 'n 4- tot 8-jarige en 9- tot 16-jarige groep verdeel. In die bespreking word veral op die hoër ouderdomsgroepe gefokus, aangesien meer volledige inligting oor hulle verkry kon word.

TABEL 1. **BETEKENISVOLHEID VAN VERSKILLE IN FISIEKE FIKSHEID VAN 4- TOT 8-JARIGE SEUNS EN DOGTERS**

	Dogters (n=10)				Seuns (n=8)				Betekenisvolheid van verskille			
	$\bar{x}$	sa	Min	Maks.	$\bar{x}$	sa	Min	Maks.	gvv	t	p	EG
Massa	20.4	3.9	14.6	24.5	20.1	4.3	13.8	27.6	16	-0.189	0.85	

Lengte	118.8	9.2	100.0	131.7	108.1	13.6	86.0	128.1	16	-1.993	0.06*	0.79
LMI	14.4	1.8	10.5	17.3	17.3	2.9	14.1	22.9	16	2.574	0.02*	1.0
Triceps	6.7	2.1	3.0	10.0	7.1	1.5	5.0	9.0	16	0.498	0.63	
Subskapulêr	5.4	1.9	3.0	8.8	5.4	1.2	4.0	7.3	16	0.008	0.99	
Vet %	11.2	3.9	4.0	17.0	11.1	2.5	8.0	14.0	16	-0.048	0.96	
Handgr - R	10.9	3.3	5.0	16.0	12.1	3.3	9.0	18.0	16	0.775	0.45	
Handgr- L	9.8	3.3	5.0	15.0	10.6	3.7	5.5	16.5	16	0.462	0.65	
Sit-en-reik	25.4	4.2	16.5	30.5	21.3	4.2	13.0	25.0	16	-2.067	0.05*	0.98
Standverspring	103.8	19.2	58.0	123.0	98.9	18.6	71.0	125.0	16	-0.548	0.59	

sa = Standaardafwyking, $\bar{x}$ = Rekenkundige gemiddeld, Min = Minimum waardes, Maks. = Maksimum waardes, gvv = grade van vryheid, t = t-waarde, p = p-waarde, betekenisvolle verskil, $p<0.05$(*), EG = Effek grootte (praktiese betekenisvolheid waar EG>0.8 groot en >0.5 medium betekenisvolheid aandui)

Tabel 1 dui die fisieke-fiksheidstatus van die 4- tot 8-jarige seuns (n=10) en dogters (n=8) afsonderlik aan, asook die statisties en praktiese betekenisvolheid van verskille wat tussen die twee geslagte gevind is. Hieruit kan gesien word dat die dogters langer (p=0.064) is en verder kan spring as die seuns (alhoewel die verskil nie betekenisvol is nie), terwyl die LMI (p=0.02, EG=1.0) en handgreepkragwaardes (p>0.05) van die seuns hoër as die van die dogters is. Die dogters se soepelheid het ook grenslyn statisties maar praktiese betekenisvolle hoër (p=0.05,

EG=0.98) waardes as die van die seuns getoon. Met betrekking tot liggaamsvetpersentasie en massa is geen verskille tussen die twee geslagte gevind nie, alhoewel lengteverskille (p=0.064) op 'n 10%-peil van betekenisvolheid gevind is. Beide die seuns (11.1%) en die dogters (11.2%) se vetpersentasie en die dogters se LMI-waardes ($\bar{x}$ =14.4) val volgens Lohman (1992) onder die 50ste persentiel vir hulle ouderdomsgroep. Die seuns se LMI-waardes val tussen die 85ste en 90ste persentiel.

Tabel 2 bevat die beskrywende inligting van die fisieke-fiksheidstatus, fisieke aktiwiteit, aantal TV-ure en liggaamsamestelling van die 9- tot 16-jarige seuns (n=10) en dogters (n=9) (Tabel 2), asook die betekenisvolheid van die verskille tussen die twee geslagte.

TABEL 2. **BETEKENISVOLHEID VAN VERSKILLE IN LIGGAAM-SAMESTELLING, FISIEKE FIKSHEID EN FISIEKE-AKTIWITEIT VAN 9- TOT 16-JARIGE SEUNS EN DOGTERS**

	Seuns (n=10)				Dogters (n=9)				Betekenisvolheid van verskille			
	$\bar{x}$	sa	Min	Maks.	$\bar{x}$	sa	Min	Maks.	gvv	t	p	EG
Massa	31.9	6.3	24.0	45.3	30.3	8.1	19.5	46.2	17	-0.51	0.62	
Lengte	140.5	10.6	125.0	161.0	141.9	9.5	127.6	157.7	17	0.30	0.77	
LMI	16.0	1.1	14.1	17.5	15.1	3.7	7.8	22.3	17	-0.78	0.45	
Triceps	4.8	0.9	3.5	6.0	8.0	3.0	5.0	14.0	17	3.22	0.005*	1.07
Subskapulêr	5.2	0.8	4.0	6.0	7.0	2.2	4.5	11.5	17	2.46	0.025*	0.82
Vet %	8.3	1.5	7.0	11.0	13.4	3.9	10.0	20.0	17	3.90	0.001*	1.31
Handgr - R	20.9	5.5	14.0	34.5	18.6	3.4	15.0	25.0	17	-0.08	0.30	
Handgr - L	20.7	5.3	12.5	32.0	18.4	4.7	11.5	26.0	17	-0.98	0.34	
Sit-en-reik	28.8	3.4	24.0	35.8	31.8	6.4	17.0	38.7	17	1.28	0.22	
Geb- armhang	-	-	-	-	9.5	5.7	2.2	20.0	7	-	-	
Optrek	3.9	2.4	0.5	8.5	-	-	-	-	-	-	-	
Standverspring	145.1	19.0	117.0	185.0	131.8	9.9	117.0	149.0	17	-1.89	0.08	
Bleep	8.5	1.3	7.0	10.1	4.0	0.7	3.1	5.1	17	-8.84	0.00*	3.46
VO2-Maks	42.8	4.5	37.1	49.3	27.8	2.2	25.4	31.8	17	-9.03	0.00*	3.13
TV-ure	1.5	1.1	0.0	3.3	1.0	0.9	0.0	2.8	17	-1.02	0.32	
FA klas (wk+nw)	2.2	0.3	1.5	2.5	1.9	0.5	1.0	3.0	17	-1.26	0.23	

TV-ure = aantal ure per dag, FA-klas (wk+nw) = Fisieke-aktiwiteitsklassifikasie gedurende die week (wk) en naweek (nw), EG = Effek grootte (praktiese betekenisvolheid)

Uit Tabel 2 kan statistiese ($p<0.05$) en groot praktiese betekenisvolle verskille tussen die twee geslagte tussen 9- en 16-jaar gesien word met betrekking tot die triceps- en subskapulêre velvoue, liggaamsvetpersentasie (dogters se waardes hoër), bleep en VO_2-maks. (dogters se waardes laer). Alhoewel nie betekenisvol nie, blyk tendense van verskille tussen die twee geslagte ook voor te kom: Die seuns het hoër waardes in LMI, handgreepkrag (links en regs) en staande verspring, teenoor die dogters se hoër sit-en-reik-waardes en effens langer liggaamslengtes. Wat massa betref, is die twee geslagte se waardes ongeveer dieselfde. In longitudinale studies wat geslagsverskille ondersoek het, is gevind dat die gemiddelde VO_2-maks.-waardes altyd groter by seuns as by dogters is (Rowland, 1990; Cooley & McNaughton, 1999), 'n bevinding wat deur hierdie studie se resultate bevestig word. 'n Verdere studie wat die resultate bevestig, is dié van Prista *et al*. (1997) betreffende 8- tot 15-jarige seuns en dogters afkomstig vanaf laer sosio-ekonomiese omgewings in Maputo. Dié resultate dui aan dat seuns fikser as dogters is en dat hulle oor beter fiksheid as kinders vanuit hoër sosio-ekonomiese omgewings beskik. Dié navorsers skryf die voorgenoemde resultaat toe aan 'n aktiewer leefwyse, die afwesigheid van die negatiewe invloed van obesiteit en 'n positiewe kulturele effek. Die vetpersentasie van die 9- tot 16-jarige seuns (8.3%, Tabel 2) sowel as die van dogters (13.4%, Tabel 2) val volgens Lohman (1992) se indeling onderskeidelik in die baie lae en die lae kategorie. Volgens Lohman sal 'n vetpersentasie wat in die optimale kategorie val (tussen 10 en 20% vir seuns en 15-25% vir dogters goeie gesondheid ondersteun). Een moontlike oorsaak vir die lae vetpersentasies wat by die groep kinders gevind is kan 'n swak voedingstatus wees wat deur die navorsing van voedingskundiges in die multidissiplinêre span bevestig is (Kruger *et al.,* 2004). Kroniese matige, tot ernstige ondervoeding word geassosieer met 'n kleiner liggaamsgrootte en spiermassa, laer fisieke prestasievlakke (krag, aërobies en motories) en laer vlakke van fisieke aktiwiteit, aldus Malina *et al.* (2004). Kruger *et al.* (2004) rapporteer 27% van die kinders as ondervoed, 24% as kort vir hulle liggaamslengte ('stunted') en 2.4% as skraal vir hulle liggaamsmassa ('wasted').

TABEL 3. **AKTIWITEITE WAT DIE SEUNS EN DOGTERS TYDENS 'N WEEKDAG VERRIG HET, GERANGSKIK (PER HALFUUR) VOLGENS DIE HOOGSTE VOORKOMS**

	Seuns (9-16 jaar)				Dogters (9-16 jaar)		
No	Aktiwiteit	Gemiddeld	Mets	No	Aktiwiteit	Gemiddeld	Mets
1	Slaap	0.31	0.9	1	Slaap	0.349	0.9
2	Kyk TV	0.133	1.5	2	Kyk TV	0.101	1.5
3	Eet	0.086	1.5	3	Eet	0.09	1.5
4	Loop stadig	0.081	2.8	4	Loop stadig	0.09	2.8
5	Jagertjie	0.057	5	5	Sit stil	0.053	1
6	Dans	0.033	3	6	"Hopschotch"	0.053	5
7	Speel wegkruipertjie	0.029	3	7	Was skottelgoed	0.048	1.6
8	Sit stil	0.024	1	8	Spring tou	0.032	10
9	Maak tuin nat	0.024	1.5	9	Inkopies	0.026	2
10	Spit/grawe	0.019	5	10	Bons en vang bal	0.026	2.5
11	Skop bal	0.019	3	11	Kook	0.021	2.1
12	Ry stadig fiets	0.014	3	12	Maak tuin nat	0.016	1.5
13	Was skottelgoed	0.014	1.6	13	Huistake/vee	0.016	2.1
14	Kook	0.014	2.1	14	Sit/praat met vriende	0.016	1.5

15	Inkopies	0.014	2	15	Ry stadig fiets	0.011	3
16	Kap hout	0.014	6	16	Stort/bad/was	0.011	2
17	Draf/hardloop(vang kuikens)	0.014	7	17	Loop vinnig	0.011	5
18	Vang vis	0.014	2	18	Pak goedere	0.011	3
19	Stort/bad/was	0.01	2	19	Motor/bus	0.005	1.5
20	Loop vinnig	0.01	5	20	Dra water	0.005	3.8
21	Sokker	0.01	7	21	Dra/laai hout	0.005	5
22	Versorg diere	0.01	2	22	Babaversorging	0.005	3
23	Motor/bus	0.005	1.5	23			
24	Huistake/vee	0.005	2.1	24			
25	Was klere	0.005	3	25			
26	Stryk	0.005	2.3	26			
27	Dra water	0.005	3.8	27			
28	Maak vuur	0.005	2	28			
29	Draadkar	0.005	5	29			
30	"Hopschotch"	0.005	5	30			
31	Bons en vang bal	0.005	2.5	31			
32	Speel skool	0.005	2	32			

Uit Tabel 3 wat die lys van aktiwiteite van die 9- tot 16-jarige seuns en dogters tydens die week aandui, kan gesien word dat die aktiwiteite wat op weekdae die meeste tyd in beslag neem, meestal sedentêr van aard is, maar dat die kinders ook verskeie werksaktiwiteite verrig en speletjies speel wat hoër energievlakke vereis. Ter bevestiging van dié resultate rapporteer Kriska (2000) dat deelname aan aktiwiteite soos om te loop, familieversorging en die uitvoer van huishoudelike take kenmerkend van kinders uit laer sosio-ekonomiese groepe is. Prista *et al*. (1997) se studie toon ook dat kinders uit ’n laer sosio-ekonomiese omgewing meer huishoudelike (binne sowel as buite die huis) en broodwinnerstake verrig en meer loop as kinders (veral seuns) uit hoër sosio-ekonomiese omgewings waar meer tyd aan sportbeoefening spandeer word.

TABEL 4. **AKTIWITEITE WAT DIE SEUNS EN DOGTERS TYDENS DIE NAWEEK VERRIG HET, GERANGSKIK (PER HALFUUR) VOLGENS DIE HOOGSTE VOORKOMS**

	Seuns				Dogters		
No	Aktiwiteit	Gemiddeld	Mets	No	Aktiwiteit	Gemiddeld	Mets
1	Slaap	0.219	0.9	1	Slaap	0.244	0.9
2	Loop stadig	0.1	2.8	2	Eet	0.086	1.5
3	Kyk TV	0.094	1.5	3	Sing	0.082	2.5
4	Eet	0.09	1.5	4	Sit stil	0.079	1
5	Skop bal	0.071	3	5	"Hopschotch"	0.072	5
6	Versorg diere	0.068	2	6	Kyk TV	0.057	1.5
7	Sit stil	0.039	1	7	Spring tou	0.054	10
8	Maak tuin nat	0.029	1.5	8	Kook	0.05	2.1
9	Kyk bal spele	0.026	1.5	9	Was skottelgoed	0.047	1.6
10	Tennis	0.026	7	10	Stort/bad/was	0.043	2
11	Sing	0.026	2.5	11	Loop stadig	0.032	2.8
12	"Hopschotch"	0.026	5	12	Huistake/vee	0.032	2.1
13	Huistake/vee	0.019	2.1	13	Naaldwerk	0.032	1.5
14	Was skottelgoed	0.019	1.6	14	Godsdiensbeoefening	0.022	1.5
15	Stort/bad/was	0.016	2	15	Bons en vang bal	0.018	2.5
16	Dra/laai hout	0.016	5	16	Speel pop	0.014	2.5
17	Ry stadig fiets	0.013	3	17	Speel kaarte	0.007	2
18	Inkopies	0.013	2	18	Versorg diere	0.004	2
19	Kap hout	0.013	6	19	Ry stadig fiets	0.004	3

20	Dans	0.013	3	20	Dra water	0.004	3.8
21	Sokker	0.01	7	21	Maak vuur	0.004	2
22	Sit, lees boek	0.006	1.3	22	Loop vinnig	0.004	5
23	Pak goedere	0.006	3	23	Maak bed op	0.004	2
24	Motor/bus	0.003	1.5	24	Hark gras	0.004	4
25	Kook/skep kos in	0.003	2.1	25			
26	Was klere	0.003	3	26			
27	Dra water	0.003	3.8	27			
28	Erf skoonmaak	0.003	5	28			
29	Sit, praat met vriende	0.003	1.5	29			
30	Godsdiensbeoefening	0.003	1.5	30			
31	Maak vuur	0.003	2	31			
32	Draadkar	0.003	5	32			
33	Pak goedere af	0.003	5	33			
34	Babaversorging	0.003	3	34			
35	Brandbal	0.003	3	35			
36	Skiet	0.003	2	36			

Tabel 4 wat die naweekaktiwiteite aandui, toon dat die vier aktiwiteite met die hoogste voorkoms by seuns en dogters veral sedentêr van aard is, alhoewel hulle ook werksaktiwiteite gedurende die naweek verrig. Dit wil verder voorkom of die seuns en die dogters 'n groter verskeidenheid ontspanningsaktiwiteite gedurende die naweek, vergeleke met tydens die week uitvoer, en dat die seuns tydens die week (Tabel 3) en die naweek (Tabel 4) by benadering effens langer tye as die dogters aan TV-kyk spandeer. Tabel 2 toon egter dat beide die seuns ($\bar{x}$ = 2.20) en die dogters ($\bar{x}$ = 1.9) as 'n groep *matig aktief* is, 'n tendens wat bevestig word deur die geraadpleegde literatuur oor die fisieke aktiwiteitsvlakke van kinders uit lae sosio-ekonomiese omgewings (Prista *et al*., 1997; Hughes, 1999; Kriska, 2000). 'n Verskeidenheid huishoudelike en ander werkstake word deur beide die seuns en die dogters verrig wat ook daartoe kon bydra dat hulle matig aktief is. Tabelle 3 en 4 se resultate bevestig dat kulturele faktore moontlik ook 'n invloed op die fisieke-aktiwiteitsvlakke van die kinders kon uitoefen, aangesien dans en musiek sterk komponente is van die speletjies wat hulle speel en van die plaaslike leefwyse (speel met draadkarre, dans en tyd wat aan die kyk van sokkerwedstryde spandeer word). Die kinders verrig baie werksaktiwiteite soos tuinnatmaak, versorging van diere, skottelgoed was, houtkap, kook en huistake/vee. Die speletjies wat hulle speel sluit die volgende in: jagertjie, wegkruipertjie, speel met balle, touspring, 'hopscotch' en tennis. Hughes (1999) stel in dié verband dat kinders wat in gemeenskappe grootword waar daar min tyd vir speel is, tyd daarvoor maak deur speletjies met hul werk te integreer.

Tabel 5 bied 'n ontleding van die 9- tot 16-jarige ouderdomsgroep en die geslagte afsonderlik met betrekking tot hulle onderskeie fisieke-aktiwiteitsvlakke. Hieruit blyk dit dat die seuns gedurende die week sowel as die naweek effens meer aktief as die dogters is. Dit blyk ook dat die seuns meer aktief is tydens naweke as gedurende die week, waar die dogters se fisieke-aktiwiteitsvlakke baie soortgelyk tydens die week en naweek is. Daar is volgens Sherman (2000) 'n gelyke afname in die naweek se fisieke-aktiwiteitsvlakke van seuns en dogters tussen Graad 4 en 6. In hierdie studie was die resultate soortgelyk, waar die Graad 4-seuns gedurende die naweek meer aktief as die dogters is, terwyl die Graad 6-seuns en -dogters dieselfde aktiwiteitsvlakke gedurende die naweek vertoon het.

TABEL 5. **FISIEKE-AKTIWITEITSVLAKKE VAN SEUNS EN DOGTERS VAN DIE VERSKILLENDE OUDERDOMME TYDENS DIE WEEK EN NAWEEK**

	Ouderdom	n		Gemiddeld		sa		Min		Maks.	
		S	D	S	D	S	D	S	D	S	D

Week	9	2	1	2	2	0	-	2	2	2	2
Naweek	9	2	1	1.5	2	0.71	-	1	2	2	2
Week	11	3	3	2.33	1.33	0.58	0.58	2	1	3	2
Naweek	11	3	3	2.67	1.67	0.58	0.58	2	1	3	2
Week	12	1	2	2	2	-	0	2	2	2	2
Naweek	12	1	2	3	2	-	0	3	2	3	2
Week	13	1	-	2	-	-	-	2	-	2	-
Naweek	13	1	-	2	-	-	-	2	-	2	-
Week	14	3	2	2	2.5	0	0.71	2	2	2	3
Naweek	14	3	2	2.33	1.5	0.58	0.71	2	1	3	2
Week	16	-	1	-	3	-	-	-	3	-	3
Naweek	16	-	1	-	3	-	-	-	3	-	3

n = aantal proefpersone, sa = Standaardafwyking; Min = Minimum waarde; Maks = Maksimum waarde; S = Seuns; D = Dogters

Peltzer *et al*. (2002) het gevind dat swart seuns en dogters tussen die ouderdom van vyf en 12-jaar redelik *hoog aktief* is, maar dat dogters in die ouer groepe meer sedentêre aktiwiteite soos

tuinnatmaak verkies, ’n bevinding wat ook deur ander studies sowel as hierdie studie bevestig word (Gilbey & Gilbey, 1995; Myers *et al*., 1996; Pate *et al*., 1997). Op onderskeidelik 11-jarige en 14-jarige ouderdom het ’n redelike verskil met betrekking tot die geslagte tydens die naweek in fisieke aktiwiteit voorgekom (Tabel 5).

Tabelle 6 en 7 toon verskille tussen die seuns (Tabel 6) en die dogters (Tabel 7) in die afsonderlike fisieke-aktiwiteitsklassifikasies met betrekking tot die fisieke fiksheid en liggaamsamestellings veranderlikes. Geen seuns was *laag aktief* nie, derhalwe word slegs die matig aktiewe groep (n=5) en die hoog aktiewe groep seuns (n=5) met mekaar vergelyk. Slegs die mate van fisieke aktiwiteit het by die twee groepe betekenisvol verskil (Tabel 7). Die matig aktiewe groep seuns het effens hoër soepelheid, VO_2-maks. en krag met die optrekke vertoon, terwyl die hoog aktiewe groep effens langer en swaarder is en ’n hoër fisieke-aktiwiteitsklassifikasie het. Geeneen van dié verskille was egter betekenisvol nie. Die LMI-waardes van die *hoog* en *matig* aktiewe seuns val volgens Lohman (1992) se norme onder die 50^{ste} persentiel en hulle liggaamsvetpersentasie heelwat onder die 50^{ste} persentiel. Geen definitiewe verskille of tendense kon verder uit dié resultate afgelei word nie, behalwe dat die seuns wat fisiek *hoog aktief* is, betekenisvol meer aktief was.

TABEL 6. **BETEKENISVOLHEID VAN VERSKILLE TUSSEN MATIG EN HOOG FISIEK AKTIEWE SEUNS (9 TOT 16 JAAR)**

	Matig FA			Hoog FA			Betekenisvolheid van verskille			
	n	$\bar{x}$	sa	n	$\bar{x}$	sa	gvv	t	p	EG
Massa	5	31.2	4.8	5	32.7	8.0	8.0	-0.4	0.712	
Lengte	5	137.6	10.3	5	143.5	11.1	8.0	-0.9	0.406	
LMI	5	16.4	0.6	5	15.7	1.4	8.0	1.1	0.300	
Triceps	5	4.7	0.8	5	4.9	1.0	8.0	-0.4	0.735	
Subskapulêr	5	5.4	0.5	5	5.0	1.0	8.0	0.8	0.455	
Vet %	5	8.4	1.5	5	8.2	1.6	8.0	0.2	0.846	
Handgr - R	5	20.0	2.9	5	21.8	7.6	8.0	-0.5	0.634	
Handgr - L	5	20.6	3.6	5	20.8	7.1	8.0	-0.1	0.957	
Sit-en-reik	5	29.9	3.6	5	27.7	3.3	8.0	1.0	0.351	
Optrek	5	3.9	3.3	5	3.8	1.4	8.0	0.1	0.951	
Standverspring	5	149.4	24.5	5	140.8	12.7	8.0	0.7	0.506	
Bleep	5	8.8	1.3	5	8.1	1.4	8.0	0.9	0.387	
VO2-Maks	5	44.2	3.6	5	41.4	5.3	8.0	0.9	0.371	
TV-ure	5	2.0	1.1	5	1.0	1.0	8.0	1.5	0.168	
FA klas (wk+nw)	5	1.9	0.2	5	2.5	0.0	8.0	-6.0	0.000*	3.0

TV-ure = aantal ure per dag; FA-klas (wk+nw) = Fisieke-aktiwiteitsklassifikasie gedurende

die week (wk) en naweek (nw), Matig FA = Matig fisiek aktief, Hoog FA = Hoog fisieke aktief

Wat die dogters se fisieke-aktiwiteitsklassifikasie betref (Tabel 7), het geen dogter in die laag aktiewe groep geval nie en slegs een dogter (16-jarige ouderdom) in die hoog aktiewe groep, wat vergelyking bemoeilik, en dus moet verskille wat voorgekom het met omsigtigheid beoordeel word. By die dogters is daar by massa, LMI en fisieke-aktiwiteitsklassifikasie statisties en praktiese betekenisvolle verskille tussen die matig aktiewe en hoog aktiewe dogter gevind.

Alhoewel nie betekenisvol nie, toon die matig fisiek aktiewe groep (n=7) beter soepelheid, kan verder spring en het 'n hoër VO_2-maks. Hierteenoor is die hoog aktiewe dogter langer ($\bar{x}$=144.0), swaarder ($\bar{x}$=46.2) en toon 'n hoër LMI-waarde ($\bar{x}$=22.3), meer krag (handgreepkrag en gebuigde armhang) en sy kyk meer TV. Engelbrecht *et al*. (2001) het dieselfde tendens gevind met betrekking tot hoog aktiewe dogters wat swakker soepelheid toon in vergelyking met laag of matig aktiewes. Die navorser het voorts gevind dat die hoog aktiewe groep dogters langer en swaarder as die dogters van die laag en die matig aktiewe groep was. Die matig aktiewe dogters (Tabel 7) se LMI-waarde val onder die 50ste persentiel en die hoog aktiewe dogter ongeveer op die 85ste persentiel (Lohman, 1992), terwyl die matige en hoog aktiewe dogters se liggaamsvetpersentasie ongeveer op die 50ste persentiel val.

TABEL 7. **BETEKENISVOLHEID VAN VERSKILLE TUSSEN MATIG EN HOOG FISIEK AKTIEWE DOGTERS (9 TOT 16 JAAR)**

	Matig FA			Hoog FA			Betekenisvolheid van verskille			
	n	$\bar{x}$	sa	n	$\bar{x}$	sa	gw	t	p	EG
Massa	7	28.8	6.2	1	46.2	-	6.0	-2.6	0.039*	2.8
Lengte	7	143.1	10.0	1	144.0	-	6.0	-0.1	0.933	
LMI	7	14.2	3.0	1	22.3	-	6.0	-2.5	0.045*	2.7
Triceps	7	7.4	2.3	1	14.0	-	6.0	-2.7	0.036*	0.3
Subskapulêr	7	7.1	2.2	1	8.5	-	6.0	-0.6	0.584	
Vet %	7	13.1	3.6	1	19.0	-	6.0	-1.5	0.177	
Handgr - R	7	18.5	3.5	1	22.0	-	6.0	-0.9	0.386	
Handgr - L	7	17.7	4.2	1	26.0	-	6.0	-1.8	0.117	
Sit-en-reik	7	31.2	7.0	1	30.6	-	6.0	0.1	0.938	
Geb armh	7	9.3	6.5	1	12.0	-	6.0	-0.4	0.711	
Standverspring	7	131.1	10.8	1	128.0	-	6.0	0.3	0.794	
Bleep	7	3.9	0.7	1	4.0	-	6.0	-0.2	0.867	
VO2-Maks	7	27.3	1.8	1	26.8	-	6.0	0.3	0.793	
TV-ure	7	0.8	1.0	1	1.3	-	6.0	-0.4	0.695	
FA klas (wk+nw)	7	1.9	0.2	1	3.0	-	6.0	-5.3	0.002*	5.5

TV-ure = aantal ure per dag, FA-klas (wk+nw) = Fisieke-aktiwiteitsklassifikasie gedurende die week (wk) en naweek (nw), Matig FA = Matig fisiek aktief, Hoog FA = Hoog fisiek aktief

GEVOLGTREKKINGS

Uit die resultate blyk dit dat plaaswerkerkinders tussen 9- en 16-jarige ouderdom se fisieke-aktiwiteitsvlakke redelik hoog (matige klassifikasie) is. Dit wil verder voorkom of hierdie aktiewe leefwyse tot 'n groot mate die gevolg is van werkstake wat hulle verrig, asook speletjies wat hulle speel en relatief min ure wat aan TV-kyk bestee word. Hierdie resultate is in ooreenstemming met ander studies (Prista *et al*., 1997; Hughes, 1999; Kriska, 2000; Peltzer *et al*., 2002) wat op kinders uit laer sosio-ekonomiese omgewings uitgevoer is. Geen

assosiasies wat op ’n verband tussen fisieke aktiwiteit en fisieke fiksheid kan dui, kon egter gevind word nie. Dié resultaat verskil van die van Prista *et al*. (1997) wat onder meer gevind het dat hoog fisiek aktiewe kinders beter in fisieke-fiksheidstoetse vaar, maar stem ooreen met Armstrong *et al.* (1998) wat geen verbande tussen fisieke aktiwiteit en fisieke fiksheid by kinders gevind het nie. As die hoog en matig fisiek aktiewe proefpersone in hierdie studie met mekaar vergelyk word, het die matig aktiewe groep (veral seuns) in die meeste van die fisieke-fiksheidstoetse hoër gemiddelde waardes (alhoewel nie betekenisvol nie), as die hoog aktiewe groep getoon. Dit wil egter voorkom of ’n matige fisieke-aktiwiteitsklassifikasie voldoende is om aërobiese uithouvermoë te bevorder, aangesien beide die seuns en die dogters wat *matig aktief* was, hoër VO_2-maks.-waardes as die hoog aktiewe proefpersone getoon het. Meer seuns as dogters was verder *hoog aktief*, wat ook deur studies bevestig word oor seuns en dogters se

fisieke-aktiwiteitsvlakke in dié ouderdomsgroepe. Met betrekking tot soepelheid, VO_2-maks. en staande verspring, het die matig aktiewe groep hoër waardes behaal, waaruit afgelei kan word dat hulle aktiewe plaaslewe tog ’n bydrae tot die instandhouding van hulle fisieke fiksheid kan lewer.

Die meeste van die plaaskinders se LMI- en vetpersentasiewaardes val onder die 50ste persentiel, en Kruger *et al*. (2004) het gerapporteer dat 27% van die kinders ondervoed is. Die jonger kinders (vier tot agt jaar, en veral dogters) het veral lae vetpersentasies en LMI-waardes getoon. Dié tendens kom steeds by die ouer kinders voor, veral by die seuns. Die gemiddelde fisieke fiksheid van die groep 9- tot 16-jarige plaaskinders kan as laag beskou word, alhoewel dit redelik goed met studies van Amerikaanse en Kanadese kinders in die tagtigerjare vergelyk (Reiff *et al*., 1986). Henneberg *et al*. (2001) het gevind dat kinders van ’n laer SES stadiger neuromuskulêre reaksies toon en dat dié kinders kleiner spiermassas en kragwaardes as kinders van hoër SES het, wat as een moontlike verklaring kan dien vir die resultate.

SAMEVATTING

Dié studie van plaaswerkerkinders het tekortkominge met betrekking tot veralgemeenbaarheid na ander plaasgemeenskappe aangesien ’n klein groepie kinders by die navorsing betrokke was. Dit het egter ’n goeie aanduiding gegee van die fisieke aktiwiteit, fisieke fiksheid en liggaamsamestelling van kinders wat op ’n plaas woonagtig is. Dit is duidelik dat hierdie kinders kwesbaarder is, veral wat hulle voedingstatus betref, as kinders wat elders woon. Hierdie resultate benadruk die belang van verdere navorsing oor plaaswerkerskinders, soos om die invloed van dieet en omgewingsfaktore in samehang met fisieke aktiwiteit en fisieke fiksheid te ondersoek. Alhoewel die fisieke aktieiwiteitspatrone van die kinders ’n aktiewe beeld uitstraal, hou hulle fisieke fiksheid nie daarmee verband nie, en word intervensieprogramme aanbeveel wat die verbetering van fisieke fiksheidskomponente soos krag sal aanspreek. Uit die ontleding van hulle aktiwiteitspatrone het dit ook geblyk dat die kinders nie aan sportdeelname blootgestel word nie (alhoewel die seuns graag toeskouers van sokkerbyeenkomste is, en beide seuns en dogters hulleself met balspele besig hou). Die insluiting van sodanige aktiwiteite in intervensieprogramme ter verbetering van fisieke fiksheid word gevolglik aanbeveel.

SUMMARY

The physical fitness and physical activity levels and patterns among children of

farmworkers: FLAGH-study

The literature reveals that the motor development, physical activity levels (PA) and physical fitness (PF) of children in rural environments, living under poor socio-economic conditions (SES), can differ (Herbst & Huysamen, 2000) from children living under different conditions (Prista *et al*., 1997). Prista *et al*. (1997) state in this regard that children from lower socio-economic environments have higher levels of physical activity. Studies (Cameron *et al*., 1992; Henneberg *et al*., 2001) also reveal that children from lower socio-economic environments in South Africa can be associated with a smaller body size.

This study forms part of a multi-disciplinary research project (FLAGH study - Farm Labour and General Health) being carried out by the Faculty of Health Sciences at the North-West University in Potchefstroom in the Northwest province of South Africa. The aim of this study was to analyse the physical activity patterns and levels and physical fitness of four to 16-year-old children of farm workers, also with regard to the relationship between physical activity and physical fitness.

The sample consists of all the farm worker children between the ages of four and 16 years living on a farm in the Potchefstroom area in the Northwest province. They completed a modified sit-and-reach, handgrip (left and right), aerobic endurance and standing long jump tests with reference to physical fitness variables (37 children; 19 girls and 18 boys) (Brewer *et al.,* 1988; Docherty, 1996; Wood, 1997). They also completed a physical activity questionnaire (Trost *et al.,* 1999) for a week day and one weekend day (only the nine to 16 year-old group) to determine their physical activity level (low, moderate or high). Body size and body composition was analysed by means of anthropometric variables (height, mass, BMI and sub-scapular and triceps skin folds). Statistica for Windows (Statsoft, 2001) was used to analyse the data for descriptive purposes. An analysis of variance (ANOVA), followed by a Tukey-*post hoc*-test, and independent t-testing ($p<0.05$) and effect sizes were computed, while the SAS-program (SAS, 1991) was used to analyse the physical activity patterns of the group.

From the results it seems that the farm environment where the children grew up does influence their physical activity. The results show that the 4- to 8-year old girls almost have significantly higher flexibility than the boys. Their body fat percentage and the girls BMI values fall below the 50^{th} percentile (Lohman, 1992). In the 9- to 16-year old group body fat percentage was below the 50^{th} percentile, while significant differences were found between the genders. This includes the triceps and sub scapular skin folds, body fat percentage (girls higher values), bleep and VO_2 –max. (girls lower values). The results also revealed that the level of physical activity of the 9- to 16-year-old group were reasonably high (moderate physical activity classification), which, from the analysis of their physical activity patterns, can largely be ascribed to walking, the work tasks performed on the farm such as carrying water and wood and looking after animals, playing games and lack of TV watching. With regard to the relationship between physical activity and physical fitness, no significant relationship was found. Further research with regard to the role of malnutrition in the physical activity and physical fitness of children living on farms is recommended, as well as intervention programs incorporating sports activities, to improve the physical fitness status of the children.

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AN ANALYSIS OF TOURISM SMEs IN SOUTH AFRICA

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ABSTRACT

In a comparative study of 37 participating countries on an analysis of Small Medium Enterprises (GEM, 2002) it was found that South Africa ranked the lowest of all developing countries, with only 3.3% of the adult population being involved in pursuing exploitable opportunities in various industries. Since 1994 South Africa has seen tremendous growth in tourism arrivals and 2002 saw a growth rate of 16.3%, which was one of the highest in the world. Even though tourism figures are on the increase, tourism SMEs are not really showing significant growth. This leads to the aim of this research, which is to do an analysis of tourism SMEs in South Africa. The analysis will entail determining the weaknesses, opportunities and threats that SMEs are experiencing. In order to achieve the latter, a survey of 150 successful tourism SMEs was conducted. These SMEs provided insight into all obstacles and threats they had experienced in becoming successful. This survey was one of the first of its kind in tourism in South Africa and from the results, recommendations are made on how to improve the current situation in order to grow tourism SMEs. In order to achieve its purpose, the paper is organised in the following manner: The first section deals with the introduction, problem statement and aim of the research; section two explains the research methodology; section three deals with the results; and the paper concludes with the recommendations in section four.

Key words: Tourism; SMEs; South Africa; Tourism industry.

INTRODUCTION

Tourism is vital to the development of South Africa and its people and it is currently the fastest growing industry, employing an estimated 600 000 people (Van der Merwe, 1999). It is also the largest industry in the world, and is at present the fourth largest industry in South Africa, after mining, agriculture and trade (Pearce, 1985; Satour, 1995; WTTC, 1995; De Kock & Saayman, 1999). Tourism is also the biggest employer in the world, with an estimated growth of 8% in employment annually, and it thus has the potential to become the biggest earner of foreign currency (WEFA, 1993; Keller & Koch, 1995; Swart, 1997). Much of these aspects were initiated by the political changes in 1994, which opened the doors of South Africa to the world.

Equally as important as recent political changes in South Africa is the fundamental restructuring of the economy. Not only is there a need for an economic transformation to support the political changes, but it is just as vital for communities to have equal access to the economic mainstream (Kuscus, 1996). According to the White Paper on Tourism (1996), South Africa's tourism resource base is phenomenal and it is of the utmost importance for

tourism small and medium enterprise (SME) opportunities to be exploited in order to enable the tourism industry to grow to its full potential. In 2002 South Africa had one of the highest

growth rates in tourist arrivals in world tourism. Saayman and Saayman (1999) and Gee *et al.* (1989: 5) have identified various sectors in the tourism industry that offer opportunities for SMEs, for example:

> Direct suppliers – sectors that are visible to the tourist, for example hotels, travel agents, restaurants, airlines (charter flights) and retailers.
>
> Support services – support the direct suppliers, for example tour operators, tourism research units, tour and trade publications, food services and laundrettes.
>
> Development organisations – mainly handle tourism development, which is more complex than the previous two categories, and include government agents, financial institutions, estate developers and educational centres.

Keeping in mind the aspects mentioned above and an increase in tourist expenditure and arrivals, as well as investment in South Africa, opportunities are knocking in different sectors of the tourism industry. The industry needs only to be well managed for benefits to be reaped for many years to come (White Paper on Tourism, 1996; Saayman, 1997). All indications are that, in line with the worldwide trend, the SME sector in South Africa is the country's only real hope for meaningful economic growth and job creation (Anon., 1998a; Godongwana, 2001; Anon., 2002). Tourism SMEs have a major role to play in the South African economy in terms of employment creation, income generation and output growth (Rogerson, 1997). SMEs account for approximately 60% of all employment in tourism and 30% in the total economy. Often, SMEs are also the vehicle by which the lowest-income people in the South African society gain access to economic opportunities – at a time that distribution of income and wealth in South Africa is amongst the most unequal in the world. In the current macro-economic context, it is imperative that significant investment is made in SMEs, in order to create both short and long-term capacity for labour absorption and output growth, as well as to improve income generation and redistribution (Rogerson, 1997; Anon., 1998b). The key objectives of the Government's national small business strategy supported by the White Paper on Tourism (1996) are the following (White Paper on Small Business, 1995):

> To create an enabling environment for small enterprises.
>
> To facilitate greater equalising of income, wealth and earning opportunities.
>
> To address the legacy of apartheid-based disempowerment of black businesses.
>
> To support the advancement of women in all business sectors.
>
> To create long-term jobs.
>
> To stimulate sector-focused economic growth.
>
> To strengthen cohesion between small enterprises.
>
> To level the playing field between bigger companies and small businesses, as well as between rural and urban businesses.
>
> To prepare small businesses to comply with the challenges of an internationally competitive economy.

From the above one could see that government intends to grow SMEs in South Africa, and specifically in the tourism industry, and is prepared to develop policies to achieve this (Swart, 1997; Swart & Saayman, 1997). However, a study comparing 37 participating countries found that South Africa ranks the lowest of all developing countries in that only 3.3% of the adult population is involved in pursuing exploitable opportunities (Gem, 2002). This finding is

supported by various other studies (for example De Coning, 1992; Visagie, 1997; Saayman & Saayman, 1999; Saayman & Slabbert, 2001; Olivier, 2002), which showed that limited success has been achieved in producing more successful SMEs in the tourism industry. Therefore it has become paramount to do an analysis of SMEs in the South African Tourism industry to identify the reasons for these results in order to make recommendations to rectify the situation.

RESEARCH METHODOLOGY

The aim of the literature study was to develop a questionnaire to collate essential information from successful tourism entrepreneurs in South Africa where the latter could reflect on issues that may give answers to why they had been successful. It was found that different researchers had looked at different aspects of entrepreneurship, for example entrepreneurial theories, elements of entrepreneurship, the needs of SMEs, government policies, and the advantages of tourism entrepreneurship, to mention a few. The relevant aspects for the purpose of this article were determined by combining the views of the various researchers, which include those of Heath (1993), Koh (1996), Kuscus (1996), McGrath and King (1996), Harrison *et al.* (1997), Visser (1997), Zulu (1998), Dean (1999), Lund & Skinner (1999), Saayman and Saayman (1999), Bennett (2000), Dott (2000), Lambris *et al.* (2000), Rogerson (2000), Schwenke (2000), Sheridan (2000), Saayman (2000) and Dannhauser (2002).

A 4-point Likert scale was used, where respondents could rate relevant aspects on a scale from Very True (4), True and Not True to Irrelevant (1). For the purpose of this paper the results of the scale Very True and True were combined to form a single percentage. The questionnaire contained both open- and close-ended questions. The target population was South African tourism entrepreneurs who had owned established SMEs for at least a period of five years and had employed at least two full-time employees, which is regarded as an indicator of success.

A list of names and addresses of SMEs in South Africa were obtained from SATSA (South African Tourism Services Association), and the criteria mentioned above was used which reduced the number of businesses from 900 to 450, of which 150 tourism businesses from all nine provinces in South Africa were randomly selected. Hence, 33% of the total population formed part of this survey. The entrepreneurs were asked to take part in the survey by completing the questionnaire. One hundred (N=100) questionnaires were returned from the original 150 distributed, thus a response rate of 67%.

RESULTS

The results of this paper deal with an analysis of the types of business that took part in the survey, followed by an analysis of their weaknesses, opportunities and threats.

TYPE OF BUSINESS

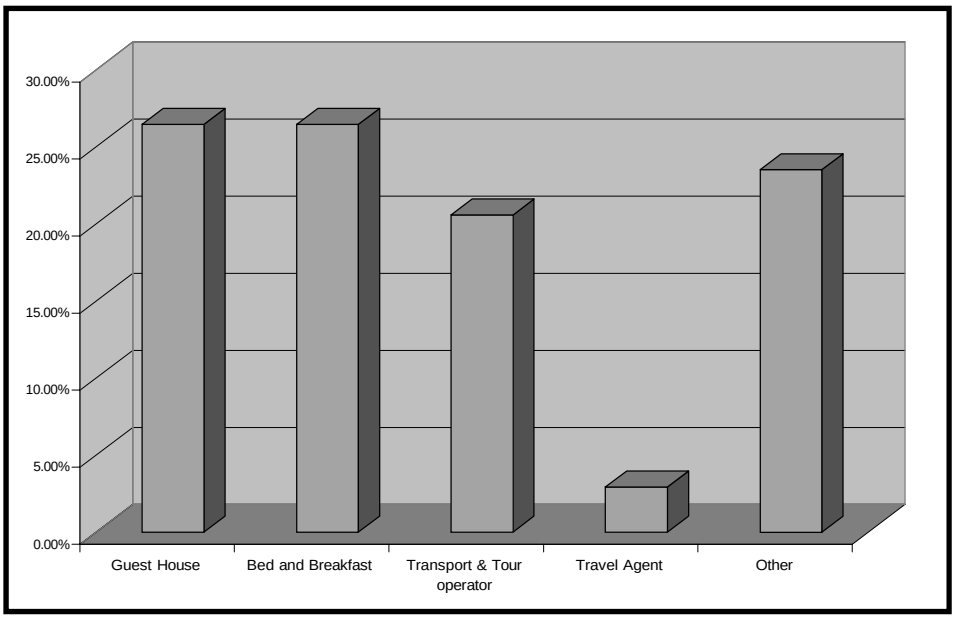

FIGURE 1. **TYPE OF BUSINESS**

According to Figure 1, 26% of the respondents were guesthouse owners and a further 26% were bed & breakfast owners, 23% had other businesses, which included game farms, curio shops, jewellery shops, game lodges and small hotels, 19% of the respondents were tour operators and 2% were travel agents. These results show that a variety of tourism SMEs formed part of this survey, and this can play an important role in the application of the results.

WEAKNESSES

According to Table 1 respondents agreed that managerial skills (100%), followed by financing of entrepreneurs (97%), knowledge, skills and experience (91%), as well as education and training are the greatest weaknesses of developing entrepreneurs in South Africa. These results were echoed by the Gem (2002) report.

When one looks at financing of SMEs, only 3% had enough start-up capital and only 35% of respondents who did not have enough start-up capital knew where to access tourism finance. Seventy-nine percent of respondents said that they had obtained bonds from a bank, 70% had used personal savings and 23% had borrowed money from family and/or friends. A further 14% had used their inheritance to start tourism businesses. None of the respondents had made use of Government grants, although 50% said that grants in tourism offer new opportunities for entrepreneurs. To the question whether they had experienced problems accessing finance, 33% of the respondents had not encountered any problems, whilst 38% had experienced problems in accessing finance.

TABLE 1. **WEAKNESSES**

WEAKNESSES	TRUE	NOT TRUE	IRRELEVANT

Managerial competence	100%		0%		0%
Education and training for entrepreneurs	82%		18%		0%
Knowledge, skills and experience	91%		9%		0%
Finance for tourism entrepreneurs • Finance as an important factor • Accessibility of finance • Problems accessing finance	97% 35% 33%		0% 56% 38%		3% 9% 29%
	Banks	**Savings**	**Family & Friends**	**Inherited**	**Government Grants**
• Financing institutions	79%	70%	32%	14%	0%

OPPORTUNITIES

According to Table 2, 76% of respondents felt that an opportunity will exist in their area to start an own tourism business within the next six months, 38% of respondents said that the government's Spatial Development Initiatives (SDI) offer new tourism opportunities. However not all entrepreneurs knew what the SDI were all about (47%). The South African Spatial Development Initiatives (SDI) programme is a short-term investment strategy, which aims to unlock economic potential in specific Southern African locations. The SDI aims to facilitate the creation of viable new jobs as potential investment opportunities, identified through the process, are taken up by the private sector. Fifty percent of respondents agreed that grants in tourism offer new funding opportunities. However, only 59% of respondents are aware of programmes to assist entrepreneurs in business ventures.

Most of the respondents (88%) indicated that experience and knowledge helped them identify an opportunity, which leads to a situation where they do not have to spend much on market research. They know what tourists want from previous experience and knowledge. Fourty one percent said that other tourism developments, for example casino developments, did create opportunities for them, while 29% indicated that family and friends as well as advertisements in the media made them aware of tourism opportunities. Only 8% said that the Government had made them aware of tourism opportunities, 97% of respondents felt that the transport and tour operator sector offers the most opportunities, followed by the accommodation sector (47%), travel agencies (38%), eco-tourism ventures (38%), conference tourism (32%), food and beverage and sports tourism (29%) respectively. Based on the information supplied by respondents, it is safe to say that respondents endorse the fact that a variety of opportunities exist in the tourism industry.

TABLE 2. **TOURISM OPPORTUNITIES**

OPPORTUNITIES	TRUE	NOT TRUE	IRRELEVANT
Opportunities to start a new tourism business	76%	24%	0%
Spatial Development Initiatives (SDI's)	38%	15%	47%
Tourism grants offer new tourism opportunities	50%	41%	9%
Government promotion for new opportunities	24%	73%	3%
Programmes to assist new business ventures	59%	41%	0%

	Experience & knowledge	Other tourism development	Family & Friends	Government Awareness	Other
Opportunities to become an entrepreneur	88%	41%	29%	8%	0%

	Transport & Tour operator	Accommodation	Travel Agents	Eco-tourism	Conference Tourism	Food & Beverage	Sport Tourism	Other
Tourism opportunities	97%	47%	38%	38%	32%	29%	29%	5%

THREATS

Although numerous opportunities exist for SMEs, some factors restrict their spontaneous growth in the South African tourism industry (Table 3).

TABLE 3. **TOURISM THREATS**

THREATS	TRUE	NOT TRUE	IRRELEVANT
A culture of entrepreneurship	53%	47%	0%
Possible low income	88%	12%	0%
Political and legal restrictions and	71%	26%	3%

deregulation			
Animosity of big business and authorities	29%	71%	0%
General economic climate	79%	21%	0%
Demographic changes	82%	15%	3%
Buildings and facilities	82%	15%	3%
Transformation	76%	18%	6%
Long hours and demanding work conditions	94%	6%	0%
Inadequately resourced and funded tourism industry	71%	29%	0%
Myopic private sector	61%	39%	0%
Limited development scope	82%	18%	0%
Inadequate training, education and awareness	74%	26%	0%
Lack of appropriate institutional structures	21%	67%	0%
Lack of objective advice	79%	3%	18%
Lack of support	15%	82%	3%
Lack of access to information	68%	32%	0%

Based on the information in Table 3 the greatest threats to tourism entrepreneurs are long hours and demanding work (94%), possible low income (88%), high rent of buildings and facilities, limited development scope and demographic changes (82%) respectively. The information above correlates well with the results of Table 1, which indicates the weaknesses. Potential entrepreneurs are not well informed or educated in terms of working hours and conditions of owning their own business. These aspects could lead to a situation where potential SMEs either do not try to start their own business, or where they quit too soon.

CONCLUSIONS AND RECOMMENDATIONS

A growing number of tourists, their needs, and their spending in particular create opportunities. However, the diversity of needs requires specialisation, which makes it increasingly difficult for entrepreneurs to enter the industry. In order for tourism to grow more entrepreneurs, a concerted effort should be made to address the weaknesses currently experienced. One way of dealing with this problem is to establish a “one stop shop” for tourism entrepreneurs either at provincial or national level. Aspects (weaknesses) raised by this and similar research can then be handled in a coordinated manner.

Weaknesses found in small and medium tourism enterprises include a lack of purposeful planning, a lack of communication and information dissemination, poor control by entrepreneurs and unsatisfactory financial management. Entrepreneurs do not always realise that the above-mentioned factors can make or break a business. For this reason entrepreneurs have to be educated and trained on how to manage a business. It is important to have training in management and marketing skills because tourist needs are changing. All of the respondents in this research agreed that managerial competence is of the utmost importance in managing a tourism business.

A major problem that limits tourism development in South Africa is the raising of the necessary capital to start a tourism business. Firstly, entrepreneurs are not always aware of the type of funding that is available and secondly, these entrepreneurs do not always know where to access the funding. Thirdly, government wants to attract more SMEs from disadvantaged

communities; however, these entrepreneurs need to be made aware of opportunities, which entails the implementation of an awareness programme, first of all, to address the issues raised above. Awareness programmes should be implemented by local and provincial governments together with non governmental tourism organisations like SATSA and FEDHASA who have practical experience. Fourthly, the literature review clearly suggests that for tourism entrepreneurs in South Africa to play a more meaningful role in the economy and to benefit from all the opportunities created by the tourism industry, these entrepreneurs have to be taken through the complete process of SME development. This implies not only training and funding, but also mentoring and after-care to ensure success. The latter is sadly lacking in the South African scenario. A recent study by Saayman (2004), who did an analysis of three government funded SME programmes in the North West province, revealed that the reason why SME's fail is because of a lack of mentoring and continued support.

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THE PERCEPTIONS OF COACHES AND ATHLETES/PLAYERS OF MOTIVATION

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ABSTRACT

It was the primary aim of this investigation to determine to what extent coaches and athletes/players agree or disagree on the importance of motivational factors in sport.

Altogether 114 coaches and 454 athletes/players took part in the investigation. The following factors were identified as important motivational factors in sport: encouragement to perform better; goal setting; enjoyment and pleasure in sport; activation; self-efficacy; communication between coaches/players; reward for achievement; self-confidence in players; praise; individual attention; effective coaching methods and techniques; competition; and being intrinsically motivated. The results of a statistical analysis indicated that coaches and athletes/players differed mainly with regard to the factors communication between player and coach, praising the player and competition. The coaches considered these factors to be more important than players do. The main factor which both coaches and athletes/players considered to be important was goal setting. Both athletes/players and coaches considered encouragement to perform better as less important.

Key words: Motivational factors; Athletes/players; Coaches.

INTRODUCTION

The coaching of sport is a complex task and at the centre of all sporting activities are the coaches, *"...* men and women who form the nucleus, giving life to the sport experience*"* (Vernacchia *et al*., 1996: 3). They play the most important role in the success or failure, satisfaction or frustration, joy or disappointment of the sporting experience for athletes. To become a coach is a goal or dream that comes true for many. To become a coach means to have skills and abilities, knowledge and wisdom, to be receptive, to have insight and to be spurred on by an emotional dedication to sport, the self and others. To be a coach does not require a superhuman, but not everyone is suited to become a coach. Although coaches come from all spheres of society, they share a pride in and enthusiasm for sport, for their role as coach and, in particular, for their athletes.

Various authors (including Ogilvie & Tutko, 1966; Cratty, 1983; Gill, 1986; Vernacchia *et al*, 1996; Morris & Summers, 2002) refer to the characteristics of a successful coach. The views of these authors may be summarised as follows:

- The personality profiles of coaches correspond to a large extent with that of outstanding athletes.
- Successful coaches are also good "psychologists". The psychological principles that they apply improve relations between them and their athletes, which creates the ideal environment for personal growth and results in better performance.
- The experiences of famous and successful coaches have consistently shown that the attention they were prepared to give their athletes was the key to unlocking their athletes' talent. The forming of relationships with the athlete is regarded by virtually all authors as critically important to the coaching process.
- Successful coaches are prepared to encourage their athletes along with the technical instructions that are given. The least popular coaches are those that are not prepared to apply disciplinary measures.
- Successful coaches are flexible in their approaches. They are able to handle different people and situations in different ways.
- The successful coach is able to analyse himself/herself, as well as the situation and his/her athletes, effectively and critically and to make appropriate recommendations.

- The successful coach not only maintains good relations with his/her athletes, but also with other people who work with the team (for example technical staff). Qualities that athletes appreciate least in coaches are sarcasm, signs of emotional immaturity and lack of technical skill.
- Successful coaches are people who pursue success, who are organised and orderly and plan in advance, who enjoy being with others, demonstrate leadership qualities, are reliable, not always on the defence, accept blame, are able to control stress and emotions, spiritually strong and display aggression in an acceptable way.

The idea that coaches are "builders of character" has been around for many years and is supported by their athletes. Unfortunately the influence of some coaches is not always as positive as one would like. A number of examples are mentioned here:

- Coaches sometimes make use of rigid and persuasive methods that make his/her athlete (especially in younger and less-experienced athletes) which may lead to friction in, for example, the family.
- Coaches are in a position to become role models for their athletes, but Coakley (1994: 203) says: *"*Few coaches ever become real role models for athletes*"*. The problem may lie in the fact that, in spite of what coaches say and the athletes expect, the emphasis of coaching is still on physical development (with the aim of winning contests), while general social and psychological development are overlooked.
- On the positive side, coaches act as advisors to their athletes. They help their athletes explore alternatives, accept new challenges, make choices and deal with triumphs and disappointments successfully. In many cases coaches play the roles of parent, therapist, psychologist and comforter.

The athletes' perception of an ideal coach depends on the type of sport and the athletes' needs. The degree to which coaches' perceptions of themselves and those of athletes differ is reflected in a study by Percival (in Cratty, 1983), where coaches awarded themselves a mark of 7 out of 10 for being a good coach, whereas their athletes gave them a mark of only 4 out of 10. Seventy-two percent of coaches described themselves as positive as opposed to only 32% of their athletes who regard them as positive. The following is a summary of what athletes more or less expect from their coaches (Ogilvie & Tutko, 1966; Cratty, 1983):

- Athletes regard their coaches as important decision makers in potentially stressful situations and expect them to remain calm if they become involved.
- Athletes report that they prefer coaches who can at least give the impression that they have their emotions under control. In general, athletes/players are against the practice where coaches run up and down the side of the field shouting abuse (Rushall & Potgieter, 1987).
- Cratty (1983) maintains that athletes with low self-confidence sometimes have a need for the authoritarian or dominant type of coach. This gives them a sense of security. The democratic type of coach is, however, more accessible for most athletes, especially females.
- Athletes expect their coaches to be reliable, stable and consistent, to be precise with regard to schedules and programmes, to be knowledgeable about the items in which their athletes are participating, not to improvise (in other words, say if you do not know) and to be careful when making promises.

Perhaps one of the most important problems in sports coaching is that coaches and their athletes/players do not always agree on specific coaching techniques and methods and, even more tragically, that they are not even aware of these differences. Furthermore, coaches are not always aware of specific qualities in their athletes. Huddleston *et al.* (1995), for example, found that there is a significant difference between coaches' estimated scores of their athletes' competitive ability and measured scores of this competitive ability. DeVoe and Carrol (1994) conducted an investigation into coaches' perceptions of why high school learners are motivated to participate in sport or to withdraw. They also found significant differences between what coaches regard as important motivators for sports participation (or not) for these learners and what learners themselves regard as important motivators.

MOTIVATION IN THE SPORTS CONTEXT

Motivation is probably one of the most important factors when coaching within a sporting context comes up for discussion. This can be seen by the eagerness with which sports coaches invite motivational speakers to "motivate" their sports teams. Le Roux (1999), for example, investigated the possibility of including sport psychology in the training programme of subject teachers who become involved in the coaching of sport. The respondents were asked, among other things, to arrange a total of 26 aspects connected with sport psychology from more important to less important for inclusion in their training programme. Motivation was consistently rated as the most important aspect. Athletes and players also involved in the research considered motivation the most important aspect of sport psychology that coaches should be aware of (Le Roux, 1999).

Sports coaches do not always know how to motivate their athletes effectively. Abusive language, threats, omission from teams and even physical punishment are often used to get athletes and players to participate with enthusiasm and commitment. These undesirable methods of "motivation" lead to the souring of the relationship between coach and athlete/player, which eventually results in a decrease in sporting achievement and even the termination of relationships.

Exactly what it is that motivates athletes and keeps them motivated is probably one of the biggest problems that coaches have to contend with. We find, for example, those that have a "need" for achievement and who also achieve in a positive way, while there are also those who are anxious and would avoid failure at all costs. These two types will react differently under the pressure of competition and should be approached differently by the coach and the psychologist. Athletes may also compete for different "awards", such as social approbation, the overcoming of stress, the friendship of teammates, the approval of the coach, the feeling of excelling, and the expression of aggression. "The difficult job of the coach is to ascertain what motive, or collection of motives, inspires a particular athlete to perform and then to aid him or her in acquiring these" (Cratty, 1983: 64).

WHAT IS MOTIVATION?

Lack of space precludes a complete discussion of motivation here. Suffice it to say that the literature contains a multitude of definitions and descriptions in this regard. Cratty (1983: 48) says, for example, the term motivation *"...* denotes the factors and processes that impel people to action or inaction in various situations". According to Silva and Weinberg (1984: 171), motivation refers *"...* to the intensity and direction of behavior*"*. According to Roberts

(LeUnes & Nation 1996: 149), motivation refers to "... to those personality factors, social variables, and/or cognitions that come into play when persons undertake a task at which he or she is evaluated, enters into competition with others, or attempts to attain some standard of excellence". The study of motivation is therefore a search for variables that explain why people do what they do and also the intensity with which they do it. Motivation affects the type, intensity and duration of a person's behaviour, which, in sport, will have an important impact on the athlete's performance.

Although many studies have been conducted on the role of motivation in sport, little research has been done on the perceptions of coaches on the one hand and athletes/players on the other as to what motivation is and what factors influence motivation. It would therefore seem meaningful to pilot an investigation in this regard.

PROCEDURE OF THE EMPIRICAL INVESTIGATION

The primary goal of the empirical research was to establish to what extent coaches and athletes/players agree on the factors that are regarded as important for motivation in sport. Five schools were randomly selected in the Kempton Park/Ekhuruleni area. Altogether 114 coaches and 454 athletes/players of various team sports participated in the research.

In a literature study (Schuman, 2003), a number of factors were identified which are regarded as important for motivation in sport. To establish whether coaches in general also regard these factors as important and to determine whether there are other factors that should be added, a questionnaire was drawn up for a pilot study. Two hundred selected respondents (consisting of psychologists, sports coaches and other experts in the field of sport) were asked to assess on a nine-point scale (1= not important; 9= very important) how important they regarded the factors mentioned with regard to motivation. Space was also allowed for adding items that the respondents might consider important. The questionnaire was drawn up in English and Afrikaans.

After the arithmetical means were calculated for each of the factors, the following factors were selected as the most important: encouragement to perform better; goal setting; enjoyment and pleasure in sport; activation; self-efficacy; communication between coaches/players; reward for achievement; self-confidence in players; praise; individual attention; effective coaching methods and techniques; competition; and being intrinsically motivated.

These selected motivation factors were then presented to the subjects of the present investigation (coaches and athletes/players) who were also asked to assess the importance of the factors according to the same nine-point scale.

RESULTS OF THE EMPIRICAL INVESTIGATION

In order to determine if coaches and athletes/players responded differently to the motivation factors, the mean for coaches and athletes/players for each of the factors were calculated. To establish whether the means differ significantly, the t-test for independent samples was used in each instance. The analysis was done for each particular type of sport (rugby, netball, hockey, cricket and athletics). The results appear in Tables 1 to 5.

TABLE 1. **COMPARISON OF THE AVERAGE RESPONSES OF RUGBY PLAYERS**

AND COACHES

Motivation factor	Respondent	n	x	s	t-value
Communication between player and coach	Players Coaches	125 22	7.20 8.27	1.56 0.76	4.94**
Competition	Players Coaches	125 22	7.44 8.40	1.61 0.73	4.51**
Efficient coaching methods and techniques	Players Coaches	125 22	7.53 7.63	1.60 1.25	0.28
Encouragement to perform better	Players Coaches	125 22	6.88 6.86	2.06 1.42	0.04
Enjoying sport	Players Coaches	125 22	7.60 8.45	1.60 0.96	3.41**
Goal setting	Players Coaches	125 22	8.18 8.45	1.27 0.73	1.39
Individual attention to players	Players Coaches	125 22	7.90 8.36	1.22 0.78	2.29*
Intrinsic motivation	Players Coaches	125 22	7.37 7.86	1.64 1.16	1.33
Praising of the player	Players Coaches	125 22	7.04 8.22	1.82 0.97	4.47**
Psyching-up	Players Coaches	125 22	7.99 7.90	1.31 1.41	0.27
Receiving awards for performance	Players Coaches	125 22	7.60 6.95	1.39 1.58	1.96*
Self-efficiency	Players Coaches	125 22	7.29 7.95	1.51 1.04	1.95*
Self-confidence of the player	Players Coaches	125 22	8.19 8.09	1.16 1.57	0.29

* $p < 0.05$ ** $p < 0.01$. For the other t-values $p > 0.05$

Rugby players and their coaches showed the largest significant difference (between means) with regard to *communication between player and coach*, *praising the player* and *competition*. In all three instances coaches considered the factor more important than players. The factors where coaches and players did not differ significantly but according to the averages, considered the factors to be important, were *goal setting, psyching-up* and *self-confidence of the player*. The factor which both players and coaches considered less important was *encouragement to perform better*.

TABLE 2. **COMPARISON OF THE AVERAGE RESPONSES OF NETBALL PLAYERS AND COACHES**

Motivation factor	Respondent	n	x	s	t-value
Communication between player and coach	Players Coaches	87 27	7.00 8.25	1.59 0.76	5.57**
Competition	Players Coaches	87 27	7.56 8.22	1.31 0.69	3.38**
Efficient coaching methods and techniques	Players Coaches	87 27	6.68 7.37	1.86 1.36	1.75

Encouragement to perform better	Players Coaches	87 27	6.83 7.00	1.88 1.27	0.41
Enjoying sport	Players Coaches	87 27	7.86 8.00	1.28 0.96	0.51
Goal setting	Players Coaches	87 27	8.57 8.44	0.94 0.89	0.63
Individual attention to players	Players Coaches	87 27	8.20 8.33	1.20 1.00	0.50
Intrinsic motivation	Players Coaches	87 27	7.35 8.14	1.41 0.94	2.72**
Praising of the player	Players Coaches	87 27	7.21 7.96	1.48 1.15	2.39**
Psyching-up	Players Coaches	87 27	8.00 8.11	1.48 1.08	0.36
Receiving awards for performance	Players Coaches	87 27	7.50 7.22	1.41 1.25	0.93
Self-efficiency	Players Coaches	87 27	7.55 8.07	1.42 0.95	1.79
Self-confidence of the player	Players Coaches	87 27	8.28 8.14	0.99 1.65	0.41

** $p < 0.01$. For the other t-values $p > 0.05$

Netball players and their coaches showed the largest significant difference (between means) with regard to *communication between player and coach* and *competition*. In both instances coaches considered the factor more important than players. The factors where coaches and players did not differ significantly but according to the averages, considered the factors to be important, were *goal setting*, and *individual attention to players*. The factor which both players and coaches considered less important was *encouragement to perform better*.

Hockey players and their coaches (Table 3) showed the largest significant difference (between means) with regard to *praising of the player*, *communication between player and coach* and *competition*. In all three instances coaches considered the factor more important than players. The factors where coaches and players did not differ significantly but according to the averages, considered the factors to be important, were *goal setting*, and *enjoying sport*. The factor which both players and coaches considered less important was *encouragement to perform better*.

TABLE 3. **COMPARISON OF THE AVERAGE RESPONSES OF HOCKEY PLAYERS AND COACHES**

Motivation factor	Respondent	n	x	s	t-value
Communication between player and coach	Players Coaches	70 14	6.52 7.92	1.96 1.20	2.56**
Competition	Players Coaches	70 14	7.37 8.14	1.22 1.02	2.20*
Efficient coaching methods and techniques	Players Coaches	70 14	7.44 7.42	1.45 1.65	0.03

Encouragement to perform better	Players Coaches	70 14	6.44 7.14	2.05 1.40	1.22
Enjoying sport	Players Coaches	70 14	7.78 8.42	1.37 0.75	1.70
Goal setting	Players Coaches	70 14	8.54 8.64	1.05 0.63	0.34
Individual attention to players	Players Coaches	70 14	7.78 8.07	1.67 0.82	0.96
Intrinsic motivation	Players Coaches	70 14	7.55 7.92	1.35 0.73	0.99
Praising of the player	Players Coaches	70 14	7.08 8.07	1.62 0.73	3.58**
Psyching-up	Players Coaches	70 14	7.77 8.14	1.24 0.94	1.06
Receiving awards for performance	Players Coaches	70 14	7.40 7.50	1.44 1.45	0.24
Self-efficiency	Players Coaches	70 14	7.55 7.85	1.32 0.77	0.82
Self-confidence of the player	Players Coaches	70 14	7.98 7.57	1.31 2.13	0.70

* $p < 0.05$ ** $p < 0.01$. For the other t-values $p > 0.05$

Cricket players and their coaches (Table 4) showed the largest significant difference (between means) with regard to *communication between player and coach* and *receiving awards for performance*. In both instances coaches considered the factor more important than players. The factors where coaches and players did not differ significantly but according to the averages, considered the factors to be important, were *goal setting*, and *self-confidence of the player*. The factor which both players and coaches considered less important was *efficient coaching methods and techniques*.

Athletes and their coaches (Table 5) showed the largest significant difference (between means) with regard to *communication between player and coach*, *praising the player* and *enjoying sport*. In all three instances coaches considered the factor more important than players. The factors where coaches and players did not differ significantly but according to the averages, considered the factors to be important, were *goal setting*, and *individual attention to players*. The factors which both players and coaches considered less important were *efficient coaching methods and techniques* and *encouragement to perform better*.

TABLE 4. **COMPARISON OF THE AVERAGE RESPONSES OF CRICKET PLAYERS AND COACHES**

Motivation factor	Respondent	n	x	s	t-value
Communication between player and coach	Players Coaches	65 13	6.29 8.30	1.80 0.94	5.84**
Competition	Players Coaches	65 13	7.36 8.00	1.46 1.15	1.46
Efficient coaching methods and techniques	Players Coaches	65 13	6.69 6.61	1.92 1.38	0.14

Encouragement to perform better	Players Coaches	65 13	6.84 7.00	1.92 1.29	0.28
Enjoying sport	Players Coaches	65 13	7.75 8.38	1.35 0.96	1.59
Goal setting	Players Coaches	65 13	8.27 8.53	1.08 0.66	0.84
Individual attention to players	Players Coaches	65 13	7.50 8.30	1.45 0.85	1.91
Intrinsic motivation	Players Coaches	65 13	7.50 7.76	1.14 1.36	0.73
Praising of the player	Players Coaches	65 13	7.30 8.15	1.49 0.98	1.95
Psyching-up	Players Coaches	65 13	7.70 7.69	1.41 1.70	0.03
Receiving awards for performance	Players Coaches	65 13	7.72 6.53	1.34 1.56	2.83**
Self-efficiency	Players Coaches	65 13	7.67 7.23	1.01 1.30	1.38
Self-confidence of the player	Players Coaches	65 13	8.27 8.30	0.87 0.85	0.12

** $p < 0.01$. For the other t-values $p > 0.05$

If the results from all the different types of sport are analysed, the following conclusions can be made

- Coaches and athletes/players differed mainly with regard to the factors *communication between player and coach*, *praising the player* and *competition*. The coaches considered these factors to be more important than players do.
- The main factor which both coaches and athletes/players considered to be important was *goal setting*. They also agreed on the importance of *self-confidence of the player* and *individual attention to players.*
- Both athletes/players and coaches considered *encouragement to perform better* as less important.

TABLE 5. **COMPARISON OF THE AVERAGE RESPONSES OF ATHLETES AND COACHES**

Motivation factor	Respondent	n	x	s	t-value
Communication between player and coach	Players Coaches	108 36	7.02 8.27	1.80 0.94	5.33**
Competition	Players Coaches	108 36	7.63 8.19	1.37 0.92	2.74**
Efficient coaching methods and techniques	Players Coaches	108 36	6.70 7.05	2.17 1.65	0.89
Encouragement to perform better	Players Coaches	108 36	7.25 6.69	1.80 1.75	1.64
Enjoying sport	Players Coaches	108 36	7.78 8.38	1.37 0.90	3.00**

Goal setting	Players Coaches	108 36	8.36 8.44	0.95 0.77	0.48
Individual attention to players	Players Coaches	108 36	8.15 8.30	1.06 0.88	0.75
Intrinsic motivation	Players Coaches	108 36	7.62 8.02	1.23 1.10	1.76
Praising of the player	Players Coaches	108 36	7.31 8.16	1.62 0.77	4.20**
Psyching-up	Players Coaches	108 36	7.88 8.27	1.24 1.00	1.69
Receiving awards for performance	Players Coaches	108 36	7.50 7.44	1.67 1.34	0.18
Self-efficiency	Players Coaches	108 36	7.60 7.58	1.27 1.48	0.07
Self-confidence of the player	Players Coaches	108 36	8.23 7.82	1.34 1.87	1.18

** $p < 0.01$. For the other t-values $p > 0.05$

IMPLICATIONS OF THE RESULTS FOR COACHING

The most important significance of the results, is the significant differences that exist between the perceptions of coaches and athletes/players regarding the importance of certain motivational factors in sport, and also that in all cases, the coaches regard these motivational factors as of more importance compared to the meanings of athletes/players. In practice coaches will therefore place more emphasis on the motivational factors *they* regard as of importance, and in doing so, might miss their final target, namely the optimal motivational level of their athletes/players.

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BEWEGINGSVERMOËNS VAN 7-9 JARIGE DOGTERS IN DIE STELLENBOSCH-OMGEWING: 'N VERGELYKING

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ABSTRACT

The movement abilities of children have undoubtedly become worse during the last 27 years. Physical inactivity is reducing the quality of life in today's children who are tomorrow's adults. A lack of regular physical activity in youth exacerbates disease incidence and severity. A vicious cycle has developed, reinforcing the negative health consequences of physical inactivity in society. It seems that now, more than ever, there is a need to promote lifestyle patterns in children that can track into adulthood. The study focuses on the identification of movement abilities of girls (N=69), ages 7-

9 years and investigates whether their movement abilities is comparable to that of the girls in the Katzenellenbogen's study of 1976, using the same tests and criteria. The tests evaluated inter alia the following: velocity; velocity and power; power; speed and accuracy as well as accuracy and precision. The girls were selected from two former Model-C schools in the Stellenbosch area as the Katzenellenbogen study (1976) only involved girls from former White schools. The results indicated that present-day girls fared much worse in almost all the movement tests. The weight of the 9-year old girls increased by as much as 7.2 kg and the length of the 7-year old girls increased by as much as 7.3 cm compared to 27 years ago. This study can therefore be a starting point for further research attempting to combat the tendency of inactivity amongst the youth of today.

Key words: Children; Movement abilities; Physical inactivity; Physical activity; Physical Education/Life Orientation.

INLEIDING

Outomatisasie en tegnologiese ontwikkeling het die moderne bestaanswyse van die jong kind indringend verander, wat veroorsaak dat die hedendaagse kind aan bewegingsarmoede ly (Nel, 1998). Faktore soos televisie, rekenaars, kitskos, motors, publieke vervoer, vinnige verstedeliking in ontwikkelende lande en onveilige omgewings, gee aanleiding tot tendense van onaktiewe leefstyle (Andersen, 1999; Underhay, De Ridder, Van Rooyen & Kruger, 2002; Doherty & Bailey, 2003; Power, 2003). As gevolg van bogenoemde faktore verkies die meeste kinders binnenshuise, sittende aktiwiteite, soos televisie en rekenaarspeletjies (Daley, 2002) wat tot swak gesondheid en 'n toename in die voorkoms van obesiteit wêreldwyd lei (Africa, 2003).

Verhoogde ure wat kinders voor die rekenaar en televisie deurbring, kan 'n bydrae lewer tot 'n vertraging in kinders se vermoëns om sensoriese inligting en beweging te koördineer (Dertouzos, 2003). Veranderinge in kinders se bewegingsvermoëns lei tot 'n afname in sensoriese, motoriese en sosiale ondervinding, asook in konsentrasie en uithouvermoë

(Kretschmer, 2001). Gevolglik ontstaan daar 'n agterstand wat tot motoriese probleme lei (Nel, 1998).

Kinders se motoriese vermoëns het gedurende die afgelope 15 tot 20 jaar verswak, wat verhoed dat hulle effektief in 'n skoolomgewing kan funksioneer (Sugden & Sugden, 1991; Kretschmer, 2001). Kinders wat hul skoolloopbaan met geringe of matige motoriese probleme begin, ontgroei nie hierdie probleme nie (Livesey & Coleman, 1998).

Voldoende ontwikkeling van fundamentele bewegingsvermoëns, fyn motoriese vaardighede en perseptueel-motoriese vermoëns is baie belangrik vir die skoolgaande kind, want dit voorsien hulle van die nodige gereedskap om suksesvol te wees (Pienaar, 1999).

Liggaamlike Opvoeding (LO) in skole het kinders in die verlede van hierdie gereedskap voorsien. Liggaamlike Opvoeding behoort deel te wees van die totale leerproses, wat deur middel van beweging tot die totale ontwikkeling en groei van kinders bydra (Darst & Pangrazi, 2002; Pangrazi, 2003; Pangrazi, 2004). Verskeie studies het bewys dat LO 'n reeks gesondheidsvoordele (fisiek, sosiaal, emosioneel en psigososiaal) inhou, indien kinders dit op 'n gereelde basis in skooltyd ontvang (Chernushenko, 2003; Doherty & Bailey, 2003; Pangrazi, 2004).

Die situasie waarin LO wêreldwyd verkeer, veroorsaak dat kinders nie meer dikwels of glad

nie aan bewegingsprogramme in skole blootgestel word nie (Darlison, 2001). In baie lande is die vereistes vir die implementering van LO in skole in plek, maar die werklike implementering voldoen nie aan die voorgeskrewe verwagtinge nie (Hardman & Marshall, 2001; Hardman, 2003).

Liggaamlike Opvoeding is in kompetisie met ander skoolvakke vir tyd in die skoolkurrikulum (Hardman, 1998; Hardman & Marshall, 2001; Doherty & Bailey, 2003; Doll-Tepper & Mailliet, 2003; Hardman, 2003; Klein, 2003). Dit kom nou slegs as een fokus van Lewensoriëntering voor (Van Deventer, 2002; Van Deventer, 2004). Alhoewel baie onderwysers positief voel oor die feit dat fisieke ontwikkeling en beweging as deel van Lewensoriëntering voorkom, is hulle nie opgelei om die programme aan te bied nie en kan hierdie gevoelens toegeskryf word aan onkunde (Van Deventer, 1999). Verder beskou die gemeenskap LO as ’n vermorsing van tyd. Soos Bucher (1974) in Krause (1991: 6) dit stel: *It’s better for my kids to have soggy bodies than soggy minds.*

Veranderinge in LO in skole hou groot probleme op die lange duur in (Van Deventer, 2004). Leerders word groot leed aangedoen deur die uitfassering of vermindering van gestruktureerde LO, want oor baie dekades heen is bewys dat daar altyd ’n balans tussen liggaamlike- en psigiese ontwikkeling behoort te wees (Chernushenko, 2003; Doherty & Bailey, 2003; Pangrazi, 2004).

Dit is dus belangrik dat almal wat voorstaanders is van gelykheid, kwaliteit van lewe, menseregte en waardigheid, gesondheids- en sosiale ontwikkeling ’n verantwoordelikheid het om hierdie situasie te probeer red (Darlison, 2001).

PROBLEEMSTELLING

Die hoofprobleem van die studie fokus op die bepaling van die bewegingsvermoëns van Grondslagfase dogters (Graad 1 tot 3) aan twee voormallige Model C (VMC)-laerskole in die Stellenbosch-omgewing.

Die volgende sub-probleem is aangespreek:

- Om vas te stel of daar verskille in die bewegingsvermoëns van dogters by VMC-skole en dogters van Katzenellenbogen se 1976-studie voorkom.

Deur middel van ’n empiriese ondersoek is ’n opname van die bewegingsvermoëns van dogters in Grade 1 tot 3 onderneem. Bewegingstoetse uit die studie van Katzenellenbogen (1976) is gebruik om die dogters se bewegingsvermoëns te bepaal. Die data is gebruik om ’n vergelyking met die resultate van die Katzenellenbogen-studie van 1976 te tref.

METODOLOGIE

Proefpersone

Die proefpersone (N=69) is uit Graad 1 (n=24), Graad 2 (n=23) en Graad 3 (n=22), vir die opname geselekteer. Om koste te bespaar is die groep proefpersone uit twee voormalige Model C-skole in die Stellenbosch omgewing geselekteer. Weens beperkende skoolreëls by bogenoemde skole kon die proefpersone nie ewekansig gekies word nie en is een klas uit elke graad as proefpersone gebruik.

Bewegingstoetse

In die Katzenellenbogen-studie (1976: 455) toon die faktoranalise bevindinge dat "hantering van die liggaam" hoofsaaklik op Faktor 1 (Snelheid-Ratsheid-Dryfkrag, met die belaste been), wat vir die grootste variasie (43.9%), verantwoordelik is, gelaai het. "Hantering van voorwerpe" (Faktor 2) is nie so prominent by hierdie ouderdomme nie, omdat maturasie by hierdie groep nog nie die piek-ontwikkeling bereik het nie. Indien Faktor 1 en Faktor 2 in ag geneem word waar die persentasie by Faktor 1 by verre die hoogste is (7-jariges - 37.1% en 13.7%; 8-jariges - 40.3% en 11.7% en 9-jariges - 31.8% en 13.2%), het 12 uit die 16 toetse wat gebruik is, binne die faktoranalise geval (Katzenellenbogen, 1976: 507). Derhalwe blyk dit sinvol om op die "Hantering van die liggaam" te fokus en slegs die toetse met 'n belading van 50 en hoër te gebruik (Katzenellenbogen, 1976: 507).

Die geldigheid van die bewegingstoetsitems is op inhoudelike- en voorkomsgeldigheid ("content and face validity") gebaseer. Die geldigheid wat deur empiriese en logiese oordeel bepaal is, het niks meer as net blote beweging gemeet nie. Die toets-hertoets metode is gebruik om die betroubaarheid van die toetsitems vas te stel (Katzenellenbogen, 1976: 14).

Die volgende toetsitems is gebruik om bewegingsvermoëns te bepaal: handeviervoet-loop met spoed, hardloop vorentoe met spoed, eenbeentjie-spring met spoed (R en L), staande verspring vir afstand, hardloop en spring oor ’n hoë voorwerp, hardloop sig-sag om voorwerpe met spoed, hardloop oor en onderdeur ’n reeks voorwerpe met spoed, kabelsprong oor tou in hande gehou, spring oor ’n bewegende tou deur ander geswaai, spring oor ’n bewegende tou – self geswaai en ophurk en katsprong op kas met spoed. Massa en lengte is ingesluit sodat tred gehou kan word met die liggaamsgrootte en groei in die vertolking van die bevindinge.

Statistiese verwerking

Die stastistiese analise is deur Dr. M. Kidd van die Sentrum vir Statistiese Konsultasie, Universiteit Stellenbosch behartig. Inligting ten opsigte van bewegingstoetse is in rekenaarformaat gekodeer en statisties verwerk. Maksimum waardes is deur middel van

analise van variansie (ANOVA) vergelyk. Daar is deurgaans op ’n 1% betekenispeil ($p<0.01$) gekonsentreer, behalwe vir enkele gevalle waar daar geen betekenisvolle verskille op ’n 1% betekenispeil was nie, maar wel op ’n 5% ($p<0.05$) betekenispeil. *Statistica 6* is gebruik om die data te analiseer.

RESULTATE

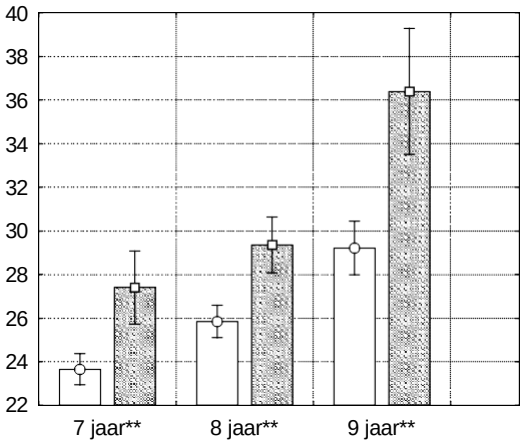
Die resultate wat vervolgens bespreek gaan word, is saamgestel om kortliks ’n oorsig van die bewegingsvermoëns van hedendaagse kinders in vergelyking met die Katzenellenbogen-studie van 1976 te bied. In die vergelyking sal daar deurgaans na Katzenellenbogen se studie as die 1976-studie en na die huidige studie as die Africa-studie verwys word, tensy anders aangedui.

Daar word slegs vergelykings tussen 7-, 8-, en 9-jarige dogters getref, omdat hierdie ouderdomsgroepe by beide studies in die meerderheid voorkom.

Voordat ’n vergelyking van die bewegingsvermoëns van die dogters in die onderskeie studies onderneem word, word inligting omtrent gewig en lengte van die proefpersone weergegee.

Liggaamsmetinge

Daar het ’n beduidende verskil in die gemiddelde gewig tussen die ouderdomsgroepe voorgekom ($p<0.01$) met veral ’n groot verskil by die 9-jarige dogters. Die 9-jarige dogters van die Africa-studie het gemiddeld 7.2 kg swaarder geweeg (Figuur 1).

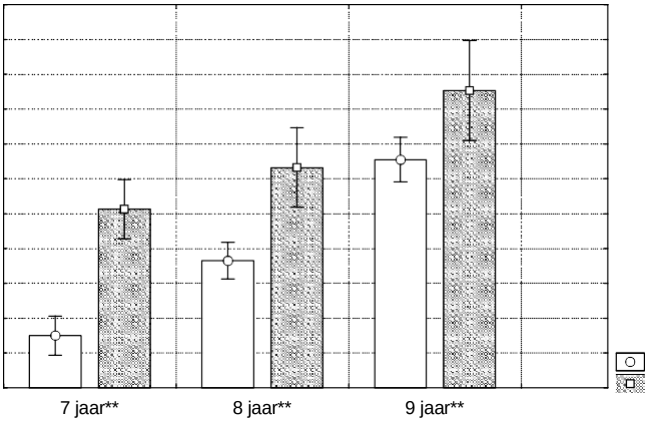

40
38
36
34
32
30
28
26
24
22
7 jaar**
8 jaar**
9 jaar**

1976
Africa

FIGUUR 1. **GEWIG**

Wat lengte betref, is die dogters van die Africa-studie heelwat langer as dié van die 1976-studie. Die 7-jarige dogters van die Africa-studie het met soveel as 7.3 cm in lengte toegeneem (Figuur 2).

142
140
138
136
134
132
130
128
126
124
122
120

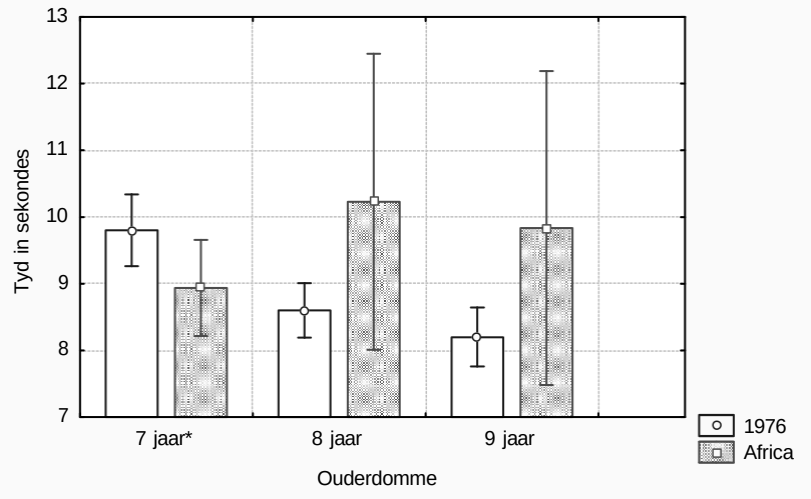

7 jaar**
8 jaar**
9 jaar**

1976
Africa

FIGUUR 2. **LENGTE**

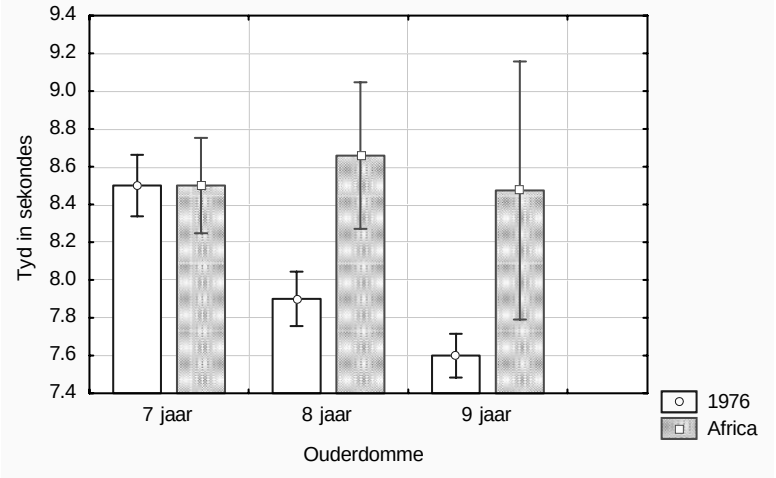
Bewegingstoetse

Die 7-jarige dogters van die Africa-studie het beter gevaar in die *handeviervoet-loop met spoed* as die 7-jarige dogters van die 1976-studie ($p<0.05$), terwyl die 8- en 9-jariges heelwat swakker as dié van die 1976-studie gevaar het (Figuur 3).



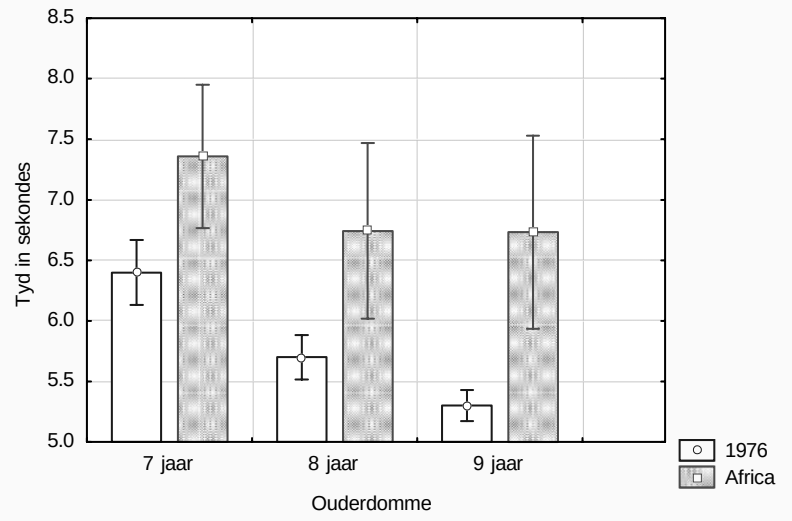
FIGUUR 3. **HANDEVIERVOET-LOOP MET SPOED**

Geen beduidende statistiese verskil in tye vir die *hardloop vorentoe met spoed* het tussen die 7-jariges van beide studies voorgekom nie. Alhoewel daar verskille in die tye van die 8- en 9-jariges voorgekom het, is dit nie statisties betekenisvol nie (Figuur 4).

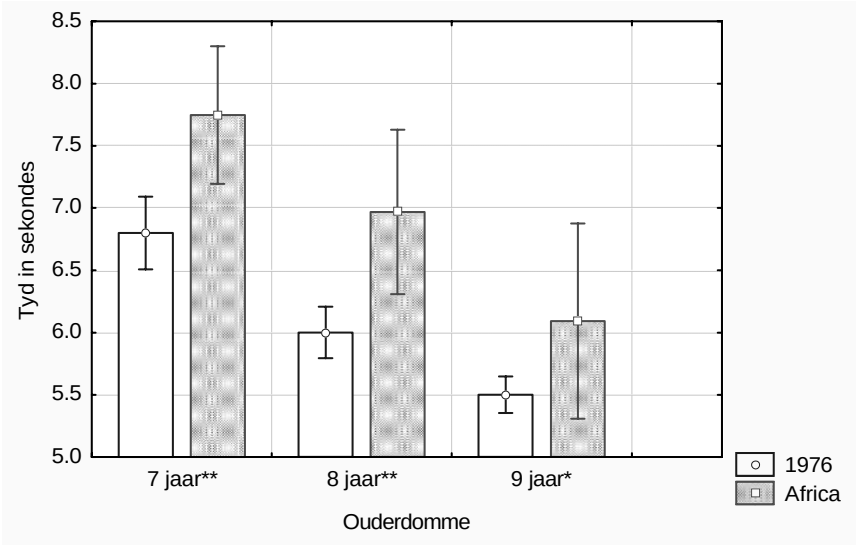


FIGUUR 4. **HARDLOOP VORENTOE MET SPOED**

Met die vergelyking vir die *eenbeentjie-spring (R) met spoed* het die proefpersone van die 1976-studie ook beter gevaar vir alle ouderdomsgroepe, alhoewel nie statisties betekenisvol nie (Figuur 5). Die proefpersone van die 1976-studie (7- en 8-jariges) het beter gevaar in die *eenbeentjie-spring (L) met spoed* as dié van die Africa-studie ($p<0.01$). Dit blyk dat die 9-jariges van die 1976-studie beter as die 9-jariges van die Africa-studie gevaar het ($p<0.05$) (Figuur 6).

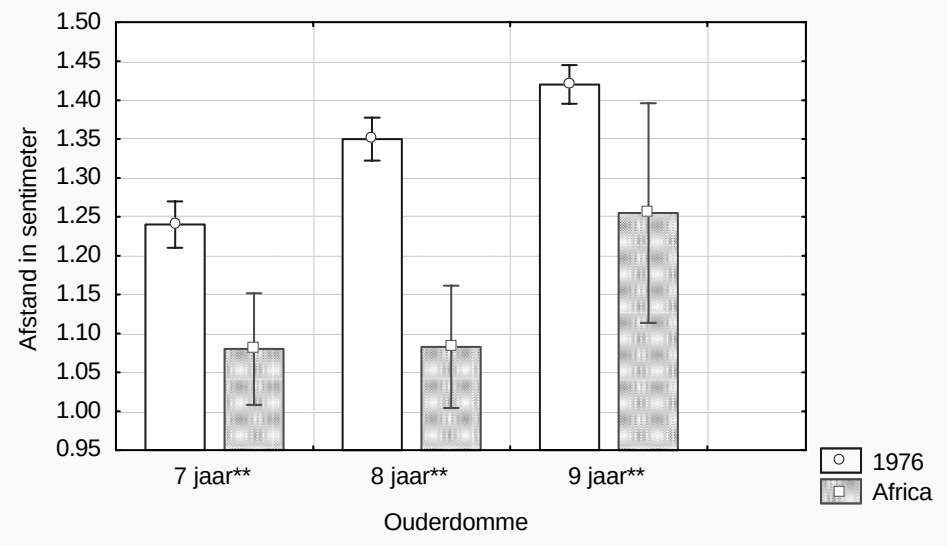


FIGUUR 5. **EENBEENTJIE-SPRING MET SPOED (R)**

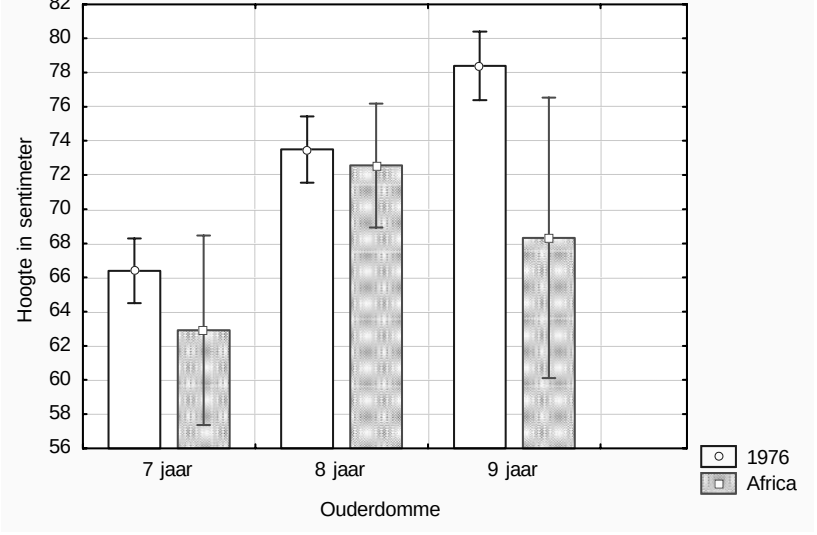


FIGUUR 6. **EENBEENTJIE-SPRING MET SPOED (L)**

Die dogters in die 1976-studie het verder afstande in die *staande verspring* behaal ($p<0.01$) (Figuur 7).

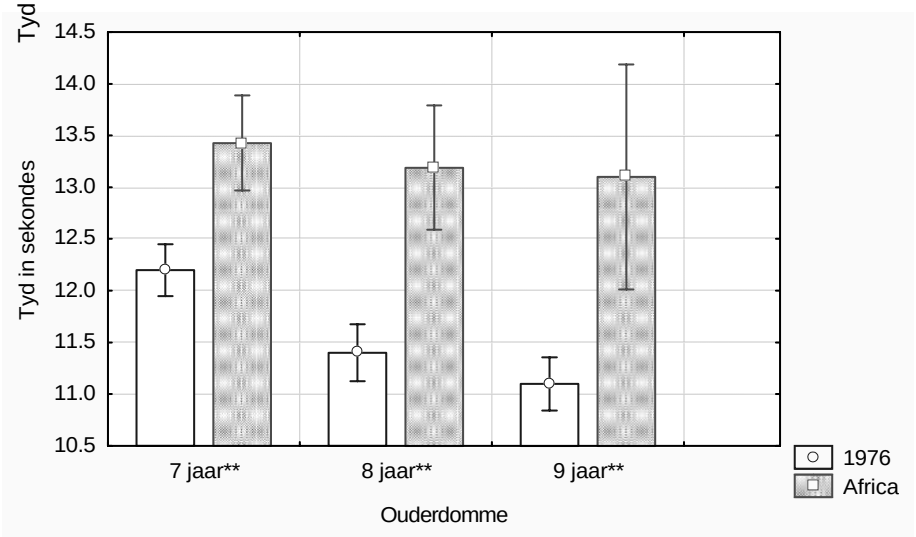


FIGUUR 7. **STAANDE VERSPRING**

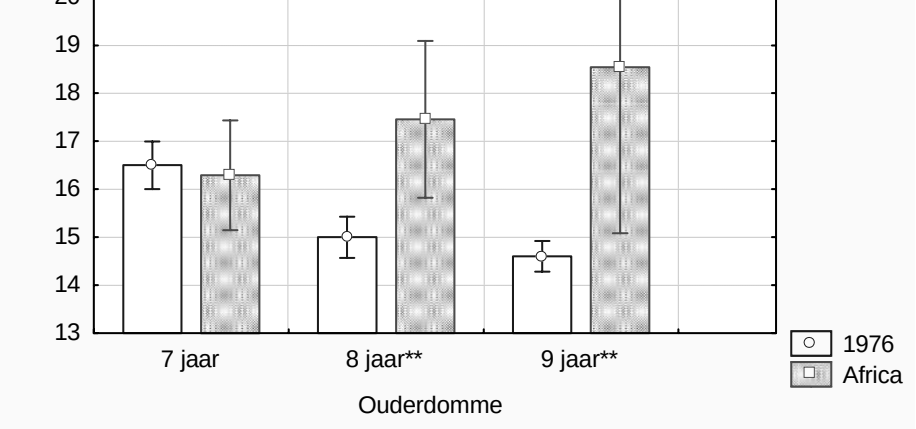


FIGUUR 8. **HARDLOOP EN SPRING OOR 'N HOË VOORWERP**

Daar het geen statisties beduidende verskille tussen die twee groepe ten opsigte van die *hardloop en spring oor 'n hoë voorwerp* voorgekom nie. Daar bestaan 'n tendens dat die 7- en 9-jariges van die 1976-studie hoër hoogtes behaal het (Figuur 8).



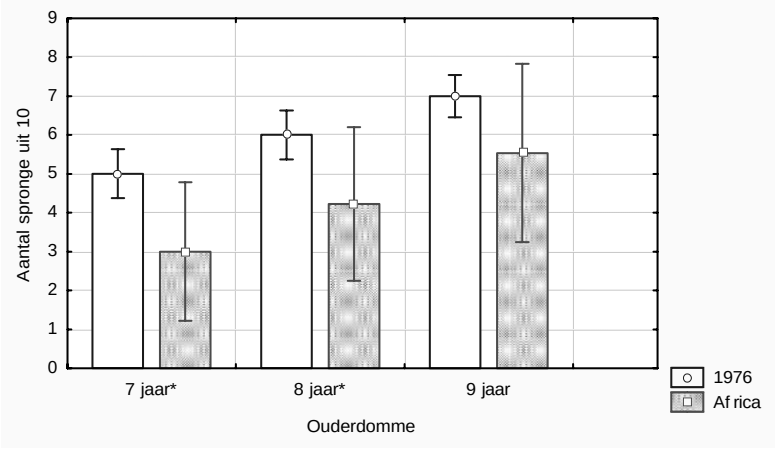
FIGUUR 9. **HARDLOOP SIG-SAG OM VOORWERPE MET SPOED**



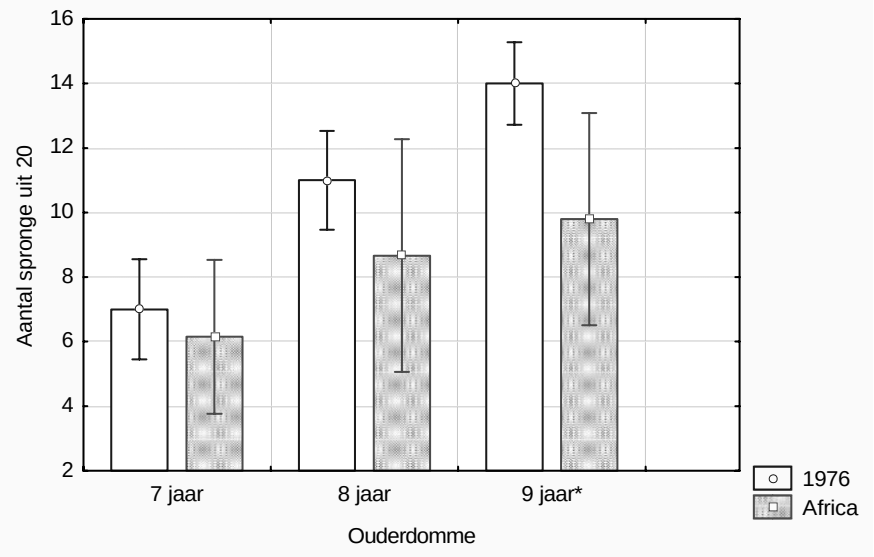
FIGUUR 10. **HARDLOOP OOR EN ONDERDEUR 'N REEKS VOORWERPE MET SPOED**

Alle ouderdomsgroepe van die 1976-studie het beter tye in die *hardloop sig-sag om voorwerpe met spoed* behaal ($p<0.01$) (Figuur 9). Geen statisties beduidende verskille het by die 7-jarige dogters van die twee onderskeie studies vir die *hardloop oor en onderdeur 'n reeks voorwerpe met spoed* voorgekom nie, maar wel by die 8- en 9-jariges ($p<0.01$). Die 8- en 9-jariges van die Africa-studie het met byna twee sekondes swakker in bovermelde toets gevaar (Figuur 10).

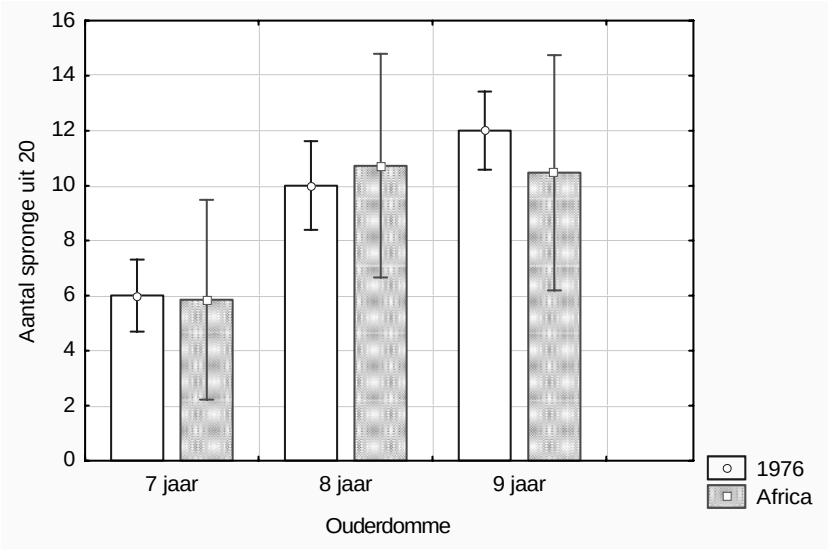
By die *kabelsprong oor tou in hande gehou* bestaan die tendens dat die 7- en 8-jarige dogters van die Africa-studie swakker gevaar het as dié van die 1976-studie ($p<0.05$) (Figuur 11). Daar bestaan 'n tendens dat die dogters van die 1976-studie beter in die *spring oor 'n bewegende tou – self geswaai* gevaar het, alhoewel nie statisties betekenisvol nie (Figuur 12). Daar is geen statisties beduidende verskil tussen die onderskeie studies vir die toets *spring oor 'n bewegende tou deur ander geswaai* nie. Die resultate toon geen verskil tussen proefpersone in beide studies vir alle ouderdomsgroepe aan nie (Figuur 13).



FIGUUR 11. **KABELSPRONG OOR TOU IN HANDE GEHOU**



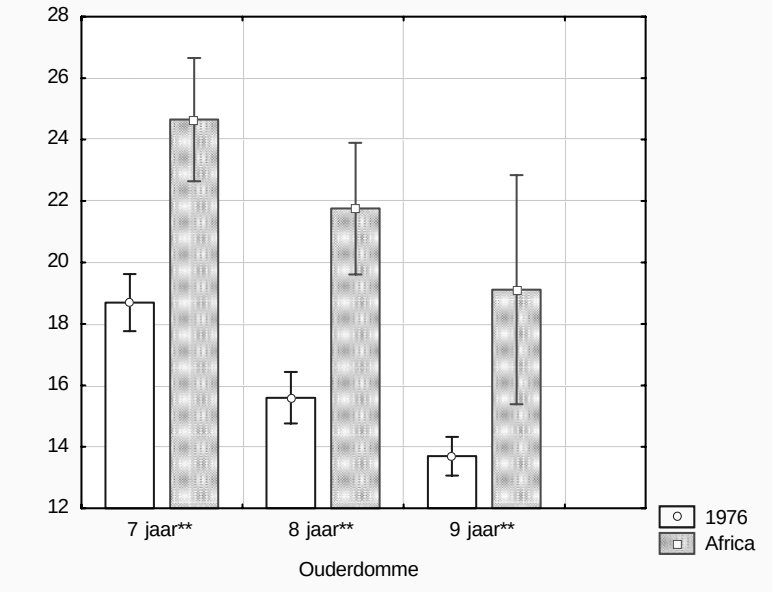
FIGUUR 12. **SPRING OOR BEWEGENDE TOU SELF GESWAAI**



FIGUUR 13. **SPRING OOR BEWEGENDE TOU (DEUR ANDER GESWAAI)**

'n Groot verskil in die tye vir die *ophurk katsprong met spoed* het tussen die onderskeie studies voorgekom. Die proefpersone van die 1976-studie het aansienlik beter vir alle ouderdomsgroepe in bovermelde toets gevaar ($p<0.01$). Uit Figuur 14 kan waargeneem word dat die Africa-groep met gemiddeld ses sekondes swakker gevaar het.

Tyd in sekondes



FIGUUR 14. **OPHURK KATSPRONG MET SPOED**

BEVINDINGE

Liggaamsmetinge

Die resultate toon dat hedendaagse dogters in vergelyking met dogters van 27 jaar gelede (1976-studie) baie meer weeg. Die 9-jarige dogters van die Africa-studie toon veral 'n groot toename in gewig (7.2kg). Wat lengte betref, toon die data 'n betekenisvolle toename in lengte met toenemende ouderdom. Dogters van vandag, in vergelyking met die 1976-studie, is langer as dogters van 27 jaar gelede. Daar het veral 'n groot verskil in lengte (7.3 cm) by die 7-jariges van die Africa-studie voorgekom.

Bewegingstoetse

Die prestasie-element, snelheid, kom in die toetsitem *handeviervoet-loop met spoed* voor. Snelheid van die ondersteunende voortbewegingsaksies word deur die uitgangsposisie van die liggaam gestrem. Die toets sluit nie slegs snelheid in nie, maar ook koördinasie, balansvermoë en ruimteskatting. Resultate toon dat die 7-jarige dogters van die Africa-studie beter gevaar het as die 7-jariges van die 1976-studie, alhoewel daar nie betekenisvolle verskille voorgekom het nie ($p<0.05$). Die tendens bestaan dat die ouer dogters (8 en 9 jaar) van die Africa-studie swakker gevaar het.

Die toetsitems waar totale inspanning ten opsigte van snelheid en dryfkrag vereis is, het *hardloop vorentoe met spoed* en *eenbeentjie-spring R* en *L* ingesluit. *Hardloop vorentoe met spoed* is 'n aksie wat uit herhaaldelike bewegings bestaan. Spoed is ook 'n belangrike element by hierdie herhalings. Dryfkrag speel ook 'n belangrike rol in die uitvoer van hierdie toets aangesien lang treë en die gebruik van die arms om meer krag aan die hele beweging te verleen, vereis word. Daar is geen statisties beduidende verskil gevind in die tye van die dogters in die Africa-studie en dié van die 1976-studie nie. *Eenbeentjie-spring met spoed (L* en *R)* sluit nie slegs snelheid en dryfkrag in nie, maar ook koördinasie en balansvermoë. Die dogters van die Africa-studie het swakker in bovermelde toets gevaar as die dogters van die 1976-studie.

Staande verspring en *hardloop en spring oor 'n hoë voorwerp* ressorteer onder die prestasie element, dryfkrag. Dogters van die Africa-studie het in vergelyking met die 1976-studie swakker in die *staande verspring*, asook in die *hardloop oor 'n hoë voorwerp met spoed* gevaar.

Hardloop sig-sag om voorwerpe met spoed en *hardloop oor-onderdeur 'n reeks voorwerpe met spoed* val onder die prestasie-element snelheid en akkuraatheid. Hierdie toetsitems sluit nie slegs snelheid en akkuraatheid in nie, maar ook koördinasie, balansvermoë en ruimteskatting. Dogters van die Africa-studie het in beide bogenoemde toetse swakker gevaar

as 27 jaar gelede.

Kabelsprong, spring oor 'n bewegende tou deur ander geswaai en *spring oor 'n bewegende tou self-geswaai*, ressorteer onder die prestasie-element akkuraatheid. Dogters van die Africa-studie het aansienlik swakker gevaar in die *kabelsprong* in vergelyking met die dogters van die 1976-studie. Uit die resultate van die *spring oor 'n bewegende tou deur ander geswaai*, blyk dit dat die 8-jarige dogters van die Africa-studie beter as die 8-jarige dogters van die 1976-studie gevaar het. Uit die resultate van die *spring oor 'n bewegende tou-self geswaai*, kan afgelei word dat dogters van die Africa-studie swakker gevaar het in bogenoemde toets.

Die *ophurk katsprong* val onder die prestasie-elemente, presiesheid en snelheid. Hierdie toetsitem sluit nie net presiesheid en snelheid in nie, maar ook koördinasie, balansvermoë en ruimteskatting. Die vergelyking tussen die Africa-studie en 1976-studie, toon dat dogters in die Africa-studie in alle ouderdomsgroepe swakker gevaar het.

GEVOLGTREKKINGS

Die bevindinge van die huidige studie in vergelyking met die 1976-studie toon dat gemiddelde gewig drasties by hedendaagse dogters toegeneem het, in so 'n mate dat hierdie toename moontlike nadelige gesondheidsrisiko's nou en in die nabye toekoms mag inhou. In vergelyking is die dogters van die 1976-studie ook heelwat korter as die dogters van die Africa-studie. Dogters van die 1976-studie het ook oorwegend beter in meeste van die bewegingstoetse as dié van die Africa-studie gevaar. Alhoewel die navorsing van Sugden & Sugden (1991) en Kretschmer (2001) andersoortige meetinstrumente gebruik het, toon die bevindinge van die Africa-studie en dié van Sugden & Sugden (1991) en Kretschmer (2001) 'n afname in die bewegingsvermoëns van kinders.

Agteruitgang in kinders se bewegingsvermoëns kan moontlik toegeskryf word aan die tendens dat kinders meer geredelik toegang tot moderne tegnologie het (Nel, 1998). As gevolg hiervan kan gespekuleer word dat hulle ontvanklik is vir sedentêre leefstyle. Die bevindinge kan ook moontlik toegeskryf word aan die feit dat Liggaamlike Opvoeding, as unieke skoolvak, nie meer deel van die skoolprogram is nie en slegs as 'n fokus van Lewensoriëntering voorkom (Van Deventer, 2002; Van Deventer, 2004). Liggaamlike Opvoeding word dikwels gedefinieer as opvoeding deur beweging. Die vak is deel van die totale leerproses, wat deur middel van beweging tot die totale ontwikkeling en groei van kinders bydra. Liggaamlike Opvoeding, soos deur verskeie studies bewys, hou 'n reeks gesondheidsvoordele (fisiek, sosiaal, emosioneel en psigososiaal) in (Chernushenko, 2003; Darst & Pangrazi, 2002; Doherty & Bailey, 2003; Pangrazi, 2003; Pangrazi, 2004).

Die Onderwysdepartement lê meer klem op Wiskunde, Wetenskap en Tegnologie en min of geen aandag word aan fisieke ontwikkeling spandeer (DoE, 2000a). Mnr. Koffi Annan, die Sekretaris-Generaal van die Verenigde Nasies, is van mening dat tegnologie alleen, nie die wêreld se probleme kan oplos nie (Van Deventer, 2002). Fisieke ontwikkeling moet dieselfde nasionale belangrikheid as Wetenskap en Wiskunde aanneem (DoE, 2000b). Indien die Onderwysdepartement op nasionale vlak 'n holistiese benadering tot onderwys voorstaan (DoE, 2002), wat wel so vervat is in verskeie dokumente, hoekom word daar dan nie ook klem op fisieke ontwikkeling en die behoeftes van kinders gelê nie? Die Minister van Onderwys in Suid-Afrika (SA) het tydens sy begrotingstoespraak op 14 Maart 2000, die volgende stelling gemaak:

> *Government blames teachers, the teachers blame the parents, the parents blame the students, the students blame government and in the end, instead of working it out,*

everyone gives up hope and goes off to a shebeen and drink themselves into oblivion (Asmal, 2000).

Soos die onderwysstelsel huidig bedryf word, waarin LO verskuil word as 'n fokusarea van Lewensoriëntering, en nie geprioritiseer word nie, kan dit slegs tot nadeel van kinders in die Grondslagfase strek.

Agterstande in motoriese ontwikkeling belemmer nie net huidige en toekomstige deelname aan fisieke aktiwiteit nie, maar literatuur dui onomwonde dat dit ook skoolgereedheid nadelig beïnvloed (Nel, 1998; Nel 2002). Daar moet dus vroegtydig opgetree word sodat daar eerder voorkomend as rehabiliterend opgetree kan word.

Dit is hoogtyd dat diegene wat verantwoordelik is vir die opstel van onderwys-beleidsdokumente ernstig moet besin oor wat hulle aan die Suid-Afrikaanse jeug doen deurdat daar feitlik geen aandag aan fisieke ontwikkeling van die kind geskenk word nie.

Soos Naul (1995:48) dit stel:

If there will be no better future for an active lifestyle for our children, there will be no better future for the world.

SUMMARY

Movement abilities of 7-9 year old girls in the Stellenbosch region: a comparison

Physical activity must be an integral part of children's lives. Physical Activity makes an essential contribution to their physical, psychological and social well–being. Despite evidence supporting this, many of today's children do not engage in physical activity appropriate for long-term health promotion. Various research studies show that children are not active enough and lead ever-increasing sedentary lifestyles and these lifestyles lead to various types of hypo-kinetic diseases. Social, environmental and technological changes, as well as the phasing out of structured physical education in schools, are aspects that are responsible for the decrease in activity levels of children. Children prefer sedentary based activities such as watching television, computer games and travelling by car, rather than bicycle. The primary aim of this study was to determine whether the movement abilities of present–day girls', (Grades 1–3) have improved or worsened as compared to the girls of the Katzenellenbogen study of 1976. Movement tests from Katzenellenbogen (1976) were used to test the movement abilities of these girls. The above mentioned tests were used because of their practicability, apparatus that were used, availability of apparatus at schools and easy executable movements. The tests evaluated inter alia the following: velocity; velocity and power; power; speed and accuracy as well as accuracy and precision. The sample population (N=69) was selected from two former Model-C schools in the Stellenbosch area. The results were compared to that of Katzenellenbogen's study of 1976. The latter study only involved girls and was undertaken at former White schools only. The coding of the variable data was done in computer format, coded and statistically analysed. Maximum values were compared through Analyses of Variance (ANOVA). From the results of the study, it can be concluded that present-day girls performed much worse in almost all the tests when compared to the Katzenellenbogen study of 1976. The challenge is, therefore, to promote the benefits of physical activity, which will most probably impact on the most prevalent risk factor among our children, namely, that of sedentary lifestyles. Physical activity during childhood is very important for healthy growth and motor development. It is particularly important to

the extent that lifetime activity habits develop and persist into adulthood. The lack of physical abilities of young children is becoming more evident and is of great concern. This trend does not seem to be prioritised as a national concern and this should definitely be reversed. The correlation between obesity, various heart-related diseases, general tiredness

and a non-existent structured physical routine will become a worldwide catastrophe which will lead to a strain on the world economy. Adults will need constant medication to counter the resultant ill health they experience. South Africa is faced with an amazing opportunity to raise healthy adults who can positively contribute to its prosperity. Any initiative which lessens a future drain on the social economic stability of South Africa should be grasped by all without hesitation. The current restructuring of the South African sporting bodies and inflow of monetary sponsorships should result in a refocus on increasing childhood activity in schools as these are orchids from which future sport stars will be picked.

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