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DISTANCES AND SHOOTING ZONES AS A FUNCTION OF MASS OF BASKETBALL AMONG 9- TO 11-YEAR-OLD MALE PLAYERS

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ABSTRACT

The goal of this study was to analyse with which ball the participants attempted a greater number of shots and achieved more successful shots from distances greater than four meters and from positions outside the free throw lane. The 54 participants included nine to 11-year-old children from six basketball teams. Three situations were established in which the participants played four games with each of the following balls: a regulation ball (485g, 69-71cm); a ball of smaller mass (440g, 69-71cm); and a ball of greater mass (540g, 69-71cm). The procedures that followed included: defining the variables; instructing the observers and obtaining reliability; monitoring the properties of the ball and filming the games; and recording the data from the observation. Kruskal-Wallis H was applied to determine in which categories there were significant differences. Then, post-hoc comparisons were performed with Mann-Whitney's U to determine with which balls these differences occurred. The results did not reflect any statistically significant differences for attempted and successful shots from any distance and shooting zone with any ball. Shots were attempted with greatest frequency from a distance of less than four meters and from inside the free throw lane with all three balls.

Key words: Basketball; Mini-Basketball; Children; Rule modification; Team sport; Game analysis.

INTRODUCTION

Various studies support the use of basketball equipment that is suitable to children's characteristics and needs (Isaacs & Karpman, 1981; Juhasz & Wilson, 1982; Satern *et al*., 1989; Regimbal *et al*., 1992; Chase *et al*., 1994). Children normally lack the strength and physical characteristics that are required for the use of equipment and rules of adult sport (Evans, 1980; Kirk, 2004). However, no studies performed during real games were found that analyse whether the decrease in ball mass contributes to youth players' not concentrating their throws predominantly inside the free throw lane.

Motor praxeology has conceptualised each sport as a motor system (Parlebas, 1999). Each motor system is defined by a set of rules. The rules determine four types of participants' relationships that cause the game action to emerge: (a) with other participants; (b) with the game space; (c) with the equipment; and (d) the way they must adjust to the game time.

When changing a rule of the motor system, such as the game ball, game actions may change. This requires the use of studies that analyse game action. Game action is revealed in motor behaviours that can be objectively observed.

The ball is one of the most important pieces of equipment that mediates confrontation in team sports. The literature consulted in the area of motor learning and development recommends a ball with a smaller circumference (63.83cm) to learn to dribble (Burton & Welch, 1990). An increase in the circumference tends to make throwing more difficult (Burton *et al*., 1992).

A literature review of youth basketball found several studies that analysed the effect of ball dimensions through shooting tests. These studies indicated that a ball of smaller dimensions (496-538.65g and 70.8-73cm) led to better shot technique (Regimbal *et al*., 1992) or did not impair it (Satern *et al*., 1989), satisfied the children's preferences (Regimbal *et al*., 1992), increased levels of perceived self-efficacy (Chase *et al*., 1994), and increased shot efficacy (Isaacs & Karpman, 1981; Regimbal *et al*., 1992) or did not impair it (Satern *et al*., 1989; Chase *et al*., 1994).

Piñar (2005) conducted a study during actual youth games. One of the goals was to increase the number of shot attempts from distances greater than four meters and from positions outside the free throw lane. Piñar (2005) modified a series of rules during two championships and found differences in the percentage of the distances and shooting zones after introducing the modifications (0-3m: 70% vs. 56.2%; 3-4m: 22.7% vs. 26.8%; more than 4m: 7.3% vs. 17%; free throw lane: 70.1% vs. 56.2%). Arias *et al*. (2011) compared the effect of two shapes of the three-point line on the shooting zone, among other variables. The results revealed an increase in the percentage of shot attempts from distances greater than four meters (2.3% vs. 1.3%) and from positions inside the free throw lane (56.4% vs. 50.3%) with the three-point line delimited by the free throw lane. After analysing the positions during the regular season, Piñar *et al*. (2002) found that most of the shots were attempted from inside the free throw lane (81%).

Studies have shown that changes in ball mass may improve shot performance and other ball-handling skills. However, the studies have paid little attention to the effect of modifying ball mass on the shot during real games in youth basketball. The changes to be made in youth basketball rules should favour shooting from distances greater than four meters and from outside the free throw lane, to allow greater variability in this behaviour (Wissel, 1994; ASEP, 1996; Piñar *et al*., 2002, 2003; Piñar, 2005; Arias *et al*., 2011). The shot is the action that youth basketball players most prefer (Palao *et al*., 2004). Children claim to derive the most fun from shooting, and it is one of the aspects they feel best performing (Piñar *et al*., 2007). Shooting near the basket produces higher percentages of efficacy (Cruz & Tavares, 1998; Piñar *et al*., 2003; Tavares & Gomes, 2003). However, this does not justify children not shooting from other distances and zones, from the time they begin their initial training. Shots from distances greater than four meters and from outside the free throw lane are the least frequent shots during the game (Cruz & Tavares, 1998; Piñar *et al*., 2002, 2003; Tavares & Gomes, 2003; Piñar, 2005; Ortega *et al*., 2006; Arias *et al*., 2011). Thus, such shots are the ones that should be favoured. Depriving children of these experiences means limiting their training in the most important content of the game. Working on shooting variability is

necessary in youth basketball. Quantity and the variability of practice are essential variables in the process of training children (Thomas, 1994; Schmidt & Lee, 2005).

PURPOSE OF THE STUDY

The goals of this study were: (a) to analyse with which ball the participants attempted a greater number of shots from distances greater than four meters and from positions outside the free throw lane; and (b) to verify whether the number of successful shots from a distance greater than four meters increased. In accordance with the literature consulted, the hypothesis was that the frequency of attempted and successful shots from a distance greater than four meters and from the outside of the free throw lane would increase with a ball of lower mass.

METHODOLOGY

Participants

The participants included 54 children (age: M=10.63, SD=0.55) from 6 basketball teams, aged between 9 to 11 years. They had practised basketball on official, federated teams for 2.52 years (SD=0.75). Each week, they practised an average of 3.57 (SD=0.51) days for a total of 5.03 (SD=0.80) hours. The teams were federated and played regionally. The sample consisted of 2 100 ball possessions from 12 games, of which 736 corresponded to the 4 games played with the regulation ball (485g), 660 to the 4 games played with the ball of smaller mass (440g), and 704 to the 4 games played with the ball of greater mass (540g). The selection of the teams and players was deliberate, because these teams fulfilled the following inclusion criteria: (a) that the teams participate in all the scheduled games; and (b) that the children from each team are the same in all the games. The selection of the ball possessions was through total sampling (Anguera, 2003). The parents of the participants and the coaches completed an informed consent form to participate in the study. The Research Ethics Committee of the university approved the study.

Experimental design

Three situations were established that consisted of all participating teams playing with three balls that differed only in their mass: four games with the regulation ball (485g, 69-71cm); four games with the ball of smaller mass (440g, 69-71 cm); and four games with the ball of greater mass (540g, 69-71cm). A 3-day tournament was organised consisting of 12 games in which the 6 teams were randomly matched. Each day, the teams played between 1 and 2 games. The game ball for each game was also randomly chosen. Among all the teams, 4 games were played with each ball. Each team played a minimum of 1 game and a maximum of 2 games with each ball.

The ball mass was selected according to the most extreme proposals within those of least mass included in studies about ball modification and in agreement with the proposals stating that the difference between balls should be greater than 57g (Chase *et al*., 1994) and 60g (Juhasz & Wilson, 1982). For the lower mass, one near to 467.76g was selected as proposed by Satern *et al*. (1989). For the higher mass, approximately between 538.65g proposed by

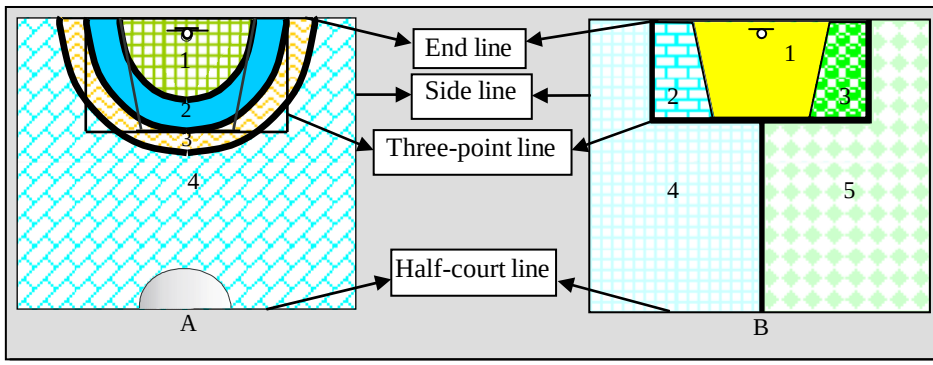
Chase *et al*. (1994) and 552.8g proposed by Isaacs and Karpman (1981), Satern *et al*. (1989) and Regimbal *et al*. (1992) was selected.

The coaches and the players did not know the objective of the study. One month before, the principal researcher informed the coaches that they would play in a tournament: (a) with the balls that the organising committee provided; (b) in which the games would be previously determined; (c) in which all the participants would receive a diploma; and (d) in which they would have to respect the inclusion criteria, as well as the prerequisites of inter-sessional consistency. In all the games, the requirements were: (a) the players were always the same players; (b) the participants played all the games on identical courts (28x15m); (c) rest interval between games was a minimum of 1 hour; (d) each game consisted of 4, 10-minute periods; (e) the participants warmed up with a ball that was similar to the game ball; (f) individual defence was compulsory, (g) the height of the baskets was 2.60m; (h) the balls were the same in texture, colour, circumference and bounce; and (i) the games followed the same rules.

Procedure

A group of 6 experts delimited and defined the variables and their categories. Three of the experts were researchers who specialised in basketball. The other 3 experts were coaches with experience of coaching 9 to 11-year-old basketball players. The categories for each variable were exhaustive and mutually exclusive (Anguera, 2003; Gorospe *et al*., 2005). The categories were coded using a numeric system to facilitate its register. The variables were the following:

1. *Shooting distance* [Distance from which the participants shot (Piñar, 2005)]. The categories were (Figure 1A): from 0-3m; from 3-4m; from 4-5m; and greater than 5m.
2. *Shooting zone* [Zone from which the participants shot (Arias *et al*., 2011)]. The categories were (Figure 1B): zone 1; zone 2; zone 3; zone 4; and zone 5.
3. *Successful shots*. The two categories were baskets scored and baskets not scored.



Key: **1**= 0-3m, **2**= 3-4m, **3**= 4-5m, **4**= more than 5m (**A**) and front court zones (**B**)

FIGURE 1: **DISTANCE TO BASKET**

By adapting a Microsoft Excel 2003 worksheet (Microsoft Corporation, United States of America [USA]) a register instrument was created to which a tool was added to capture and process the videos (Virtual Dub, v. 1.7.0.). This instrument allowed the observers to register the number corresponding to each category in the Excel sheet while viewing the recording at a speed of 25 frames per second.

Four observers were trained according to the training stages suggested by Anguera (2003). The observers accumulated a minimum of 30 hours of experience. Observer reliability was obtained through intra-observer evaluation at the end of the training process. For this purpose, the observers observed 123 ball possessions, which meant a 20-minute interval from 2 game periods. Subsequently, the observers again observed the same fragment after 7 days of no observation. Reliability of the observation was measured through an inter-observer evaluation at the end of the observation process. For this assessment, 15% of the ball possessions of the investigation games were used. Thus, the observers observed 5 randomly selected periods, which meant 50 minutes of game and 315 ball possessions. Reliability was calculated with Kappa's coefficient. Observer reliability ranged between 0.95 and 1, and for the observation, it was 1.

In accordance with Crisco *et al*. (2005) in addition to basketball regulations, the properties of the ball that were controlled were: mass; circumference; and bounce height. Three collaborators monitored this for 30 minutes before and after each game, following a protocol that was adapted by Crisco *et al*. (2005). This consisted of taking 3 measurements of each property and calculating the mean. The mass should be 440g for the lightest ball, 540g for the heaviest ball, and 485g for the regulation ball. The circumference should be 69-71cm. To monitor bounce, the collaborators let the ball fall from a height of 1.8m (from the bottom of the ball) and they measured the height it reached after bouncing (at the top of the ball) (Hamilton & Reinschmidt, 1997; Huston & Grau, 2003). Recording the height points and extrapolating them through the calibration mark were the measurements taken. For this purpose, with the video camera (Everio Full HD-GZ-HD7, JVC, Japan) connected to the computer (Acer Aspire 3630, Acer Inc., Taiwan), the image was sent to the Virtual Dub 1.6.15 program. The height of the dribble should be between 1.2 and 1.4m (Hamilton & Reinschmidt, 1997). Measurements with a horizontal component were eliminated.

Two collaborators recorded the games, each one with a video camera (Everio Full HD-GZ-HD7, JVC, Japan). The camera was situated transversally to the basketball court, on the opposite side from the scoring table. The camera was placed 5m off the ground and 2m from the side-line. The focus was on the centre of the court and with the open field in order to record the greatest possible space. The camera rotated on the tripod axis when necessary. As a general rule, the recording included the player with the ball, the court, and the basket, in addition to the rest of the players.

The four observers recorded the data using a systematised register from the observation of the game videos (Anguera, 2003). The unit of analysis was ball possession. The study variables were coded on the registry instrument (Anguera, 2003; Gorospe *et al*., 2005). The observers used a protocol of observing each ball possession 2 times at real speed in order to increase observation reliability. If necessary, the observers observed each possession at a speed of 25 frames per second. The observers registered the numeric code that corresponded to each

variable on which the observation was focused. Each observer observed and registered 3 games.

Statistical analyses

The statistical analysis of the data was performed with the Statistical Package for Social Sciences (SPSS) v. 17.0 for Windows (SPSS, Inc., USA). Descriptive analyses through

frequencies and percentages were conducted. The normality of the data was determined with the Kolmogorov-Smirnov test. From this test, it was determined that the data were non-parametric. The Kruskal-Wallis H was used to assess the categories in which there were significant differences. Then, post-hoc comparisons were performed with Mann-Whitney's U to determine with which balls these differences occurred. Statistical significance was set at $p \leq 05$.

RESULTS AND DISCUSSION

The goals of this study were: (a) to analyse with which ball the participants attempted a greater number of shots from distances greater than 4 meters and from positions outside the free throw lane; and (b) to verify whether successful shots from a distance greater than 4m increased. The results did not confirm the hypothesis.

TABLE 1: **FREQUENCIES, PERCENTAGES AND SIGNIFICANT DIFFERENCES OF MEANS OF COMPARED VARIABLES**

Variables	**Ball**						χ^2	**p**
	4‹ g		Regulation		540g			
	n	%	n	%	n	%		
Distance								
0-3m	309	46.8	301	40.9	308	43.8	4.975	.084
3-4m	32	4.8	26	3.5	28	4.0	1.571	.456
4-5m	14	2.1	17	2.3	18	2.6	0.286	.867
More than 5m	62	9.4	50	6.8	65	9.2	3.935	.140
Zone								
Zone 1	309	46.8	301	40.9	308	43.8	4.957	.084
Zone 2	11	1.7	15	2.0	17	2.4	0.951	.622
Zone 3	35	5.3	28	3.8	29	4.1	2.038	.361
Zone 4	32	4.8	22	3.0	35	5.0	4.366	.113
Zone 5	30	4.5	28	3.8	30	4.3	0.489	.783
Successful shots								
From less than 4m	150	44.0	135	41.3	128	38.1	2.429	.297
From more than 4m	25	32.9	19	22.9	15	22.4	4.957	.077

As shown in Table 1, the results reflected no statistically significant differences either for shots from any distance and shooting zone or for successful shots from distances smaller and greater than 4m, with any ball. These results do not seem to agree with the studies consulted about improvement of shooting performance and other handling skills when reducing ball mass (Isaacs & Karpman, 1981; Burton & Welch, 1990; Regimbal *et al*., 1992; Pellett *et al*., 1994). Nor is this result in accordance with the proposals stating that the difference between the balls to be compared should be greater than 57g (Chase *et al*., 1994) and greater than 60g (Juhasz & Wilson, 1982).

The greatest number of attempted shots with the 3 balls occurred from a distance of 0-4m. In

contrast, the smallest number of attempted shots with the 3 balls occurred from a distance greater than 4m. These values were 11.5% for the 440g ball, 9.1% for the regulation ball, and 11.8% for the 540g ball. When considering the number of attempted shots as the unit of analysis, the results obtained did not produce significant differences. From a distance of up to 4m, the values were 81.77% with the 440g ball, 83% with the regulation ball, and 81% with the 540g ball. These results are similar to the 83% found after the modification of the rules (court size, free-throw line, 3-point line, game duration, and number of players) reported by Piñar (2005).

More shots were attempted with all 3 balls from inside the free throw lane (zone 1). In contrast, fewer shots were attempted with all 3 balls from outside the free throw lane. These values were 16.3% for the 440g ball, 15.8% for the regulation ball, and 12.6% for the 540g ball. The number of shots attempted from outside the free throw lane with the 3 balls was higher than that obtained by Arias *et al*. (2011) when the participants played on the court with the 3-point line delimited by the free throw lane. This result suggests that the 3-point line proposed in the study of Arias *et al*. (2011) did not match the players' possibilities and needs.

When considering the number of attempted shots as the unit of analysis, the results obtained did not produce significant differences. From inside the free throw lane, the values were 74.1% with the 440g ball, 76.39% with the regulation ball, and 73.5% with the 540g ball. The number of shots attempted from inside the free throw lane was less than the 81% found by Piñar *et al*. (2002) after analysing 4 male mini-basketball games in which the participants played without the 3-point line. In contrast, this value was higher than the 69.5% observed by Piñar *et al*. (2003) and the 56.2% obtained by Piñar (2005) after changing the rules. Such large differences in comparison to the study by Piñar (2005) could be due to the series of modifications introduced. It seems that it is necessary to analyse other modifications in the regulations in order to increase the number of shots from outside the free throw lane.

The percentage of successful shots from distances greater and smaller than 4m was similar with all 3 balls, although the differences in percentage were slightly higher with the 440g ball. Moreover, from a distance greater than 4m, there are signs of statistical significance, which indicates that the differences in percentage were near to not being a cause of randomness. These results suggest that the ball of lesser mass did not facilitate success when increasing the distance to the basket. Various studies allude to the fact that the reason why children are not more successful is the absence of strength (Juhasz & Wilson, 1982; Chase *et al*., 1994; Cleary *et al*., 2006), but the ball of lesser mass of this study did not lead to the players' increasing their successful shots. These results are similar to those found by Satern *et al*. (1989) and Chase *et al*. (1994), who reported no positive effect with the ball of lesser mass, but they are contrary to those found by Isaacs and Karpman (1981) and Regimbal *et al*. (1992), who reported that the reduction in ball dimensions increased effectiveness.

Nevertheless, the percentage of successful shots with the 440g ball from distances smaller (44%) and greater (32.9%) than 4m was higher than the 39.44% and 20%, respectively, achieved by the participants of the study by Piñar *et al*. (2003).

These results may be related to three arguments. Firstly, shots from a distance of less than 4m and from inside the free throw lane are the most frequent during the game (Cruz & Tavares, 1998; Piñar *et al*., 2002, 2003; Tavares & Gomes, 2003; Piñar, 2005; Ortega *et al*., 2006; Arias *et al*., 2011). This is a consequence of coaches' favouring shots near the basket due to

the demands involved in shooting from outside the free throw lane. Thus, players often resort to shooting from outside the free throw lane when they cannot shoot from close positions. Secondly, shots near the basket produce higher percentages of efficacy (Cruz & Tavares, 1998; Piñar *et al*., 2003; Tavares & Gomes, 2003). This increases the levels of perceived self-efficacy and reinforces shooting from zones where the players are more successful (Vollmer & Bourret, 2000; Wilson *et al*., 2007). Thirdly, and due to the above reasons, the shooting pattern with regard to distances and shooting zones seems to be so well-established that it was not affected by a short-term modification in ball mass. The modified component did not produce any critical fluctuation in the context to cause behaviour to change. That is, the ball mass was not a sufficiently relevant stimulus to cause the distances and shooting zones to change. However, this does not justify children's not shooting from other distances and zones from the beginning of their training (Wissel, 1994; ASEP, 1996; Piñar *et al*., 2002, 2003; Tsitskaris *et al*., 2002; Piñar, 2005; Arias *et al*., 2011).

There were several limitations in this study: (a) only boys were studied; and (b) anthropometrical characteristics, biological age, strength, and skill level were not controlled. These conditions may limit the generalisation of the results and restrict them to participants with similar characteristics to those in this study.

CONCLUSION

In conclusion, the present study provides evidence of the effect of the modification of ball mass on variables during real games in youth basketball. The results showed that the distances and shooting zones and successful shots from distances smaller and greater than four meters did not vary with any of the balls. Youth basketball should favour attempted and successful shots from distances greater than four meters and from outside the free throw lane, so that children can practise from different positions (Wissel, 1994; ASEP, 1996; Piñar *et al*., 2002, 2003; Palao *et al*., 2004; Piñar, 2005; Arias *et al*., 2011). This would allow them to discover their possibilities with regard to game constraints. Thus, teachers and coaches would attend to children's needs, preferences and progress (Palao *et al*., 2004; Piñar *et al*., 2007).

In this study, the lower ball mass did not lead to attempted and successful shots from distances greater than four meters and from positions outside the free throw lane. This result reveals the need to study other modifications. The literature proposes adapting the three-point line (Piñar *et al*., 2002; Piñar, 2005; Ortega *et al*., 2006; Arias *et al*., 2011). Nevertheless, teachers and coaches should not restrict training children in the most important content of the game at the expense of achieving higher efficacy from positions near the basket. They should propose tasks that favour the variability of this behaviour by increasing shooting from distances greater than four meters and from outside the free throw lane. The predominance of these game variables may provide more enjoyable experiences for the children; in turn, they may choose to continue practising basketball and put out more effort for a longer time.

In future studies, other game variables should be studied to assess whether the modification of ball mass (maintaining its circumference) favours a game that is suitable for children's characteristics and needs.

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A MULTI-STAGE INTEGER PROGRAMMING APPROACH TO FANTASY TEAM SELECTION: A TWENTY20 CRICKET STUDY

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ABSTRACT

Team selection is a controversial topic, even more so when a team performs poorly. Many sport fans believe they can perform the selection process better than those tasked with the responsibility. With the developments of fantasy sport games, fans

now have a platform to test their claims, albeit in a purely recreational manner. Participants in fantasy league sport games can select their own team and based on the players' performances are awarded points. The participant with the highest points is declared the winner. This study proposes a multi-stage integer optimisation algorithm for a fantasy team selection. The sequential capability of the automated selection algorithm is demonstrated in a Twenty20 cricket tournament.

Key words: Integer programming; Cricket; Statistics; Team selection; Fantasy leagues.

INTRODUCTION

Twenty20 cricket is a new and exciting short form of cricket, which has gained much support since its introduction in 2003 (Weaver, 2008). Since this format of the game is only a few years old, it provides a new focus area for research of many kinds. This paper adds to the emerging research into this topic by providing a team selection strategy for a Twenty20 fantasy league. Fantasy leagues provide a platform for fans of various sports to test their team selecting abilities in competition with each other. The modern fantasy league game involves the selection of a "fantasy" team at the beginning of a season and then managing this team during the course of the season. In 1980, Daniel Okrent (Vichot, 2009) developed this format of the game with the introduction of "Rotisserie League Baseball". Vichot (2009) mentioned that fantasy league participants at this time were presented with many of the team selection problems facing professional coaches. As such, fantasy league participants were required to make changes to their team to account for injury and poor player performance.

The game of cricket has provided a lucrative research area for many researchers. Studies into the mathematics and statistics of the game and of the players have resulted in numerous publications. Arguably, the most prominent of these was the study of Duckworth and Lewis (1998) who provided a mathematical technique to reset targets in rain affected matches. This initial approach, as well as the subsequent adjustments to the approach, has had a large and lasting impact on the limited overs game. The reader who is unfamiliar with the game of cricket is referred to Preston and Thomas (2002) for an overview of the game. Barr and

Kantor (2004) and Lemmer (2004), have conducted research into the performance measures of batsmen. Lemmer (2002) studied the bowling ability of cricketers. The performance measures of both batsmen and bowlers were represented graphically by Van Staden (2009). Simulation techniques have been used by Swartz *et al.* (2006) to determine optimal batting strategies. Swartz *et al.* (2009) then devised a method to simulate entire one-day cricket matches. These simulations are very useful for studying the game. Gerber and Sharp (2006) devised an integer-programming model, which selects a squad of cricketers according to the values of their performance measures. A similar technique was used by Sharp *et al.* (2010) to select an optimal team from the data of the inaugural International Cricket Council (ICC) World Twenty20 held in South Africa in 2007. The current research modifies the integer-programming model of Sharp *et al.* (2010) to select and manage a fantasy league team. This is done in a Twenty20 cricket framework and illustrated using data from the 2008 Indian Premier League (IPL).

FANTASY LEAGUES AND PROBLEM STATEMENT

Fantasy leagues are available for many sports and are becoming a popular pastime for millions of people across the world. Many of these leagues are hosted on the Internet and are usually based on a popular competition or tournament. The host websites manage the league and determine all the rules and regulations for participants. The participants of a fantasy league act as a virtual team manager. Each participant is given a budget of virtual funds and is required to purchase players for their team according to predefined conditions. The players available to be purchased are the sport personalities from the competition on which the fantasy league is based. The cost of the players varies according to the perceived ability of the player. Naturally more skilled players will cost more than less skilled players. The participants then manage their team throughout the course of the competition. The real life performances of the sport personalities are assessed and points are awarded to each player after every match. High scores are given to players who perform well and low scores to those who perform badly.

Typically a fantasy league will be divided into "stages" which consist of a group of matches. Fantasy league participants are thus required to assess recent player performance and make necessary changes to their team in order to maximise the number of points scored at each stage. To perform well in a fantasy league usually requires comprehensive research and planning (Allen *et al.*, 2007). Classically there are strict limitations on the number of changes a fantasy manager is allowed to make. The team with the highest cumulative points at the end of the season is then deemed the winner. Much research has been conducted into fantasy leagues but this research typically focuses on sport popular in the United States of America such as baseball (Allen *et al.*, 2007) and American football. Summers *et al.* (2008) researched optimal drafting techniques in hockey pools, which is another popular North American sport. The current study exposes the game of cricket to similar research.

The Twenty20 competition, which this study used for illustrative purposes of the algorithm, was the inaugural IPL, which was held in India in 2008. This competition was the first of its kind and involved cricketers from all over the world. The current study used a modified version of the rules used for the fantasy league competition hosted on the CricInfo website (CricInfo IPL Fantasy League, 2008). The rules used in this study were:

- no team can cost more than 1 million units (each player costs between 50 000 and 150 000 units),
- each team must consist of 11 players,
- each team must have one of the following combinations:
  - 4 batsmen, 4 bowlers, 2 all-rounders and 1 wicket keeper, or
  - 4 batsmen, 3 bowlers, 3 all-rounders and 1 wicket keeper,
- a maximum of 9 changes can be made to the team,
- the tournament is broken into 4 stages, and
- changes made to a team must be concluded before the commencement of each stage and the team chosen at the start of a stage remains the same until the end of the stage.

The four stages partition the tournament into groups of 16, 14, 14 and 15 games respectively. This results in each team/cricketer participating in approximately four games per stage. The last three rules are unique to this study. These rules are included to partition the competition into a game which allows for a simple illustration of the mathematical programming routine.

The research problem for this study can now be defined. A team of 11 players had to be

selected prior to the commencement of the 2008 IPL. The total cost of the players in the team cannot exceed 1 million units at any stage of the tournament. The team must be selected according to the formation restrictions of the game. Once the tournament had commenced, a further nine changes could be made to the team provided none of the game restrictions were violated. The team had to be selected and modified over the four stages in order to maximise the number of points scored by the players. This study proposes a mathematical optimisation procedure that provides a solution to this problem.

METHODOLOGY

The team was selected for each stage of the competition using a binary integer optimisation procedure. This optimisation procedure constructs the team by selecting the players with the highest values of their respective performance measures subject to the constraints imposed by the fantasy league. The performance measures used in this study were similar to those proposed by Croucher (2000) and modified by Barr and Kantor (2004) and again by Sharp *et al.* (2010). These performance measures were selected as they have already been used for team selection and assessment purposes. As such, their effectiveness in this setting has been established. There is on-going research identifying cricketer's performance measures. The measures used in this study were for ease of application. The primary objective of the paper was the mathematical algorithm for sequential selection.

The measure used for a batsmen was the weighted product of the batting average AVE_{BAT}, and the batting strike rate, SR. This measure can be represented as $BAT = (AVE$

BAT

$)^{1-\alpha}(SR)^{\alpha}$ where

α is the weighting constant. Values of α greater than 0.5 thus imply a greater weighting to the batting strike rate. In Twenty20 cricket the ability to score runs quickly is desirable and thus a higher weighting should be given to the batting strike rate. As such, a value of $\alpha = 0.75$ is used.

The bowling measure used was similar to the batting measure, however, the bowling measure was a weighted product of the bowling average,

AVE_{BWL}, and the bowling economy rate, EC.

This measure is a variation of the measure proposed by Sharp *et al.* (2010). The bowling measure was thus represented as

$BWL = (AVE$

$)^{1-\beta}(EC)^{\beta}$

where β was the weighting constant. Values of β greater than 0.5 imply a greater weighting to the bowling economy rate. Owing to the importance of limiting the runs scored in the Twenty20 game, a greater weighting should be allocated to the bowling economy rate. As such, a value of $\beta = 0.75$ was used.

The measure used for all-rounders was a weighted product of the batting and bowling measures (BAT and BWL). Each measure in this instance was given an equal weighting. The measure used for all-rounders was thus represented as $ALR = (BAT)^{0.5}(BWL)^{0.5}$. The measure used to select wicket keepers was identical to that of a batsman. This measure depends solely on the batting performance of a cricketer and was chosen since the bowling statistics (AVE_{BWL} and EC) of a wicket keeper are often not available. Thus, the wicket keeper measure was provided as $WKR = (AVE$

BAT

$)^{0.25}(SR)^{0.75}$.

The performance measures described above used the career statistics for each cricketer to select the team at the first stage of the competition. The performance measures for each cricketer were then updated as new information became available. The updated performance measures were now calculated using only the data from the most recent stage in the tournament. This allowed the optimisation algorithm to use the recent data to select the cricketers who performed best. The performance measures used in this study were thus calculated sequentially at the beginning of each stage, only using the data available at the time of selection. The team selections were thus made in real time, so as to recreate the fantasy league environment.

To include these performance measures into a single integer program, each measure must be standardised. This was accomplished using the method proposed by Lemmer (2004) and used by Gerber and Sharp (2006) where each measure was divided by its mean value. The resulting measures were then unit less and all had the same mean value of 1. The measure for: batsman i for stage k thus became $F = \left(\frac{BAT_{ik}}{\quad} \right) \times n$ where

ik n_{Fk}

$\left| \quad_{Fk} \right.$

$$\left(\left| \sum_{j=1} BAT_{jk} \right| \right)$$

BAT_{ik}

$= \left(AVE\right.$

BAT_k

$)^{1-\alpha}(SR)^{\alpha}$

was the performance measure for batsman i using the batting average and strike rate as calculated for stage k and n_{Fk}

was the number of batsmen stage in
k for which the measure

BAT_{ik}

could be determined. The measures for each bowler, all-rounder and wicket keeper for stage k (denoted as G_{ik}, similarly calculated.

H_{ik}

and

I_{ik}, respectively) were

This standardisation method, however, did not account for the difference in variance between the categories of cricketers. In order to equate the variances the method proposed by Lemmer

(2004) was employed. This method selects a base standard deviation, σ_b, and then equates all the variances to this base value. This is accomplished using an iterative process which raises each performance measure within a certain player category to the power $\left(\frac{\sigma_i}{\sigma_b}\right)$, where σ_i is the standard deviation of the measures in that category for the previous iteration. This process is continued until the standard deviation for each category of cricketer (batsmen, bowlers, etc.) was equal to σ_b, correct to the third decimal place. This process was conducted for each category of cricketer for each stage of the competition. The base value was arbitrarily chosen to be the value of the variance of for bowlers for the first stage.

G_{i1}

that is, the performance measures calculated

To model the optimisation problem, the decision variables are defined as

$$x_{ik} = \begin{cases} 1 \\ 0 \end{cases}$$

if player i is selected for stage k

if player i is not selected for stage k

Since all the performance measures have been standardised, they can all be included into a single set A. This set will thus contain the performance measures for batsmen, bowlers, all-rounders and wicket keepers. Let a_{ik} be the performance measure of cricketer i prior to stage k. Let the competition consist of n registered players and be partitioned into q stages. The objective function for the optimisation procedure at each stage can thus be expressed as

$\lceil \quad n \quad \rceil$

where

$k \in \{1,...,q\}$. Each optimisation procedure is solved under a $\max\{Z = \sum_{i=1} a_{ik} x_{ik}\}$ number of constraints. The constraints must be expressed mathematically in order to be included in the optimisation procedure. Each cricketer taking part in the competition was classified as a batsman, bowler, all-rounder or wicket keeper prior to the competition. These classifications are expressed mathematically using the following methodology.

Define the variable

$$b_{ik} \begin{cases} 1 & \\ 0 & \end{cases} =$$

if player$i$ is a batsman in stage k

if player$i$ is not a batsman in stage k

This categorisation is constant throughout the competition and thus

$b_{ij} = b_{il}$

for all $j,l \in \{1,...,q\}$. Similarly the variables for bowlers, all-rounders and wicket keepers are defined as

$$c_{ik} = \begin{cases} 1 \\ 0 \end{cases}$$

if player$i$ is a bowler in stage k , if player$i$ is not a bowler in stage k

d_{ik}

e

$$= \begin{cases} 1 & \\ 0 & \end{cases} = \begin{cases} 1 & \end{cases}$$

if player*i* is an all rounder in stage *k*

if player*i* is not an all rounder in stage *k*

if player*i* is a wicket keeper in stage *k*

, and

$$_{ik}\begin{cases}\\0\end{cases}$$

if player i is not a wicket keeper in stage k

respectively. At each stage exactly four batsmen must be chosen, this constraint is expressed as

$$\sum_{i=1}^{n} b_{ik} x_{ik} = 4$$

$\forall k \in \{1,...,q\}$.

Similarly the constraint for the number of bowlers selected at each stage is expressed as

$$3 \leq \sum_{i=1}^{n} c_{ik} x_{ik} \leq 4$$

For all-rounders the constraint is expressed as

$$2 \leq \sum_{i=1}^{n} d_{ik} x_{ik} \leq 3$$

$\forall k \in \{1,...,q\}$.

$\forall k \in \{1,...,q\}$,

and for wicket keepers as

$$\sum_{i=1}^{n} e_{ik} x_{ik} = 1$$

$\forall\, k \in \{1,...,q\}$.

The total number of cricketers selected for a team must be 11 at each stage of the competition. This constraint is expressed as

$$\sum_{i=1}^{n}\left(b_{ik}x_{ik} + c_{ik}x_{ik} + d_{ik}x_{ik} + e_{ik}x_{ik}\right) = 11$$

$\forall k \in \{1,...,q\}$.

The budget of 1 million units sets an upper limit for each stage of the competition. Let the variable p_{ik} be defined as the price of cricketer i in stage k. The price of a cricketer is constant throughout the competition and thus

$p_{ij} = p_{il}$

for all $j,l \in \{1,...,q\}$. To ensure that

the cost of the selected cricketers never exceeds the budget, the following constraint is included:

$$\sum_{i=1}^{n} p_{ik} x_{ik} \leq 1000\,000$$

$\forall k \in \{1,...,q\}$.

The final constraint relates to the total number of changes that are allowed to be made to the team. Only changes at the end of each stage are counted. That is, only changes made prior to Stage 2, ... , q are counted. Changes made after stage q are not included as this coincides with the conclusion of the tournament and changes made at this point are irrelevant. Changes made prior to Stage 1 are unlimited as this coincides with the initial selection of the team. This implies that there are

$q-1$ opportunities to make changes. Let the maximum number of changes allowed for the entire tournament be T. It is proposed that the maximum number of changes allowed at each of the $q-1$ stages is $t_k = \frac{T}{q-1}$, where $k = 2,3,...,q$, if the solution is an integer. If the solution of $q-1$

$\frac{T}{\quad}$ is not an integer then the following formula is used

$$\left\lceil \left(\frac{T}{\quad} \right) \right\rceil \qquad \left| \text{int} \right|_{q-1} \Big|$$

for $1 < k \le q-1$ and k even

$$t_k = \left\lfloor \text{int}\left(\frac{T}{q-1} \right) \right\rfloor + 1$$

for $1 < k \leq q-1$ and k odd

$$\left| \binom{}{q-1} \right| \qquad |T - \sum t_i$$

for

$k = q.$

$$\lfloor \quad _{i=2}$$

The integer program must thus limit the number of changes made at each stage to a maximum of t_k. To count the number of changes made at each stage the following summation is required,

$$\sum_{n}$$

$$\sum_{i=1}$$

x_{ik}

$x_{i(k-1)}$

where

$k \in \{1,...,q\}$. The decision variables

x_{ik}

and

$x_{i(k-1)}$ indicate
cricketer *i*'s selection in (or omission from) the team in the

k^{th}

and the $(k-1)^{th}$

stage

respectively. Since

x_{ik}

is a binary variable, we have that

$x_{ik}x_{i(k-1)}$ is also a binary variable.

In fact,

$x_{ik}x_{i(k-1)} = 1$ indicates that cricketer i was selected for both stages and

$x_{ik}x_{i(k-1)} = 0$

either indicates that a change was made, or that the cricketer was not selected for either stage. The summation $\sum_{i=1}^{n} x_{ik}x_{i(k-1)}$

thus indicates the total number of cricketers selected in the team for both the $(k-1)^{th}$ and k^{th} stage. Since a maximum of 11 cricketers are selected in the team, the value

$$_{n}$$

$$m_k = 11 - \sum_{i=1} x_{ik} x_{i(k-1)}$$

indicates the number of changes made to the team between stages $(k-1)$ and k. Since changes are only counted from the end of Stage 1, the changes made to the team prior to the competition are not counted. We thus set

$x_{i0} = 1$

$\forall i$, this

ensures that the number of changes made prior to Stage 1,

$m = 11 - \sum x \; x$

$= 11 - 11 = 0$.

n

1 $i1$ $i0$

$i=1$

Suppose now that m_k

changes are made to the team between stage $(k-1)$ and stage k and that

$m_k < t_k$. This implies that an additional

$t_k - m_k$

changes can be made later in the competition. The constraint for the number of changes allowed for stage k in the competition where $k \in \{2,...,q\}$ is thus expressed as

$$m_k = 11 - \sum_{i=1}^{n} x_{ik} x_{i(k-1)} \leq \left(\sum_{j}^{k} t_j - \sum_{j}^{k-1} m_j \right)$$

$\sum_{j=2}$

$j=2$)

where $\sum_{j=2}^{1} m_j$

$= 0$. The integer optimisation procedure using the above constraints is run at each stage of the competition. The output of the procedure provides the team selected at each stage.

If a cricketer were to get injured or be absent for some reason, it is assumed that this knowledge is available before the stage begins. This is the case for many Australian and New Zealand cricketers who had international commitments during the course of the 2008 IPL. The fantasy league participants would know this information. Knowledge of injured cricketers would also be available to the participants through various media sources. To account for the missing players, cricketers are allocated a performance measure value of $a_{ik} = 0$ for every stage in which they were absent. This was included to encourage a change when a cricketer is absent. The option of setting the decision variable to

$x_{ik} = 0$

was

disregarded as this may result in an infeasible solution when the constraint on the number of allowed changes is considered.

DATA

Twenty20 career data were collected for each cricketer who took part in the competition. These data were collected from the CricInfo website (CricInfo, 2008). The 2008 IPL data were also collected from the CricInfo website (CricInfo, 2008).

TABLE 1: **BATTING: FANTASY LEAGUE SCORING**

Event	Points	Event	Points
Per run scored	1	$150 \le SR < 180$	10^{*}
Six hit	2	$180 \le SR < 200$	20^{*}
Duck	-10	$SR \ge 200$	30^{*}
$0 \le SR < 50$	-30^{*}	Reaching 25 runs	10
$50 \le SR < 75$	-20^{*}	Reaching 50 runs	20
$75 \le SR < 100$	-10^{*}	Reaching 75 runs	40
$100 \le SR < 150$	0^{*}	Reaching 100 runs	80

*These points are only awarded if the batsman scores at least 20 runs.

Using a fantasy league scoring methodology the overall performance of a cricketer in a match is given a single numerical value. High values of a fantasy league score correspond to good performances and low values to poor performances. The scoring methodology used in this study was developed by CricInfo (CricInfo IPL Fantasy League, 2008) and is given in Tables 1 to 3.

TABLE 2: **BOWLING: FANTASY LEAGUE SCORING**

Event	Points	Event	Points
Dismissing a:		$7 \le EC < 9$	0^{+}
batsmen,		$9 \le EC < 11$	-10^{+}
all-rounder or	25	$11 \le EC < 14$	-20^{+}
wicket keeper		$EC \ge 14$	-30^{+}
Dismissing a bowler	10	Taking 2 wickets	10
Maiden over	40	Taking 3 wickets	20
$0 \le EC < 3$	30^{+}	Taking 4 wickets	40
$3 \le EC < 5$	20^{+}	Taking 5 wickets	80
$5 \le EC < 7$	10^{+}		

+These points are only awarded if the bowler has bowled at least 2 overs.

TABLE 3: **FIELDING: FANTASY LEAGUE SCORING**

Event	Points
Catch	15
Stumping	15
Direct run out	30
Indirect run out	10

To illustrate how points are awarded from these tables consider the following example: Suppose a cricketer scored 60 runs off 40 balls hitting 2 sixes. The cricketer also bowled 3 overs conceding 27 runs and taking the wicket of an opposition all-rounder. The points scored by the cricketer are given as:

- 60 points (1 for each run scored),
- 4 points (2 for each six hit),
- 10 points (since $SR = 150$),
- 20 points (for reaching 50 runs),
- 25 points (for dismissing an all-rounder), and
- -10 points (since $EC = 9$).

The total fantasy score for the cricketer for this example is thus $60 + 4 + 10 + 20 + 25 - 10 = 109$ points. This is a typical scoring system used in a fantasy league. A fantasy score thus provides a single numerical value to the overall performance of a cricketer in a given match. This value provides a convenient and informative measure of a cricketer's overall contribution to a match.

RESULTS AND DISCUSSION

The optimisation procedure was run in GNU R 2.10.1 using the package lpSolve version 5.6.4 (Berkelaar, 2008). The fantasy league game discussed in Section 2 is used and thus the optimisation algorithm considers a 4-stage game. The total number of changes allocated to each stage is $t_k = \frac{9}{3} = 3$ for stages $k = 2,3,4$. Unused changes at any stage of the competition would be passed on to the subsequent stage. The team selections considering each category of cricketer are discussed separately.

Batsmen

The batsmen selected for the fantasy team for each round are presented in Table 4. Before the start of the competition the batsmen with the best performance measures were M. Hayden, R. Ponting, R. Sharma and R. Taylor. This selection provided a total of 790 fantasy league points. As the tournament progressed and data from each player's performance in the first stage of the competition became available, R. Ponting was replaced by V. Sehwag. In Stage 1, V. Sehwag scored 254 points, almost 5 times more than R. Ponting.

TABLE 4: **BATSMEN CHOSEN FOR THE FANTASY LEAGUE TEAM**

Stage 1		**Stage 2**		**Stage 3**		**Stage 4**	
Name	**Pts**	**Name**	**Pts**	**Name**	**Pts**	**Name**	**Pts**
M. Hayden	331	M. Hayden	0	G. Gambhir	300	G. Gambhir	32
R. Ponting	51	V. Sehwag	364	V. Sehwag	222	V. Sehwag	68
R. Sharma	182	R. Sharma	298	R. Sharma	152	R. Sharma	165
R. Taylor	226	R. Taylor	93	S. Marsh	261	S. Marsh	678

Since a fantasy league score, in itself, is a fair reflection of the performance of a cricketer,

one can conclude that V. Sehwag's performance in Stage 1 was far superior to that of R. Ponting. This resulted in V. Sehwag replacing R. Ponting in Stage 2. This was the only change in batsmen for this stage. The batsmen selected in Stage 2 provided an aggregate fantasy score of 755 points. The decrease owes itself to the selection of M. Hayden in this stage, even though he was no longer participating in the tournament. The optimisation procedure, in this case, determined that it would be more beneficial to make changes to other members of the team. The poor performance by R. Taylor in Stage 2 (only 93 points) and M. Hayden's absence from the competition resulted in their replacement by S. Marsh and G. Gambhir. These batsmen scored 324 and 343 points respectively in Stage 2. These performances increased the performance measures sufficiently for S. Marsh and G. Gambhir's inclusion in the team for Stage 3. The aggregate fantasy score for Stage 3 for the batsmen was 935. This increase lends support to the benefits of using the model. No changes were made to the batsmen for Stage 4. Although G. Gambhir and V. Sehwag did not perform particularly well, the inclusion of S. Marsh resulted in an aggregate score for the batsmen in Stage 4 of 943. This is an improvement on the result of the previous stage indicating useful selections were made.

Bowlers

The bowlers selected for the fantasy team for each round are presented in Table 5.

TABLE 5: **BOWLERS CHOSEN FOR THE FANTASY LEAGUE TEAM**

Stage 1		Stage 2		Stage 3		Stage 4	
Name	**Pts**	**Name**	**Pts**	**Name**	**Pts**	**Name**	**Pts**
A. Kumble	25	A. Dinda	36	A. Dinda	161	A. Dinda	-10
D. Zoysa	25	D. Zoysa	41	D. Zoysa	-10	L. Balaji	45
M. Mural'ran	95	M. Mural'ran	95	M. Mural'ran	5	A. Mishra	87
D. Vettori	25	D. Vettori	45	–	-	S. Tanvir	374

The optimisation algorithm selected A. Kumble, D. Zoysa, M. Muralitharan and D. Vettori for the first stage. This suggests that these cricketers performed well in competitions prior to the 2008 IPL. This selection provided a total of 170 fantasy league points. This is not an ideal

result, and provides some evidence that the bowling performance measures do not provide a good reflection of a bowler's ability in a fantasy league setting.

The bowlers selected in Stage 2 are similar to Stage 1 except for a single change where A. Dinda replaced A. Kumble. A. Dinda scored 170 points in the first stage, resulting in his selection for Stage 2. A. Dinda then performed poorly in Stage 2, only scoring 36 points. The selection of D .Zoysa and D. Vettori in Stage 2 despite poor performances in Stage 1 is likely a result of the constraint on the number of changes allowed between stages, as well as both cricketers having good initial performance measures. The total number of fantasy points scored in this stage is 217, which, although poor, is an improvement on the selection for Stage 1.

D Vettori is replaced by an all-rounder in Stage 3.This is a consequence of his absence from the remainder of the tournament. The rest of the bowlers remain unchanged. The resulting

fantasy score for this stage is 156. Although this is a reduction from the previous stage, it must be noted that only three bowlers are considered. M Muralitharan and D Zoysa performed badly in Stage 3, resulting in their replacement by L Balaji and A Mishra in the fourth and final stage.

A. Dinda's inclusion in Stage 4 is a result of a good performance in Stage 3. The most notable change in Stage 4 is the inclusion of S. Tanvir, who had been performing well throughout the competition. S. Tanvir's score of 374 in this stage pushed the total points scored by bowlers in the final stage to 496. S. Tanvir's inclusion identifies both a limitation and an advantage of the approach used in this study. The advantage is that he was included and the algorithm noticed his performances. The limitation is that he had been performing well throughout the tournament and was only included in the final stage, despite scoring 389 and 215 points in Stage 2 and 3 respectively. When compared with batsmen, the selected bowlers under performed. This is observed by the total fantasy scored of the batsmen (3 423) who score 2 384 points more than those of the bowlers (1 039). This possibly indicates that the measure used to determine the performance of bowlers was less suitable for fantasy league selection purposes.

All-rounders

The all-rounders selected for the fantasy team for each round are presented in Table 6.

TABLE 6: **ALL-ROUNDERS CHOSEN FOR THE FANTASY LEAGUE TEAM**

Stage 1		Stage 2		Stage 3		Stage 4	
Name	**Pts**	**Name**	**Pts**	**Name**	**Pts**	**Name**	**Pts**
Y. Pathan	271	Y. Pathan	312	Y. Pathan	162	Y. Pathan	475
P. Kumar	128	P. Kumar	303	P. Kumar	2	–	–
–	–	–	–	S. Watson	341	S. Watson	373

Y. Pathan and P. Kumar were selected for the first Stage of the tournament and both performed well, scoring 271 and 128 fantasy points respectively. These good performances

resulted in their inclusion in the fantasy team for the second stage. Both all-rounders scored over 300 points in this stage. The continued inclusion of P. Kumar in Stage 3 was a result of his performance in Stage 2. The interesting inclusion was that of S. Watson in Stage 3. He scored 466 and 275 points in Stage 1 and 2 respectively, resulting in him replacing a bowler (D. Vettori) in Stage 3. P. Kumar's poor performance in Stage 3 (only scoring 2 points) resulted in his exclusion from the team in the final round.

The all-rounders selected for the final round were S Watson and Y Pathan, who both scored over 1 200 points in the competition. This result provides some indication that the performance measure defined for all-rounders provided useful insight into the selection of a fantasy cricket team. The total number of fantasy points scored by the selected all-rounders was 2 367. This provides further evidence that the measure used for bowlers, which only resulted in 1 039 points, was not ideal for the selection of the fantasy league team.

Wicket keepers

The wicket keepers selected for the fantasy team for each round are presented in Table 7.

TABLE 7: **WICKET KEEPERS CHOSEN FOR THE FANTASY LEAGUE TEAM**

Stage 1		**Stage 2**		**Stage 3**		**Stage 4**	
Name	**Pts**	**Name**	**Pts**	**Name**	**Pts**	**Name**	**Pts**
L. Ronchi	101	A. Gilchrist	237	A. Gilchrist	111	A. Gilchrist	167

L. Ronchi, an Australian wicket keeper, was selected for the first stage. This was a result of good domestic Twenty20 performances prior to the start of the 2008 IPL. A. Gilchrist (also Australian) replaced him for the remainder of the competition. This was a result of A. Gilchrist scoring 384 points in Stage 1, as well as L. Ronchi taking no further part in the competition. As a result, the selected wicket keepers score was a total of 616 fantasy league points in the competition.

Fantasy league team

The team selected for the fantasy league and as each player's price, are presented in Table 8.

The budgeting constraint does not seem to influence the selections noticeably, as the budget amount of 1 million spent at each stage of the competition is 930 000, 965 000, 935 000 and 880 000. This indicates that the budget and pricing restrictions established by the organisers may make the fantasy league selection process too easy. This is illustrated by showing that if the total budget (1 million) is split evenly between the 11 selected players, then approximately 90 000 is available for each cricketer. This means that each cricketer in an average fantasy league team would be of the quality of M. Hayden, A. Kumble and Y. Pathan. All of these are very good cricketers. Ideally, the budget should allocate between 60 000 and 80 000 per cricketer. This would make the selection process more difficult, and thus lend support to an algorithmic selection method.

TABLE 8: **SELECTED FANTASY LEAGUE TEAM**

Stage 1		**Stage 2**		**Stage 3**		**Stage 4**	
Name	**Price**	**Name**	**Price**	**Name**	**Price**	**Name**	**Price**

M. Hayden	90 000	M. Hayden	90 000	G. Gambhir	105 000	G. Gambhir	105 000
R. Ponting	90 000	V. Sehwag	105 000	V. Sehwag	105 000	V. Sehwag	105 000
R. Sharma	100 000	R. Sharma	100 000	R. Sharma	100 000	R. Sharma	100 000
R. Taylor	75 000	R. Taylor	75 000	S. Marsh	55 000	S. Marsh	55 000
A. Kumble	85 000	A. Dinda	50 000	A. Dinda	50 000	A. Dinda	50 000
D. Zoysa	75 000	D. Zoysa	75 000	D. Zoysa	75 000	L. Balaji	60 000
M. Mural'ran	100 000	M. Mural'ran	100 000	M. Mural'ran	100 000	A. Mishra	100 000
D. Vettori	100 000	D. Vettori	100 000	S. Watson	75 000	S. Watsonr	75 000
Y. Pathan	85 000	Y. Pathan	85 000	Y. Pathan	85 000	Y. Pathan	85 000
P. Kumar	75 000	P. Kumar	75 000	P. Kumar	75 000	S. Tanvir	75 000
L. Ronchi	55 000	A. Gilchrist	110 000	A. Gilchrist	110 000	A. Gilchrist	110 000

Performance of the algorithm

The proposed algorithm resulted in a total score of 7 445 for the tournament. To determine the usefulness of the algorithm, it must be compared to alternative selection strategies. Since the four-stage fantasy league scenario used is unique to this study, a simulation approach must be used to generate other possible team selections. The simulation was conducted using two approaches. The first approach randomly selected a team for the initial stage of each simulation while the second approach used the initial team selected in this study for each simulation. Based on the rules described in this paper, 50 000 fantasy teams were generated for each of these approaches.

After each team was selected for the initial stage, changes were made to the team at the subsequent stages. The number of changes allocated to each stage was 3, and any unused changes were passed on to the following stage. The number of changes made at each stage was randomly selected from the number of allowed changes at the stage, where the possibility of making zero changes was included. The worst performing players at each stage were dropped. These players were randomly replaced by top performing players in each category. For a player to be considered a "top performer" they must achieve a fantasy league score in the top 10% of their category in the previous stage. Any unused changes in a particular stage were carried over to the subsequent stages. The total fantasy league score of each simulated team was then recorded.

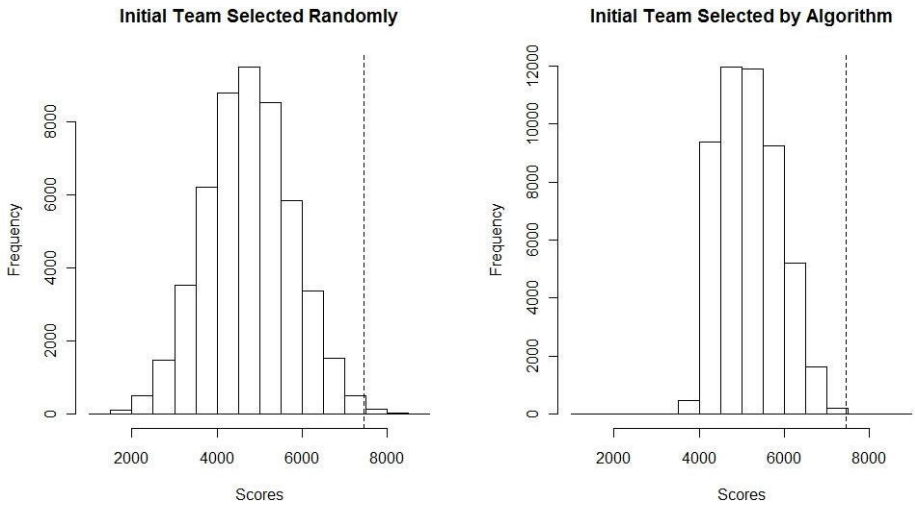

FIGURE 1: **DISTRIBUTION OF FANTASY LEAGUE SCORES***
(*Scores from 50 000 randomly simulated fantasy league teams using a randomly selected initial team and a fixed initial team [selected by the algorithm])

The distribution of these scores is given in Figure 1. For the first approach (randomly selected initial team), the distribution of fantasy league scores is fairly symmetric. The dotted vertical lines represent the score (7 445) obtained using the selection algorithm described in this paper. It is clear that this score lies near the maximum value from the simulations. In fact, this score places itself in the top 0.5% of the simulated scores. This result provides evidence that the selection method documented in this paper is competitive when compared to typical fantasy league selection strategies.

The results of the second approach (fixed initial team) indicate that the distribution in this case is more positively skewed and shifted to the right. Using this approach, the score of 7 445 places itself in the top 0.02% of the simulated results. Once again, there is evidence that the selection algorithm of this paper provides a highly competitive selection procedure when the initial starting teams are identical. The results of the simulated teams, in both cases, indicate that the algorithm proposed in this study provides useful and competitive results when selecting a fantasy league team.

CONCLUSION AND RECOMMENDATIONS

Fantasy leagues are growing in popularity, so too is Twenty20 cricket. This study combines these two emerging interests and provided an algorithm, which facilitates the fantasy league selection process. The total number of points scored using the proposed integer optimisation approach is 7 445.

This result (7 445) placed in the top 0.5% of the total fantasy league scores of 50 000 randomly simulated fantasy league teams. This indicates that the integer optimisation procedure provided useful and even competitive results in a fantasy league setting. Furthermore, no intuition is used in this study, only inputting data as it becomes available.

This makes the procedure described in this study useful to participants with limited knowledge of cricket.

There are a few areas that require further investigation. The performance of the bowling measure indicates that possible improvements are required. This introduces an area for further research opportunities. Restricting the number of changes allowed per stage is a limitation of the algorithm. Adjusting the number of changes allowed per stage according to the magnitude of the increase of the objective function might provide a better solution to this problem. This, too, requires further investigation. Lastly, analysing the fixture list of a tournament is an important part of selecting a fantasy league team. Ideally if a strong team were to play a weak team, selecting cricketers from the stronger team might provide better results.

In conclusion, this study provides a sequential team selection procedure in a fantasy league setting. The study also provides a simple illustration of the implementation of the optimisation technique, and illustrates its effectiveness using computer simulation.

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ETHICAL ISSUES IN TURKISH SPORT MEDIA: PERCEPTIONS OF PROFESSIONAL FOOTBALL PLAYERS

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ABSTRACT

The purpose of this study was to determine the perceptions of professional football players on the obedience of the Turkish Sport Media to journalistic ethical codes. This study was based on feedback received from professional football players (N=138) whose ages ranged from 20≤ (n=30), 21-30 (n=53) and 31≥ (n=55) years, representing 10 teams participating in Turkey's Super League. Each participant evaluated a series of five statements related to the media's news gathering techniques, treatment of their personal lives, prevalence of gossip, general accuracy of news stories, as well as the tendency of the media to stimulate and encourage violence. One-way analysis of variance (ANOVA) and the Kruskal-Wallis Non-Parametric test were used to analyse the data. It was determined that the ethical codes, namely gossip, private life and honesty are frequently violated, and the ethical codes, namely newsgathering and violence are sometimes violated. According to these results, Turkish sport media outlets are plagued with significant ethical code difficulties.

Key words: Ethical code; Sports media; Professional Football players.

INTRODUCTION

The media plays a significant role in today‟s world. Of importance is its effect on the general perception within a society (Hughes & Shank, 2005; Lee, 2005) and the provision of a public forum for debate about important social issues (Moy *et al.*, 2003). The media‟s ability to function constructively in these roles is directly related to its acceptance of and adherence to certain ethical codes. Therefore, all media workers are required to abide by the official ethical codes regardless of the country from which they report as governed by the members of various regional and international media associations. Similar lists of ethical codes are issued by the associations and are directed to specific fields of the media, such as sport. The members of these associations are requested to abide by these ethical codes.

Similarly, the Turkish Press Council (1987) adopted sixteen Journalism Principles, including ethical codes, in 1987. These universally accepted ethical codes speak directly to items such as conflicts of interest (Wulfemeyer, 1985), honesty (Nichols *et al*., 2002), receiving gifts (Douglas, 1983), newsgathering methods (Lambeth *et al.*, 2004), fairness (Voakes, 2000), privacy (Herrscher, 2002; Whitehouse & McPherson, 2002; Ward, 2005), moonlighting and news sources (Lo *et al*., 2005) and plagiarism (Reader, 2006).

These ethical codes may include similar or different items. For example, cultural differences and the uncertainty of the ethical codes do not allow the formation of a guideline that can be wholly understood. For this reason, media employees must evaluate their professional practices within the framework of socially accepted ethical standards, the ethical codes that govern their professional study areas, as well as their own consciences. The issue of ethical reporting is further complicated by the fact that there is not a general consensus on the issue. As a result, journalists may implement different principles that can be defended morally (Nichols *et al*., 2002).

In journalism, as with other media, common manifested ethical values generally determine the written ethical codes. By agreeing on these standards, organisations provide a solid ethical foundation for the journalists (Garrison & Salzven, 1994). It is important to remember that ethical codes are not related only to journalists. They also apply to educators in the field of journalism, as well as to the society as a whole (Lo *et al*., 2005). However, according to Hardin (2005a), while the list of ethical codes helps to explain ethical issues, determine preliminary and behaviour standards and is accepted as valuable for journalism, it cannot guarantee the ethical behaviours and cannot resolve ethical problems. For this reason, ethical codes remain a problematic area in journalism.

In the light of this generally weak image of journalism, as well as the daily violations of the media‟s ethical codes (Wulfemeyer, 1985), sport journalism is widely viewed as the media discipline in which the majority of these ethical problems are experienced (Hardin, 2005a). Similar observations are noted in the Turkish sport media and sport journalism. The practice is widely tolerated since media outlets are conveying non-ethical news, especially by sport clubs, coaches, managers and players (Uzun, 2004). Many of the ethical code violations are related to football, which is the most popular sport in Turkey. These infractions take their toll on football clubs, players, coaches and club managers. Unfortunately, little effort is made to either verify sources or confirm the accuracy of information about the players who are the source and subject of the news. Therefore, the purpose of this study was to examine public perceptions of the extent to which professional football players and the Turkish sport media abide by the ethical codes.

Football in Turkey

Football, which currently is the most popular sport in Turkey, first began to draw attention more than 20 years ago. Today football takes an important place in the media alongside economic and political issues. As a result, daily newspapers now allocate more pages for sport, the number of the sport magazines has dramatically increased, and there are more sport programs and live broadcasts of sport matches and competitions on television. The commercialised media devotes more attention to professional, team and men‟s sport than they do to amateur, individual, women‟s (Cunningham & Sagas, 2002; Pedersen, 2002; Bruce & Saunders, 2005; Hardin, 2005b) and disabled sport (Hardin & Hardin, 2003). For example, although 40% of the people participating in sport in the United States of America (USA) are women, they receive far less than 40% of the media coverage as compared to the men (Kane, 2007:394).

In addition, sport with higher revenue potential command greater privileges than sport aimed at active participation (Boyle & Haynes, 2000). This cycle is further perpetuated as demand for these sports also generate revenue for media outlets (Boyle & Haynes, 2002) encouraging a greater emphasis on sport with commercial opportunities (Bennett *et al*., 2006). Developments in the Turkish sport media continue to run parallel to developments around the world. For example, at the end of the 1980s, with football‟s ever-increasing popularity, it became the primary focus of the sport media in Turkey. As the popularity of football continues to increase, especially in Turkey‟s Premier League (Turkish Football Super League TFSL), its role as an important industry will also continue to expand. This is comparable with other countries, namely the United Kingdom (UK), Italy and Spain (Lee, 2005) not to mention other countries (Cerrahoğlu, 2004).

This high interest is best illustrated by citing the following examples. For instance, the number of sport fan associations of all the TFSL teams‟ numbers in the thousands (Uygur, 2003) and, during the 2008-2009 football season, 400 000-550 000 sport fans attended matches every weekend. During that same period, over 200 football matches of the TFSL, Turkey Cup, Champions League and UEFA Cup were broadcast live, not to mention live broadcasts from the UK, France, Spain and Italy leagues. As a result, millions of people watched football and followed what happened via written and visual media. It is inevitable, then, that the sport pages of daily newspapers, sport newspapers, sport magazines, television stations and many internet websites are interested in football and, in particular, the TFSL. It is widely accepted that media coverage increases both the participation of spectators at sporting events, as well as media usage itself as spectators who actively follow sporting events also follow those events in the media (Pritchard & Funk, 2006).

As stated by Foster *et al*. (2006:344), "the live broadcast of matches which are likely to have uncertain outcomes binds the sport fans to each other while allowing each to enjoy a slightly different experience". This trend has begun to make its mark on football matches. So, the sport media whether TV, cable, Internet and written media, each undertake important roles in broadcasting matches to people watching the matches live or to fans who are unable to attend the events. As a result, each media outlet is an important part of the machine ensuring the spread of football to society and stimulates increased interest of sport fans in the organisations, leagues, matches, clubs and players through pre- and post-match/game analyses.

As a result, for some countries, broadcasting more live football matches/games not only increases ratings and football news, but it also is directly proportional to the increase in sales of newspapers and sport magazines (Boyle & Haynes, 2000). For example, 69.2% of the columnists and sport correspondents in Turkey cover football news (İlhan, 2004:66), 72.9% of the news on sport pages in daily newspapers is related to football (Uzun, 2001:173) and sport programs on television are largely dominated by football (Cerrahoğlu, 2004). Moreover, 52.7% of people in Turkey use the word „football‟ synonymously instead of the word „sport‟ (Turkish Football Federation, 2005:25).

Naturally, football news is very important for Turkish football fans, spectators and those interested in football following the sport media. For this reason, the commercialised sport, football, and the commercialised media sector exert various efforts in order to maintain and

increase their market share. For example, the Turkish sport media violate ethical codes in order to increase the interest and attract more spectators, when sport clubs implement flash transfers. This is one of the easiest ways to increase advertisement and sponsor revenue by selling more newspapers and magazines, as well as increasing ratings (Uzun, 2004).

Football as the dominant sport in Turkey ensures that football organisations and persons involved in football (players, coaches, managers) enjoy important positions and occupy a greater percentage of media coverage as compared to other sport and organisations. Therefore, this level of coverage means that football organisations and people in these organisations are influenced by the unethical news, images and comments in the Turkish sport media in much larger percentages than other organisations and people. The TFSL‟s professional players are the most affected by this as they are the most attractive news material for sport media.

Ethical codes and the Turkish sport media

As in other areas around the world, sales and rating concerns driven by commercialisation are the major factors contributing to Turkey‟s violation of ethical codes (Cerrahoğlu, 2004). Add to this the fact that various media tools with recently developing technology, such as the Internet, allow for the instant dissemination of information. Thus, legal controls are becoming harder to impose. Some of the ethical codes recognised by the Turkish Press Council are considered in this study and examples are given below.

***Private life*:** The journalistic code of ethics prevents making news about people‟s private lives without their consent**.** As in many countries, football fans are more interested in the images, personalities, nightclub adventures and especially private lives of football players than their professional performance (Lee, 2005). Naturally, public demand drives sport media outlets to cover these areas. Newspapers, in particular, see the coverage of the private lives of the players as essential to be able to compete with the television networks and not lose readership (Uzun, 2004). In Turkey, it is the professional football players and coaches whose private lives are frequently intruded upon who most often complain about this coverage. Sometimes foreign football players playing in Turkey are swept up in the frenzy as stated in the press release by Kezman, the Serbian football player who is a member of the Fenerbahce Club, one of the major Turkish teams (*Miliyet Gazetesi*, 2007):

> Ortega, Van Hooijdonk, Anelka and Appiah also experienced what I have experienced. That is, the problem is not with the players here, but with the press. This is my last interview for this year. I have taken this decision to protect myself and my family. The media has started to be very oppressive, and because of this I don‟t have a private life anymore.

In another example, pictures of the head-scarved wife of the coach of Besiktas, an important TFSL team, which were irrelevant and in no way related to sport, appeared in the sport media for days. Finally, coach Sağlam made this statement (*Sabah Gazetesi*, 2007):

> Inaccurate representations have been made about my private life. I am opposed to these kinds of stories. They are unnecessary and inappropriate. We live in the 21st century and bringing these items related to language, religious views and the races
>
> of people to the sport platform is unnecessary. It is my work [and] not my wife that should attract attention.

***Honesty*:** Honesty, is at the top of the list of the ethical codes (Andrew & Chadwick, 1998; Nichols *et al.*, 2002). Honesty affects the news, items, photos and the images reflecting reality. For this reason, journalists have the responsibility to be absolutely honest in their work and writing (Andrew & Chadwick, 1998). The following frequently experienced example highlights the challenges in the Turkish sport media related to honesty (Uzun, 2004:4):

> "Turkish journalists were competing with each other in order to have their photo taken with Beckham as if they were his fan. We - as the other football players who were present there - thought it was a souvenir photo. Then when we came back to Turkey, we saw that photo in the newspaper with the caption: „Beckham answered our colleague‟s questions sincerely‟."

***Newsgathering*:** Another ethical issue refers to the searching for and gathering of news in appropriate ways and methods. Of particular concern is the rise of modern technology such as micro and hidden cameras and sound recorders, which facilitate the work of reporters. People in the public eye now find themselves subject to intensive hidden surveillance. Magazines concentrating on sport news often use this method. In addition, news may be simply created by finding photos and fabricating captions beneath the images. Uzun (2004:5) gives a good example of how the sport media produce news without undertaking research:

> "Before training, a correspondent spoke to Günes who was [the] technical coach of the Turkish national football team. „The boss wanted me to have a photo taken with you.‟ First, Günes rejected this request, then relaxed and said: ‟What will you write below the photo?‟ The correspondent replied: „Actually, I will not write anything. My boss will write it. He will write in any way even if you do or do not have your photo taken…"

***Violence*:** News items, photos and images should not include elements of violence, which encourage people to be violent. According to Kane (2007:409), the following factors contribute to violence in sport: team sports whose teams are comprised of men, sport practised at the elite level, and financially profitable sport. The connection between sport and violence has become an area of interest especially in recent academic studies (Bernstein & Blain, 2002). This, in turn, has increased the level of media coverage related to acts of violence observed in sport.

Football and violence frequently go hand in hand in Turkey. There is a general perception that the media often stimulate the violence in football (Sazak, 2004; *Sporvizyon*, 2006). As a matter of fact, a research committee has been formed in the Turkish Grand National Assembly to study the ubiquitous subject of „violence in football‟. This research includes football spectators who have been involved in acts of violence in football matches in four provinces where some of Turkey‟s more important football teams are located. According to the police records, 51.7% of the football spectators involved in violence stated that they were affected before the game by the news in the sport media and 33.3% stated that they were partially affected (Turkish Grand National Assembly, 2005:55).

In fact, although it is possible to deliver news, which may stimulate violence due to the language used, the media is also capable of presenting the news in a way that will not encourage violence. It appears that the Turkish sport media prefers the language of violence as it is more striking and sensational. The following are examples from daily newspaper headlines: "Fans tangle with each other" (*Sabah Gazetesi*, 2004); "Bloodshed in Uşak" (*Star Gazetesi*, 2005); "Bloody placard revenge" (*Vatan Gazetesi*, 2007); and "Football players powder keg" (*Hürriyet Gazetesi*, 2004).

***Gossip*:** This particular code states that news, items, photos and images should not be exaggerated and should not emanate from gossip. In the Turkish sport media, there are reporters assigned to follow each club and are tasked to create news every day for the media that employs them. This pressure to find news items in a limited time results in reporters resorting to gossip to create the news stories (Uzun, 2004; Yücelman, 2006). Below is an example of this process (Uzun, 2004:4).

> "We were in the camp before the first game that we played against England on 2nd April. An article in the sport page of one of the important Turkish newspapers stated

that Bobby Robson and Haluk Ulusoy (President of Turkey Football Federation) had made a bet on the outcome of the national game. In the evening before training, when all the reporters were together, Ulusoy turned to the reporter who had written the article and said: „My brother, how do you make up such thing? I have never met Robson before"".

Although it is thought that visual elements used by media increase the ethical reasoning (Coleman, 2006), Turkish sport media may use them in order to simply increase the persuasiveness of unethical "gossip" news (Uzun, 2004:4):

"Headline of a newspaper from National Football Team camp: İlhan: „I want Nihat as striker" and a photo of İlhan together with Nihat. Throughout the camp, the national players posed for media only on one day and on that day, İlhan and Nihat were never together. However, İlhan had a photo taken with Yıldıray. When we carefully looked at the newspaper, we saw that the Nihat"s head had been pasted over Yıldıray"s body".

RESEARCH DESIGN AND METHODOLOGY

The purpose of this study was to determine to what extent the Turkish sport media adhere to ethical codes. The constant media exposure of professional football players and their perceptions of the extent to which the Turkish sport media abide by journalistic ethical codes was the basis for this study. The research statements of this study which were based on Turkish Press Council Journalism Principles (1987) and literature were as follows:

1. Sport media make the private lives of sport-related persons the subject of the news even though their private lives do not benefit the public.
2. Sport media make news from incorrect or inaccurate information, and do not attach importance to honesty.
3. Sport media research news through inappropriate ways and tools, such as using news of other sources without approval and via hidden cameras.
4. Sport media encourage violence.
5. Sport media provide a forum for gossip.

Perceptions of football players regarding these five items about the codes of ethics in Turkish sport media tools, showed some meaningful differences on statements according to the level of following the media tools, the level of appearing in the media tools and age.

Participants

This study was executed during the 2008-2009 football-seasons. The sample consisted of 138 (approximately 30% of the players in TFSL) male professional football players from 10 different TFSL teams in Turkey. Their ages ranged from ≤20 (n=30), 21-30 (n=53) and 31≥ (n=55) years. The participants of this study were randomly selected and were attractive news material and were affected by unethical news, images and comments of the Turkish sport media.

Measures

In the first step, the 16 Media Principles recognised by the Turkish Press Council were

examined, and a literature survey on media ethics was undertaken and various issues were determined and discussed with experts (N=7) in this field. Based on recommendations from the experts, 5 items (gossip, honesty, newsgathering, encourage violence, private lives) related to ethical issues were deemed to be sufficient in measuring professional football players‟ perceptions of the ethical codes in Turkish Sport Media. The participants rated the 5 research statements ranging from 1 (indicating never) to 5 (indicating always) accordingly. The demographics and age of the respondents, their following level of sport media tools and their appearing level in the sport media were determined initially.

Analyses

In the statistical evaluation of the study, the following data were collected: Age of the participants, the frequency of following the media (6-7 days per week, 3-5 days per week, 1-2 days per week and never), and the frequency of players, teams, coaches and managers appearing in the media (6-7 days per week, 3-5 days per week, 1-2 days per week and no coverage). These variables were analysed in terms of frequency (f) and percentage (%). Differences between the perceptions of players were assessed by applying the one-way analysis of variance (ANOVA) in terms of „age‟ and „media coverage‟ and the Kruskal-Wallis Non-Parametric test in terms of „following media tools‟.

RESULTS

Based on players following sport media tools, it was found that 77 players (55.8%) follow the media for „6-7 days‟ per week, 47 players (34.1%) follow the media for „3-5 days‟ per week and 14 players follow the media (10.1%) for „1-2 days‟ per week. Regarding the players themselves, their teams, coaches and their managers, any of them become the subject of news in sport media on „3-5 days‟ per week (46%), „6-7 days‟ per week (30%) and „1-2 days‟ per week (24%) respectively.

In this study, the professional football players‟ perception of the observation of the ethical codes by the Turkish Sport Media was measured across 5 items. The perceptions of the subjects are presented in Table 1 with frequency, percentage, mean and standard deviation values.

TABLE 1: **PERCEPTIONS OF ETHICAL CODES OF FOOTBALL PLAYERS IN RELATION TO THE TURKISH SPORTS MEDIA**

	Never	**Rarely**	**Some times**	**Fre-quently**	**Always**		
Ethical codes	**f (%)**	**f (%)**	**f (%)**	**f (%)**	**f (%)**	**Mean**	**SD**
Private life	- (-)	3 (2.2)	18 (13.0)	83 (60.1)	34 (24.6)	4.08	0.68
Honesty/Truthfulness	1 (0.7)	3 (2.2)	19 (13.8)	77 (55.8)	38 (27.5)	4.07	0.75
News gathering	1 (0.7)	2 (1.4)	27 (19.6)	77 (55.8)	31 (22.5)	3.98	0.74
Stimulate/Encourage violence	- (-)	4 (2.9)	29 (21.0)	79 (57.2)	26 (18.8)	3.92	0.72
Gossip	- (-)	1 (0.7)	24 (17.4)	65 (47.1)	48 (34.8)	4.16	0.73

According to Table 1, the football players generally marked *frequently* and *always* regarding their perceptions about the violation of the above ethical codes by Turkish sport media. When the total of the *frequently* and *always* choices were evaluated; the lowest percentage value

(76.0%) was seen in the item of „stimulating violence", the highest percentage (84.7%) was in the item of „private life". The lowest average value (Mean=3.92) was again observed in the item of „stimulating violence" whereas the highest average value (Mean=4.16) was seen in the item of „gossip" news.

TABLE 2: **ANOVA RESULTS ACCORDING TO AGE**

	2(≤ (n=30)		**21-30 (n=53)**		**31 ≥ (n=55)**		**F-value**
Ethical Codes	**M**	**SD**	**M**	**SD**	**M**	**SD**	
Private life	3.70	0.79	4.13	0.59	4.21	0.63	6.449*
Honesty/Truthfulness	3.93	0.83	4.00	0.85	4.22	0.57	1.818
News gathering	4.00	0.79	4.00	0.78	3.95	0.68	0.089
Stimulate/Encourage violence	3.80	0.81	3.94	0.66	3.96	0.72	0.549
Gossip	4.17	0.79	4.13	0.73	4.18	0.70	0.064

** Significance 0.05 level*

Generally, the results of this study provide valuable support for the research statements of the study. There was a meaningful difference between the points related to the „private life" of football players ($F_{(2\text{-}135)}$=6.449; p<0.01) as related to age. According to the results of the Tukey HSD test, for the „private life" item, a meaningful difference was found between the points of ≤20 age group (Mean=3.70), 21-30 age group (Mean=4.13) and 31≤ age group (Mean=4.21) related to the age variable. Subjects who were younger (≤20) scored lower than older subjects (21-30 and 31≤) (Table 2).

TABLE 3: **ANOVA RESULTS ACCORDING TO COVERAGE IN MEDIA**

	6-7 days p.w. (n=39)		**3-5 days p.w. (n=64)**		**1-2 days p.w. (n=35)**		**F-value**
Ethical Codes	**M**	**SD**	**M**	**SD**	**M**	**SD**	
Private life	4.17	0.64	4.03	0.69	4.03	0.71	4.889*
Honesty/Truthfulness	4.23	0.63	4.16	0.72	3.74	0.85	3.095*
News gathering	4.05	0.89	4.08	0.72	3.71	0.52	0.671
Stimulate/Encourage violence	3.87	0.92	4.03	0.62	3.77	0.60	1.632
Gossip	4.18	0.72	4.20	0.69	4.06	0.80	0.473

** Significance 0.05 level*

As suggested in the research statements, there were meaningful differences between the groups regarding the items of "honesty" ($F_{(2\text{-}135)}$=4.889; p<0.01) and „newsgathering" ($F_{(2\text{-}135)}$=3.095; p<0.01) as covered in the media. According to the results of the post hoc multiple comparison test, a meaningful difference was found between the variables of those appearing in the media on „6-7 days" per week (Mean=4.23), for „3-5 days" per week (Mean=4.16) and on „1-2 days" per week (Mean=3.74) for the item „honesty". For „newsgathering", a meaningful difference was found for „6-7 days" per week (Mean=4.05), „3-5 days" per week (Mean=4.08) and „1-2 days" per week (Mean=3.71) in accordance with the duration of appearing in the media. It was determined that the participants who appeared in the media more („6-7 days" per week and „3-5 days" per week) scored higher than those who featured less in the media („1-2" days per week) (Table 3).

TABLE 4: **KRUSKAL-WALLIS TEST RESULTS ACCORDING TO FOLLOWING OF MEDIA TOOLS**

Ethical codes	6-7 days p. w. (n=77)		3-5 days p.w. (n=47)		1-2 days p.w. (n=14)		X^2
	MR	df	MR	df	MR	df	
Private life	74.47	2	67.65	2	48.39	2	6.78*
Honesty/Truthfulness	69.16	2	71.48	2	64.71	2	0.40
News gathering	70.63	2	66.52	2	73.29	2	0.55
Stimulate/Encourage violence	71.85	2	65.82	2	68.93	2	0.83
Gossip	73.65	2	64.16	2	64.61	2	2.21

**Significance 0.05 level*

The analysis also indicates that „private life" scores of participants differentiate meaningfully regarding their status of "following media tools" (X^2 (2)=6.78, p<0.01). This finding shows that the duration of following media has different effects in the aspect of „private life" (Table 4).

DISCUSSION AND CONCLUSION

Recently, issues related to sport media such as violence, gender, marketing and commodification, race and sport, fandom and spectator experiences (Bernstein & Blain, 2002) have shed light on issues related to the code of ethics for sport media. Despite being a frequently discussed topic, relatively few studies about sport media and ethics in Turkey have been reported. The most important aspect of this study is that it is based on the perceptions of professional football players who themselves often appear in the media as the subject and source of news and follow sport media as reader/audience. The most important finding of this study is that professional football players perceive that the Turkish sport media continually violate the ethical codes.

According to the perceptions of professional football players, treating gossip as factual news is the most often violated ethical code by the Turkish sport media. The most important factor of the coverage of gossip news on the Turkish sport media is that clubs and football players whose numbers of fans are high, appear more frequently in the sport media. Media employees who cannot find adequate news about these clubs and football players attempt to remedy this shortfall by using gossip as news. As a result, the ethical code is violated.

The private lives of people who appear in the public eye are always of interest. The objective of the media in making news about these people is to increase the interest in their media tools. However, in the news made regarding these people, it should not be forgotten that the confidentiality of a person"s private life should always be respected. Football players whose private lives become the subject of the news believe that this ethical code is severely violated. Furthermore, football players who follow the sport media more („6-7 days" per week and „3-5 days" per week) and those who follow less („1-2 days" per week) and players at the age of 21 and over all perceive that the ethical code of „private life" was continually violated. This stems from the fact that football players, who have the opportunity to follow the news in sport media closely, can evaluate the current situation better. Also, the private lives of the football

players at the age of 21 and over are covered more in the media than younger players.

According to the perceptions of professional football players, the ethical code of „honesty", which is seen as the basis for the ethical codes in general, is frequently violated by Turkish sport media. Furthermore, it is considerably meaningful that football players whose team"s or own life is frequently subjected to news („6-7 days" per week and „3-5" days" per week) find the sport media to have more issues in the ethical code of honesty. This finding corresponds with the general conviction of the public that "falsified and sensational news" concerning football is fabricated in order for the Turkish sport media to increase interest and market share in media.

In fact, it would not be wrong to state that the commercialisation of the media is the reason for the perception that these four ethical codes are violated so frequently. The public is aware that news is often made as an attempt by sport media outlets to attract more interest and to increase its sales or ratings. A statement by Bapçum (2004:26), one of Turkey"s most important sport media journalists, supports the findings of the study. He said: "with the commercialisation of the media, sensation has got ahead of accurate and high-quality reporting in the sport media, too".

While the media is being commercialised, the emerging media culture has started to accept sport, particularly football, as a commercial tool and abandoned its social and cultural importance (Boyle & Haynes, 2002). Therefore, sport have begun to be seen as purely a commercial commodity, which attracts the interest of the customer and increases the consumption. Thus, economic policies drive the need to increase sales and advertisement incomes for the media outlets (Horne, 2005). When journalism studies are examined, variables related to commercialisation, such as news organisation ownership, newsroom influences, competition, subjects and sources, advertisers, audience, and organisation size (Coleman, 2006), all affected the ethical decisions of media employees.

Apart from the four ethical codes mentioned earlier, news research methodology is an ethical code that sometimes is violated. Football players who themselves are many times the source of news are able to observe the sport media"s research methods more easily. The general consensus of the players is that ethical code violations are also experienced widely. This is a striking finding in terms of the Turkish sport media.

The ethical code which was believed to be violated the least in this study was the idea that the sport media encourages violence. These perceptions of the football players are very interesting since the sport media is often the first element blamed by the coaches, club managers, football circles, even politicians and the general society for inciting violence.

Some events experienced after the 1990"s with the media and sport media contribute to the beliefs and perceptions of the football players about the fact that the Turkish sport media frequently violates the ethical codes. The first and the most important reason is the increase in the number of media tools and the circulation/rating concerns caused by the competition between them. That is, commercial concerns stimulate owners of media tools to earn more and the employees ignore the ethical codes in order to maintain their positions. The second reason is that the football circles, those people who are interested in professional football, want the commercialisation of the sport as much as the media. It is in their interest for the

game to remain popular. Therefore, they are complicit in maintaining the unethical news and methods of the media. For similar commercial concerns, professional football and football circles shift the focus of interest to sensational news to ensure that professional football retains a high position in the minds of the public.

As with other media outlets around the world, the task of the sport media in Turkey should be to inform, educate, entertain and create a healthy society through the news it delivers. Its goal should be "to increase the popularity of sport in general and contribute to its spread in society" (Girgin, 2000; TGNA, 2005:53). It can be said that the realisation of these tasks and the benefits of the media for society is directly proportional to its adherence to the ethical codes.

In conclusion, this study has shown that professional football players perceive that Turkish sport media frequently violate ethical codes. This result supports the determinations of the Commission Report of Research in Sport Violence of the Turkish Grand National Assembly (TGNA, 2005:54) and Uzun"s (2004:19) opinions: "reasons such as preventing promotion of some responsible journalists who do not make sensational news due to commercial concerns, the presence of many journalists who are not concerned about the validity of the information and research, and the inconsistency of the news and comments, some sport reporters behaving like they are the friends of the club inadequacy of the sport knowledge and culture are seen as the most criticized issues and the obstacles to behaving in accordance with ethical codes".

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EXERCISING 'RACE' THROUGH THE CORONATION PHYSICAL TRAINING COMPETITION

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ABSTRACT

During the last decade of the 19th and first two decades of the 20th century, the Cape Colony education authorities employed an instructional method known as physical training or physical training drill. This investigation expands on two previous studies that explored the Coronation Physical Training Competition (1902-1906). *The low number of entries indicates that the Education Department was not serious in drawing a mass of learners to the competition. This article investigates the racial considerations behind this. The competition was organised in a post South African War* (1899-1902) *period where the education authorities asserted British racial superiority through their concern with race. The Coronation Physical Training Competition fitted into this agenda. Despite betrayal by the English during the post South African War negotiations, Black political movements and individuals continued seeking means to prove themselves loyal subjects of the King. Black schools therefore had no problem with competing in the Coronation Competition as second-class citizens. The education authorities held two Coronation competitions under the same banner. The competition was not only divided racially but differed in quality, favouring Whites.*

Key words: Coronation Competition; Physical training; Race.

INTRODUCTION

This study investigates salient features of „race" in the Coronation Physical Training Competition held for the first time in 1902 at the Green Point Common in Cape Town, which lasted until 1906. The term, Black, is used as a collective descriptor for the Non-white grouping. The competition coincided with the emergence of a new racial, political and social structure in post-war Cape Town. Therefore this research is guided by two questions: What ideas did key players advocate during this time? Why did physical training become important during this period?

The South African War confirmed English supremacy in South Africa. Blacks were, however, disillusioned by British betrayal at the signing of Treaty of Vereeniging on 31 May 1902, which ended the war. Clause 8 declared, despite previous British promises to them that the franchise would not be extended to Blacks in the Transvaal and Orange River Colony (Lewis, 1987:15). Nevertheless, the political conscious Black elite retained faith in the Cape liberal tradition and in a belief that they would progressively advance toward full assimilation into a meritocratic society (Adhikari, 1993:14). A Coloured writer in a newspaper said: "Let us … build an honourable reputation as worthy subjects of King Edward VII" (APO, 1909:4).

The Challenge Shield of the Physical Training Competition (Cape division)
Instituted in commemoration of the Coronation of Edward VII
(Cape of Good Hope, 1902e:172)

The war had also brought bubonic plague to Cape Town. Many Capetonians linked the plague with the poorer areas of the city and secured the removal of Africans to a location at Uitvlugt. Many Coloureds feared they would be next. A deputation representing the respectable Coloureds of Cape Town waited upon the Cape Colonial Secretary in March 1901 to raise their voices about the harsh treatment inflicted on them by plague control authorities. The threat of residential segregation outlasted the actual plague epidemic. Black political leadership in Cape Town in 1902 was under Francis Peregrino and expressed their ideas in his self-funded newspaper, *The Spectator*. Being aware of British superiority and the futility of open confrontation, Peregrino wrote that Blacks "should make every effort to educate themselves … adopt habits of sobriety and respectability and … maintain a high moral standard" (Lewis, 1987:16-18). Respectability also implied being associated with „high culture" events such as Queen Victoria"s Diamond Jubilee (1897) and the spectacular 19th century military parades on the Grand Parade to mark the Queen"s birthday (Adhikari, 1996a:59; Bickford-Smith *et al*., 1999:262).

Cape Town authorities marketed the Coronation Competition as a „high culture" event. It operated as an inter-school Physical Training Drill competition organised by the Department of Public Education, Cape of Good Hope (henceforth referred to as the Education Department). This competition was the first mass school sport competition in 20th century Cape Town. By investigating the social environment within which the competing schools operated, it is envisaged to provide information on government provision for mass school sport participation in Cape Town during the early years of the 20th century. An argument is made that the colonial education authorities used the Coronation Physical Training Competition to continue the 19th century project of creating racial-social distance through education. In the last decade of that century, the outgoing Superintendent-General of Education (SGE), Langham Dale, reported that White schooling has become "a means of elevating the European to the dignity of his glorious heritage not to be degraded to the level of the savage" (Department of Public Education, 1891:14). The Education Department regarded

it the duty of the colonial government to provide Whites with a superior education (Adhikari, 1993:19).

The late 19th and early 20th century British imperial project was supported by ideas of social consciousness, rooted in Charles Darwin"s hypothesis of natural selection, which in turn is based on the science of eugenics. This can be defined as "the study of agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally" (Fantham, 1924:498). The first great eugenic exponent was Darwin"s cousin, Francis Galton, who believed in a theory of race betterment where "heredity plays an important part in achievement and that better men could be bred by conscious selection" (Fantham, 1925:410-411)

This belief of race bettermen" was taken seriously by prominent South African social scientists such as Harold Fantham and advocated it along the lines of education rather than legislation (Fantham, 1924:498,499). Fantham (1918:304) believed and advocated that: "Duties, not rights, must be the watchword if real progress is to accrue". The disguised aim was to instil loyalty to the British Empire and physical training drill in schools was a suitable means to accomplish this. This aim was a shift from 19th century muscular Christianity (a philosophy that made exercise and fitness compatible with Christian life) to a 20th century phenomenon where the educational value of sport was recognised (Siedentop, 1990:23).

Although the emerging 20th century Black political leaders accepted such ideas they occasionally accused the educational authorities of blatant racism. Despite increasing racist legislation against Blacks, they voluntarily (and involuntarily sometimes) participated on both sides in the South African and later First World War (Grundlingh, 1987:11,24,25; Nasson, 1999:5-19,24-52). Francis Peregrino, who published a special brochure painting „Native" involvement in the First World War in glorious colours, also stated that the SGE, Thomas Muir, from 1892 until 1915 was "not innocent of the charge of being unfriendly towards the non-White people of the Cape Colony" (Grundlingh, 1987:61; *S.A. Clarion*, 1919:16). Muir saw the progress of Coloured education as a racial separate entity in church or mission schools compared to public (White) institutions. In 1899, Thomas Muir stated that the only chance for continuing the progress in mission schools "lay in the improvement of the teachers and this could only be done by a determined effort on the part of the churches that have Training Schools set apart for this purpose" (Department of Public Education, 1899:11). Muir

therefore gave no consideration of integrating Coloured and African learners into the same schools that would lead to uniform teacher training entry examinations and qualifications.

The Education Department advanced notions of race in Cape schooling and used the Coronation Physical Training Competition to this end. This paper on the Coronation Competition also makes the point that physical training provision at schools was influenced by the racist attitudes of the period. The purpose for physical training drill was not health development but instilling loyalty to the British Crown (Howes, 1996:15). Thus, while there is little evidence that mission schools in Cape Town derived benefit from physical training, it is apparent that the practice of physical training drill was intended to favour White persons.
The Coronation Physical Training Competition has not been given due consideration in South African education history (Borman, 1989:167). To date two works deal with this topic in this area: an unpublished paper by Siggi Howes and part of a doctoral dissertation (Howes, 1996;

Cleophas, 2009:61-65). Howes ignores the social and political landscape within which this competition operated whilst Cleophas explored the participation of Non-white teachers and learners only. There is therefore a need to view the situation holistically.

School inspector reports, newspaper clippings, journals and books were used as research materials to extend on the above-mentioned studies. This led to an exploration of physical training in the Cape Colony between 1892–1906; historical background of the Coronation Competition; and the forced relationship between race, schooling, physical drill and the Coronation Competition.

PHYSICAL TRAINING DURING 1892–1906

During the last decade of the 19th and first two decades of the 20th century, British education authorities throughout the empire employed the instructional method known as physical training or physical training drill, inherited from military manoeuvre (Cape of Good Hope, 1902d:86; 1905b:692; Ministry of Education, 1952:85). The major motive behind physical training and sport in British schools remained the instilling of discipline (Mason & Reidi, 2010:5). Physical drill was entrenched in the English military campaign of the South African War and the historian, Allan Dean, records that "…on board the Union liner *Briton* whilst en route to Cape Town during January 1900… the men on board double round the boat-deck for hours every day and did plenty of physical drill…" (Allen, 2002:45). A great contribution towards the development of physical training in England came from the teaching and writings of Archibald Maclaren, for many years proprietor of a gymnasium at Oxford. Under his influence, a teaching method (in the army and schools) developed from several roots: military drill, callisthenics and gymnastics. This led to the British physical training system, which at the end of the 19th century also spread to schools in British colonies (McIntosch, 1968:11,17,18).

Thomas Muir introduced the subject in the Cape Colony school curriculum. At the time, physical training also formed part of a system called manual training or manual work. A German missionary principal/teacher at a Cape school, Theodor Schreve, claimed this system had as sole use the development of the mental, moral and physical power of children. It included kindergarten, handwork drawing for boys, needlework for girls, domestic economy (or science) and physical training (*Teachers' Review*, 1911:3,4).

PHYSICAL TRAINING IN MISSION SCHOOLS BETWEEN 1892-1906

In 1895, school inspector J.H. Brady of the Cape Town circuit, reported that in some of the mission schools under his charge he found "half White and half Coloured children in attendance" (Borman, 1989:127; Department of Public Education, 1895:9,16). Brady served as the inspector of Cape Town schools at the time when some pupils received "a little bit of drill" in 1894 (Department of Public Education, 1895:9). Although the number of pupils receiving instruction in physical training drill at mission schools increased by 1899, only a third of all schools in the Cape Colony paid some attention to the subject (Department of Public Education, 1900:13).

Physical training in all Cape schools was not given much attention because of the lack of qualified teachers and limited outdoor space (*Cape Argus*, 1903:5). The Education Department‟s solution that "school furniture be moved or cleared to permit the few simple steps and arm movements set forth in the syllabus of the *Education Gazette*" did not help much (Cape of Good Hope, 1906a:376). Most mission schools had overcrowded classrooms and teaching happened under conditions detrimental to the health and progress of the pupils and teachers (Western Cape Archives, correspondence file). In 1905 the Education Department published an article in its Education Gazette where it advises communities who intend designing new schools to plan the classrooms around a quadrangle. The quadrangle should provide the space for "physical drill and taking exercise" (Cape of Good Hope, 1906a:376). Mission schools also known as „*blikskooltjies*‟ ("tin schools") were without a quadrangle (Van der Ross, 2011).

The lack of physical fitness amongst the British recruits for the second South African War resulted in national intervention. King Edward VII took keen interest in physical training in schools and on 31 March 1902 he appointed a commission of nine. The commission was:

> "to enquire into the opportunities for physical training available in state-aided schools and other educational institutions of Scotland and to suggest means by which such training may be made to conduce to the welfare of the pupils; and further, how such opportunities may be increased by continuation classes and otherwise, so as to develop, in their practical application to the requirements of life, the faculties of those who left the day school, and thus contribute towards the sources of national strength" (Leonard & McKenzie, 1927:215,216).

British education authorities displayed keen interest in the commission‟s report findings and established an "Interdepartmental (English and Scottish) Committee on the Model Course of Physical Exercises". This report was tabled to both Houses of Parliament on 10 March 1904 (Leonard & McKenzie, 1927:216). The committee concluded the maintenance and improvement of health and physique along with the development of alertness, decision, and perfect control of mind over body were of paramount importance. Further, it was suggested that military drill should be discontinued and a new system based on scientific principles, requiring no special apparatus, be introduced (Cape of Good Hope, 1904b:614). The Education Department introduced the *Model Course of Physical Exercises* that year with the general principle that there should be "rapid and vigorous exercises, which stimulate the respiration and circulation for short periods only and should be followed by exercises of an entirely different nature, during which the pulse and respiration are slowed down" (Cape of Good Hope, 1904c:282).

The implementation of these developments was not uniform and was determined largely by "the first legal distinction between „White" and „non-White" in 1893" (Backman, 1991:8). Also, the authorities did not insist that the new scheme be adopted immediately to the exclusion of other schemes (Cape of Good Hope, 1904d:299). Although Physical Training Drill was compulsory in teacher training courses, it was not so for schools. This only happened in July 1934 and only at secondary schools, under the jurisdiction of the School Board Act (De Vries, 1963:85). The *Cape Argus* pointed to the German education system where all schools possessed a gymnasium (*Turnhalle*) (*Cape Argus*, 1903:5).

HISTORICAL BACKGROUND OF THE CORONATION COMPETITION

The Victorian era ended with the death of Queen Victoria and the accession of her son Edward VII on 26 January 1901. The following year the Education Department organised the first Coronation Physical Training Competition funded by the City Corporation (Cape Town City Council) (*Cape Argus*, 1903:5). This formed part of the Coronation Celebrations of Edward VII. On 2 May 1902, the SGE announced:

> the children"s sub-committee for the Cape Town Coronation Celebration has intimated to find two silver Challenge Shields for the annual competition among the White and Coloured schools … It is exceedingly pleasing to see that there is to be something of lasting value as an outcome of the festivities (Cape of Good Hope, 1902a:217).

Muir took charge of the entries and a departmental instructor, W.J. Milne, visited schools to prepare them for the competition and the Education Department supported the competition financially (Cape of Good Hope, 1902a:218,219). Prominent Cape Town teachers formed a Coronation Cup Committee and took charge of the marshalling on the day of the competition. Muir later expressed much satisfaction at the "distinct success of the competition" (Cape of Good Hope, 1902d:3). At the time Cape Town was ablaze with displays of patriotic fervour in a city heightened by the tensions of war. The Coronation of Edward VII was celebrated throughout the empire and other parts of the Cape Colony within this military atmosphere.

Militarism and the Coronation Competition

The Second South African War had just come to an end in 1902 and there was a strong military presence at the Green Point Common, with thousands of Boer prisoners and their guards. Muir introduced his official report, for the year 1902, with the words: "The most important fact to remember – the fact which explains almost all anomalies – is that the year under review was the last year of the war" (Cape of Good Hope, 1903a:86). It is possible that the intention of organising the drill competition at Green Point Common was to gloat the "youth of the empire" (Howes, 1996:15).

The competition was judged according to military parameters and Lieutenant-Colonel Robert-Francis Cantwell, Sergeant-Major Wilson and Sergeant-Major Brennan acted as judges (*Cape Times*, 1904b:7). These were prominent military figures at the time and all three were listed in the first edition of *South African Who's Who* in 1909 (Anon., 1909:54,72,529). The fact that Black children in Cape Town were exposed to military aspects (physical training drill) posed no threat of an uprising against the colonial authorities because they were small in number and powerless and therefore posed no military threat to the social order (Adhikari, 2002:155). A visible military atmosphere permeated the Coronation competition and education authorities presented it as materially beneficial for the participating Black schools.

The Department prescribed double marches and waltzes for public schools but restricted mission schools to figure marching and free exercises. Mission schools were also excluded from the "floral march display" after the competition (*Cape Argus*, 1902:5; Cape of Good Hope, 1902a:219,220). This was in line with British regime thinking, under Alfred Milner, that the war had not altered master-servant relations (Giliomee & Mbenga, 2007:224). Milner‟s educational policy aimed at achieving a dominance of pro-British views and the

school curriculum had a strong imperialist bias (Giliomee & Mbenga, 2007:226). Therefore, British nationalist march past music was played with the exercises: *The British Grenadiers* and the *Keel Row* (for marching exercises) and *The National Guard Waltz* by Ada Henriques for the dumbbell exercises (Cape of Good Hope, 1902a:220). Two weeks later the waltz was replaced by *The Myosotis* by Caroline Lowthian, owing to "the fact that a sufficiently large number of copies of the music sheets were not available" (Cape of Good Hope, 1902b:236).

A forced relationship between race, schooling, physical drill and the Coronation Competition

The first Coronation Competition took place during the June school vacation and school managers were given permission to close school one week later than normal (27 June) and re-open on 23 July instead of the 16th (Cape of Good Hope, 1902b:236). The presence of many female instructors was evidence of an urban mission work that provided an outlet for some of Britain‟s surplus single women (Bickford-Smith *et al*., 1999:186). In 1902 the Education Department officially employed 3078 female teachers, compared to the 2357 males (Cape of Good Hope, 1902e:173).

The competition was held at the Corporation Athletic Ground at Green Point Common on 26 June and the Education Department divided the competition in two sections: One for White schools and one for Coloured schools (Cape of Good Hope, 1902a:217,219; 1902c:3). At the turn of the 20th century, education authorities referred to schools as Public (White) and Mission (Coloured) schools (Cape of Good Hope, 1902d: 86). Public Schools were officially divided into three sections: first, second and third class that and catered for most of the White population of the Cape Colony (for those who were financially able to found schools and pay half the teachers‟ salaries). Mission schools were funded for teachers‟ salaries only and were intended for people of colour (Malherbe, 1925:96). However, the prevailing school system, prior to 1905 (when the School Board Act was passed), was such that pupils of different racial groups mixed in mission and public schools (Marais, 1955:32). Yet, the Department insisted on classifying schools, competing in the Coronation Competition, as Coloured and White (Cape of Good Hope, 1902c:3). Education authorities forced participation in the Coronation Physical Training competition along lines of race and ignored the multi-racial character of some participating schools. Two examples highlight this. In 1903, St Agnes (Woodstock Roman Catholic School) had 119 White boys, 148 White girls and three Coloured girls on its books; St Phillips School had five White and 33 Coloured boys and the Dock District Public School had 51 White boys, 28 Coloured boys, 55 White girls and 21 Coloured girls (Cape of Good Hope, 1903d:154,155). The *Cape Argus* marketed it as a "competition open to all White schools throughout the Cape Peninsula" (*Cape Argus*, 1903:5). These two artificial categories of schools competed in separate competitions and the Coloured schools did not participate in all the prescribed exercises (Cape of Good Hope, 1902a:217). Official figures indicate that approximately 1000 children participated in the Coloured section and 2000 in the White section. Yet, the bulk of Cape Town children were found in the schools designated Coloured

(Malherbe, 1925:96). Some managers at these mission schools encouraged White children to enrol. (Backman, 1991:43). Not only was education racially divided but differed in quality and the *South African News*, after praising the St Agnes (White) team, referred to the St George‟s Mission School (Coloured) who "gave a monotonous display but gave evidence of careful tuition" (*South African News*, 1904:8).

The post-Second South African War years were characterised by a British school system intent on extending control over Black people (Christie, 1985:159). Physical training drill, being part of this school system, could be used to teach Black children obedience and acceptance of their status in society. Black opinion makers (amongst others: Francis Peregrino, John Tobin, Abdullah Abdurahman and their organisations: Coloured People‟s Vigilance Committee; Stone meetings and African Political Organisation) were invisible in this imperial experiment although they were increasingly visible in the broader early 20th century Cape society.

The *Education Gazette* reported in 1903 that Cantwell acted as chief adjudicator and donated a £4 cheque to be divided among the participating Albertus Street and Ndabeni (St Cyprian‟s) „Location Schools‟. Both these schools participated in the „Coloured‟ division. The Albertus Street School agreed that the money, with an equal contribution from the Education Department, be used for the extension of the school library. The Ndabeni Location School "preferred to expend the amount of its prize, £1 10s, on books for individual members of the team, most of whom were likely to leave school at the end of the year and return to their homes in distant parts of the colony" (Cape of Good Hope, 1903e:222). Such competition creates a festival atmosphere, with attending traditions, rituals and celebrations. It also establishes a forum within which children and youth can test themselves against accepted standards of excellence. Further, it promotes friendly rivalry and lastly striving within the rules and tradition is emphasised. „Good competition‟ is the antithesis of „bad competition‟ that uses the rules to gain an advantage, assuming the only way to win is to have the best score, disregarding traditions and rituals of the activity and letting the outcome affect you after the competition is over (Siedentop, 1990:261). Coronation participation along the lines of „good competition‟ took place along the lines of „enforced race‟.

The St Cyprian‟s pupils were viewed as African by the colonial authorities that argued their natural home is outside the Cape Colony, beyond the Kei River in the east. On the other hand, the greatest portion of the Albertus Street School pupils were regarded Coloured, whom colonial authorities considered having a certain measure of permanency in the Western Cape. The education authorities previously supported legislation aimed at restricting Africans from entering the Western Cape. A case in point is the Education Department‟s support for the Glen Grey Act of 1894 (Cape of Good Hope, 1903b:97). Mining imperialist, Cecil John Rhodes, proposed this Act and set a 10 acre limit on land ownership in the Black reserves beyond the Kei River (Williams, 1990:93). Schooling provision for Africans was subject to this Act (Cape of Good Hope, 1903b:97; 1904a:270). The Albertus Street School, however, registered African pupils and the Ndabeni Location residents were described by the authorities as a "mixed race" rather than African (Bickford-Smith, 1999:44; Cleophas, 2009:65).

When the hype, generated by the Cape Town colonial authorities, of the 1902 Coronation fever passed the competition was shifted to 26 and 27 November the following year (Cape of Good Hope, 1903e:222). The rules for the competition were altered with a shorter set of

exercises and no combined display was planned for the closing ceremony. Again the Education Department organised two competitions, one for White schools and one for Coloured schools. The former would be tested in various detailed exercises but the latter only in figure marching and free exercises (Cape of Good Hope, 1903c:109,111). Six schools

participated in the White division and the *Cape Argus* expressed its disappointment by this (*Cape Argus*, 1903:5). By 1904 interest in the Coronation Competition had waned to the degree that only three schools entered: St George‟s Mission School in Roeland Street; the St Cyprians Mission School in Ndabeni Location (Coloured) and St Agnes School in Woodstock (White) (*Cape Times*, 1904b:7). The competition was held on a later date than the previous two, on 14 December. That year the competition had moved to the (smaller) indoor venue of the Drill Hall and no entry fee was charged. The Education Department insisted that the only White team should go through "the prescribed exercises at the close of the Coloured schools competition" (Cape of Good Hope, 1904c:281). Cantwell remarked that "if there had been a competition… the squad (St Agnes) would have obtained the maximum number of marks" (Cape of Good Hope, 1905b:314). The Coronation Competition was shifted to May in 1906, an indication of the lack of permanency on the school calendar (Cape of Good Hope, 1905c:150). Again, White schools were tested in all the prescribed exercises and Coloured schools only in figure marching and free exercises (Cape of Good Hope, 1906b:647).

Colonial authorities supported urban missionary work to inculcate Western values to create a „respectable‟ poor. These values included consciousness about dress, a time discipline, basic literacy and drill and games (Bickford-Smith *et al*., 1999:186). It is not surprising therefore, that the Coronation Competition awarded marks for general set-up and carriage; smartness and accuracy in movements, covering and distance in marching and neatness and uniformity in dress (Cape of Good Hope, 1903c:111). Institutions, such as the media, supported these values. In 1903 the *Cape Times* reported of the schools competing in the Coloured division that the movements were "simple and of entertaining order and precision and order was well pleasing" (*Cape Times*, 1903a:7). The following year it said that "the neatness and alertness of the movements evoked enthusiastic applause" and the girls were complimented for their "methodical and neat work" (*Cape Times*, 1904b:7). This is in response to the strict rules enforcing propriety of conduct and attire that deterred Blacks from enrolling their children at public schools (Adhikari, 1993:18-19).

Dress code, rewards, race and the Coronation competition

In 1903, the *Cape Times* over-stressed the clothing appearance of St Agnes (white with red sachets and ribbon), Hebrew Public School (white with Cambridge blue), St Mary‟s Convent School (navy blue and sky blue), St Michaels Boys School (white and red), High School Simonstown (naval uniform) and Dock District Public School (white and light blue) (*Cape Times*, 1903b:7). Similarly, the *Cape Argus* reported that the favourite dress code was the sailor blouse and short skirt. These were schools in the White division. Those in the Coloured section reportedly all "wore white with red or blue sashes… with the exception of St George‟s School who had dark blue sailor costumes with red sashes" (*Cape Argus*, 1903:5). It is possible that these were not school uniforms but specially purchased outfits. Stuttaford & Co. Department Stores in Cape Town advertised white drill sailor knickers suits (*Cape Times*, 1904a:10). The other competing schools in the Coloured division were St Phillip‟s, Albertus Street and St Cyprian‟s Schools (*Cape Times*, 1903a:7). The *South African News* reported in 1904 that the "St Agnes team was made up of a 19 member squad consisting of 6-12 year old girls. They were neatly garbed in white stocking caps, white sailor blouses and red shirts…

performed intricate figures in marching drill and afterwards credibly performed free gymnastics and barbell drills" (*South African News*, 1904:8). Finally dress and grooming

articulates a sense of national identity. Therefore, the *Cape Argus* writer took exception on the absence of a dress code, in the Coronation Competition, as worn in the Home Country (England) (*Cape Argus*, 1903:5).

Competition, with its rewards, also played an important part in colonial capitalist societies. Besides the Coronation Competition, the Education Department also staged an annual Drill Marching competition for infant school pupils (Cape of Good Hope, 1905c:150). In 1907 G.G. Cillié, chairman of the *Suid-Afrikaanse Onderwysers Unie* (SAOU), lashed out at the „drill, solfa singing and sand modelling‟ (Borman, 1989:168). These competitions and their subsequent rewards were not meant to promote racial interaction and instead reflected colour status. The Coloured school competition was therefore the curtain raiser for the Coronation Competition (*Cape Argus*, 1902:5). Considerations of race in the Coronation Competition remained important for the Education Department, and the St Agnes Roman Catholic School participated in the White section despite being positioned within the multi-racial working class suburb of Woodstock. When St Agnes was the sole entrant in 1904 in the White section, an opportunity was created to enter the schools in one division. Instead, the Education Department persisted in having two separate competitions with separate rewards. In consequence, W.J. Milne and Miss O‟Connor (the St Agnes trainers) each received a teacher‟s medal alongside Miss Cole, who trained the St George‟s team (girls). All St Agnes and St George‟s team members received book prizes and both schools retained the shield from the previous year (*Cape Times*, 1903b:7; Cape of Good Hope, 1905a:314).

CONCLUSION

The Coronation Physical Training Competition did not deviate from the accepted notion of race at the time for the purpose of celebrating imperial Britain. Despite being marginalised, African, Coloured, Jewish and poor White people accommodated British advances and, through this Physical Training Competition, they expressed loyalty to the British Crown. It is questionable if it was loyalty alone to the British Crown that was the overriding factor in the participation of these schools in the Coronation Competition. The *Cape Times* reported that "the most elaborate arrangements were made for providing children with food" (*Cape Times*, 1902:5). Also, the post-war period was characterised by an intensified racial and political hierarchical contestation where Blacks were at the receiving end. In 1901 Alfred Mangena, a school teacher at a night school in Cape Town, urged a stand against government demands of rent and refusing free-hold title to Blacks. This resulted in a mass demonstration that turned violent and ended with the arrest of resisters. The result of this was to put the newly established African location, Uitvlugt, on a legal footing with the passing of the Native Reserve Location Bill of 1902 (Bickford-Smith, 1999:29-30). However, Capetonians attached much importance to competition. Such importance stemmed from a desire to emphasise social advantages and consciousness in Westernised society (Bickford-Smith *et al*., 1999:22). The involvement in a Coronation Physical Training Competition afforded marginalised communities with an opportunity of association with British class prestige.

The low number of entries indicates that the Education Department was not serious in drawing a mass of learners to the Coronation Physical Training Competition. In the circuit of school inspector Edward Noaks alone, that included the Cape Town area, there were 142

schools (Noaks, 1902:97a). Also the Coronation Competition was an exercise in a low status

subject, physical training that was also referred to as „physical jerks‟ (Van der Merwe, 1941:35). The education authorities expressed less zeal for the Coronation Competition than for the cadet corps, a movement that was best suited for "teaching patriotism… and the cultivation of military intelligence" (Cape of Good Hope, 1906c:675). After the establishment of the Union of South Africa, the Education Department (then known as the Cape Education Department) never supported mass based school sport organisations in the poor communities of Cape Town. The first mass based school sport organisation in Cape Town that targeted poor children, mainly Coloured, was the Central School Sports Union established in 1928 (*Cape Standard*, 1941:12; *Cape Herald*, 1966:9). This body was established independently of the Cape Education Department.

Further, the Education Department was overly concerned with issues of race and ignored the „multi-racial‟ nature of the participating schools in the Coronation competition. Schools with differing physical and human resources came together, for the first time, to participate in a movement extravaganza, called the Coronation Physical Training Competition. However, participation in this extravaganza did not dent social injustices. Three years later the Education Department implemented the 1905 School Board Act, which made provision for compulsory education for selected racial groups and excluded others (Adhikari, 1996b:11). The Coronation Competition was an exercise for reinforcing existing ideas of race in the post South African War period. This social marker continued in the practice of school sport during the years of Union (1910-1960).

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PERCEIVED CONSTRAINTS TO LEISURE-TIME ACTIVITY AMONG THE ELDERLY

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ABSTRACT

The elderly are in an important period in their lives as substantial changes occur with regard to leisure and family roles. Changes may be complicated by a variety of factors such as being empty nested, economic adjustments, being responsible for a single-parent household, the changing socio-demographic composition, the lack of an elderly-friendly environment and physical infrastructure necessary for an ageing population. Hence, the purpose of the study was to establish the factors that constrain the elderly from participating in desired leisure activities. A structured questionnaire relating to leisure constraints were administered to 75 respondents within the age category of 60-69 years. An 11-item scale was developed using exploratory factor analysis along three dimensions, namely, time and security, economic and structural, and personal constraints. Time, the ageing process and poor health conditions seem to strongly prohibit the elderly in leisure activity participation. The elderly also vary in their perceptions of constraints in terms of population groups, education levels and gender. Decision-makers in leisure and recreation need to endorse and acknowledge these constraints in order to facilitate effective implementation of policies and strategies in order to mitigate the impact of these constraints.

Key words: Leisure; Constraints; Elderly; Ageing; Health status; Recreation.

INTRODUCTION

Over the last decade, researchers and academics have generated an interest in the use of time among older persons because of the unprecedented rapid ageing of the world population (Su *et al*., 2006). In almost every country the proportion of people aged over 60 years is growing faster than any other age group. Ageing can be seen as a success story for public health policies and for socio-economic development, but it also challenges society to adapt, in order to maximise the health and functional capacity of older people, as well as their social participation and security (Anon., 2009). The proportion of persons aged 60 and over is expected to double in Africa (United Nations Population Division, 2006). The world"s population is ageing at an unparalleled rate with the percentage of adults 65 years of age and older expected to more than double from 7.7% in 2010 to 16% in 2050 (United Nations Department of Economic and Social Affairs, 2007). In the United States for example, the number of persons aged 55 to 64 is projected to increase by 15.9 million between 2000 and 2015, while the number of persons 65 years of age and older will amount to 64.6 million in 2030 (Su *et al*., 2006:381). It is projected that Europe will witness the greatest increase with an estimated 12.9% increase from 2000 to 2050, followed by Latin America and the Caribbean at 12.8%, Asia at 11.6%, Oceania at 9.6%, North America at 8.7% and Africa at 3.4% (Dupuis, 2006).

Ageing population

In South Africa, according to the Census 2001 report, approximately 7.3% of the population was 60 years of age and above and 0.9% of the population was 80 years and above (Statistics South Africa, 2003) in 2001. The United Nations Population Division that completed a modelling process shows that in the year 2050 approximately 12.1% of the population will be over the age of 60 while 2.2% of the population will be over the age of 80 years (Hunter &

May, 2003).

Elderly people (60-69 years) are in an important time period in their lives as substantial changes occur with regard to leisure and family roles. Furthermore, changes may be complicated by a variety of factors such as being empty nested, economic changes, single-parent households and transition roles into later life (Warnick, 1987). During this stage one may retire from work; one may become a grandparent and one may find contentment through new activities such as being responsible for an extended family. During this time of their life, emotional adjustments may have to be made in relation to accepting the ageing process. The death of a spouse may become a reality and new health risks and health problems may emerge (Statistics South Africa, 2005). The elderly generation is likely to be affected, inter-alia by the changing socio-demographic composition, the lack of an elderly-friendly environment and physical infrastructure necessary for an ageing population (Wong, 2003).

With a rapid increase in the ageing population, policy makers need to focus their attention on the implications of population ageing on social and economic development (Dupuis, 2006). By acquiring a comprehensive understanding of the variation in the meaning and experience of the ageing across different social, cultural and economic contexts and identifying the determinants of healthy ageing and quality of life, policies and procedures may have to be implemented in order to ensure that older adults have an opportunity to age well. This article focuses on leisure experiences in later life that is, those people who are 60 to 69 years and who are not in full-time employment. This group of the elderly corresponds with the conventional definition of older people and represents a period of reduced earnings, but without necessarily the reduction of health status and strength (Hunter & May, 2003).

Within a South African context, organisations such as Age-in-Action (previously known as „The South African Council for the Aged") play a pivotal role through the Department of Sport and Recreation in providing some form of leisure and recreation for the elderly (Eckley, 2006). For example, The South African National Games and Leisure Activities (SANGALA) initiated through the efforts of the Department of Sport and Recreation, on taking recreation to the Black communities in the rural and urban areas. The SANGALA gave purpose to hundreds of clubs by providing equipment, exercise programmes and training to remain active and productive (Department of Sport & Recreation, 1997).

Leisure

Leisure is defined in sociology as activities other than work. It includes "free time allowing a release from occupational responsibilities, forms of relaxation such as recreation and hobbies and various creative pursuits" (Jain, 2007:17). Jackson (2006) aptly summarised Western Europe and North American scholars" view of leisure from one or more of three perspectives. These perspectives are:

- as a measure of time (discretionary time left over after the completion of work and other obligations);
- as a container of activity (what people choose to do in their discretionary time); and
- in terms of the meaning of leisure (how people define, experience and value leisure, the role it plays in their lives and its centrality or otherwise as an expression of quality of life).

In one of the earlier studies, Donald and Havighurst (1959:355) defined the meaning of leisure as "the satisfaction an individual gains from their leisure activities". The researchers collected statements on the meaning from literature and requested respondents to rank the statement in their order of priority. Six pertinent connotations for leisure emerged. These conations were linked to pleasure, change from work, new experiences and contacts with friends, achieving something and passing time. Other researchers have adopted the approach of measuring the characteristics as a measure of leisure (Iso-Ahola, 1979). With the diverse perceptions and meaning of leisure, for the purposes of this study, leisure among the elderly is defined as activities that the elderly undertake in their free time for fun, relaxation and recreation as a means of self-expression, which is not work-related.

Constraints to leisure time activity

Constraints have been defined as "factors that are experienced by individuals to limit the formation of leisure preferences and to inhibit or prohibit participation in leisure activities" (Jackson, 1991:276). According to Chick and Dong (2003:341), constraints appear to stem from:

- the physical environment (for example lack of infrastructure);
- culture (for example, taboo or otherwise prohibited activities for certain groups such as women);
- individual characteristics (for example, the lack of interest, lack of physical ability); and
- social structural factors (for example, race, social class, ethnicity, gender).

It is also widely accepted that constraints are classified into intrapersonal, interpersonal and structural. This categorisation was introduced by Crawford and Godbey (1987) and adopted by the majority of researchers in areas of constraints to leisure participation. **Intrapersonal** constraints are internal in nature, which is related to individual psychological states and attributes. Such constraints may include lack of perceived skill levels, low fitness levels, lack of confidence, stress, anxiety, fatigue, depression, and lack of prior socialisation into specific leisure activities (Crawford & Godbey, 1987). These are constraints sometimes based on emotions and tend to change over time (Goodale & Godbey, 1988). As a consequence of their emotional nature, these types of constraints are perhaps difficult to overcome. Often the barrier is not the result of a belief but rather psychological in nature. For example, an elderly person may experience an undue amount of stress while engaging in an activity that focuses the attention of onlookers. **Interpersonal constraints** are related to lack of social interaction and social isolation. Such constraints may include inability to find partners to participate with

that may arise out of the absence of interaction with others such as, family members, friends, co-workers and neighbours (Chick & Dong, 2003). **Structural constraints** are external to an individual. Structural constraints represent blocks or obstacles to participation, which intervenes between personal preferences and participation (Goodale & Godbey, 1988). These constraints are related to the unavailability or lack of resources to participate in leisure activities. Such constraints may include lack of money, problems related to facilities, service accessibility issues and the cost of the facility usage (Jackson, 2005). Against this background of constraints leisure, a thorough understanding of what keeps the elderly away from leisure is essential for the identification of appropriate points of intervention.

PROBLEM STATEMENT

While leisure constraint is well established as a recognisable sub-field within leisure studies, a serious lack of knowledge of constraints still remains (Jackson, 2005). In addition, several studies were conducted on constraints that focused on residential contexts such as retirement homes (Henderson & Hickerson, 2007). With leisure constraints research being a popular topic and substantially researched in other continents (United Kingdom and United States of America) in the last two decades (Chick & Dong, 2003) leisure and leisure constraints in general within a South African context is limited especially (Goslin, 2003). As a consequence a gap exists in research on leisure constraints among the elderly.

The purpose of the study was to establish the factors that constrain the elderly from participating in desired leisure activities. The secondary purpose of the study was to examine the relationship between respondents‟ perceptions of constraints and selected demographic characteristics (population groups, level of education and gender). The study focused on leisure experiences in later life that is, those people who are 60 to 69 years and who are not in full-time employment. Investigating leisure constraints among specific age-based category is important as knowledge gained could be used to improve the implementation of leisure services. This group of the elderly corresponds to the conventional definition of older people and represents a period of reduced earnings, but without necessarily the reduction of health status and strength (Hunter & May, 2003).

RESEARCH DESIGN

The data from which this study was derived was from a broad study that examined elderly engagement in leisure and recreational activities in the Vaal Triangle, Southern Gauteng using a quantitative approach.

Sample

A convenience sample of 75 participants from the Vaal Triangle was obtained. Participants were selected on the basis that they resided in one of the two neighbourhoods, namely Vanderbijlpark or Sebokeng. This was necessary in order to obtain a fairly representative sample based on two major population categories. Respondents who officially retired but were still working (Jain, 2007) were excluded from the study, as work commitments can be a barrier on its own (Searle & Jackson, 1984). The screening method was utilised to avoid

contamination of the sample in order to ensure authenticity of respondents included in the study.

Research instrument

A leisure constraints 13-item scale was developed with the underlying leisure constraints drawn primarily from the studies of Crawford *et al*. (1991) and Walker *et al*. (2007). Respondents were asked to evaluate the agreement/disagreement of the 13-item scale as limiting or prohibiting factors for their participation in leisure activities. The responses to the questions were based on a five-point Likert scale, ranging from very often a barrier (5) and certainly not a barrier (1). Three demographic variables were included in the study: population group (African, White), level of education (primary school, Grade 7-11, Degree, Honours, Master‟s) and gender (male, female).

Data collection

Data was collected by means of a survey using a structured questionnaire in the two communities using a face-to-face interview technique. Fourth year marketing research students who were trained for the fieldwork, conducted the interviews. Three screening (filter) questions were posed to prospective respondents prior to the interview in order to ensure: that they were between 60-69 years of age, resided permanently in Sebokeng or Vanderbijlpark and were not in full-time employment. Where respondents refused to participate, the next eligible respondent was chosen. The data for the study was collected in December/January of 2008/2009. Data was analysed using Statistical Package for Social Sciences (SPSS) (version 16.0 for windows) with descriptive measures, as well as multivariate analysis (factor analysis), analysis of variance (ANOVA) and post-hoc analysis.

ANALYSIS OF RESULTS

The analysis of results comprised three distinct phases namely, an analysis of the demographic profile, the ranking of the constraints in leisure participation and an assessment of the underlying dimensions of the constraints to leisure participation.

Demographic profile

Frequency analysis was first conducted on the respondents‟ demographic characteristics. Male respondents (n=43; 57%) were more than females (n=32; 43%) in the sample. The sample distributions in terms of population categories were as follows: African (n=45; 60%), Whites (n=23; 31%) and other, which comprised Coloured and Indian (n=7; 9%). The distributions of the sample in terms of the level of education, 28 respondents (37%) were in possession of a university degree or higher degree, 20 respondents (27%) were in possession of a matriculation certificate, 18 respondents (24%) attained an education level below a matriculation certificate and 9 respondents (12%) had no formal education.

Constraints to leisure participation

Constraints to leisure activity among the elderly were ranked in terms of their frequency (expressed in %) reported by respondents. The ranking of the various constraints are reported

in Table 1. Among the barriers, time management, ageing, poor health status, lack of knowledge of leisure activities, fatigue, lack of companionship, transport, safety and security and finance seem to prohibit the elderly in engaging in leisure activities.

TABLE 1: **PERCENTAGE OF AGREEMENT AS A BARRIER**

Rank	Barriers	%
1	Time availability and management	86
2	Ageing	80
3	Poor health	79
4	Lack of knowledge on leisure activities	77
5	Feel tired/lack of energy	75
6	Lack of company	73
7	Transport	72
8	Fearful of crime	71
9	Fear for my safety	71
10	Short of finance	63

11	Family/spouse have different leisure choices	51

In addition to the ranking of constraints, the dimensionality of the constraints to leisure-time activity was established by performing an exploratory factor analysis. An exposition of the analysis and subsequent extraction of factors are discussed below.

Exploratory factor analysis

The Bartlett‟s test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was undertaken in order to establish whether factor analysis was suitable for application on the data set. The approximate chi-square was 288.08 (df=55) significant at p=0.000 indicating that factor analysis was suitable for the data. In addition, the KMO measure of sampling adequacy was 0.779, which is considered "meritorious" by Kaiser (1974:35). Exploratory factor analysis (EFA) using the principle components method with varimax rotation was run to determine the number of dimensions underlying the perceived constraints scale.

The primary advantage of EFA is that each component extracted from the data set accounts for the maximum amount of variance among the set of variables under study (Green *et al*., 2006). Rotation on the other hand assists to mathematically redistribute the relationship among the components, without changing the relationships between items and components, which assists in the interpretability of the final solution (Malhotra, 2004). Each of the EFA principle component solutions was evaluated based on four criteria (Comrey & Lee, 1992). First, percentage of variance explained was assessed. Considering the amount of variance accounted for by each component helps to determine if the component is significantly contributing to the factor solution. The second evaluative criterion considered was the occurrence of a simple structure. Items that have cross-loaded (where an item has a strong relationship with more than one component, may cause problems when interpreting the EFA solution) were deleted. Items were considered markers of a component if their loading values were at least 0.50. The third criterion, lower item-to-component correlations, was considered

if items did not associate as highly with any other component. The solution was evaluated for the absence of specific factors and served as the fourth criterion. Specific factors are components consisting of a single item and are often an indication that the data has been over-factored (Gorsuch, 1983).

The initial screen plot suggested three components underlying the factor structure. Three factors accounted to 61.6% of the variance across the 11-item scale. Two items were dropped because they had low inter-item correlations and low factor loadings. There were no dominant components and the rotation converged in 5 iterations. Further the solution had no cross-loading on more than one component. Finally, the three-component solution was interpretable, logical and meaningful in explaining constraints to leisure behaviour among the elderly. The final factors and eigenvalues are reported in Table 2.

TABLE 2: **ROTATED FACTOR LOADING MATRIX**

ITEM	Factor 1	Factor 2	Factor 3
I have a huge problem in managing my time	**0.671**	0.234	0.004
I fear for my safety in the area to engage in leisure activities	**0.876**	0.257	0.102

I am fearful of crime in the area to engage in leisure activities	**0.912**	0.136	0.040
I am short of finance to engage in leisure activities	0.172	**0.658**	0.074
I feel tired with no energy to participate in leisure activities	0.168	**0.659**	0.352
I do not have company to include leisure activities in my daily life	0.210	**0.690**	0.201
I have a lack of knowledge on leisure activities	0.101	**0.688**	0.146
I have transport problems in order to access leisure activities	0.223	**0.596**	0.047
My spouse/family has different leisure choices compared to myself	0.054	0.036	**0.764**
I am ageing so I need to be left alone	0.197	0.169	**0.748**
My poor health does not allow me to participate in leisure activities	0.418	0.157	**0.664**
Eigenvalues	4.031	1.679	1.067
% of variance explained	36.64	15.250	9.690
Cumulative % of variance	36.64	51.910	61.60
Reliability (Cronbach **α**)	**0.795**	**0.748**	**0.617**

DISCUSSION OF RESULTS

The discussion on constraints is explained using the underlying dimensions extracted from the EFA procedure, the ranking of the constraints listed in Table 1, and an analysis of the demographic variables in relation to the extracted factors. The empirical results obtained from prior research on constraints to leisure participation were also used to consolidate the findings.

Exploratory factor analysis and ranked constraints

Factor 1 labelled the **'time and security'** constraint comprised 3 variables and accounted for 36.64% of the variance. The dimensions embrace issues of time, safety and the occurrence of crime in the areas to engage in leisure activities. Respondents ranked time, safety and crime related issues 1st and 8th respectively. This dimension in part encapsulates the structural and interpersonal constraints of the study of Crawford and Godbey (1987). Jackson"s (2005) study on constraints also ranked the lack of time as the most common and strongest constraint. The lack of time related constraints were revealed by other studies that investigated constraints on leisure participation (Kay & Jackson, 1991; Alexandris & Carroll, 1997). The fear of crime is not new as the study of Scott and Jackson (1996) also revealed that older people were more likely to be constrained in their park use due to the fear of crime. Perceptions of fear and crime have also been found to be an obstacle for physical activity in a study by Amesty (2003).

Factor 2, labelled the **'economic and structural'** constraint, comprised 5 variables and accounted for 15.25% of the variance. This constraint relates to finance, energy, lack of companionship, lack of knowledge and transport in engaging in leisure activities. Respondents also ranked these aspects 9th, 5th, 6th, 4th and 7th respectively. Studies undertaken by Searle and Jackson (1984) within a Canadian setting, revealed among others, that money, economic barriers such as equipment cost, admission fees and cost of transport, and lack of

knowledge about where they could learn about an activity were some of the key barriers to non-participation in leisure activities. It is acknowledged that in every society there are groups of individuals who, for various reasons, do not share the same wealth and social resources and thus are in a position of disadvantage (Jain, 2007:19). Unfortunately, in economic terms such reality cascades into the increasing importance of money in the fulfilment of leisure desires, which may also push the elderly to the periphery. The market is also flooded with leisure activities but they come at a high cost.

Lack of energy may be due to the reduction in their physical activity to participate in leisure activities. The lack of companionship also seems to be prevalent in other studies, which present a barrier that inhibits people from participating in leisure activities (Alexandris & Carroll, 1997). The lack of company may be explained by the generic phenomenon of isolation especially among the elderly and less stable social support (Rhodes *et al*., 1999) compared to the younger generation. Research evidence maintains that the lack of social support is an important determinant of leisure activity and may present a barrier to leisure participation (Orsega-Smith *et al*., 2007). Providers or sources for companionship and social support for older adults usually comprise family members, close friends, casual friends or acquaintances such as community group members. Such associations enable individuals to cope with stressful life events, which mitigate stress-related adverse health impacts (Sasidharan *et al*., 2006). The lack of companionship may be due the changes in the social sphere with respect to family composition and family arrangements (United Nations Department of Economics and Social Affairs, 2007), the fact that households and individuals are experiencing transitions from one family form to another and today‟s children and adults live in more diverse forms of household than previous generations (Kay, 2006). This results in greater variation in family living arrangements. As a consequence, families have become less stable and the family as a social institution has become less homogenous.

Factor 3 was labelled the **‘personal’** constraint comprised 3 variables and accounted for 9.69% of the variance. This constraint encapsulates spouse/family variation in leisure choices, the ageing process and poor health status of the elderly. Respondents ranked these constraints 10^{th}, 2^{nd} and 3^{rd} respectively. Searle and Jackson (1984) also found that an individual‟s physical status, whilst ranked 15^{th} in their study, was a barrier to some of the respondents. The ageing process and being left alone appears to be associated with withdrawal from leisure activities, based on the disengagement theory. The disengagement theory proponents argue that the older one gets, there is a tendency to withdraw from society, which is inevitable and intrinsic (Nimrod, 2007).

In summary, the 3 factors partially align with constraints model of Crawford and Godbey (1987). However, some of the variables crossed over 3 factors in the current study. Walker *et al*. (2007) also caution that constraints may differ across cultures. Shaw and Henderson (2005:31) asserted, “research involving people of different cultural backgrounds would greatly enhance the constraints literature”.

Constraints and demographic variables

An array of research on leisure constraints in different settings has illustrated that non-participation to leisure varies according to demographic variables. Hence, it was necessary to examine whether population groups vary in terms of leisure constraints.

For the purpose of analysis, only Whites and Africans were categorised and analysed as the

number of the Indian and Coloured sample was too small to draw any meaningful conclusions. Analysis of variance (ANOVA) was used for this purpose. In ANOVA, the F-test as illustrated in Table 3 is used to statistically evaluate the differences between the group means (Hair *et al*., 2000). In addition to statistical significance, practical significance using Cohen‟s d statistic (1988) was used.

TABLE 3: **ANALYSIS OF VARIANCE OF CONSTRAINTS AND POPULATION GROUPS**

Constraints		**Sum of Squares**	**df**	**Mean Square**	**F-value**	**Signifi-cance.**
Factor 1: (Time and security)	African vs White	14.822	3	4.941	3.450	0.021*
Factor 2 (Economic & structural)	African vs White	13.194	3	4.398	4.737	0.005*
Factor 3 (Personal constraints)	African vs White	4.526	3	1.509	1.249	0.299

* Significance p<0.05

Differences were identified between Factor 1 (time and security constraint) (F=3.450, p=0.021) and Factor 2 (economic and structural constraint) (F=4.737, p=0.005) between the two population groups. The third factor (personal constraints) showed no statistical differences between the population groups. It is as a result of the differences between groups in the first two constraints and population groups, that multiple post-hoc comparisons were

undertaken using Tukey HSD and Bonferroni tests to establish which groups differed significantly.

Multiple post-hoc comparisons are presented in Table 4. For the African respondents living in a semi-urban area, time and security (Mean=2.80) and economic and structural constraints (Mean=2.93) seem to be slightly higher compared to their White counterparts living in urban areas. Practical significant differences (Steyn *et al*., 2004) were found (medium and large effect size) between the African and White population groups with regard to both barriers to leisure participation. This may be due to the socio-economic status of those living in semi-urban areas. Chick and Dong (2003) also found that constraints differ depending on socio-economic status. Lack of essential networks and the social capital environment were also reported in other studies which impede on leisure participation by making the elderly insecure because of the risk of being exposed to crime (Lindström *et al*., 2003).

TABLE 4: **POST HOC MULTIPLE COMPARISONS - CONSTRAINTS AND POPULATION GROUPS**

Dependent variable (constraints)	**(I) Question 3** (African group)	**(J) Question 3** (White group)	**(I-J) Mean Difference**	**Statistical signifi-cance**	**Practical significance** **Cohen's d**	**Effect size**

Factor 1 (Time & security)	Mean=2.80	Mean=1.87	0.930*	0.017	0.7165**	Medium
Factor 2 (Economic & structural)	Mean=2.93	Mean=2.01	0.920*	0.002	0.9224**	Large

* Statistical significance p<0.05.
** Practical significance with at least a medium size effect

Significant differences between means using ANOVA were also found between Factor 2 (economic and structural constraint) (F=4.737, p=0.005) and levels of education (Table 5).

TABLE 5: **ANALYSIS OF VARIANCE – CONSTRAINTS AND LEVEL OF EDUCATION**

Variables (constraints)		**Sum of Squares**	**df**	**Mean Square**	**F-value**	**Signi-ficance**
Factor 1 (Time & security)	Levels of education	20.687	6	3.448	2.447	0.033*
Factor 2 (Economic & structural)	Levels of education	20.251	6	3.375	3.899	0.002*
Factor 3 (Personal)	Levels of education	16.014	6	2.669	2.443	0.034*

* Significance p<0.05

Post-hoc multiple comparisons in Table 6 revealed that differences were found between respondents in Grades 7-11 (Mean=3.30) and respondents with a honours degree (Mean=1.97); respondents in Grades 7-11 (Mean=3.30) and respondents with a degree (Mean=2.26); respondents with a primary school education (Mean=3.40) and respondents with a Master‟s degree (Mean=1.40) with regard to Factor 2. Practical significant differences were also found (large effect size) between the African and White population groups with reference to economic and structural barriers.

TABLE 6: **POST HOC MULTIPLE COMPARISONS - CONSTRAINTS AND LEVEL OF EDUCATION**

Dependent variable (constraint)	**(I) Question 5** (Level of education)	**(J) Question 5** (Level of education)	**(I-J) Mean Difference**	**Statistical significance.**	**Practical significance Cohen's D**	**Effect size**
Factor 2 (Economic & structural)	Primary school Mean=3.40	Masters Mean=1.40	2.000*	0.050	3.3960**	Large
	Grade 7-11 Mean=3.30	Honours Mean=1.97	1.900*	0.010	1.1489**	Large
	Grade 7-11 Mean=3.30	Degree Mean=2.26	1.044*	0.037	0.9019**	Large

* Statistical significance p<0.05
** Practical significance with at least a medium size effect

In all instances those respondents with a lower level of education seem to find the impact of economic and structural constraints greater compared to those respondents with a higher level of education. Previous studies affirm that leisure constraints have also been found to vary in relation to education (Alexandris & Carroll, 1997). People with a higher level of education have been found to experience a lower level of constraints. Lindström *et al*. (2003) also revealed that internal barriers such as lack of motivation, lack of time are common among people in higher education groups, whereas lack of money and transport are common in lower education groups.

Constraints to leisure activities have been reported in previous studies appear to vary in terms of gender. Significant differences using ANOVA were identified between respondents regarding Factor 1 (time and security constraint) (F=3.066, p=0.034) and Factor 2 (economic and structural constraint) (F=4.736, p=0.005) and gender were found. These results are shown in Table 7.

TABLE 7: **ANALYSIS OF VARIANCE - CONSTRAINTS AND ETHNIC AND GENDER GROUPS**

Factors (constraints)		**Sum of Squares**	**df**	**Mean Square**	**F-value**	**Signifi-cance.**
Factor 1 (Time & security)	Ethnic & gender	13.695	3	4.565	3.066	0.034*
Factor 2 (Economic & structural)	Ethnic & gender	13.875	3	4.625	4.736	0.005*
Factor 3 (Personal)	Ethnic & gender	4.576	3	1.525	1.166	0.330

* Statistical significance p<0.05

Post-hoc multiple comparisons in Table 8 revealed that differences were found between African males (Mean=2.72) and White males (Mean=1.79); African males (Mean=2.72) and Africa females (Mean=2.88) with regard to Factor 1 (time and security constraint). Differences were also found between African males (Mean=2.87) and White males (Mean=1.87); African females (Mean=2.99) and White males (Mean=1.87) with regard to Factor 2 (economic and structural constraint). In all instances African female respondents seem to be more affected by time, security, economic and structural constraints compared to their African male and White male counterparts. Practical significant differences were found (medium effect size) between African and White males with reference to time and security constraints. Practical significant differences were also found (large effect size) between African and White males, African females and White males with reference to economic and structural constraints.

TABLE 8: **POST HOC MULTIPLE COMPARISONS – CONSTRAINTS AND GENDER AND ETHNIC GROUPS**

Dependent variables (constraints)	(I) (Ethnic gender)	(J) (Ethnic gender)	(I-J) Mean difference	Statistical Signifi-cance	Practical significance Cohen's D	Effect size
Factor 1 (Time & security)	1 (African-male) Mean=2.72	3 (White-male) Mean=1.79	0.9390*	0.027	0.7750**	Medium
	2 (African-female) Mean=2.88	3 (White-male) Mean=1.79	-1.0930*	0.011	0.1130	No effect
Factor 2 (Economic & structural)	1 (African-male) Mean=2.87	3 (White-male) Mean=1.87	1.0124*	0.018	0.9728**	Large
	2 (African-female Mean=2.99	3 (White-male) Mean=1.87	1.1338*	0.007	1.1375**	Large

* Statistical significance $p<0.05$

** Practical significance with at least a medium size effect

Researchers through the years have also revealed that women face more intense leisure constraints than men, which results from lack of time (Jackson & Henderson, 1995; Alexandris & Carroll, 1997; Jackson, 2005). These authors suggest that a women‟s place within society, their roles and responsibilities often limit their freedom of choice. Furthermore, women experience the lack of technical skills (driving and financial resources) more intensely than men (Harrington & Dawson, 1995).

Regarding the synthesis of women within the African continent, Hunter and May (2003) identified a range of roles in which older females feature as prominent actors as child-minders for employed family members with children. The authors accentuate that approximately 42% of African households are female headed and that 17% of these are granny households in which the female household head is the grandmother rather than the mother of the children in her care. This arrangement is largely as a result of the increasing incidence of HIV/AIDS pandemic where older persons are filling in the role of carers for those suffering from terminal diseases. Su *et al*. (2006) found that rural elderly residents were more occupied by responsibilities as caregivers, such as attending to children and doing housework during the day. Accordingly, they reported less participation in recreational activities that entertain personal interest.

In summary these are just a few startling developments on the changing face of the South African family, without delving into the poverty status of families. Such burden may therefore impact on the available time for older people to engage in leisure activities (Dhurup, 2008). It seems that this phenomenon of the disintegration of family life as a nucleus has started to replace the traditional norm in which all South Africans have so long cherished. Notwithstanding such developments, challenges and threats are posed in the risk of a wake of a dysfunctional society, which may have far reaching implications for the Government and Non-profit Organisations (NPO‟s) in terms of the necessary support structures.

Reliability and validity

The standardised Cronbach α was 0.810 for the entire scale and the reliability for the

individual factors was 0.79, 0.75 and 0.62 respectively. While the first two factors were above the acceptable levels of 0.70, the third factor was marginally acceptable (Nunnally & Bernstein, 1994; Malhotra, 2004). The Cronbach alpha values are not unusual as other studies on constraints also revealed values between 0.61 and 0.58 when research was undertaken among different cultures (Walker *et al*., 2007) in exploratory studies.

Two types of validity tests were performed namely, content and construct validity. Content validity was ascertained by pre-testing the questionnaire and a review of the questionnaire by the sport management academics and a statistician. In addition, a pilot test was undertaken where changes were made to the questionnaire regarding the deletion of items, addition of items, rewording and rephrasing of questions. Construct validity of the scale was assessed by the computation of the Cronbach alpha coefficient for the scale. In addition, factor analysis was performed on each of the constructs to determine what percentage of variance is explained by the factor. The results indicated that the three factors (time and security, variance explained=36.64%; economic and structural, variance explained=15.25%; personal,

variance explained=9.69%) accounted for approximately 62% of the variance explained thus inferring construct validity.

RECOMMENDATIONS, LIMITATIONS AND CONCLUSION

Three factors were generated from the study that addresses barriers to leisure time activity among the elderly. The three factors, time and security, economic and structural and personal constraints may be able to provide leisure and recreation practitioners with important cues on users and non-users of leisure activities among the elderly. The information may also assist in understanding what attracts people to participate and what keeps the elderly away from participating in leisure activities.

Family and social networks with friends need to be harnessed. Research has been consistent in demonstrating the positive impact of shared leisure experiences on the quality of life of the elderly (Orthner & Mancini, 1991). Leisure is a form of a social network for the development and expression of relationships among family and friends. Positive relationships through social networks can contribute to the well-being of the elderly. Visits by family and friends on a regular basis, being together and sharing auspicious or religious occasions and sending gifts may assist in improving the loneliness of the elderly. The fact that the elderly are ageing and prefer to be left alone was ranked second of the constraints is a cause for concern. Active leisure in various forms is encouraged in resisting stereotypical images of later life, particularly the negative script of ageing (Dupuis, 2006). In the case where the elderly distance themselves from participation and challenge the negative script of later life should use active participation in leisure. Leisure should be pursued as an alternative to what it means to grow old and as a means of redefining new scripts of ageing. Hence, leisure should be used as a social empowerment tool for later life.

It is evident that time, security, economic and structural constraints prevail among South Africans with moderately higher levels of constraints experienced by Africans. Such evidence points to a direction that leisure and recreational endeavour know no boundaries. It is about thought, space and congeniality, and above all, a will to create conducive environments for the elderly to harness their lives in later years. Such evidence, whilst limited in terms of generalisation because of the small sample size, may nevertheless provide fertile grounds for

leisure and recreational officials to re-visit their current modes in the provision of leisure activities.

While the SANGALA initiative, since its inception in 1996, provided some relief for many disadvantaged communities, much still remains to be done for the elderly. According to the predictions of the United Nations (Department of Economic and Social Affairs, 2007) at least until 2050, the older population is expected to continue growing faster than the population in other age groups. These implications may have far-reaching economic and social consequences in most countries, including South Africa. Writing a statement for leisure and recreation policy within the government is necessary for sustainable action in leisure activity among the elderly.

Levels of education also appear to influence leisure participation as those respondents with a lower level of education reported lower levels of participation in leisure activity. This scenario is not uncommon from findings of previous research. Jain (2007:23) appropriately encapsulates the educationally marginalised societies in terms of leisure participation with the following phrase: "as we move from an economy of scarcity to one of abundance, the blow falls heaviest on the uninformed, the untrained and the uneducated in one phrase, the socially disadvantaged". Hence, there is a dire need for leisure and recreational policy makers to integrate the advocacy of leisure in marginalised communities, especially the elderly with low levels of education in order to improve quality of life. Advocacy may take the form of elderly education on issues such as living healthily and the need for basic health and physical activity.

This study is not without its limitations. A larger sample size is necessary to generate results that are applicable to the wider population. A comprehensive effect of cultural constraints, apart from two major population categorisations, namely African and White, may provide revelations in terms of constraints to leisure activity. Further studies including differentiation on the basis of South African diverse language, religious background and cultural practices may provide possibilities for future research. The analysis reported in this study is cross-sectional in nature. A longitudinal study is needed to deepen our understanding of the casual and predictor variables of constraints in leisure participation among the elderly. The study, due to its exploratory nature, examined constraints to leisure activity among the elderly in general. Further research on barriers to physical activity among the elderly will enhance our understanding of constraints.

With the current economic uncertainties gripping the western world, which also impacts on the local economy and local communities, pro-active measures are necessary so that such economic meltdowns cause no further erosion of services to the elderly. The late and erstwhile Minister of Sport and Recreation, Steve Tshwete, viewed older persons as torch bearers of the nation and commented that "if their torches would lose its light, it will become dark for the young" (Eckley, 2006:24). The provision of leisure is not about opulence; it is about providing the basic necessities for nurturing the elderly for their vulnerability to constraints in our fledgling democracy and leaving negative episodes for those yet to enter this chapter of their lives. Perhaps behind every cloud there is a silver lining. It is hoped that the sun will shine for this generation in their golden years ahead.

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TEAM PERFORMANCE AND SPORT ATTENDANCE OF SOUTH AFRICAN SUPER RUGBY AND CURRIE CUP RUGBY FANS

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ABSTRACT

To compete successfully in the expanding sport market, sport marketers need a thorough understanding of sport consumers, who include sport participants and sport spectators. Sport spectators are, in many instances, fanatical about the performance and success of their teams. It is thus obvious that ultimately their satisfaction with the experience of attending sporting events will be an important predictor of whether they will attend future events. Understanding the factors that influence spectator attendance is fundamental to understanding decisions about sport consumption. In professional rugby, competitions such as the Super Rugby and Currie Cup benefit from the lucrative money-generating opportunities offered. This study focuses on team performance and spectator attendance of the Super Rugby and Currie Cup competitions. Results indicated some interesting relationships between team performance and spectator attendance, and that a team's final log position could predict future spectator attendance.

Key words: Team performance; Sport attendance; Spectators; Rugby; Fans; Marketing.

INTRODUCTION

Marketing practices have also become part of traditionally non-business organisations, causes and issues. One area where the application of marketing principles has gained considerable attention globally is the marketing of sport and marketing through sport. The production, distribution and consumption of sport have characteristics unique to sport, and these characteristics make the marketing of sport quite a challenge (Irwin *et al*., 1999:1). Both marketing sport and marketing through sport have become well-known examples of spectacular marketing campaigns and applications of marketing principles. The annual Superbowl Final is an example of such an event.

Sport competes with various other forms of entertainment for the attention and money of consumers. Today, the role of marketing is well entrenched as a means to provide in the financial needs of sport bodies and teams. It is probably correct to say that initially most sport teams or leagues used to rely on ticket sales at the gate to meet financial obligations. Today, professional sport receive income from a wide range of sources, depending on the popularity of the sport and the level at which the sport is operating, namely local, regional or international, and where the level is not confined to particular geographic boundaries.

Examples of the latter would be soccer and rugby in England, and baseball and ice hockey in Northern America. Sources of income today include television and various other media

revenues (Chandler, 1991; Rowe, 1995), the selling of merchandise and clothing (Steinbreder, 1992; Gorman & Calhoun, 1994; Burton, 1996;), sponsorships (Grimm, 1993; Schaaf, 1995; Cousens & Slack, 1996), and the letting of stadiums to other sport such as soccer teams playing matches in rugby stadiums.

The fact that sport potentially has access to various sources of finance has led to a vicious circle of players demanding more and more money (together with the administrators' perks), and sport bodies are forced to raise ticket prices and explore more avenues for finances. As an example of how much sportsmen earn, one can refer to David Beckham who earned $40 million between May 2010 and May 2011 (Highest paid footballers, 2011). The Springbok rugby players who were part of the squad who won the World Cup in 2007 also benefited handsomely from their success. It was reported that the most popular Springbok players were paid up to R1 million for each product or service endorsement because of their Rugby World Cup success (Boks to become cash cows, 2007). This amount is apart from the R1 million per player that SA Rugby paid to the members of the Springbok team who won the cup. It is not difficult to calculate how many spectators should attend matches and what incomes should be derived from sponsorships and other deals to pay such salaries. In 2004, Sasol announced that it would sponsor SA Rugby over the next six years to the tune of R120 million, and so became the official team sponsor of the Springboks, the SA "A" team, the Springbok Sevens, and the Under-21 team (Sasol invests R120 million in SA rugby, 2004). The most recent sponsorship of Springbok rugby by ABSA is worth R50 million per year for a period of five years (Absa new Springbok sponsor, 2011).

The number of sport spectators is important when sponsorships are negotiated and when decisions related to advertising and promotions have to be made. Individual players are often major draw cards to lure supporters, for instance, Real Madrid paid Manchester United as much as €94 million for Cristiano Ronaldo (*New York Times*, 2009). Television broadcasts and the sale of merchandise are most probably the biggest income generators of many sport bodies. Ticket sales, directly dependent on the number of spectators attending a game, are also big money. Real Madrid's total revenue for 2009 was €401 million. This achievement made them the first sport team ever to generate revenue of more than €400 million in a year (Houlihan *et al*., 2010). Almost a quarter of Real Madrid's income in 2009 (€101.4 million) came from ticket sales. Even in South Africa, top rugby franchises such as the Sharks regard ticket sales as a major income generator (Lamberti, 2002).

SPORT SPECTATORS AND SPORT ATTENDANCE

One common denominator in the marketing of sport, which directly or indirectly affects most of the income-producing activities, is the number of spectators who attend games, watch television broadcasts, and purchase merchandise to illustrate their affiliation with a team. In sport marketing, sport consumers consist of sport spectators (also known as "fans") and sport participants (Wakefield, 2002:1). Sport participants are people who participate in sport (Shank, 2002:145) and sport spectators or fans are defined as people who (Wakefield, 2002:1):

- identify with and follow the behaviour or actions of a team and/or individual players of sport teams on or off the field;

- purchase the licensed merchandise of sport teams;

- buy season tickets;
- travel to watch the games of a specific team outside of their geographical area; and
- devote significant social time attending, watching and discussing a team with others who are committed and devoted to the same or other teams.

The extent to which sport spectators are interested in and follow sport and sport teams ranges from occasionally watching a televised game or attending a live event, to owing season tickets and attending or watching as many games as possible (Funk & James, 2001). Wann and Branscombe (1990) believe that sport spectators identify with a team in order to feel a sense of belonging to a larger social structure.

FAN IDENTIFICATION

According to Tajfel (1982), the way an individual (or in this case sport spectator) feels about belonging to a specific social group and the emotional attachment that occurs whilst being a member of that group are referred to as social identity. Social identity refers specifically to those aspects of a person that are defined in terms of his or her group memberships (Deaux, 2002). It enables people to distinguish themselves from other groups because they identify with a particular group(s). Tajfel and Turner (1979 in *Social Identity Theory*, 2010:2) identify three variables whose contribution to the emergence of in-group favouritism is particularly important:

- firstly, the extent to which individuals identify with an in-group to internalise such group membership as an aspect of their self-concept;
- secondly, the extent to which the prevailing context provides ground for comparison between groups; and
- finally, the perceived relevance of the comparison group, which itself will be shaped by the relative and absolute status of the in-group.

Individuals are likely to display favouritism when an in-group is central to their self-definition and a given comparison is meaningful or the outcome is contestable.

Dionisio *et al*. (2008:19) point out that, in respect of sport fans, "the primary assumption of the social identity theory is that individuals will seek to resolve attitudes that are not balanced or equitable" and go on to emphasise that the phenomenon of basking in reflected glory (BIRG) is well known and serves to mirror the psychological character of fandom and the basis of explicit triumph. Then again, when a team fails, fans tend to dissociate themselves through a process labelled "cutting off reflected failure" (CORF) (Snyder *et al*., 1986).

Wann and Branscombe (1990) showed how identification with a sport team positively influenced the self-concept of sport fans. For example, a rugby supporter's self-concept can be expressed as follows: "I am a South African, I am male, I am a Bulls supporter." High self-esteem is achieved through motivation and it is maximised through creative social comparison. An example of the latter is the selection of dimensions on which the individual's group excels, for instance: "The least tries were scored against the Stormers" or "the Sharks scored the most tries in the 2011 Super 15 competition". When a number of particular groups

compare the group with "worse" groups, the group-esteem is enhanced and consequently association improves the member's self-esteem.

One result of a strong connection to a sport team is that an individual feels a sense of personal success when the team wins and a sense of loss when the team loses (Funk & James, 2001). Fans are informed about how their teams perform in respect of various measures. Each week of a competition, a new set of statistics is produced with the updates of the previous week's results. Apart from the reports in daily newspapers and television broadcasts, various Internet sites also keep track of the detailed statistics of teams' performances in the competition. Statistics such as games won or lost, points scored or scored against, number of tries scored or scored against and a team's points in the competition (or log standing) are aspects that sport fans follow and keep track of. According to the social identity theory, fans' behaviour will largely depend on the dimensions selected by fans to differentiate their team from those of competing teams.

TEAM PERFORMANCE AND SPORT ATTENDANCE

Many attempts have been made to better understand the factors that influence sport spectators to attend sporting events (Wells *et al*., 2000; Fink *et al*., 2002; Boyd & Krehbiel, 2003; Trail *et al*., 2003; Ferreira & Armstrong, 2004; Robinson *et al*., 2005). The main factors that were identified include psychological factors, economic variables, game attractiveness, and stadium factors (Shank, 2002; Boyd & Krehbiel, 2003; Ferreira & Armstrong, 2004). Specifically, game attractiveness is a situational factor that varies from game to game and from week to week. Game attractiveness is influenced by the perceived quality of an opponent, the importance of the game and team performance, where *team performance* refers to the team's actual performance on the field (in sport terms, games won or lost, points scored or scored against, number of tries scored or scored against, and a team's points in the competition or log standing).

Winning and spectator attendance probably go together for most sports teams, but the direction of causation is not unmistakable in a particular direction (Davis, 2008). Stated otherwise, does winning go hand-in-hand with an increase in attendance, or does an increase in attendance result in more wins as teams have more resources to spend on players' compensation? In a study of major baseball teams, Davis (2008:1) found "that the direction of causation runs from team success to greater attendance, and that an … increase in fans does not" necessarily result in more wins later on.

Since the needs and demographics of sport consumers have become more complex, and competition for spectators' support has increased, the demand for professional sport marketing has also grown (Mullin *et al*., 2000). Sport marketing demands a thorough understanding of sport consumers. For instance, understanding how fan identification impacts on spectators attending sport events is essential, and determining why spectators attend sport games is therefore necessary. A great number of studies have been conducted on team performance and spectator attendance (Wells *et al*., 2000; Fink *et al.*, 2002; Boyd & Krehbiel, 2003; Trail *et al*., 2003; Ferreira & Armstrong, 2004; Robinson *et al.*, 2005). Most studies focus on spectators' perception of their attendance behaviour (Jones, 1997; Shank & Beasley, 1998; Dietz-Uhler *et al*., 2000). In South Africa, however, research on spectator attendance is

limited. For example, since the introduction of Super Rugby in 1993, the performance of the South African Super Rugby teams has not been consistent; South African Super Rugby teams only won the competition in 1993, 2007, 2009 and 2010 (Rugby in South Africa, 2010). In spite of the fact that, during the Super 12 competition, no South African Super Rugby team won the tournament, South African viewership grew (Van der Berg, 2001:1). Even when viewership in New Zealand and Australia decreased, South African viewership and attendance of the Super Rugby matches increased (Ray, 2011). Team performance and the effect it has on sport attendance was the main focus of the study on which this article is based. Specifically, the team performance and sport attendance of two major rugby competitions, the Currie Cup and Super Rugby, were focused on.

THE SUPER RUGBY AND CURRIE CUP COMPETITIONS

The Currie Cup (only played in South Africa) is the oldest of its kind in rugby competitions (Currie Cup, 1999). Owing to South Africa's policy of separate development, the South African rugby team's participation in world rugby ended in 1981. South Africa was only readmitted into international competition in 1992. During this period of isolation, the Currie Cup became the passion of South African rugby (Currie Cup, 2000). Claassen (2001) states that the isolation contributed to a tradition of provincialism in South Africa.

Over the years, the Currie Cup has assumed various forms (Rugby in South Africa, 2010). Initially it was a centralised tournament, but thereafter all 14 provincial teams were divided into two sections of seven teams each. Each section played a single round within the section and the top four teams in each section advanced to play for the ABSA Currie Cup, while the remaining three teams in each section played for the ABSA Cup (Roos, 2001:5). From 2003, the ABSA Currie Cup reverted to a strength versus strength format. It featured two sections, namely a top section of six teams and a lower section of eight teams. A double round of games is then played with the top two teams in each pool qualifying for the finals (Currie Cup, 2002). Since the Currie Cup took on various forms, only the teams that featured most in finals and semi-finals during the last 10 years (i.e. Blue Bulls, Cheetahs, Lions, Natal Sharks and Western Province) were included in this study.

Super Rugby was introduced in 1993 and took on various forms: Super 10 (1993 to 1995), Super 12 (1996 to 2005) and Super 14 (Rugby in South Africa, 2010). From 2011 onwards, the Super Rugby competition will be called the Super 15. The Super competition was the first in which South African teams annually competed in an international competition directly below the level of national sides. South African rugby fans have always been regarded as fanatical, and the introduction of the Super competition offered the opportunity to identify the performance measures that bring fans to the rugby stadiums. One of the major challenges for the management of a Super side is to develop and maintain fan support for the team. Before the introduction of the Super competition, provincial players generally came from the geographical area which constituted the home of the team. With the introduction of the Super competition, players became professionals and started to move around from one team to another. "Local" fans thus had to become familiar and supportive of players joining their team, whom they previously might not have liked at all.

PROBLEM STATEMENT AND OBJECTIVES

Marketing success comes from identifying and meeting customer needs or wants (Rix,

2004:10). This also holds true for companies who want to compete successfully in the expanding sport market, where a thorough understanding of sport consumers is essential (Shank, 2002:145; Wysong, 2002:1). It can thus be stated that satisfaction with the experience of attending a sporting event and team performance is likely to be important when predicting the likelihood of spectators attending future events (Matsouka, 2003). A comprehension of the factors that influence sport consumers' preferences and behaviour is essential to understand their sport consumption decisions (Ferreira & Armstrong, 2004).

For many years, South African sport was characterised by passion and pride of mainly White spectators, especially for local brands, because of the international sport boycott. With the introduction of professionalism and the commercialisation of rugby, the focus has shifted to regional teams that compete internationally (Basson, 2003:16; Rugby in South Africa, 2010). Even though a popular belief amongst sport marketers is that winning teams attract great crowds, little research has been conducted in South Africa to confirm this notion. There seems to be a paucity of research in respect of sport spectators' consumption behaviour in South Africa. The primary purpose of this study was to assess the relationship between team performance and sport attendance. Even though some research has been conducted on the specific topic, researchers have attempted to explain the relationship between team performance and sport attendance by interviewing sport spectators. This study proposed a different methodology to assess the relationship between team performance and sport.

METHODOLOGY

To achieve the objective of this study a meta-analysis of match results was performed. A meta-analysis is a statistical technique for amalgamating, summarising and reviewing previous quantitative research. A meta-analysis allows the researcher to investigate a wide variety of questions on condition that a reasonable body of primary research studies exists. The purpose of a meta-analysis is to integrate the findings of earlier results to uncover new insights relevant to a particular phenomenon. For purposes of this study, the spectator attendance figures for the 2000 to 2005 Currie Cup games, as well as South African Super 12 home games from 2000 to 2005 were used as the dependent variable (as the Currie Cup as well as the Super Rugby competitions took on various formats, only the period 2000 to 2005 provided data that were comparable for purposes of this study). The performances of the Blue Bulls, Cheetahs, Lions, Natal Sharks and Western Province (i.e. 2000–2005 Currie Cup competition), as well as the Bulls, Cats, Sharks and Stormers (2000–2005 Super 12 tournament) were therefore analysed (Colquhoun, 2001; Colquhoun, 2002; Colquhoun, 2003; Colquhoun, 2004; Colquhoun, 2005; Colquhoun, 2006). Since only attendance figures of the home games for the Super 12 tournament were available, only home games were taken into account. Semi-finals and finals were not taken into consideration.

In an endeavour to achieve the objective of this study, namely to assess the relationship between spectator attendance and team performance, team performance was measured by investigating the actual performance of rugby teams on the field. Team performance measures which were studied consisted of number of games won by the relevant team,

number of games lost by the team, actual points scored by the relevant team, actual points scored against the team, number of tries scored by the team, number of tries scored against the relevant team, and final points at the end of the competition (i.e. competition points). The following hypotheses were postulated:

H_1: A positive relationship exists between spectators' attendance and number of games won by the particular team

H_2: A negative relationship exists between spectators' attendance and number of games lost by the team

H_3: A positive relationship exists between spectators' attendance and points scored by the particular team

H_4: A negative relationship exists between spectators' attendance and points scored against the team

H_5: A positive relationship exists between spectators' attendance and number of tries scored by the team

H_6: A negative relationship exists between spectators' attendance and number of tries scored against the particular team

H_7: A positive relationship exists between spectators' attendance and tournament points

H_8: The variance in spectator attendance can be explained by team performance variables (i.e. number of games won and lost, points scored by and against a team, number of tries scored by and against a team and tournament points)

Pearson's product moment correlation was used to test H_1 to H_7. Simple linear regression was used to test H_8. The significance level of 0.05 was considered sufficient (α =0.05).

RESULTS

Since this study focused on spectator attendance and game attractiveness of South African Super 12 and Currie Cup teams, only the performances of South African teams were investigated. A summary of the actual team performance results of the Bulls, Cats, Sharks and Stormers is given in Table 1.

TABLE 1: **ACTUAL PERFORMANCE OF SOUTH AFRICAN SUPER 12 TEAMS 2000-2005**

	Variables	N	Min.	Max.	Mean	Std. Dev.
Bulls	Number of games won	6	0	7	3.50	2.881
	Number of games lost	6	2	11	6.00	3.347
	Points scored by the relevant team	6	231	320	271.17	40.701
	Points scored against the team	6	229	500	361.17	89.584
	Number of tries scored by the team	6	19	36	29.83	6.494
	Number of tries scored against	6	25	67	44.17	13.541
	Final tournament points	6	4	34	19.67	12.469
	Number of games won	6	1	7	3.17	2.994
	Number of games lost	6	0	10	7.00	4.099

	Points scored by the relevant team	6	226	320	268.67	37.713
	Points scored against the team	6	244	459	361.33	75.804
	Number of tries scored by the team	6	23	34	27.17	4.792
	Number of tries scored against	6	17	59	41.50	14.869
	Final tournament points	6	6	34	18.17	11.788
Sharks	Number of games won	6	1	8	3.67	2.658
	Number of games lost	6	1	9	5.67	3.077
	Points scored by the relevant team	6	205	322	248.50	41.549
	Points scored against the team	6	246	384	315.17	45.640
	Number of tries scored by the team	6	25	34	27.83	3.764
	Number of tries scored against	6	24	50	36.33	8.454
	Final tournament points	6	9	38	20.50	10.932
Stormers	Number of games won	6	3	7	5.17	1.329
	Number of games lost	6	1	7	5.00	2.191
	Points scored by the relevant team	6	215	310	273.67	34.273
	Points scored against the team	6	260	354	301.50	34.350
	Number of tries scored by the team	6	22	37	29.17	5.776
	Number of tries scored against	6	28	45	34.50	6.091
	Final tournament points	6	18	33	26.33	5.428

Given that a popular belief is that the Currie Cup is central to the passion of South African rugby focus (Currie Cup, 2000), investigating the team performance and attendance figures for the Currie Cup competition was essential in this study. As previously mentioned, the Currie Cup has taken on various forms. Only the attendance figures for the top five Currie Cup teams (during the relevant period) were therefore included. A summary of the actual team performance results of the Blue Bulls, Cheetahs, Lions, Natal Sharks and Western Province (WP) are given in Table 2.

TABLE 2: **ACTUAL PERFORMANCE OF CURRIE CUP TEAMS 2000-2005**

	Variables	**N**	**Min.**	**Max.**	**Mean**	**Std. Dev.**
Blue Bulls	Number of games won	6	12	21	18.00	3.347
	Number of games lost	6	0	7	4.50	2.429
	Points scored by the relevant team	6	760	1061	940.83	125.653
	Points scored against the team	6	509	665	624.50	60.285
	Number of tries scored by the team	5	89	142	120.00	23.054
	Number of tries scored against	5	55	80	71.40	9.864
	Final log position	5	1	10	4.60	3.912
Cheetahs	Number of games won	6	12	16	14.17	1.472
	Number of games lost	6	1	11	7.00	3.406
	Points scored by the relevant team	6	717	987	805.17	94.641
	Points scored against the team	6	464	746	600.83	93.779
	Number of tries scored by the team	5	81	189	108.60	45.357
	Number of tries scored against	5	52	91	70.60	14.673
	Final log position	5	2	5	3.60	1.140

Lions	Number of games won	6	11	19	14.83	3.061
	Number of games lost	6	1	9	6.17	2.927
	Points scored by the relevant team	6	701	911	812.33	90.831
	Points scored against the team	6	560	654	621.17	39.807
	Number of tries scored by the team	5	78	112	98.00	14.629
	Number of tries scored against	5	68	71	69.60	1.517
	Final log position	5	3	4	3.40	0.548
Natal Sharks	Number of games won	6	7	15	11.83	2.639
	Number of games lost	6	1	13	7.67	3.933
	Points scored by the relevant team	6	565	744	652.00	77.967
	Points scored against the team	6	432	586	525.33	57.200
	Number of tries scored by the team	5	67	94	81.00	13.210
	Number of tries scored against	5	44	70	58.60	10.431
	Final log position	5	1	5	2.20	1.643
WP	Number of games won	6	7	21	13.33	4.676
	Number of games lost	6	0	12	6.83	4.215
	Points scored by the relevant team	6	584	964	743.17	125.085
	Points scored against the team	6	491	659	585.83	72.112
	Number of tries scored by the team	5	67	121	93.00	19.429
	Number of tries scored against	5	53	77	64.80	9.628
	Final log position	5	1	5	2.60	1.517

Since attendance figures are classified confidential information that is used by sport marketers to negotiate sponsorship deals and contracts, the researchers were asked not to publish the data relating to attendance.

Hypothesis testing: Relationship between spectator attendance and team performance

The objective of this study was to assess the relationship between spectator attendance and team performance. Table 3 provides a summary of the findings.

TABLE 3: **PEARSON'S CORRELATION: TEAM PERFORMANCE AND ATTENDANCE FIGURES**

	HYPOTHESES		**Test statistic**	**H_0 rejected/accepted**
Supe	H_{1a}:	Number of games won	r= 0.685 ($p<0.05$)	H supported
	H_{2a}:	Number of games lost	r= -0.431 ($p<0.05$)	H supported
	H_{3a}:	Points scored by the relevant team	r= 0.450 ($p<0.05$)	H supported
	H_{4a}:	Points scored against the team	r= -0.688 ($p<0.05$)	H supported
	H_{5a}:	Number of tries scored by the team	r= 0.366 ($p>0.05$)	H not supported
	H_{6a}:	Number of tries scored against	r= -0.650 ($p<0.05$)	H supported

	H_{7a}:	Final tournament points	r= 0.712 (p<0.05)	H supported
Currie Cup	H_{1b}:	Number of games won	r= 0.368 (p<0.05)	H supported
	H_{2b}:	Number of games lost	r= -0.063 (p>0.05)	H not supported
	H_{3b}:	Points scored by the relevant team	r= 0.298 (p>0.05)	H not supported
	H_{4b}:	Points scored against the team	r= -0.051 (p>0.05)	H not supported
	H_{5b}:	Number of tries scored by the team	r= 0.145 (p>0.05)	H not supported
	H_{6b}:	Number of tries scored against	r= -0.203 (p>0.05)	H not supported
	H_{7b}:	Final log position	r= 0.650 (p<0.05)	H supported

Table 3 clearly illustrates that, in respect of Super 12 Rugby, only in the case of $H_{5a,}$ the hypothesis (i.e. no relationship between number of tries scored and attendance figures) could not be supported. The remaining hypotheses were supported. Number of games lost showed a moderate negative relationship with attendance figures (r = -0.45), and points scored by the relevant team showed a moderate positive relationship with attendance figures (r = 0.45). Points and tries scored against the team displayed strong negative relationships (r = -0,688 and r = -0.650 respectively), whereas number of games won and final tournament points showed strong positive relationships with attendance figures (r = 0.685 and r= 0.712). One could therefore conclude that, in the Super 12 case, team performance on the field, the number of games won, points scored by teams and specifically the final log standing of teams, influenced spectators to attend games. However, if teams allow opponents to score tries, lose and specifically give up points, spectators are less likely to attend games.

The results showed differences between the Super 12 and Currie Cup data. The hypotheses of H_{2b}, H_{3b}, H_{4b}, H_{5b} and H_{6b} could not be supported for Currie Cup rugby. This implies that, in the case of Currie Cup games, the number of games lost, points scored by the relevant team, points scored against the team, number of tries scored by the team and the number of tries scored against a team do not have a significant relationship with the attendance of games. Only the number of games won and specifically final log position showed significant positive relationships with attendance figures (r = 0.368 and r = 0.650 respectively). One could therefore conclude that in Currie Cup games, spectators attend games only if their teams are doing well and winning in the competition.

Hypothesis testing: Variance in spectator attendance

The final hypothesis in this study stated that variance in sport attendance can be explained by team performance variables (i.e. number of games won and lost, points scored by and against a team, number of tries scored by and against a team and tournament points predicted). The hypothesis was tested by performing a simple linear regression analysis for Currie Cup and Super 12 competitions. Both models were not significant ($p < 0.05$). Table 4 gives a summary of the findings of the regression analysis.

TABLE 4: **REGRESSION: TEAM PERFORMANCE VARIABLES AND ATTENDANCE FIGURES**

VARIABLE	**t-value**	**p-value**

Super 12	(Constant)	1.858	0.081
	Number of games won	-0.534	0.600
	Number of games lost	0.113	0.911
	Points scored by the relevant team	-0.491	0.630
	Points scored against the team	-0.410	0.687
	Number of tries scored against	0.224	0.825
	Final tournament points	1.029	0.318
Currie Cup	(Constant)	1.308	0.214
	Number of games won	-1.355	0.198
	Number of games lost	-.0170	0.868
	Points scored by the relevant team	0.570	0.578
	Points scored against the team	0.850	0.411
	Number of tries scored against	-0.368	0.719
	Final log position	-0.756	0.463

None of the variables are significant, and could therefore not be used to explain variance in sport attendance. Stepwise regression was performed to eliminate nonsignificant variables. For the Super 12 competition, results showed that final tournament points predicted variance

in sport attendance ($p < 0.05$, adjusted $R^2 = 0.485$). For the Currie Cup, final log position predicted variance in sport attendance ($p < 0.05$, adjusted $R^2 = 0.35$). One could therefore conclude that variance in sport attendance can be explained by the performance of teams according to their final tournament points. Table 5 gives a summary of the stepwise regression findings.

TABLE 5: **STEPWISE REGRESSION: TEAM PERFORMANCE VARIABLES AND ATTENDANCE FIGURES**

		Model Summary			**Anova**	**Coefficients**		
	Predictor	**R**	**R^2**	**Adjusted R^2**	**F (df)**	**B**	**Beta**	**t**
Super 12	Dependant variable: Spectator attendance							
		0.621	0.385	0.351	11.272* (1)			
	Final log position					-1944.49	-0.621	-3.357*

Currie Cup		0.656	0.431		0.406	17.393* (1)		
	Final log position						-18004	-0.656	-4.140*

* Significant at the 99% confidence level

From the above it is clear that, in the case of the Super 12 competition, rugby teams should attend to most of the "components" that constitute team performance. In the Currie Cup competition, however, teams need to win. Components such as tries scored are irrelevant to fans. This finding could be ascribed to the fact that, when comparing Currie Cup and Super Rugby teams fans identify stronger with Currie Cup teams as these teams are "local" and have a long tradition. Historically, the core players in Currie Cup teams were local people with whom spectators associated easily. The Super teams have yet to become strong and preferred brands.

CONCLUSION

To be successful in sport marketing, sport marketers have to understand both the nature of sport marketing and the specific application of marketing principles and processes to the sport context (Parkhouse, 2001). To complicate matters, three things are happening simultaneously: the needs and demographics of sport consumers have become more complex, competition for the spectators' support has increased, and the demand for professional sport marketing has also grown (Mullin *et al.*, 2000). More attention needs to be paid to developing a theory of sport consumption (McDonald *et al*., 2002), in particular the way fan identification impacts on spectators attending sport events (Wysong, 2002).

The main objective of this study was to assess the relationship between team performance and sport attendance by following a different methodological approach than previous research. Specifically, a meta-analysis was performed on sport attendance and team performance of the Currie Cup and South African Super Rugby competitions. Team performance was measured by assessing the actual performance of the Currie Cup and the South African Super Rugby teams on the field (i.e. number of games won, number of games lost, points scored by the relevant team, points scored against the team, number of tries scored, number of tries scored against the team, and final tournament points). Results showed that, in the case of the Super Rugby competition, a significant relationship existed between the number of games won, points scored by teams and the final log standing of teams and spectator attendance. In the Currie Cup competition, results showed a significant relationship between spectator attendance and games won and final log position.

Even though results showed that a relationship does exist between team performance and sport attendance, only the final log position of a team (i.e. final points in the tournament) explained variance in spectator attendance (i.e. the higher the log position, the more spectators attended). It is, however, obvious that the final log position is a composite figure and depends on a number of "positives", such as points scored and games won by rugby teams. The notion that winning teams attract crowds is thus supported in this study. However,

the study has also shown that, in the case of the Super 12, poor performance on the field (i.e. tries and points scored against teams) will in fact lead to fans not attending games. This result supports Ray's (2010) comment that spectators want to see the best players playing their best rugby.

Sport marketers need a rational, coherent system that can match sport consumers to sport products (Mullin *et al.*, 2000:8). The results showed that for both the Currie Cup and Super Rugby tournaments team performance is essential. The results also revealed that spectator attendance decreased when Super Rugby teams performed not as good as could be expected on the field, but more so for Currie Cup games. One can conclude that the spectators' expectations of their teams were not as high in international competitions as in local competitions. Thus, to attract spectators to Super Rugby home games, teams should perform well on the field. They should score tries, get a good log standing and not give up points. However, in local competitions, like the Currie Cup, teams should win.

Understanding the factors that influence sport spectators' preferences and behaviour is fundamental to understanding sport consumption decisions. The current study assessed team performance only in South Africa, and only amongst rugby fans. Future research could be extended to other sport attendance factors such as economical, psychological and stadium factors, as well as other sport such as cricket and soccer.

The social identity theory has been proposed as a theory to explain the behaviour of fans. The findings in respect of fan behaviour for both the Super Rugby and Currie Cup competitions support the social identity theory. If a team performs well the fans attend games but when a

team fails, less fans attend games. The latter is also in line with the social identity theory which states that fans tend to dissociate themselves from a team when the team does not perform. The latter behaviour takes place through a process labelled "cutting off reflected failure".

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IMPACT OF PLACE ATTACHMENT AND RECREATION INVOLVEMENT ON SATISFACTION AND FUTURE BEHAVIOUR: EVIDENCE FROM TAIWANESE RECREATIONAL SURFERS

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ABSTRACT

Place attachment, recreation involvement and satisfaction are key indicators explaining future behaviour in nature-based recreation. This study examined a behavioural model using latent variables of place attachment, recreation involvement, recreation satisfaction and future behaviour of surfers. In total, 1140 usable questionnaires were collected using cluster sampling from July to August 2006 at Nanwan, Jiialeshuei, Miyuewan, and Jinshan beaches, Taiwan. Structural equation modelling using LISREL 8.70 for Windows was employed to examine the behavioural model. Empirical results indicate that place attachment significantly and directly affected recreation satisfaction and indirectly affected future behaviour. Moreover, place attachment significantly and directly affected future behaviour. Recreation involvement significantly and directly affected recreation satisfaction and indirectly affected future behaviour. However, recreation involvement had no impact on future behaviour. Recreation satisfaction significantly and directly affected future behaviour. Managers of surfing destinations maintain and protect coastal areas in order to ensure environmental quality, subsequently promoting place identity and place dependence for recreational surfers.

Key words: Behavioural model; Place attachment; Recreation involvement; Recreational surfer.

INTRODUCTION

Polynesians first engaged in recreational surfing at a beach in Tahiti in approximately

500AD. Around 1000AD, the Tahitians introduced surfing to the Hawaiians (Finney & Houston, 1996). As surfing is an activity largely pursued for pleasure during free time, surfing can be considered as a leisure and recreational activity (Smith, 1990; Lazarow *et al*., 2008; Phillips & House, 2009; Dredge, 2010). Surfing has recently become increasingly popular worldwide, especially in America, Japan, Australia and South Africa. In the 1960s, American soldiers introduced surfing to Taiwan. Surfing clubs were first established in 1979 to meet the recreational needs of American soldiers staying in Taiwan.

Literature on recreation, generally examined the relationships between place attachment and recreation involvement (Kyle *et al*., 2003; Kyle *et al*., 2004a; Hwang *et al*., 2005). Relationships between involvement and satisfaction (Hwang *et al*., 2005; Lee & Chang, 2012) and involvement and future behaviour have been examined for recreationists visiting

hiking trails and forest settings (Kyle *et al*., 2004a; Lee *et al*., 2007). However, these behavioural models have not been well examined in relation to recreational surfers.

PROBLEM

In view of a lack of research in this area related to recreational surfers, this study used place attachment, recreation involvement, recreational satisfaction and future behaviour as variables in developing a behavioural model for recreational surfers in Taiwan. The main purpose of this study was to examine how place attachment impacts satisfaction and future behaviour, as well as how recreation involvement impacts satisfaction and future behaviour for recreational surfers. Finally, this study presents data that support practical managerial implications and provides recommendations for further study.

This study presents the following research hypotheses based on related and completed empirical studies, which will be discussed in the literature review:

H_1: Place attachment significantly and directly affects recreation satisfaction (H_{1-1}), and significantly and indirectly affects future behaviour (H_{1-2});
H_2: Place attachment significantly and directly affects future behaviour;
H_3: Recreation involvement significantly and directly affects recreation satisfaction (H_{3-1}), and significantly and indirectly affects future behaviour (H_{3-2});
H_4: Recreation involvement significantly and directly affects future behaviour; and
H_5: Recreation satisfaction significantly and directly affects future behaviour.

LITERATURE REVIEW

This study developed and examined a behavioural theoretical model that represents how critical elements such as place attachment, recreation involvement, and satisfaction contribute to future behaviours. A brief overview of variables in the behavioural theoretical framework follows.

Place attachment

Place attachment is a positive or negative relationship a person has with a location and is often based on satisfaction and fulfilled expectations. Place attachment is a response generated by complex experiences associated with a place, creating an emotional bond (Williams *et al*., 1992; Kyle *et al*., 2003). In the field of recreation and leisure, place

attachment is embodied in emotions and feelings associated with a recreational setting (Hidalgo & Hernández, 2001). Many leisure scholars argue that place attachment is composed of place identity, which is a person's symbolic or affective attachment to a place, and place dependence, which is associated with the functionality of a place for a recreational activity (Williams *et al*., 1992; Hidalgo & Hernández, 2001; Kyle *et al*., 2003; Brown & Raymond, 2007; Yüksel *et al*., 2010).

Recreation involvement

Involvement, the degree to which an individual engages in an activity, can be based on the purchase or use of related products and services (Kerstetter & Kovich, 1997), participation

frequency (McIntyre & Pigram, 1992), and recreationist awareness of a recreational setting (Kyle *et al*., 2004b). Factors such as exterior prospects, personal values, needs, personality, and self-awareness affect the recreation involvement of individuals (Dimanche *et al*., 1991). Increased recreation or activity involvement leads to increased sensitivity to activity attributes, increased perception of activity importance, increased recreation commitment and, subsequently, increased loyalty to a recreation destination (Bricker & Kerstetter, 2000; Lee *et al*., 2007). Thus, studies of activity involvement have significant implications for understanding recreational and leisure behaviours. Leisure scholars have recently applied structural equation modelling (SEM) to examine the causal relationships between activity involvement and place attachment (Kyle *et al*., 2003; Hwang *et al*., 2005) and between activity involvement and destination loyalty (Iwasaki & Havitz, 2004; Kyle *et al*., 2004a; Lee *et al*., 2007; Lee & Chang, 2012). Therefore, recreation involvement is an important construct for interpreting recreationists' experiences and has been employed to explain recreationists' behaviours.

Recreation satisfaction

Satisfaction is regarded as the outcome of a comparison between customers' expectations and their actual experiences (Parasuraman *et al*., 1985). Satisfaction is an important indicator for assessing recreational activities and has garnered the interest of many scholars. It is important to assess the factors that impact satisfaction, as they may be plentiful, given the broad cultural diversity of recreationists (Cronin & Taylor, 1992). Conversely, recreation satisfaction is a significant predictor of choice of a recreational destination (Cole & Crompton, 2003) and destination loyalty (Kyle *et al*., 2004a; Lee *et al*., 2007; Lee, 2009a,b; Lee & Chang, 2012). Consequently, recreation satisfaction is considered an important variable in recreation and leisure studies.

Future behaviour

Future behaviour in this study is related to whether, after participating in an activity, a recreationist will choose to participate in that activity again. Recreationists typically express their loyalty to a recreational activity (Baker & Crompton, 2000). Repeat visits (or purchases), recommendations and positive word-of-mouth are manifestations of loyalty. Loyalty is recognised as a very useful indicator for assessing marketing strategies in the leisure industry (Baker & Crompton, 2000; Bigné *et al*. 2001; Um *et al*., 2006). Several leisure studies have employed leisure (activity) involvement (Kyle *et al*., 2004a; Lee *et al*., 2007; Lee & Chang, 2012) as an antecedent variable to assess and predict future leisure behaviour. The impact of this variable on future behaviour associated with different nature-

based recreational areas needs further clarification.

Development of the research model

Williams *et al*. (1992) indicated that recreationists typically have attachments to particular places that make them unlikely to choose other places for recreation. Moreover, when the attachment of recreationists to a place is high, their willingness to revisit that place is also high (Williams *et al*., 1992; Eisenhauer *et al*., 2000). Place attachment has served as a predictor of behavioural phenomena (Jorgensen & Stedman, 2001). For example, place attachment was used as an antecedent variable in assessing the behavioural loyalty of

recreationists of the Appalachian Trail (Kyle *et al*., 2004a). Additionally, Hwang *et al*. (2005) indicated that place attachment significantly impacted the interpretation satisfaction of recreationists visiting national parks. However, these causal relationships for recreational surfers have not been examined.

Considerable research indicates that recreation involvement reflects a recreationist's opinion of a recreational activity (Hwang *et al*., 2005; Lee *et al*., 2007; Lee & Chang, 2012). Consequently, recreation involvement is an important variable in discussing recreational experiences. Empirical studies have indicated that recreation involvement significantly impacts satisfaction in youth sport (Green & Chalip, 1998). Hwang *et al*. (2005) indicated that tourist involvement positively and significantly impacts the satisfaction of recreationists visiting national parks. Furthermore, some studies have demonstrated that activity involvement is the antecedent variable of destination loyalty (Iwasaki & Havitz, 2004; Kyle *et al*., 2004a; Lee *et al*., 2007; Lee & Chang, 2012).

Satisfaction often results in increased numbers of recreationists revisiting a destination and recommending a destination to other recreationists engaged in the same recreational activity (Bigné *et al*., 2001). Moreover, some scholars suggested that an individual can be attached to a place, but can simultaneously be dissatisfied with its current environmental quality (Stedman, 2002). Other scholars indicated that an individual needs to be satisfied with a place to want to revisit it frequently thereby building an attachment to the place (Tribe & Snaith, 1998). Consequently, if a person is satisfied with a place, she or he will likely form a place attachment and revisit that place. Empirical studies indicated that recreation satisfaction significantly impacts future behaviour associated with diverse leisure and recreation areas (Kyle *et al*., 2004a; Lee, 2007; Lee *et al*., 2007; Lee, 2009a,b; Lee & Chang, 2012). However, few studies have examined these relationships in the context of surfing.

METHODOLOGY

Study sites

Taiwan has many coastal areas suitable for surfing. The four main beaches are in Jinshan, Miyuewan, Jiialeshuei, and Nanwan. Jinshan is located on Taiwan's northern coast. There were 13 surfing clubs at the time of this study. Miyuewan, which is located on Taiwan's north-eastern coast, has a moon-shaped bay. As the undersea topography varies considerably, waves often reach heights of 2-3 meters. Miyuewan was home to seven surfing clubs at the time of this study. Jiialeshuei, located on the south-eastern coast, has a beach with good waves and a consistent climate. International surfing competitions were held in this area in

2006, 2007 and 2008, which is home to four surfing clubs. Nanwan, located in southern Taiwan, is a famous beach and recreational area. Nanwan had two surfing clubs at the time of this study. These four sites were selected for this study because they are considered the most popular surfing destinations in Taiwan.

Survey instrument

A questionnaire was developed using the latent variables of place attachment, recreation involvement, recreation satisfaction, future behaviour, recreational characteristics, and

demographics of surfing recreationists. A pre-test was conducted on June 24 and 25, 2006, at Nanwan and Jiialeshuei. Randomly sampled recreational surfers at the beaches answered the questionnaires between 12:00 to 18:00. In total, 80 usable questionnaires were collected. An item analysis was conducted to improve questionnaire items and Likert scales. The questionnaires were then revised based on the feedback from two surfing clubs managers and one researcher, and comments from recreational surfers concerning the item comprehensibility. The final questionnaire comprised four sections (*place attachment*, *recreation involvement*, *recreation satisfaction*, and *future behaviour*), which will be described in the following sections.

An 8-item *place attachment* scale was developed to measure the place attachment of recreational surfers. This place attachment scale utilised items from Kyle *et al*. (2003). Place attachment, which was composed of place dependence and place identity, was measured with 4 items for each of the latter. Item responses were on a 7-point Likert scale, ranging from 1 for "strongly disagree" to 7 for "strongly agree". Items in *recreation involvement* were drawn from scales used by McIntyre and Pigram (1992) and Kyle *et al*. (2003). Recreation involvement consisted of attraction (5 items), self-expression (6 items), and centrality (3 items). Item responses were also based on a 7-point Likert scale as in the previous case. Using items from Dorfman (1979) and Whisman and Hollenhorst (1998), several different aspects of *recreation satisfaction* were assessed. Recreation satisfaction included: recreational experience (13 items); club image (3 items); convenience (4 items); facility and product (4 items); price (3 items); and overall satisfaction (1 item). Responses to items were measured using a 7-point Likert scale, ranging from 1 for "very dissatisfied" to 7 for "very satisfied". Based on studies by Baker and Crompton (2000), 4 items (including willingness to revisit the same surfing site, willingness to consider surfing as their first choice among leisure alternatives, willingness to recommend this surfing site and willingness to convey positive word-of-mouth to other recreational surfers) were used to measure the *future behaviour* of recreational surfers. Item responses were on a 7-point Likert scale, ranging from 1 for "strongly disagree" to 7 for "strongly agree".

Sampling survey

This survey was conducted during July-August 2006, as surfing is primarily a summer activity in Taiwan. A cluster sampling method was used. First, a total of 18 Saturdays or Sundays in this period were considered the total cluster units. Next, 3 days (as clusters) were chosen for questionnaire distribution at each study site. Recreational surfers at the Nanwan and Jiialeshuei beaches were surveyed on July 1, 22 and 23, 2006; surfers at the Miyuewan beach were surveyed on August 5, 6 and 12, 2006; surfers at the Jinshan beach were surveyed on August 13, 19 and 20, 2006. All recreational surfers were administered the questionnaire between 12:00 and 18:00 (most recreational surfers surf during this period) on the selected

days. The questionnaire was administered to respondents in person by researchers. In total, 1290 questionnaires were handed out. Of these, 145 respondents refused to fill out a questionnaire and 5 questionnaires were incomplete, leaving 1140 usable questionnaires.

Development of the research instrument

Based on sample size (N=1140), the survey of this study can be accurate within a 2.9% sampling error with 95% confidence. The final questionnaires were revised through item

analysis, and comments made by one scholar and two surfing club managers, who indicated that this research instrument had an acceptable content validity. The Cronbach's alpha values of place attachment, recreation involvement, recreation satisfaction and future behaviour were 0.90, 0.94, 0.96, and 0.90 respectively; all exceeded the 0.70 benchmark (De Vellis, 1991) indicating that the research instrument had good reliability.

Data analysis

Statistical analysis of data was performed using Statistical Package for Social Sciences (SPSS), 12.0 for Windows. Place attachment, recreation involvement and recreation satisfaction involved a large number of measurement variables. An exploratory factor analysis was performed to extract a few important factors from a larger number of observed variables (in this case scale items). It assumes that the factors are correlated with the larger number of observed variables. The few important factors make the interpretations of the data more concrete (Agresti & Finlay, 1997). Subsequently, these factors were treated as indicators that could be used to measure a construct during the structural equation modelling analysis (Hwang *et al*., 2005; Lee, 2009b). In this study, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.88 for place attachment, 0.92 for recreation involvement and 0.96 for recreation satisfaction. Bartlett's test of sphericity yielded significant values for *place attachment* (χ^2=6066, df=28, p<.001), *recreation involvement* (χ^2=12368, df=91, p<.001) and *recreation satisfaction* (χ^2=23853, df=351, p<.001).

Thereafter, an exploratory factor analysis of the multi-item dimensions of place attachment, recreation involvement and recreation satisfaction was performed to reduce the number of variables serving as measurement variables for SEM analysis of the overall model. Principal axis factoring was used as it is recommended for behavioural research aiming to extract factors for SEM analysis (Iacobucci, 2001). After applying factor analysis, only factors with *eigenvalues* exceeding 1 were retained. An oblimin with Kaiser normalisation rotation was used for axis rotation since the resulting factors were assumed correlated.

Two factors were extracted from items measuring ***place attachment***. The first factor was place identity (*eigenvalu*e=4.74, variance=59.22%), and the second was place dependence (*eigenvalue*=1.04, variance=12.96%). These two factors were used as variables to measure place attachment.

Three factors were extracted from items measuring ***recreation involvement***. The first factor was attraction (*eigenvalue*=7.74, variance=55.62%), the second was self-expression (*eigenvalue*=1.61, variance=11.46%), and the third was centrality (*eigenvalue*=1.08, variance =7.68%). These extracted factors were used as variables to measure recreation involvement.

Four factors were extracted from items measuring ***recreation satisfaction***. The first factor

was recreational facility (*eigenvalue*=13.24, variance=49.04%), the second was surfing club's service (*eigenvalue*=2.16, variance=7.99%), the third was surfing experiences (eigenvalue =1.53, variance=5.67%), and the fourth was surfing cost (*eigenvalue*=1.17, variance=4.35%). These four factors plus single-item overall satisfaction were used as variables to measure recreation satisfaction.

The proposed model was examined using Standards equation modelling (SEM) to test both theoretical relationships in the model and overall model fit. The program LInear Structural RELations (LISREL), 8.52 for Windows was used for the SEM analysis. All parameters were estimated using the maximum likelihood method. To determine the direction and significance of relationships, all hypotheses were tested simultaneously. Thus, a path analysis was conducted using variables that simultaneously consider all hypotheses.

RESULTS

Structure model fit

Many statistics can be applied to assess the adequacy of a structural model (McDonald & Ho, 2002). The most commonly employed statistic is χ^2. The χ^2 goodness-of-fit test evaluates the adequacy of the theorised model's creation of a covariance matrix and estimated coefficients in comparison with the observed covariance matrix. However, since sample size may affect the χ^2 value, a large sample can render this test inadequate for assessing model fitness (Hu & Bentler, 1999). Many scholars have divided the χ^2 value by degrees of freedom to accommodate large sample sizes (McDonald & Ho, 2002).

Marsh and Hocevar (1985) suggested that a χ^2/df rating of less than 5 is favourable for a large sample. Other statistics, such as goodness of fitness index (GFI), adjusted goodness of fitness index (AGFI), comparative-fit index (CFI), incremental fit index (IFI), root mean square error of approximation (RMSEA), and standardised root mean square residual (SRMR), have been used to assess model fitness. In this study, only the χ^2 test (χ^2=313.91, df=67; p<0.001) was unable to determine the goodness-of-fit of the model, perhaps because the sample size was large. Nevertheless, the other goodness-of-fit statistics, including χ^2/df (4.7), NFI (0.98), NNFI (0.98), GFI (0.96), AGFI (0.94), NFI (0.98), NNFI (0.98), CFI (0.99), IFI (0.99), RMSEA (0.06), and SRMR (0.04) indicated that the model had an acceptable fitness.

Final model

Figure 1 shows the final structural model. Structural equation modelling (SEM) analysis demonstrates that place attachment significantly, positively, and directly affected recreation satisfaction (gamma=0.32; t=6.72; p<0.001) and indirectly affected future behaviour (p<0.001); thus, *hypothesis 1* was tested and accepted. Place attachment also significantly, positively, and directly affected future behaviour (gamma=0.61; t=14.02; p<0.001); thus, *hypothesis 2* was tested and accepted. Recreation involvement significantly, positively, and directly affected recreation satisfaction (gamma=0.38; t=7.43; p<0.001) and significantly, positively and indirectly affected future behaviour (p<0.001); thus, *hypothesis 3* was tested and accepted. Recreation involvement has an insignificant effect on future behaviour (gamma=0.05; t=1.3; p>0.05); thus, *hypothesis 4* was tested and rejected. The squared multiple correlation was 0.40 for recreation satisfaction, indicating that 40% of the variance in recreation satisfaction can be attributed to place attachment and recreation involvement.

Recreation satisfaction significantly, positively, and directly affects future behaviour (beta=0.26; t=7.40; p<0.001), thus, *hypothesis 5* was tested and accepted. The squared multiple correlations resulted in 0.67 for future behaviour, indicating that 67% of the variance in future behaviour can be explained by recreation satisfaction.

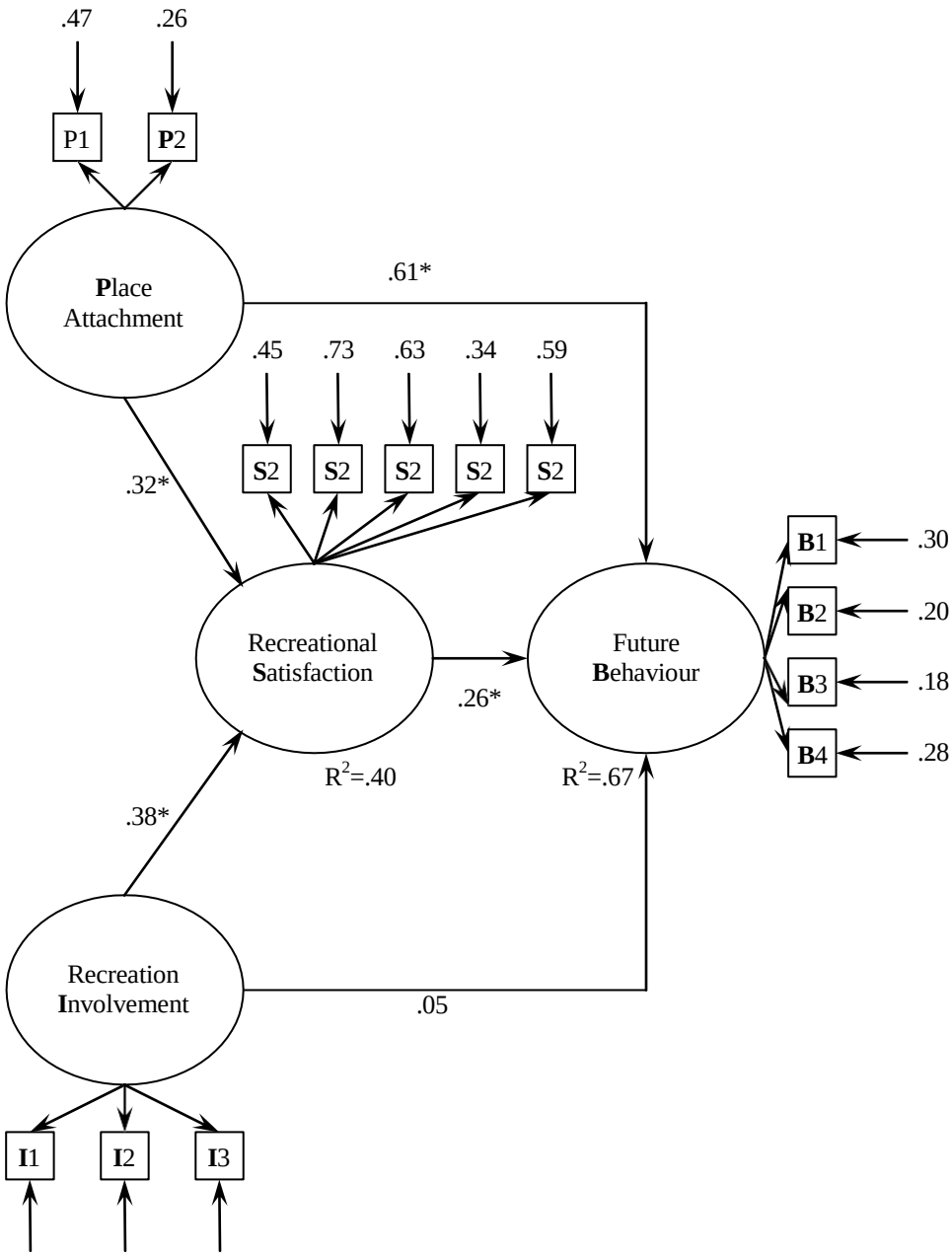

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FIGURE 1: **FINAL MODEL**
(*p<.001)

DISCUSSION

This study is an initial attempt to examine how place attachment and recreation involvement affect recreation satisfaction and the future behaviour of recreational surfers in Taiwan. Assessing this behavioural model will contribute to literature on surfing and nature-based recreation.

First, an empirical finding obtained by this study was that place attachment directly affected recreation satisfaction and indirectly affected the future behaviour of recreational surfers. This supports a finding in a leisure study by Hwang *et al*. (2005), who reported that place attachment affects the interpretation satisfaction of visitors to national parks, indicating that a causal relationship exists between place attachment and interpretation satisfaction of recreationists visiting national parks. However, Hwang *et al*. (2005) restricted satisfaction to interpretation satisfaction; this could not fully represent satisfaction as other satisfaction dimensions of satisfaction were not included. Conversely, this study applied multiple dimensions (recreational facility, surfing clubs service, surfing experiences, surfing cost and overall satisfaction) to represent surfer satisfaction. However, few studies have examined the structural relationship between place attachment, recreation satisfaction and future behaviour. The final model in this study indicates that satisfaction has a partly mediating effect on place attachment and future behaviour. Hence, this study examined the causal relationships between place attachment, recreation satisfaction and future behaviour with place attachment as an antecedent variable of recreation satisfaction and the future behaviour of surfers, thereby contributing to the body of knowledge associated with nature-based recreation areas.

Second, empirical results indicated that recreation involvement significantly and directly affected recreation satisfaction, thereby supporting the behavioural model developed for the national parks recreationist and wine tourists in Taiwan (Hwang *et al*., 2005; Lee & Chang, 2012). This study suggests that recreation involvement impacts recreation satisfaction in nature-based recreational areas. Additionally, this relationship between recreation involvement and recreation satisfaction is in agreement with other consumer behaviours such as purchase behaviour (Russell-Bennett *et al*., 2007) and behaviour of youth sport (Green & Chalip, 1998). This study suggests that recreation involvement impacts recreation satisfaction with nature-based recreation and consumer behavioural models reflecting international and multicultural perspectives.

Recreation involvement indirectly affects future behaviour, indicating that the indirect effect of recreation involvement on future behaviour is recreation satisfaction. Hence, recreation satisfaction plays a significant mediating role in this causal relationship. Recreation involvement affects future behaviour positively and directly but not significantly; this finding disagrees with those in previous studies indicating that recreation involvement has a significant and positive impact on destination loyalty and the future behaviour of hikers along the Appalachian Trail (Kyle *et al*., 2004a) and on visitors to a forest setting (Lee *et al*., 2007). This may account for the positive future behaviour, which is mainly affected by recreation involvement through recreation satisfaction. Moreover, the total effects (direct and indirect)

of recreation involvement on future behaviour are significant. Obviously, recreation involvement impacts future behaviour of recreational surfers in Taiwan, this finding is similar

to the effect of recreation involvement on future behaviour of recreationists in trails and forest settings.

Finally, recreation satisfaction significantly and directly affects future behaviour, suggesting that recreation satisfaction effectively predicts the future behaviour of recreational surfers. This analytical result is in agreement with findings in previous studies of other nature-based recreational behaviours (Lee, 2006, 2007, 2009a,b; Lee *et al*., 2007; Lee & Chang, 2012). Furthermore, recreation satisfaction was identified as a significant mediating variable in other nature-based recreational studies (Lee, 2006, 2007, 2009b; Lee *et al*., 2007). Therefore, satisfaction clearly plays a significant mediating role in behavioural models in nature-based recreation studies, as well as for surfing.

CONCLUSIONS

Few studies have examined how place attachment and recreation involvement affect the future behaviour of recreational surfers. This study assessed the behavioural model for recreational surfers. According to empirical findings, the relationships among place attachment, recreation involvement, recreation satisfaction and future behaviour have been examined and discussed. Study findings, which advance the understanding of behavioural models of recreational surfers, suggest that place attachment significantly and directly affected recreation satisfaction and indirectly affected future behaviour. Additionally, place attachment significantly and directly affected future behaviour. Although recreation involvement significantly and directly affected recreation satisfaction and indirectly affected future behaviour, recreation involvement did not significantly affect future behaviour. Recreation satisfaction significantly and directly affected future behaviour, and was a significant mediating variable in the behavioural model of recreational surfers in Taiwan.

IMPLICATIONS AND RESEARCH DIRECTIONS

According to the proposed behavioural model, recreation satisfaction significantly and directly affected future behaviour, and therefore, managers of surfing clubs can improve recreational surfer satisfaction by enhancing the services, facilities, and surfing experiences that will positively impact the future behaviour of recreational surfers.

Satisfaction and future behaviour were significantly affected by place attachment. This paper thus suggests that managers of surfing destinations maintain and protect the coastal environment to ensure environmental quality, and subsequently promote place identity and place dependence for the recreational surfers (Tribe & Snaith, 1998; Stedman, 2002). This will likely elicit positive emotions from recreational surfers and promote their satisfaction and loyalty to local surfing beaches.

As this paper has shown, recreation involvement impacted on recreation satisfaction and future behaviour. Recreation involvement is reflected in a recreationist's preference for a recreational activity. Similar to other nature-based recreational activities, recreation involvement tends to be high among recreational surfers. This study suggests that a marketer may enhance recreation involvement by offering surfing package tours, environmental

education classes, or advanced surfing courses to subsequently increase satisfaction and enhance the positive future behaviour among the recreational surfers.

Finally, this study developed a behavioural model for assessing the relationships among place attachment, recreation involvement, recreation satisfaction, and future behaviour of Taiwanese recreational surfers. Relatively more rigorous model testing is required using different samples in different nations to assess the efficacy of behavioural models in other cultures.

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RELATIONSHIP BETWEEN SEDENTARY AND ACTIVE LEISURE PARTICIPATION AMONG MIDWESTERN COLLEGE STUDENTS

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ABSTRACT

This study used the Catharsis Theory and the Stimulation Theory to examine the relationship between sedentary leisure participation (watching television (TV), videos or DVDs and computer or video game playing) and active leisure participation (strength sport, recreational sport and team sport) within a sample of 1134 Midwestern college students in the United States. Multinomial logistic regression analyses were upheld for both theories. Findings showed that (1) college students who spent less than three hours per day watching TV, videos or DVDs on weekdays were more likely to engage in strength and recreational sports than those spending four or more hours per day; and (2) college students who did not play computer/video games on weekdays were less likely to participate in team sport than those who spent at least one hour per day. The variables, gender and ethnicity, were found to be significant predictors across different active leisure activities. Based on the research findings, promotion of active leisure participation requires tailored approaches that are dependent on the target segment of the college student populations.

Key words: Sedentary leisure; Active leisure; Catharsis Theory; Stimulation Theory; College students.

INTRODUCTION

Completed research indicates that participation in physical activity increases overall physical and psychological health across different populations (Kull, 2002; US Department of Health and Human Services, 2004; Payne *et al*., 2006; Lloyd & Little, 2010). Despite various benefits that can result from participation in physical activity, a considerable population-wide decline in physical activity and an increase in sedentary leisure behaviour (TV/computer/video usage) among adolescents and young adults were identified in the literature (Gordon-Larsen *et al*., 2004; Brownson *et al*., 2005; Statistics Canada, 2006). One research question that could help to understand this decline in physical activity is "does participation in a sedentary leisure activity increase or decrease the chance of participation in certain kinds of physical activities?" To date, little research has been directed towards answering this question, for example, by examining relationships among different kinds of leisure participation (Pagano *et al*., 2006).

The meaning of leisure has been defined in four ways: time free for making personal choices (Russell, 2002); participation in recreational activities; a state of mind (Kelly & Freysinger, 2000; Edginton *et al*., 2002); and an entire way of being (Neulinger, 1974; Murphy, 1981;

Kraus, 1984). The second definition of leisure is most commonly used because it can be easily observed and measured by researchers (Mannell & Kleiber, 1997; Loucks-Atkinson & Mannell, 2007).

Although leisure participation has been categorised in various ways, the degree of physical exertion is used in this article to distinguish two types of leisure activities: 1) active leisure; and 2) sedentary leisure. While active leisure implies a desired exertion of energy, sedentary leisure implies a desire to refrain from exerting energy. Active leisure participation is usually classified as physical activities that need physical effort and energy expenditure (such as swimming and dancing), and sedentary leisure participation is classified as non-physical activities (including watching TV, videos and DVDs, playing computer/video games) (Dardis *et al.*, 1994; Sylvia-Bobiak & Caldwell, 2006).

This study aims to examine the relationship between these two types of leisure activities for two reasons. On the one hand, this classification has been empirically tested (Pagano *et al*., 2006) and widely used by previous researchers (Dardis *et al.*, 1994; Mull *et al.*, 1997; Sylvia-Bobiak & Caldwell, 2006) and organisations. On the other hand, college students spent most of their time on these two types of leisure activities (sport, TV watching and video games), and this amount of time is increasing. On the contrary, the percentage of subjects who took part in shopping, touring, outdoor, cultural and hobby leisure activities was quite consistent over time (Hall, 1984).

The Centres for Disease Control and Prevention (CDC) and the American College of Sports Medicine (ACSM) recommend accumulating 30 minutes or more of moderately intense physical activity on all or most days of the week. Related to this recommendation, the American Academy of Paediatrics (AAP‟s) Committee on Public Education recommends engaging in less than two hours of TV/video viewing and computer/video games per day. The AAP‟s recommendation on media exposure was not based exclusively on physical inactivity. It was also based on other detrimental effects that could result from media exposure, such as the risk of increased violent and aggressive behaviour, an increased use of alcohol, tobacco and other drugs, and an accelerated onset of sexual activity. Despite these recommendations, little consensus has been reached on the effects of media exposure on active leisure behaviour. Conflicting and inconclusive findings are noted in the literature regarding the relationship between active and sedentary leisure participation (Gordon-Larsen *et al.*, 2000; Sallis *et al.*, 2000; Russell, 2002; Santo *et al.*, 2005; Bennett *et al*., 2006). This study was designed to contribute to the literature by examining the relationship between active and sedentary leisure participation among college students in the United States (US).

College students were chosen as the target population of this research due to their transition from adolescence to young adulthood involving substantial changes in their lifestyles, relationships and leisure activities (Sylvia-Bobiak & Caldwell, 2006). Students have more

control over their leisure choices in college than in high school, mainly because in college they are often separated from their former high school peers and families. Also, most college students can play video games or watch TV/videos without a parent‟s permission. On the other hand, they are more exposed to sport activities when in college as compared to their high school years, and this could be conducive to engaging in more physical activity. The college environment offers both risk and opportunity in respect of physical activity participation. A better understanding of young adults‟ voluntary choice and pursuit of a

balance between passive and active leisure will: 1) reveal effective interventions for constructive and healthy leisure choices among young adults; and 2) provide an insight into which of the two theoretical frameworks, the Catharsis Theory or the Stimulation Theory, would be a better model to explain the relationship between sedentary and active leisure pursuits.

Research on the impact on leisure behaviour of playing video and computer games has a comparatively short history because they did not arise as popular leisure activities until the last two decades. According to Interactive Digital Software Association (2001a; 2001b), video games are increasingly popular, with 42% of households in the US owning a video game console. In addition, Roberts *et al.* (1999) indicated that young adults are frequent users. Video game research has typically adopted strategies arising from research that has evaluated the effects of television on violent behaviour (Funk, 1992; Christensen & Wood, 2007; Sherry, 2007). However, playing video games adds an active dimension that intensifies the impact of game playing as compared to the relative passive influence of watching television (Chambers & Ascione, 1987; Funk & Buchman, 1996). Due to the increased popularity of video games among young adults and the paucity of research regarding its impact on active leisure behaviour, the current research aimed to explore this relationship by examining screen time viewing, computer/video game playing and participation in different types of active leisure among college students.

THEORETICAL FRAMEWORKS

To explain the impact of sedentary leisure on college students‟ subsequent participation in physical activity, this study used leisure theories explaining why people participate in active leisure, and media theories exploring how the media influences people‟s leisure behaviour. The research questions in this study are: what is the relationship between active and sedentary leisure?; and how do types of leisure activities moderate this relationship? In general, these theoretical explanations can be grouped into two categories (the Catharsis Theory and the Stimulation Theory).

The *Catharsis Theory* views recreational sport as a positive and safe outlet for the release of negative emotions (Ellis, 1973). According to this theory, a negative emotion such as aggression, if not given a safe outlet, will build up and be let out in a harmful way, such as fighting (Leitner & Leitner, 2004), whereas the surplus energy theory provides a consistent prediction stating that people participate in leisure activities in order to release excess energy (Ellis, 1973). In contrast, the recreation theory asserts that people play to restore energy (Weiskopf, 1982). This apparent conflict is influenced by previous findings concerning the relationships between different psychological needs and leisure activities (Leitner & Leitner, 2004). For example, competitive games and sport such as football and basketball are

appropriate leisure activities for the release of aggressive impulses, whereas non-competitive sport and games such as dancing and hiking can eliminate feelings of inferiority or superiority. In media studies, the Catharsis Theory explains that the exposure to media violence would permit angry or frustrated viewers to purge their feelings such that after viewing was completed, they would be less likely to behave aggressively (Dominick, 1984; Calvert & Tan, 1994). A similar theory (drive reduction theory) contends that people struggle to maintain physical, emotional and psychological equilibrium (Sherry, 2007). Sherry and Lucas (2003) reported that individuals use video games for managing arousal. Sherry (2007)

highlighted that individuals may choose to engage in passive leisure activities (violent video games) to manage negative emotions (aggression).

According to the catharsis theory, an individual exposed to a tension or anxiety producing situation seeks emotional release through participation in either high-energy-consuming or relaxing activities, depending on the individual‟s preferred means of unwinding (Witt & Bishop, 2009). Therefore, the Catharsis Theory predicts that both active leisure and sedentary leisure can provide a safe outlet for negative emotions and the time that people spend on active leisure will be negatively correlated with the time that people spend on sedentary leisure. That is, people who spend more time watching TV, videos and DVDs or playing computer or video games are less likely to engage inactive leisure activities.

The second group of theories is best represented by the *Stimulation Theory*, which argues that viewing violence prompts more aggression on the part of the viewer (Wimmer & Dominick, 2000). This theory postulates that an individual‟s predisposition to act aggressively will be heightened by the arousing effects of media. A study revealed that media violence enhances adolescents‟ aggression in interactions with strangers, classmates and friends (Christensen & Wood, 2007). Through exposure to violence and antisocial acts, people will be desensitised and will therefore become less anxious about the consequences. Another stimulation-related theory, arousal-seeking theory, states that people need a certain level of physical and mental activity (Russell, 2002), and since some individuals strive to maintain an optimal state of stimulus, they will attend physical activities. This theory suggests that, whenever media content arouses a student, he or she would like to keep that arousal and pursue further excitement through real exertion of physical energy.

Based on the above theories, a person who is more stimulated by media exposure is more likely to heighten his or her arousal level and thus will be more likely to seek his or her optimal state of stimulus from relatively competitive physical activities. In other words, all these theories suggest that watching TV, viewing videos and playing video games can stimulate people‟s emotion to indulge in more active behaviours. People who spend more time watching TV, videos and DVDs or playing computer/video games are more likely to engage in active leisure activities.

The total amount of leisure time is an important moderator of the relationship between active leisure and sedentary leisure. Since people have limited time, leisure behaviours (no matter what type) will compete with each other. Russell (2002) argued that a common criticism of TV watching is that it replaces more active leisure. However, decades of time-use surveys revealed a dramatic increase in overall leisure time between 1965 and 2003 (National Bureau of Economic Research, 2006). Specifically, time devoted to leisure by men increased by 6-8

hours per week and for women by 4-8 hours per week. This increase in leisure results from approximately 5-10 additional weeks of vacation per year. Robinson (1969, 1981) found that some early substitutes of TV, such as listening to radio, visiting, housework and reading newspapers have continued to decline as TV viewing time seeks a new plateau. However, away-from-home activities are the most successful competitors for Americans' leisure time. This suggests that active leisure is not necessarily reduced by an increase in the time spent watching TV or playing video games. Nevertheless, this study will control this variable by including student‟s time spent on studying.

METHODOLOGY

Sample

A convenience sample of college students were recruited from four different universities located in three Midwestern states in the US. Before the administration of the questionnaire, an approval of the research protocol was received from the institutional review boards of the participating universities. During the academic year of 2004-05, college instructors and research assistants administered the questionnaire to a sample of students (N=1200) enrolled in health-related courses on all campuses. To ensure voluntary and anonymous participation, a passive consent letter was attached to the front of the questionnaire. Out of the 1200 students, 1163 (97%) participated in the survey. Prior to the treatment of the collected data, two exclusion criteria were investigated: 1) cases that showed systemic response patterns such as answering all questions „1" ("protest response") were deleted; and 2) cases that contained more than 10% of no responses to the question items were deleted. Through this procedure, a total of 29 questionnaires were eliminated, reducing the sample size to 1134 (response rate of 94.5%).

Measurement instrument

To develop the survey instrument for this study, researchers combined questions primarily derived from the 2005 Youth Risk Behaviour Survey (YRBS) questionnaire and the 2004 Behavioural Risk Factor Surveillance System (BRFSS) questionnaire developed by the Centres for Disease Control and Prevention (CDC). Since valid and reliable scales were documented in the literature and were available, researchers made every effort to use these scales intact. Three questions regarding demographics of participants derived from BRFSS were self-reported age, gender and ethnicity.

Active leisure activities were measured by a single question drawn from the literature (Peretti-Watel *et al*., 2002). The participants were asked, "Which of the following categories best represents the exercise or sporting activities you practice most frequently?" The response options of this question included „team sport" (basketball, baseball, etc.), „athletic sport" (running, cycling, etc.), „strength sport" (weightlifting, body-building, etc.), „martial arts and combat sport" (taekwondo, boxing, etc.), other „recreational sport" (tennis, golf, etc.), and „I do not play any sport". For time spent watching TV, videos or DVDs on an average weekday, the participants were asked, "On an average weekday, how many hours do you watch TV, videos, or DVDs?" Response options included „I do not watch TV, videos, or DVDs on an average weekday", „less than 1 hour per day", „1 hour per day", „2 hours per day", „3 hours per day", „4 hours per day" and „5 or more hours per day". Similarly, a single item was used to measure participants" time spent playing computer/video games on an average weekday. The respondents were asked, "On an average weekday, how many hours do you spend playing computer/video game?" The response options for this item were the same as the previous question. Participants" time spent on studying was measured by asking: "In the past 7 days, how many hours have you spent on studying for your classes (assignments, papers, exams, etc.), not including actual class attendance?" The response options provided for this item included: „0-5 hours", „6-10 hours", „11-15 hours", „16-20 hours", „21-25 hours", „26-30 hours". Regarding their intentions about their body weight, respondents were asked: "Which

of the following are you trying to do about your weight?" Response options of this item included „lose weight", „gain weight", „stay the same weight", and „I am not trying to do anything about my weight".

Statistical procedures

The Windows version 17.0 of the Statistical Package for Social Sciences (SPSS) was used to conduct statistical analyses. Frequencies and percentages of each response were calculated for all respondents. Before selecting variables for logistic regression analysis, the bivariate associations of each variable with the outcome variable applying likelihood ration chi-square test was examined. After fitting a logistic regression model for each variable to obtain unadjusted odds ratios (ORs) and 95% confidence intervals (CIs), the variables with a bivariate $p<0.25$ were selected as candidates for the multivariate model (Mickey & Greenland, 1989; Hosmer & Lemeshow, 2000).

Backward likelihood ratio elimination with a threshold of $p<0.05$ was used for retention in the model followed by a test for forward selection to minimise the possibility of multi-collinearity (Hosmer & Lemeshow, 2000). Response options were collapsed in instances of those variables with few cases for the purpose that the assumption of adequate cell-size in chi-square tests and logistic regression analyses could be satisfied. For example, the six categories of active leisure activities were collapsed into four options, which were strength sport, recreational sport, team sport and those who do not play any sport.

Multinomial logistic regression was performed for the outcome variable with four categories to investigate odds ratios (ORs) of correlates regarding sedentary leisure activities after adjusting for other documented correlates of active leisure activities. The categorical outcome variable in this study was active leisure activity which was collapsed into four categories, including team sport, recreational sport, strength sport, and non-participation in any sport. Non-participation in any sport was taken as reference group in the multinomial logistic regressions analyses.

The variable entry in the model was made in the order of: 1) gender, race; 2) time spent on studying; 3) intention to lose weight; and 4) time spent watching TV, videos or DVDs, and time spent playing computer/video game. The variable that is well documented in the literature and demographic or hard-to-intervene variables were entered into the model first, and then the variable of research concern or easy-to-intervene variable was entered last. Furthermore, similar variables were entered together. For instance, time spent watching TV, videos or DVDs, and time spent playing computer/video games were entered last and at the same time because both of them are variables of research concern.

RESULTS

Descriptive findings

In this study, most of the college students of 18-23 years of age were the dominant respondents. Only 6% of the participants were between 24 and 46 years old. As shown in Table 1, most of the college students were female (61%) and White (81%), with 19% of the total respondents being Non-white. Specifically, white respondents include those labelled as non-Hispanic White, while Non-white respondents would be of a Hispanic, Latino or Spanish origin, African Americans, Asian/Pacific Islanders, and other races or ethnicity.

TABLE 1: **FREQUENCY OF STUDENTS' ACTIVE LEISURE**

Variables	Total F (%)	[a]Strength Sport F (%)	[b]Recreational Sport F (%)	[c]Team Sport F (%)	[d]No Sport F (%)
Gender					
Male	439 (38.7)	106 (24.1)	115 (26.2)	197 (44.9)	21 (4.8)
Female	695 (61.3)	48 (6.9)	359 (51.7)	138 (19.9)	150 (21.6)
Race					
White	918 (81.0)	126 (13.7	404 (44.0)	266 (29.0)	122 (13.3)
Non-White	216 (19.0)	28 (13.0)	70 (32.4)	69 (31.9)	49 (22.7)
Hours of study					
10 hrs or less	694 (61.2)	98 (14.1)	284 (40.9)	206 (29.7)	106 (15.3)
11-20 hrs	325 (28.7)	40 (12.3)	129 (39.7)	100 (30.8)	56 (17.2)
21 hrs or more	115 (10.1)	16 (13.9)	61 (53.0)	29 (25.2)	9 (7.8)
Weight					
Same weight	268 (23.6)	31 (11.6)	106 (39.6)	92 (34.3)	39 (14.6)
Gain weight	163 (14.4)	45 (27.6)	31 (19.0)	75 (46.0)	12 (7.4)
Lose weight	577 (50.9)	63 (10.9)	294 (51.0)	129 (22.4)	91 (15.8)
No action	126 (11.1)	15 (11.9)	43 (34.1)	39 (31.0)	29 (23.0)
Watching TV/video on weekdays					
Less than 1 hr p.d.	234 (20.6)	31 (13.2)	119 (50.9)	55 (23.5)	29 (12.4)
1-3 hrs p.d.	744 (65.6)	103 (13.8)	307 (41.3)	226 (30.4)	108 (14.5)
4 or more hrs p.d.	156 (13.8)	20 (12.8)	48 (30.8)	54 (34.6)	34 (21.8)
Playing video games on weekdays	524 (46.2)	56 (10.6)	260 (49.6)	113 (21.5)	95 (18.1)
Don"t play	266 (23.4)	39 (14.6)	100 (37.5)	90 (33.8)	37 (13.9)
Less than 1 hr p.d.	344 (30.3)	59 (17.1)	114 (33.1)	132 (38.3)	39 (11.3)
At least 1 hr p.d.					
Total N/F(%)	1134	154 (13.8)	474 (41.8)	335 (29.5)	171 (15.1)

[a]Strength sport include weightlifting, body-building, etc.
[b]Recreational sport, which are combined with athletic sport, include running, jogging, swimming, gymnastics, cycling, dancing, tennis, golf, roller-skating, horse-riding, etc.
[c]Team sport, which are combined with martial arts and combat sport, include basketball, baseball, soccer, football, volleyball, softball, taekwondo, judo, karate, boxing, etc.
[d]No sport means non-participation in any sport.

Of the total respondents, 14% (n=154) participated in strength sport as their leisure pursuits; 42% (n=474) participated in recreational sport; 30% (n=335) took part in team sport; and 15% (n=171) did not play any sport. When compared to male (5%) college students, a larger proportion of female students (22%) did not participate in any sport. In terms of college students of different ethnicities, 23% of Non-white students and 13% of White students did not participate in any sport. Regarding students" passive leisure pursuits in watching TV, videos and DVDs on weekdays, 20% of the total respondents spent less than 1 hour per day on these activities whereas 80% spent at least 1 hour per day on them. Furthermore, around 46% of the college student respondents reported not playing any computer or video games on weekdays while 54% spent at least 1 hour per day engaging in this passive leisure activity.

Bivariate relationships

Chi-square significance tests were used to examine associations between different types of

active leisure activities and other correlates of interest. All of the variables, including gender, ethnicity, hours of studying, weight, watching TV, videos or DVDs on weekdays, and playing computer or video games on weekdays, showed significant associations with active leisure activity (Table 2).

TABLE 2: **BIVARIATE ASSOCIATIONS WITH ACTIVE LEISURE OF COLLEGE STUDENTS**

	Active leisure			
	[a]Strength sport (n=154)	**[b]Recreational sport (n=474)**	**[c]Team sport (n=335)**	**[d]No sport (n=171)**
Correlate (*df*)	**X^2**		***p***	
Gender (3)	207.96		<0.001*	
Race (3)	16.46		<0.001*	
Hrs of studying (6)	10.42		0.108*	
Weight (9)	100.73		<0.001*	
Watching TV/video on weekdays (6)	19.67		0.003*	
Playing video games on weekdays (6)	50.85		<0.001*	

[a]Strength sport are not limited to weightlifting and body-building.
[b]Recreational sport (which are combined with athletic sport) are not limited to running, jogging, swimming, gymnastics, cycling, dancing, tennis, golf, roller-skating, horse-riding, etc.
[c]Team sport (which are combined with martial arts and combat sport) are not limited to basketball, baseball, soccer, football, volleyball, softball, taekwondo, judo, karate, boxing, etc.
[d]No sport = Non-participation in any sport.
* p<0.25

Multivariate analyses

The results of multinomial logistic regression analyses showed that all of the variables emerged as important predictors of active leisure participation (Table 3.1 & 3.2). In particular, gender, ethnicity, hours spent on studying, action of weight, watching TV, videos or DVDs on weekdays, and playing computer or video games were significant predictors for active leisure participation before and after controlling for all other variables in the model.

TABLE 3.1: **UNADJUSTED ODDS RATIO: MULTINOMIAL LOGISTIC REGRESSION ANALYSES OF PREDICTORS OF ACTIVE LEISURE**

	Strength [f]sport (n=154)		**Recreational [g]sport** (n=474)		**Team [h]sport** (n=335)	
Predictor	[b]OR	[d]95% CI	OR	95% CI	OR	95% CI
Gender						
Male	15.7**	8.9-27.8	2.2**	1.3-3.7	10.1**	6.1-16.9
Female	1.00 reference		1.00 reference		1.00 reference	
Race						
White	1.8*	1.0-3.0	2.3**	1.5-3.5	1.5*	1.0-2.3
[a]Non-White	1.00 reference		1.00 reference		1.00 reference	
Hours of study						
10 hrs or less	0.5	0.2-1.2	0.3*	0.1-0.8	0.6	0.2-1.3
11-20 hrs	0.4*	0.1-1.0	0.3**	0.1-0.7	0.5	0.2-1.2

21 hrs or more	1.00 reference		1.00 reference		1.00 reference	
Weight						
Stay the same weight	1.5	0.7-3.3	1.8*	1.1-3.3	1.7	0.9-3.2
Gain Weight	7.2**	2.9-17.6	1.7	0.7-3.9	4.6**	2.1-10.0
Lose Weight	1.30	.6-2.6	2.1**	1.2-3.6	1.0	0.6-1.8
No Action	1.00 reference		1.00 reference		1.00 reference	
Watch TV/video						
Less than 1 hr/day	1.8	0.8-3.8	2.9**	1.5-5.2	1.1	0.6-2.2
1-3 hrs/day	1.6	0.8-2.9	2.0**	1.2-3.2	1.3	0.8-2.1
4 or more hrs/day	1.00 reference		1.00 reference		1.00 reference	
Play video games						
Do not play games	0.4**	0.2-0.6	0.9	0.6-1.4	0.3**	0.2-0.5
Less than 1 hr/day	0.6	0.3-1.2	0.9	0.5-1.5	0.7	0.4-1.2
At least 1 hr/day	1.00 reference		1.00 reference		1.00 reference	

Note: Reference group is "I do not play any sports" (n=171) * p<0.05 ** p<0.01

[a]Non-white= African-American, Hispanic, Asian/Pacific Islander, etc.
[b]OR= Unadjusted odds ratio [d]CI = Confidence interval [e]NS= Not significant
[f]Strength sport = Sport not limited to weightlifting, body-building, etc.
[g]Recreational sport combined with athletic sport= Sport not limited to running, jogging, swimming, gymnastics, cycling, dancing, tennis, golf, roller-skating, horse-riding, etc.
[h]Team sport combined with martial arts and combat sport= Sport not limited to basketball, baseball, soccer, football, volleyball, softball, taekwondo, judo, karate, boxing, etc.

Specifically, compared to those who did not play any sport, male college students were more likely than their female counterparts to participate in strength sport (adjusted OR=16.0; CI=8.3–31.8), recreational sport (adjusted OR=3.2; CI=1.7–5.7), and team sport (adjusted OR=9.2; CI=5.4–17.6).

TABLE 3.2: **ADJUSTED ODDS RATIO: MULTINOMIAL LOGISTIC REGRESSION ANALYSES OF PREDICTORS OF ACTIVE LEISURE**

	Strength [f]sport (n=154)		**Recreational [g]sport** (n=474)		**Team [h]sport** (n=335)	
Predictor	[c]AOR	95% CI	AOR	95% CI	AOR	95% CI
Gender:						
Male	16.0**	8.2-31.5	3.2**	1.7-5.7	9.2**	5.1-16.6
Female	1.00 reference		1.00 reference		1.00 reference	
Race:						
White	1.9*	1.1-3.6	1.9**	1.1-2.9	1.6*	1.1-2.6
[a]Non-White	1.00 reference		1.00 reference		1.00 reference	
Hours of study						
10 hrs or less	[e]NS		0.4*	0.2-0.9	NS	
11-20 hrs	NS		0.3**	0.1-0.7	NS	
21 hrs or more	1.00 reference		1.00 reference		1.00 reference	
Weight						
Stay the same weight	2.1	0.9-4.8	2.0*	1.1-3.7	2.2*	1.1-4.4
Gain Weight	2.7	0.9-7.3	1.1	0.4-2.7	1.8	0.7-4.4
Lose Weight	2.5*	1.1-5.4	2.6**	1.5-4.5	1.7	0.9-3.1
No Action	1.00 reference		1.00 reference		1.00 reference	
Watch TV/video						
Less than 1 hr/day	3.1**	1.3-7.4	3.1**	1.6-5.8	NS	
1-3 hrs/day	2.0*	1.1-4.0	2.1**	1.2-3.5	NS	

4 or more hrs/day	1.00 reference	1.00 reference	1.00 reference	
Play video games				
Do not play games	NS	NS	0.5*	0.3-0.9
Less than 1hr/day	NS	NS	0.8	0.4-1.4
At least 1 hr/day	1.00 reference	1.00 reference	1.00 reference	

Note: Reference group is "I do not play any sports" (n=171) * p<0.05 ** p<0.01

[a]Non-white= African-American, Hispanic, Asian/Pacific Islander, etc.
[c]AOR= Adjusted odds ratio [d]CI = Confidence interval [e]NS= Not significant
[f]Strength sport = Sport not limited to weightlifting, body-building, etc.
[g]Recreational sport combined with athletic sport= Sport not limited to running, jogging, swimming, gymnastics, cycling, dancing, tennis, golf, roller-skating, horse-riding, etc.
[h]Team sport combined with martial arts and combat sport= Sport not limited to basketball, baseball, soccer, football, volleyball, softball, taekwondo, judo, karate, boxing, etc.

In comparison with students who did not play any sport, non-Hispanic Whites were more likely than Non-white students to engage in strength sport (adjusted OR=1.9; CI=1.1–3.4), recreational sport (adjusted OR=1.9; CI=1.1–2.9), and team sport (adjusted OR=1.6; CI=1.1–2.6). Compared to those who did not participate in any sport, college students who spent 10 hours or less (adjusted OR=0.4; CI=0.2–0.9) and 11 to 12 hours (adjusted OR=0.3; CI=0.1–0.7) studying for classes were less likely to play recreational sport than those who spent 21 hours or more studying for classes.

Furthermore, compared to those who did not play any sport, students who tried to stay the same weight were more likely to participate in recreational sport (adjusted OR=2.0; CI=1.1–3.8) and team sport (adjusted OR=2.2; CI=1.1–4.4) than those who did not try to do anything about their weight. Those who tried to lose weight were more likely to play strength sport (adjusted OR=2.5; CI=1.1–5.4) and recreational sport (adjusted OR=2.6; CI=1.5–4.5) than those who did nothing about their weight.

Interestingly, in comparison with students who did not play any sport, those who spent less than 1 hour per day watching TV, videos or DVDs on weekdays were more likely to engage in strength sport (adjusted OR=3.1; CI=1.3–7.4) and recreational sport (adjusted OR=3.1; CI=1.6–5.8) than those spending 4 or more hours per day. Those spending 1-3 hours per day watching TV, videos or DVDs on weekdays were more likely than those spending 4 or more hours per day to play strength sport (adjusted OR=2.0; CI=1.1–5.4) and recreational sport (adjusted OR=2.6; CI=1.5–4.5).

These two findings supported the prediction of the Catharsis Theory that college students who spent more time on watching TV, videos and DVDs were less likely to engage in active leisure activities. On the contrary, college students who did not play computer/video games on weekdays were less likely to participate in team sport (adjusted OR=0.5; CI=0.3–0.9) than students who spent at least 1 hour per day when compared to those who did not play any sport. In other words, this finding supports the prediction of the Stimulation Theory that college students who spent more time on sedentary leisure activities were more likely to participate in active leisure activities than their counterparts.

DISCUSSION

Mixed findings from this study uphold both the Catharsis Theory and the Stimulation Theory as theoretical frameworks for understanding the relationships between college students'

sedentary leisure and active leisure pursuits. The Catharsis Theory states that college students who spent more time on watching TV, videos and DVDs were less likely to engage inactive leisure activities. In particular it was found that college students who spent less than 3 hours per day watching TV, videos or DVDs on weekdays were more likely to engage in strength sport and recreational sport than those spending 4 or more hours per day watching TV, videos or DVDs. The Stimulation Theory suggests that participation in a sedentary leisure activity such as watching TV or playing video games can stimulate people‟s emotion to attend more active leisure activities. The research findings support this theory in that college students who did not play computer/video games on weekdays were less likely to participate in team sport than those who spent at least 1 hour per day on the games.

However, both the Catharsis Theory and the Stimulation Theory are only supported by half of the "sedentary leisure" constructs of either watching TV, videos or DVDs or playing computer games during the week. This finding is consistent with the argument of Witt and Bishop (2009) that different theories provide rationale for different types of leisure activities because people favour different leisure activities after having been in certain antecedent situations. For example, the situations constructed to fit the Catharsis Theory are most likely to be associated with "seeking a quiet place" and "hiking or walking", but less likely for all high energy activities. The situations of available energy and non-tension are highly correlated with the desire for active endeavours.

These mixed findings are notable in two ways. On the one hand, these variables were entered last in the multinomial logistic regression model so that, even after the variance in the outcome variable was accounted for by all other variables entered in the model, these variables were still significant predictors of three types of active leisure activities. On the other hand, there is an alternative explanation stating that leisure time spent on different types of leisure activities that reasonably compete with each other was controlled by including college students‟ time spent on their major task, which is studying. In particular, in the fully-adjusted model the college students who spent more time on studying were more likely to take part in recreational sport than those spending less time on studying.

In this study, the college students who spent less time on watching TV, video or DVDs on weekdays were more likely to participate in strength and recreational sport. This finding is in agreement with previous research. For example, Bennett *et al*. (2006) found that each hour of television viewing on an average day was associated with a decreased likelihood of engagement in pedometer-determined physical activity in adults. In addition, our finding empirically confirms the suggestion addressed by Bennett *et al*. (2006:1681) that "as part of a comprehensive physical activity promotion plan, recommendations to reduce television viewing should be made". Another practical implication of this finding is that among different types of active leisure activities, the promotion of comparatively less competitive active leisure activities, such as recreational sport and strength sport may influence college students‟ involvement in sedentary leisure behaviour, particularly with respect to "screen time viewing". Given that this research focused only on a limited number of sedentary and active leisure activities, further research is required relating to how other types of active leisure activities are influenced by other sedentary leisure pursuits.

Another finding from this study was that college students who spent more time on playing computer or video games on weekdays were more likely to participate in more competitive sport after all other variables were controlled. The results of this study showed that those

college students were more likely to participate in team sport. One plausible explanation for this apparent contradiction is that the common belief about the relationship between sedentary leisure and active leisure participation mainly focused on the physical dimension of leisure participants rather than on their mental dimension. Playing video games demands a comparatively higher degree of mental concentration than other sedentary leisure activities (watching TV) (Russell, 2002). Therefore, based on the Stimulation Theory, a person‟s mentality is stimulated to become involved in a similarly mentally demanding leisure activity (team sport).

These observations suggest notable implications for future studies on sedentary leisure behaviour. In previous research, watching TV and playing video games were generally regarded as "sedentary behaviour" or "screen time" (Strauss *et al.*, 2001; Gordon-Larsen *et al.*, 2004) and were measured using a single item. However, findings from this study indicate that these two sedentary leisure activities have different associations with various types of active leisure activities and should be measured using separate items (Devellis, 2003). Chambers and Ascione (1987) indicated that watching television and playing electronic games may demand different degrees of mental effort and will thus have different impacts on participants. The results among the college students seem to confirm the above assertion insofar as the leisure pursuit of watching TV, videos and DVDs may be a better predictor of

recreational and strength sport, whereas playing computer or video games may better predict team sport.

Since the Catharsis Theory refers to the need for purging emotional tension and anxiety, it is applicable as an explanation of why people choose to engage in leisure activities that demand low mental concentration. In contrast, the Stimulation Theory refers to the need for pursuing arousal and high level of physical and mental activity. It is better suited as an explanation for why people seek leisure activities that involve high mental concentration no matter whether it is active or sedentary leisure.

While all other variables in the multinomial logistic regression model are controlled, gender was found to be predictive across different types of participation in active leisure activities. It was found that, when compared to those who did not play any sport on weekdays, male college students were more likely than female students to engage in strength, recreational and team sport (which is consistent with previous research). One example is that Sylvia-Bobiak and Caldwell (2006) found that male college students reported higher participation in active leisure than female students. The result confirmed here suggests that the promotion of active leisure participation through provision of different kinds of sport may be more effective for male rather than for female college students.

Ethnicity was another significant predictor of two types of active leisure activities: strength and recreational sport. In comparison with the college students who did not play any sport on weekdays, non-Hispanic White students were more likely than Non-white students to engage in strength and recreational sport. This finding supports previous studies. Sallis *et al.* (2000), reviewing 54 studies between 1970 and 1998 for potential correlates of physical activity among adolescents and young adults, found most consistently that non-Hispanic Whites were more active than other ethnic groups.

CONCLUSION

Whereas previous studies on physical activity mainly focused on the various levels of physical exertion across different ethnicities (McKenzie *et al.*, 1992; Gordon-Larsen *et al.*, 2004) such as moderate to vigorous physical activity, this study has considered the various types of leisure time physical activities across different ethnicities. These findings have therefore produced additional in-depth conclusions as compared to previous studies in that health-promotion interventions can be targeted specifically at strength and recreational sport for non-Hispanic White students.

Findings from this study should be interpreted by taking the following limitations into account. Firstly, the data were not collected via the probability sampling technique and therefore a biased selection of samples may have been obtained. For future studies it is recommended that different sampling methods (such as probability sampling) be used to acquire a representative sample. Secondly, in this study the measurement of watching TV, video or DVDs on weekdays and playing computer or video games was not media-content-specific. Therefore, as this was not analysed, comment cannot be made on how specific media content would influence college students‟ active leisure behaviour. It is important that future research on leisure behaviour takes this into consideration. In addition, though the two

dimensions of leisure behaviour (the levels of mental versus physical energy exertions) are useful to explain the relationship between sedentary and active leisure participation, further empirical examination is still needed. Lastly, active leisure was measured in this study by using self-report measures. Although the use of this measure is quite common in studies on physically active leisure among college students, biased results may have been obtained by applying this subjective measure.

Despite these limitations, the results of this study contribute to the literature by providing additional information with respect to the relationship between different kinds of active leisure activities and two important sedentary leisure pursuits among college students. The findings have produced important implications for campus health promotion programmes and for future studies on the relationships between different kinds of leisure activities.

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TEACHERS' UNDERSTANDING AND IMPLEMENTATION OF THE NATIONAL CURRICULUM FOR PHYSICAL DEVELOPMENT IN THE RECEPTION YEAR

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ABSTRACT

This study explored Grade R teachers" understanding and implementation of early childhood physical development practices, based on the Revised National Curriculum Statement (RNCS). A case study, which entailed a focus group discussion, non-participant observations and document analysis of Grade R was conducted at a pre-primary school. Taxonomic and thematic analyses revealed that participants understood early physical development as a precursor to academic functioning. Teaching practices offered varying opportunities to learn within a whole-school approach to Physical Education (PE). Participants perceived various shortcomings in terms of non-specificity, participative versus quality performance approach, lack of age appropriate norms, irregularities with certain aspects of the Grade R curriculum and insufficient guidance for teachers. Participants reported limited reliance on the RNCS to inform their implementation of physical development practices. Further research is recommended, focusing on engaging critically with the physical development section of the RNCS for Grade R and comparing teaching practices in varying contexts. Additionally, there is a need for teacher training in early childhood PE, as well as assistance and dissemination of information

Key words: National Curriculum; Early childhood; Harrow's taxonomy; Physical development; Physical Education.

INTRODUCTION AND RATIONALE

Early childhood is a crucial period in which the foundation for lifelong learning is established (DoE, 2001; Willenberg, 2005; Lerner & Johns, 2009). Physical development is central to the early learning experience, impacting on cognitive development and academic achievement (Jordan-Black, 2005; Son & Meisels, 2006; Santhanam *et al*., 2008). Numerous studies have documented the increasing inactivity of children and the associated health risks (Hills *et al*., 2007; Sollerhed & Ejlertsson, 2008), thus turning the focus of research in physical development to the school context, where children are exposed to physical developmental activities through Physical Education (PE).

Studies show that PE is often seemingly inadequately implemented in schools, having a low status internationally (Hardman, 2008; Sherman *et al*., 2010) as well as in South Africa (Du Toit *et al*., 2007; Amusa & Toriola, 2008). This is often due to a lack of consensus among

professionals regarding the aims and purposes of PE (Van Deventer, 2007). Research has generally focused on primary and high school contexts (Du Toit *et al*., 2007; Smith & Parr, 2007), thereby not adequately addressing the early childhood phase of schooling and the purpose of PE as it pertains to early physical development as a foundation for further academic achievement. Current literature calls for research into physical development in the early childhood phase of schooling (Fredericks *et al*., 2006; Longhurst, 2006).

Furthermore, research around physical development in schools often focuses on its implementation (Van Deventer, 2004, 2009; Du Toit *et al*., 2007) and not on the curriculum, which informs implementation practices, namely the Revised National Curriculum Statement (RNCS). The RNCS is currently under review with the aim of improving its implementation. With this in mind, a need for research that explores specific sections of the RNCS, including physical development in Grade R (the lowest grade bearing formal curriculum in early childhood), seems to exist. Indeed, the need for effective physical development programmes in early childhood has often been raised in literature (Fredericks *et al*., 2006; Longhurst, 2006; Hills *et al*., 2007; Wessels *et al*., 2008).

Current research on Grade R has mostly been in response to concerns with the state of literacy levels of South African children (De Witt *et al*., 2008; Fleisch, 2008). There is also concern in terms of the numeracy levels of South African children (Carnoy *et al.*, 2008; Fleisch, 2008). Yet, limited research could be found pertaining to the physical development section of the RNCS for Grade R, despite the fact that physical development provides the building blocks for mastering literacy and numeracy skills such as reading, writing (Cheatum & Hammond, 2000; Goddard-Blythe, 2000; Ayres, 2005; Santhanam *et al*., 2008) and mathematics (Goddard-Blythe, 2005; Jordan-Black, 2005; Fredericks *et al*., 2006; Son & Meisels, 2006). Therefore, the current scarcity of literature in this area of enquiry, together with the concerns discussed above, confirm that this area of research requires further attention.

PURPOSE

The purpose of this paper is to report on a study exploring how Grade R teachers, at a selected pre-primary school, understand and implement early childhood physical development practices, based on the RNCS. In this context, the study aimed at describing Grade R teachers' understanding of physical development and exploring how these understandings inform their daily classroom practices. Furthermore, Grade R was considered against the backdrop of existing literature on early physical development and the participants'

interpretation of the RNCS.

THEORETICAL FRAMEWORK

Physical development as a concept incorporates a myriad of complex, interrelated processes and, as such, lacks a consistent and clear definition or description. If each word of the concept is analysed, the word *physical* implies "of the body" (Swannell, 1984:425), while the word *development* indicates a "stage of advancement" (Swannell, 1984:158). To say that physical development entails the advancement of the body in stages is a most rudimentary and primarily inadequate definition of the concept, as the question inevitably arises as to what is encompassed when referring to the body or physical aspects of an individual? It could,

therefore, be argued that a single definition of physical development cannot encompass the intricacies of the variety of processes implied by this concept.

Many studies have highlighted the impact of isolated competencies of early physical development on later learning difficulties and cognitive development (Fredericks *et al*., 2006; Son & Meisels, 2006; Pienaar *et al.*, 2007; Lerner & Johns, 2009). Yet, the lack of integration of these isolated competencies into physical development as a whole implies that it is often difficult to track the path of development from the original competency to the resulting learning difficulty and underlying cognitive skill. Anita Harrow's (1972), taxonomy of psychomotor learning provides a framework for describing and organising the processes of physical development, thereby facilitating insight into the pathways between early physical development competencies and related cognitive skills.

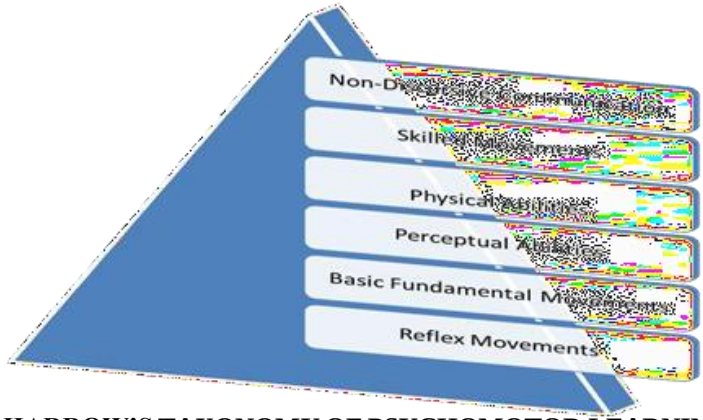

FIGURE 1: **HARROW'S TAXONOMY OF PSYCHOMOTOR LEARNING**
Source: Adapted from Harrow (1972:32)

Taxonomies of learning are regarded as "hierarchical ways of classifying possible learning outcomes" (Killen, 2007:82) on a continuum from the lowest to the highest level of observable behaviour (Harrow, 1972). Harrow's (1972), taxonomy of psychomotor learning (hereafter referred to as Harrow's taxonomy), is an adapted version of the previously unpublished psychomotor domain of Bloom's taxonomy of learning which in turn, entails cognitive, affective and psychomotor domains (Bloom, 1956; Killen, 2007). The psychomotor domain of learning is "concerned with the control of body movements and physical actions" (Killen, 2007:81).

Harrow's taxonomy is designed to assist educators and curriculum developers to formulate a meaningful sequential curriculum by categorising observable movement into six hierarchical levels (Harrow, 1972). The hierarchical nature of this taxonomy was chosen as the theoretical framework for the study for its appropriateness in exploring curricula associated with early physical development, which entails progressively more challenging physical activities (Hills *et al*., 2007).

The first of the six levels, *reflex movements* comprises involuntary movements, which form the base for all other movement (Cheatum & Hammond, 2000). Harrow (1972) includes examples of flexion, extension, stretch and postural adjustments. The second level comprises

basic fundamental movements of which three types are distinguished, namely locomotor, non-locomotor and manipulative movements (Gallahue & Cleland-Donnelly, 2007). Locomotor movements enable the child to get from one place to another (such as crawling, creeping, sliding, walking, running, jumping, hopping, rolling and climbing), while non-locomotor movements require the child to move parts of the body around an axis (such as pushing, pulling, swaying, stooping, stretching, bending and twisting) (Gallahue & Cleland-Donnelly, 2007). Manipulative movements form part of fine motor skills, which involve control of the small muscles of the fingers and wrists (Woodfield, 2004; Lerner & Johns, 2009).

The third level of *perceptual abilities* refers to the detection and interpretation of sensory stimuli by higher brain centres enabling the child to respond and adjust to his/her environment (Harrow, 1972; Stephenson *et al*., 2007). Perceptual abilities include kinaesthetic discrimination, involving the child's body image, awareness of how the body moves, its position in space and its relationship to objects in the surrounding environment (Harrow, 1972; Cheatum & Hammond, 2000). Bilaterality, laterality and dominance form underlying competencies of kinaesthetic awareness (Harrow, 1972; Gallahue & Cleland-Donnelly, 2007). Visual, auditory and tactile discrimination, as well as coordinated abilities, also form part of perceptual abilities (Harrow, 1972; Cheatum & Hammond, 2000).

The fourth level comprises *physical abilities* that form the foundation for highly skilled movement and require endurance, strength, agility and flexibility. The fifth level refers to *skilled movements*, which infer a degree of efficiency or mastery when performing a learned, complex physical task and are characteristic of sport, recreation and dance (Harrow, 1972). Finally, the sixth level involves *non-discursive c*ommunication, ranging from exploration of movement and postures to dance choreographies (Harrow, 1972).

METHODOLOGY

The meta-theoretical paradigm of interpretivism (Terre Blanche & Durrheim, 2006; Cohen *et al*., 2007), together with the qualitative methodological paradigm (Berg, 2004; Durrheim, 2006), facilitated the study's approach to the enquiry. While interpretivism places emphasis on understanding individual interpretations of the world (Cohen *et al.*, 2007), qualitative enquiry seeks to gain rich, detailed information in terms of these individual interpretations (Berg, 2004; Durrheim, 2006). A case study was conducted at a purposefully selected private pre-primary school comprising a total of 182 learners, of which 48 were in Grade R. The selected pre-primary school belongs to a South African group of private schools, which benchmarks students' progress in further grades through internationally accredited school assessments. In 2003, this group of schools embarked on an initiative to enhance the RNCS by involving all staff in collectively brainstorming an improved curriculum (including the

physical development section) for their own use, starting at Grade R and addressing what the Group regards as limitations in the current RNCS. Thus, in addition to following the RNCS for Grade R, the selected participants have critically engaged with the curriculum with a view to improving it and therefore have experience in working with the curriculum as a policy.

The staff at the selected school appeared extensively trained and knowledgeable about literature regarding early physical development, for various reasons. Firstly, the school is an internationally accredited 'Investors in People' member, meaning that a sizeable budget is set

aside each year for the further training of staff who are mandated to attend at least four external training events per year. Secondly, professionals in fields related to physical development have provided staff with in-house training relating to early childhood physical development. Finally, the school has a small teacher's resource library where staff members are able to refer to books and articles pertaining to physical development in early childhood.

The participants selected for the study were 5 staff members who were directly involved in implementing the PE programme, comprising the school principal (who carried out some classroom teaching activities), 2 Grade R class teachers and 2 Physical Developmental Education (PDE) specialists. Focusing on a selected, small number of participants allowed for in-depth enquiry into the teachers' understanding, approach and practices in early physical development. Data was collected via the following strategies as recommended by Creswell (2003), as well as Ryan and Lobman (2007).

Analysis of the data was twofold: utilising taxonomic as well as thematic analyses. This combination allowed for thematic analysis to provide further insight into taxonomies (Pope *et al*., 2006). The taxonomic analysis enabled classification of the data reflecting participants' understanding and implementation of physical development practices according to the 6 levels of Harrow's (1972) taxonomy. The thematic analysis thereafter provided further insight into the data itself, thereby facilitating the interpretation of data.

TABLE 1: **DATA COLLECTION AND DOCUMENTATION STRATEGIES**

Source	Type	Documented	Explored
Document analysis	Public documents	Electronic and hand-written notes	The physical development section of the RNCS for Grade R
Focus group discussion	Semi-structured	Audio recorded and transcribed, as well as field notes and member checking	Participants' accounts of their understanding and implementation of physical development practices and the Grade R RNCS
Observations	Observation as context-of-interaction	Field notes	Participants' physical-developmental practices in the school setting

Trustworthiness was approached by striving to adhere to the quality criteria of credibility, transferability, dependability, confirmability (Lincoln & Guba, 1985) and authenticity (Guba & Lincoln, 1989). As part of the research process, member checking (Gillham, 2000) of emerging focus group themes was employed, thick descriptions of the case and participants

were offered (Rubin & Babbie, 2010), triangulation (Stake, 2000; Berg, 2004) and crystallisation strategies (Janesick, 2003; Maree & Van der Westhuizen, 2009) were utilised and an audit trail established (Patton, 2002).

Ethical considerations in this study entailed acquiring informed consent in writing from the school and participants (Berg, 2004; Strydom, 2005). The integrated guidelines of privacy, confidentiality and anonymity were upheld in the research process (Strydom, 2005; Wassenaar, 2006). Throughout, the participants were treated with respect and trust (De Vos *et al*., 2005). Following the above-mentioned, ethical considerations further facilitated the protection of harm to the participants (Boeije, 2010).

RESULTS AND FINDINGS

The results of the study are summarised in Figure 2 and discussed.

Twofold data analysis	
Taxonomic (Understanding and implementation)	Level 1: Reflex movements Level 2: Basic fundamental movements Level 3: Perceptual abilities Level 4: Physical abilities Level 5: Skilled movements Level 6: Non-discursive communication *A whole-school approach to physical development*
Thematic	Theme 1: The impact of modern lifestyle on early physical development Theme 2: Current inadequacies of physical education in schools Theme 3: Keeping informed and educated in early physical development Theme 4: The role of early physical development in academic performance Theme 5: Physical development as a social and emotional experience Theme 6: Concern about the current physical development curriculum *Subthemes*: 6.1: Non-specificity of the physical development curriculum 6.2 Need for quality performance versus participation 6.3: Need for age-appropriate developmental norms 6.4: What, why, how and when of the curriculum 6.5: Irregularities across the Grade R curriculum 6.6: Guidance for new or inexperienced teachers 6.7: Limited reliance on the curriculum to inform teaching

FIGURE 2: **RESULTS OF THE STUDY**

TAXONOMIC ANALYSIS (Teachers' understanding and implementation of physical development practices based on Harrow's Taxonomy of Psychomotor Learning).

The study's results indicate that although participants implemented physical development practices at all 6 levels of Harrow's (1972) taxonomy, their understanding of early physical development encompassed 5 of the 6 levels. An element pertaining to physical development in the sixth level of Harrow's (1972), taxonomy, namely non-discursive communication, was not mentioned by participants until they encountered an assessment standard in the Grade R curriculum which referred to elements of this level: *"Performing expressive movements using*

different parts of the body… We haven"t really discussed that. That"s more covered in music, dance and drama". Thus, by encompassing Harrow's (1972), 6 levels of the taxonomy of psychomotor learning, participants seemingly displayed a thorough, in-depth understanding of the elements and sub-areas of early physical development.

Overall, participants' understanding of the elements, purposes and current concerns related to early physical development seemed to be in-depth, reflecting current empirical research. However, participants reported that they felt their thorough understanding of physical development was not evident amongst professionals at many other schools. They explained that the additional training, research and regular collaboration with other professionals, which they undertook, enhanced and deepened their understanding of physical development in early childhood. This enhanced understanding of physical development was reflected in participants' implementation practices at the school.

The study's findings indicate that early physical development practices implemented by the participants incorporated all 6 levels of Harrow's (1972) taxonomy, thereby encompassing most of the elements of early physical development. Practices were, seemingly, both direct and unstructured. Direct practices included, for example, PE rings, daily morning reflex exercises, weekly rings with exercise balls and structured activities. More unstructured practices involved providing and facilitating physical development and skills through free play, exploration and problem-solving both in the classroom, during outdoor free play and in moving between venues within the school. Thus, participants seemingly implemented physical development practices in a way that could encourage participation in a variety of activities.

The participating school followed a whole-school approach to the implementation of early physical development practices, including the assistance of non-academic staff, specialist practitioners and parents. Timperio *et al*. (2004) argue for a whole-school approach to physical activity interventions as the most effective means of facilitating physical development. The school incorporates specialised programmes such as the Wilbarger Deep Pressure and Proprioceptive Technique (Wilbarger & Wilbarger, 1991) and exercises from the Institute for Neuro-Physiological Psychology (Goddard-Blythe, 2005). This whole-school approach to physical development implies that the learners have opportunities to engage in activities that could promote physical development. These opportunities are integrated into the school day, easily accessible and varied in approach.

The holistic approach of the school is also extended to the nutritional needs of children, where the school endeavours to provide a healthy mid-morning snack, as well as a nutritious lunch for children who remain for after-school care. An unhealthy diet may be a significant contributor to childhood obesity in addition to physical inactivity (Burdette & Whitaker, 2005; Veugelers & Fitzgerald, 2005). In addition, children bring their own water bottles to school and are encouraged to drink water regularly during the day.

THEMATIC ANALYSIS (Situating teachers' understandings of early physical development within current literature and the RNCS for Grade R).

Participants' understanding of the various purposes and roles of physical development correlated with empirical research. They expressed the role of physical development in encouraging a healthy lifestyle (Anderson *et al*., 2005; Loland, 2006; Hardman, 2008),

enhancing social and emotional skills (Anderson *et al*., 2005; Bart *et al*., 2007; Hills *et al*., 2007) and as a potential foundation for the development of academic skills and functioning

(Fredericks *et al*., 2006; National Joint Committee on Learning Disabilities, 2006; Son & Meisels, 2006).

Additionally, participants displayed an understanding of current challenges and questions as reflected in empirical research, relating to the physical development of young children, such as childhood obesity (Van Deventer, 2004; Du Toit *et al*., 2007; Hardman, 2008; Sollerhed & Ejlertsson, 2008), inactive lifestyles of children (Du Toit *et al*., 2007; Hills *et al*., 2007; Hardman, 2008) and inadequacies in school PE (Du Toit *et al*., 2007; Amusa & Toriola, 2008; Van Deventer, 2009) as a vehicle for physical development: "*...you"ve got to look at the quality, or the work that the PE teachers are presenting...we"ve all had the experience of „here"s a ball, go kick it around". So if you haven"t got a constructive Phys. Ed lesson that has a set objective that is a part of their programme, what is the value of what those kids are doing in that lesson that"s once a week, for half an hour?"*

Findings of the study indicate that participants had many concerns with the physical development section of the RNCS for Grade R. Firstly, participants seemed to be of the opinion that the physical development curriculum does not adequately specify exactly what is required of a child in terms of observable movements, leaving the curriculum open to subjective interpretation by teachers. It was argued that the curriculum required only participation of children rather than quality performance. Teachers argued that while participation in physical development activities has health benefits for the child, participation alone is not sufficient to develop the foundational physical skills necessary for academic functioning.

Participants further maintained that the curriculum needed to be based on age-appropriate developmental norms. It was postulated that basing the physical development curriculum on developmental norms would specify the 'what, why, how and when' of the curriculum. Therefore, emphasis would be placed on what observable movements teachers should look out for, why they need to observe those specific movements, how the child could perform the movements in terms of the expected quality of movement and when it is developmentally age-appropriate for a child to be expected to perform a specific movement.

Additionally, participants reported potential irregularities across the Grade R curriculum itself, stating that the other learning areas are far more comprehensive and specific in detailing what exactly is required from children. Thus, when compared to the rest of the Grade R curriculum, participants found the physical development section to have insufficiencies, both for themselves, and more especially, for newly qualified or inexperienced teachers for whom the curriculum seemingly does not provide extensive substance and guidance: "*Unless you have a teacher with enormous experience, they are actually not going to know what they"re looking for"*. Participants' concerns with the physical development section of the Grade R, RNCS seemed to impact on the extent of their use of the curriculum to inform their teaching practices: "*I certainly don"t think we are reliant upon the curriculum to determine what we"re teaching because it certainly isn"t anywhere near the amount of information that we would require, to provide a comprehensive programme".*

Participants were seemingly not reliant on the RNCS to inform their understanding and

implementation of physical development practices. This is due to participants' reported concerns with what they perceived as the limited scope of the curriculum (as discussed above) and their argument that the curriculum is not comprehensive enough for the physical development programme implemented at the school.

Instead, participants endeavoured to seek guidance for their physical development practices from various alternative sources, such as gaining additional training, keeping informed on research in the field of early physical development, referring to their teacher's resource library and collaborating with other professionals: "*I think we are relying more on developmental norms given to us by O.T. (Occupational Therapist), physiotherapist and from various child developmental books, than we are relying on this (the RNCS). Even our reports are not based on this curriculum (for the physical development section).*

DISCUSSION

This study indicates that the school staff participating in this study possessed an in-depth and comprehensive understanding of physical development in early childhood, thereby affirming the research assumption in this regard. Their comprehensive understanding of physical development informed an implementation of teaching practices that were integrated into a variety of learning opportunities, following a whole-school approach to learning. Another research assumption that teachers' understandings of physical development in early childhood serves to inform their teaching practices, was also supported.

Although the RNCS is a document formulated to guide and inform teachers' understanding and implementation of early physical development practices, the participants found it inadequate in such a role and not comprehensive enough for the school's implementation practices. The research assumption that the RNCS informs teachers' understandings of physical development would appear not to be supported in this study. Furthermore, the assumption that the participants interpret the physical development section of the Grade R, RNCS according to their understandings of early physical development was not affirmed, since teachers' understandings of physical development reportedly fuelled their concerns, instead of their engagement with the RNCS when interpreting it.

The overall assumption that the participants would base their physical development implementation practices on the RNCS was not confirmed, since the RNCS reportedly had little influence on the in-depth understanding and thorough implementation of physical development practices by the participants. Instead, participants reportedly turned to other sources of guidance and information in order to enhance their teaching practices. This study concludes that for the selected school, school staff's in-depth understandings of physical development in early childhood and their comprehensive, whole-school approach to the implementation thereof, seemed to be neither informed, nor guided, by the physical development section of the RNCS for Grade R.

CONCLUSION

This study set out to explore how Grade R teachers at a particular pre-primary school understood and implemented physical development practices based on the RNCS. What emerged from the study was that the curriculum appeared to fall short as a valuable resource for the teachers at the selected school, and consequently, their facilitation of physical

development seemingly had little to do with guidance by the curriculum. As a result, further questions were raised regarding the effectiveness of the curriculum itself.

Questions were also raised as to the possible similarities and differences regarding understanding and implementation of physical development practices in schools within varying contexts across the country. What this study highlights, however, is that physical development plays a vital, if not central, role in the young child's overall development and future academic achievement. This should be regarded as a central component of the Grade R curriculum. If Hardman's (2008) call for improving the relevance and quality of PE in the curriculum is to be heeded, then the Grade R curriculum needs to be critically engaged with a view to embracing the primary purpose of physical development in early childhood as a precursor to learning and academic achievement. The goal of critically engaging with the Grade R curriculum is of particular relevance when taking into consideration the Education Department's (Department of Basic Education, 2010) goal of having 90% of five year olds in Grade R programmes by 2014.

RECOMMENDATIONS

When considering recommendations, it is pertinent to note the inherent limitations of this study. The high socio-economic status of the school, together with the small number of participants, to a certain extent limited the transferability of the results. The nature of case study design does not facilitate the implementation of changes in varying contexts (Opie, 2004). Research based on case study design is limited to suggesting recommendations based on the findings of the study, which can be an impetus for further study on the topic (Edwards, 2001). The findings of this study do not facilitate implementation of changes to the RNCS, but rather endeavours to stimulate debate and further investigation into the topic of enquiry.

Further research into the understanding and implementation of early physical development practices at schools, in various contexts and socio-economic circumstances could provide valuable insight into practices surrounding early physical development in larger populations. Within-case as well as across-case analyses could be useful in this regard, to compare understanding and practices surrounding early physical development and PE in different schools.

Pivotal to further research in early physical development is the need for further enquiry into the physical development section of the RNCS for Grade R. Future research could explore possible differing interpretations of the Grade R physical development curriculum by teachers who may be informed by varying depths of understanding in early physical development. Furthermore, research could explore how the physical development section of the Grade R, RNCS might currently be utilised by teachers to varying extents, depending on the availability of alternative resources to inform their teaching practices.

Future curriculum research focusing on enhancing or changing the curriculum needs to include teachers themselves. Involving teachers in curriculum change is regarded as a contentious challenge, since curriculum developers often regard teachers as conveyors of the curriculum rather than designers thereof (Srivastava & Kumari, 2005). However, including teachers' voices in future curriculum change may add further insight and innovation to the

curriculum, based on teachers' experiential knowledge. In order for teachers to be involved in further research regarding curriculum change, they need to have a degree of knowledge, insight and experience in early physical development and PE.
Further research and consideration is needed in the training of teachers in physical development, and also the manner in which physical development is facilitated through PE. Further training could take the form of workshops and conferences. However, an awareness of the various purposes of physical development needs to be central to teacher training. Training in early physical development needs to focus on the building of physical skills as a foundation for further cognitive development and academic performance. Du Toit *et al*. (2007) argue that although teachers and principals are aware of the health implications of PE, they need further education with regard to other benefits of PE. If teachers, parents, policymakers and other stakeholders become more aware of the link between physical development in early childhood and future academic functioning, the status of PE in schools may be elevated, regardless of whether PE is an examinable subject or not.

This study has demonstrated how the status of PE can be elevated within a school due to teachers' in-depth understanding of the nature, purpose and importance of physical development for the child, thus showing that teacher training itself can serve to elevate the status of PE in schools. A need seems to exist to convince government (as curriculum developers and policymakers) about the potential benefits of optimal physical development in early childhood. As professionals in the education sector and other helping professionals, are in a position to liaise with government in this regard.

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TRAVEL BEHAVIOUR OF SOUTH AFRICAN TOURISM STUDENTS

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ABSTRACT

When developing and managing tourism products, understanding the travel behaviour of niche markets, such as students can create a competitive advantage for tourism products. The purpose of this research was to determine the travel behaviour of tourism students in South Africa. Surveys were conducted at eight Tertiary Education Institutions offering tourism-related qualifications. Second and third year students at these institutions completed a total of 1062 questionnaires. The statistical analysis entailed descriptive statistics and factor analyses of travel motives and factors influencing holiday choices. The results revealed that students have specific preferences, but also similarities with other studies conducted among other tourist markets. Relaxation was found to be a significant motive for students, but gaining knowledge and learning new things were also very important for this market. When selecting destinations, personal influences (for example, previous visits, popularity and season) as well as predetermined influences (for example, availability of a holiday home, size of the travelling group, availability of time share and purpose of the holiday) played an important role.

Key words: Tourism students; Travel motivations; Holiday choice sets; Factor analysis.

INTRODUCTION

The student travel market has shown significant growth over the past few years (Kim *et al*., 2007), and according to Schrage *et al*. (2001) and Liu (2008), students of today travel more than previous generations. Despite the economic contribution of a growing student travel market, Kim *et al.* (2007) found that there is still a lack of information regarding the travel behaviour and travel motives of students. The latter can assist in explaining or predicting student travel decisions and behaviour (Liu, 2008). Travel behaviour is the result of an attempt to satisfy unfulfilled needs, such as relaxation and spending time with family and friends (Nylen, as cited by Kotze, 2005). It refers to what people do over a specific time and is influenced by various factors, including personality, lifestyles, tourist roles and culture (Pizam & Sussmann, 1995). Carr (2002) states that behaviour is also influenced by a combination of socio-cultural norms, values and personal motivations that is present in both the home and holiday environments. This implies that travel behaviour, motives and destination choices differ according to the life cycle of the tourist (Oppermann, 1995), previous experiences, personal barriers and age, to name but a few.

Today, travel is easier than it has ever been and this leads to new and extended opportunities for the student market (Shoham *et al*., 2004). Therefore, the aim of this study is to determine the travel behaviour of tourism students at selected universities in South Africa by analysing the demographic profile and factors influencing the travel behaviour of students. The results of such research would be of definite marketing, economic and social value, could lead to a harmonious blend of marketing and planning, and could assist in establishing an integrated information system regarding travel behaviour research (Minghui, 2007).

LITERATURE REVIEW

Tourism can be considered as an experience that is produced and consumed at the same time

(Heung *et al*., 2001). Travelling has become popular for numerous reasons, including increased leisure time and income, new technological booking processes, low-cost airlines, more accessible information, easy transfer of money and easier travelling in general (Yau & Chan, 1990; Hsu & Sung, 1997; Richards & Wilson, 2003; Shoham *et al.*, 2004). Gallarza and Saura (2006) identify students as a relatively neglected segment, which is attracting the attention of many researchers due to the growth in the number of students taking holiday breaks and using very particular tourism services. Both Hsu and Sung (1997), as well as Carr and Axelsen (2005) point out the importance of this market as long holiday breaks, increased mobility, independence, and living far from their parents leave students with enough time to travel. It has become easier for students to travel domestically in addition to globally. Richards and Wilson (2003 & 2005) show that nowadays students spend more time on travel planning, especially regarding the destination visit, the mode of travel and the cost of the trip.

Although students tend to be constrained by relatively low levels of disposable income, the fact that they have few commitments, such as children and dependant spouses makes them more inclined to travel. The travel behaviour of students is further encouraged by society‟s view of student lifestyles, peer pressure to conform to the travel-orientated image of students and parental expectations of students‟ travel behaviour (Carr & Axelsen, 2005). It is therefore important to analyse the travel preferences of students and some factors influencing the travel behaviour of this niche market, which include accommodation preferences, transport (method of travel) preferences as well as preferences in terms of frequency and duration of trips.

Accommodation

Michael *et al*. (2003) found that staying with family and friends is the preferred choice of accommodation for students in South Africa. Josiam *et al*. (1994), Chadee and Cutler (1996), Richards and Wilson (2003), and Shoham *et al*. (2004), who conducted research into international student travel behaviour in the United States of America (USA), obtained similar results. A study done by Pearce and Son (2004) found that hotels and motels are the most popular form of accommodation for international students and that backpackers are less likely to use hotels or motels. Chadee and Cutler (1996), Field (1999) and Heung and Leong (2006), confirmed that cultural differences exist among students from different parts of the world.

Method of travel

The following section deals with different modes of transport used by students, including car, train and air travel. Research by Shoham *et al*. (2004) found that travelling by car is the preferred transport choice for students in South Africa. However, Oosthuizen and Baloyi (2000) reported that many black people in South Africa predominantly use taxis and buses. Travelling by bus is popular and more affordable, and is also considered as a fairly safe way to travel (Bywater, 1993). Hobson and Josiam (1992) found that the majority of trips taken by American students were by car. This was echoed by Josiam *et al*. (1994) in a study in the USA, Shanka *et al*. (2002) in their study in Australia and Shoham *et al*. (2004), who conducted a cross-cultural study. According to Michael *et al.* (2003), poor infrastructure and high costs make travelling by train and airplane less popular, although low-cost airlines have had a significant impact on travel patterns. However, Gmelch (1997) found that travelling by train was becoming more popular with American students, while Pearce and Son (2004) also established that Australian students preferred travelling by train. In an international study conducted by Richards and Wilson (2003), the main mode of transport for students was air

travel, followed by rail travel. In a study that questioned students from Canada, the Czech Republic, Hong Kong, Mexico, Slovenia, South Africa, Sweden and the United Kingdom (UK), Heung and Leong (2006) reported that air travel was more popular for the Hong Kong student market. Similar results were obtained by Josiam *et al*. (1999), who studied college students at Panama City Beach (Florida) and Hobson and Josiam (1992), who studied American students. It is clear that preferences differ in terms of preferred modes of transport.

Time and duration

McKercher *et al*. (2006) revealed that most students plan their trip/vacation four to six months in advance. In Australia, students prefer to travel during the summer break (December-February), followed by the break between the first and second semesters, during the southern winter in July (Michael *et al.,* 2003). Kim *et al.* (2006) reported that students stay on average between six and 14 nights, while Josiam *et al*. (1994) and Sung and Hsu (1996) found that the average length of stay for the US spring travel market is five nights peaking at six to seven nights. United Kingdom students on average took two holidays a year, averaging 17 days (Carr, 2005), whereas students from Asian countries and Australia stay up to 10 nights (Frost & Shanka, 1999). The findings of Richards and Wilson (2003), on the other hand, revealed in an international study that for students who travel to long-haul destinations the average length of stay was 63 days. A study by Chadee and Cutler (1996) indicated that the cost of travel highly influenced the length of time students wished to travel.

Various factors can influence the travel behaviour of students (Michael *et al*., 2003; Pearce & Son, 2004; Shoham *et al*., 2004; Kim *et al*., 2006; Liu, 2008), which include income and budget, travel motivations and aspects influencing destination choice.

Income and budget

Financial restrictions are one of the greatest challenges that students have to face when deciding to travel (Donaldson & Gatsinzi, 2005). According to Harvey (2005), students spend exactly the same amount of money as other travellers, with the difference being that they spend the money over a longer period than older tourists. Students tend to cut down on

accommodation costs to afford recreation activities. Tourists who save money on transport to a destination are likely to spend more on other travel components, such as accommodation or activities (Patkose *et al*., 2005). Mondschein *et al*. (2006) found that people with a higher income level have more choices of destinations to travel to with better transport. Richards and Wilson (2003) state that the average spending of students is relatively low, with most of the students spending less than US$20 per day. However, the level of daily spending is inversely related to the length of stay. Michael *et al*. (2003) found that the average expenditure per student was A$392. Payne (2009) established that students spend on average between NZ$397.81 and NZ$688.77 per holiday, mostly on activities and transport. The way spending is measured differs among the various studies and it is not always indicated whether it refers to daily spending or average spending. It is therefore difficult to compare studies with one another.

Travel motivations

Studies into the travel motivation of American students include the one by Josiam *et al*. (1999), who found that the respondents‟ main motivations are „good party reputation‟,

„friends going there", and „family live there". In a study of US university students, Kim *et al.* (2006), based on the work of Cha *et al*. (1995), identified seven motivational factors: knowledge, sport, adventure, relax, lifestyle, travel bragging and family. A primary reason for US students travelling is to „get away and to relax" (Hobson & Josiam, 1992; Josiam *et al.*, 1994). A reason shared by New Zealand students was also to want to „relax" (Carr, 2003). However, Chadee and Cutler (1996) found that „adventure" and „culture" are strong motivators for New Zealand university students, whereas Babin and Kim (2001) identified safety as a concern for US students. Research by Richards and Wilson (2003) revealed factors such as to explore other cultures, excitement, increasing knowledge and to meet different people and places. The findings of a study completed in Australia by Michael *et al.* (2003), made known that the most important travel motives are recommendation by friends and family, good beaches, the variety of attractions and scenic beauty. To „party and drink" and „being with friends and family" are also important reasons for both American (Smeaton *et al.*, 1998) and Australian students (Carr, 2003).

Destination choice

Hobson and Josiam (1992) and Shanka *et al.* (2002) found that students are interested in renowned and familiar destinations. Chadee and Cutler (1996), however, showed that students who travel overseas seek adventure experiences and that students from New Zealand travel for adventure. Butts *et al.* (1996) revealed that image influenced the destination choice with the image of the sun being one of the most important factors attracting students to a destination. Bywater (1993) states that many young travellers choose sun and sand destinations. Tourism infrastructure is another aspect that can influence destination choice. Josiam *et al.* (1994), Gmelch (1997) and Payne (2009) found that students choose destinations based on the easy driving distance of three to four hours. A primary factor when choosing destinations is the influence of family and friends, according to studies by Hobson and Josiam (1992) and Josiam *et al.* (1994), while Bywater (1993) and Butts *et al*. (1994) found that students travel to destinations where accommodation costs are low.

The literature review clearly shows that there are similarities, as well as differences in the travel behaviour and motives of students. Other than the studies of Schrage *et al.* (2001), Michael *et al.* (2003) and Richards and Wilson (2003), who addressed South African student travel behaviour and motives as part of a bigger international survey, there has been no research into the travel behaviour and travel motives of South African tourism students. This research aims to determine the travel behaviour of tourism students in South Africa.

METHOD OF RESEARCH

Quantitative research was conducted by means of a survey. The questionnaire was developed after a comprehensive literature review of previous related studies. The questionnaire focused on the demographic characteristics of students, their holiday preferences, type of travel (weekend, domestic travel and longer international travel), travel motivations and factors influencing holiday choice. The survey was conducted during August 2009. All tertiary institutions in South Africa offering Tourism Management as a degree programme were contacted and asked to participate. The eight institutions (and the number of students) that participated in the survey were: Central University of Technology (50), Nelson Mandela Metropolitan University (67), Pretoria University (154), Vaal University of Technology (79), Tshwane University of Technology (253), North-West University (179), University of

Johannesburg (162) and Walter Sisulu University (118), resulting in a total of 1062 questionnaires.

This research is based on complete sampling, as the number of questionnaires related to the total number of second and third year tourism students willing to complete the survey. The total number of students in these classes formed part of the survey. Lecturers were responsible for administering (distributing and collecting after completion) the questionnaires in the tourism management class. The data for the surveys were captured in Microsoft Excel by fieldworkers of North-West University and analysed using the Statistical Package for Social Sciences (SPSS 17.0). The statistical analysis included descriptive analyses and in particular factor analyses.

Factor analyses for travel motivations and holiday choice sets were conducted in order to identify smaller sets of explanatory composite factors that define the fundamental constructs assumed to underlie the original variables. Only those factors with an *eigenvalue* equal to or greater than 1.0 were considered. A factor loading of 0.30 is considered significant, while a factor loading of 0.50 is considered very significant (Field, 2005). However, variables with factor loading coefficients of 0.40 were considered. To ensure quality of measurement, the variables were also subjected to reliability (Cronbach alpha reliability test) and appropriateness (Bartlett‟s test of sphericity and Kaiser-Meyer-Olkin measure of sampling adequacy) testing.

RESULTS

Demographic profile

The descriptive analysis (Table 1) indicates that a higher percentage of females (67%) participated in the survey than males (33%), reflecting the reality that in general more

females than males enrol for tourism studies. The age distribution of students was between the ages of 18 and 21, which correlates with the fact that the questionnaires were completed by second and third year tourism students. Black tourism students account for 56% of the sample, followed by White tourism students at 39%. Most tourism students originate from Gauteng (40%) and the Eastern Cape (17%) and speak other languages such as isiXhosa, Sepedi, Sesotho and Xitsonga. This correlates with the locations of the institutions that participated in the survey.

TABLE 1: **DEMOGRAPHIC PROFILE AND TRAVEL BEHAVIOUR OF STUDENTS**

Attribute & categories	**Percentage students *N* = 1062**
Gender	
Male	33%
Female	67%
Age	
18-21	74%
22-25	23%
26-30	2%

30+	1%
Race	
Black	56%
White	39%
Coloured	4%
Indian	1%
Province of residence	
Gauteng	40%
Mpumalanga	11%
North West	7%
Free State	7%
Eastern Cape	17%
Western Cape	1%
Northern Cape	1%
KwaZulu-Natal	3%
Limpopo	8%
Outside RSA borders	4%
Language	
Afrikaans	33%
English	29%
Other	38%

Travel preferences of students

While on holiday, most students stay with relatives (40%) or make use of camping facilities (22%) and hotels (21%), and they travel by car (71%) (Table 2). Students prefer to travel over the weekends and take 7.98 weekend trips per year. However, students take 2-3 holidays per

year (46%) and 75% have never travelled overseas. Holidays last 8.6 days and international trips 12.8 days.

TABLE 2: **TRAVEL PREFERENCES OF STUDENTS**

Attribute & categories	**Percentage: Students** (N=1062)
Accommodation preferences	
Relatives	40%
Holiday home	20%
Camping	22%
Chalet	17%
Guesthouse	12%
Backpacker, Youth hostel	8%
Hotel	21%
Other	2%
Transport preferences	
Car	71%
Bus	25%
Taxi	16%
Motorcycle	1%
Aeroplane	16%

Train	5%
Holidays frequency	
Once a year	34%
2-3 times a year	46%
4-5 times a year	10%
More than 5 times a year	6%
Never	4%
International trips frequency	
Once a year	19%
2-3 times a year	4%
4-5 times a year	3%
Never	75%
Weekend trips	7.98 per year
Duration of the holidays	8.6 days
Duration of international trips	12.8 days

Factors influencing travel behaviour

On holiday, students spend R2587.62 per trip, mostly on accommodation (R639.23) and retail shopping (R462.62).

TABLE 3: **SPENDING PATTERNS OF STUDENTS**

Expense items	**Amount**
Accommodation	R 639.23
Food and restaurants	R 347.78
Alcoholic drinks	R 186.02
Non-alcoholic drinks	R 116.37
Retail shopping (excl. food & drinks)	R 462.62
Souvenirs and presents	R 158.31
Transport	R 410.55
Entertainment	R 235.36
Other	R 31.38
TOTAL	**R2587.62**

In order to determine the travel motives of students, a principle component analysis with orthogonal VARIMAX rotation was conducted on the 20 motivational statements measuring travel motivation. The analysis resulted in the extraction of 5 factors with *eigenvalues* greater than one. The 5 factors accounted for 54% of the variance. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.829, which is highly acceptable. The Bartlett test was also found to be significant ($p<0.00001$).

Table 4 displays the factor loadings of the rotated matrix and the mean values of each factor. The factors are labelled according to similar characteristics: Education and Participation (Factor 1), Relaxation and Escape (Factor 2), Socialisation (Factor 3), Novelty (Factor 4) and Togetherness (Factor 5).

The factor analysis revealed factors that relate to the behaviour of students. Students are enthusiastic tourists and should be exposed to various experiences. They consider Factor 4 (Novelty) to be the most important factor, which means that students would benefit from exposure to new destinations and experiences. Students enjoy being with friends and family, which explains socialisation as a motivational factor.

Mirroring the results of other studies, one of the key factors for students is also relaxation, with a mean value of 3.31. However, students consider the learning experience as less important with a mean value of 2.98. The Cronbach alpha coefficient for Factor 5 (Togetherness) is below the recommended value of 0.5 and can therefore not be considered as a factor. However, the mean value for the items „to be together as a family" is 3.46, „to get refreshed" is 3.50 and „to participate in entertainment" is 3.13.

TABLE 4: **FACTOR ANALYSIS OF STUDENTS' TRAVEL MOTIVES**

Travel motives	**Factor 1** *Education & partici-pation*	**Factor 2** *Relaxation & escape*	**Factor 3** *Sociali-sation*	**Factor 4** *Novelty*	**Factor 5** *Together-ness*
To experience different lifestyles	.747				
To learn more about my/other countries	.708				
To meet people with similar interests	.648				
To learn new things	.598				
To study	.577				
To participate in recreation activities	.417				
To relax		.727			
To relax from daily tension		.706			
To share familiar/unfamiliar places with someone		.508			
To rest physically		.501			
To escape from a busy environment		.444			
To spend time with friends			.772		
To be together as a group of friends			.723		
To have fun				.701	
To explore new destinations				.543	
To do exciting things				.528	
To do something out of the ordinary				.487	
To be together as a family					.698
To get refreshed					.543
To participate in entertainment					.469
Cronbach's alpha	**0.731**	**0.657**	**0.705**	**0.648**	**0.475**

Mean values	**2.98**	**3.31**	**3.24**	**3.58**	**–**

A second principle component analysis with OBLIMIN rotation (with Kaiser Normalisation) was conducted on the 21 aspects influencing destination choice due to correlations between the factors. The analysis resulted in the extraction of 6 factors with *eigenvalues* greater than one. The 6 factors accounted for 57% of the variance. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.867, which is highly acceptable. The Bartlett test was also found to be significant ($p<0.00001$). The factor loadings of the rotated matrix and the mean values of each factor are presented in Table 5.

TABLE 5: **FACTOR ANALYSIS: HOLIDAY CHOICE OF STUDENTS**

Holiday choices	**Factor 1** Personal influences	**Factor 2** Predeter-mined influences	**Factor 3** External influences	**Factor 4** Financial influences	**Factor 5** Destination influences	**Factor 6** Image-related influences
Climate at destination	.667					
Season	.623					
Popularity of the destinations	.617					
Previous visits	.458					
Availability of a holiday home		-.763				
Size of the travelling group		-.755				
Availability of time share		-.714				
Purpose of the holiday		-.680				
Length of holiday		-.526				
Sport facilities			.729			
Available recreation activities			.568			
Parents‟ influence			.527			
Distance to destination				.794		
Finances				.753		
Transport					-.678	
Security					-.661	
Entertainment					-.638	
Type of accommodation					-.509	
Available tours					-.486	
Scenic beauty						.668
Value for money						.475
Cronbach's alpha	**0.654**	**0.775**	**0.510**	**0.532**	**0.710**	**0.408**
Mean value	**2.9**	**2.9**	**2.6**	**3.3**	**3.2**	**–**

The factors were labelled according to similar characteristics: Personal influences (Factor 1), Predetermined influences (Factor 2), External influences (Factor 3), Financial influences (Factor 4), Destination influences (Factor 5) and Image-related influences (Factor 6). The Cronbach alpha coefficient for Factor 6 is below the recommended value of 0.5 and can therefore not be considered as a factor. However, the mean value is 3.33 for „scenic beauty" and 3.5 for „value for money", indicating that students consider these two attributes important when making holiday choices.

The factor analysis revealed factors related to holiday choice variables. Students are subjected to personal influences, which include aspects such as climate, season, popularity of the destination and previous visits. The students consider these aspects to be less important with a mean value of 2.9. Students are also affected by predetermined influences over which they have no or little control, such as the availability of a holiday home, the size of the travelling group, the availability of time-share, and the purpose and length of the holiday. Students also considered external factors, including the availability of sport and recreation facilities and activities, and the influence of parents, although the latter was considered less important. The greatest influences on holiday choice are financial matters with a mean value of 3.3, followed by destination influences with a mean value of 3.2.

FINDINGS AND IMPLICATIONS

Travel preferences

Accommodation

The results clearly show that students prefered to stay with relatives, which supports research by Michael *et al*. (2003), Richards and Wilson (2003) and Shoham *et al*. (2004). However, this study contradicts the main findings of Bywater (1993) and Payne (2009), who found that students" first choice is backpackers or a hostel, followed by staying with family and friends.

Mode of travel

Travelling by car is the preferred mode of travel for students, which supports the findings of Hobson and Josiam (1992) and Payne (2009). The results, however, contradict the Richards and Wilson (2003) study that revealed that students prefer to make use of air travel followed by rail travel, as well as a study conducted in South Africa by Shoham *et al*. (2004), which reported that students prefer travelling by bus.

Frequency and length of stay

The study found that students go on holiday 2-3 times per year for an average of 8.6 days, which is similar to results obtained by Michael *et al*. (2003) and Payne (2009). Kim (2007) also revealed that students tend to stay between 3 and 6 nights. However, this finding is contradicted by Kim *et al*. (2006), who found that students travel for 14 nights, while Richards and Wilson (2003) found that students travelling internationally travel for 63 days.

Factors influencing travel behaviour

Spending

Expenditure results of this study showed that students spend on average R2587.62 on a holiday trip, whereas Michael *et al.* (2003) found that students spent $392.00 per holiday trip. A comparison of these results is difficult, as the studies were conducted in different years,

different spending categories, different currencies and in different countries. Even with the latter taken into consideration, the amounts are similar.

Travel motives

„Novelty" was identified as the most important travel motive with a mean value of 3.58. The combination of „having fun", „exploring new destinations", „doing exciting things" and „doing something out of the ordinary" seems attractive to the student market and has not been identified by other studies as primary travel motives. „Novelty", as identified in this study, has only been found in one other student travel study, that of Klenosky (2002).

The other motives are similar to those identified in previous research: „to relax" (Cha *et al.*, 1995; Klenosky, 2002; Richards & Wilson, 2003; Kim *et al*., 2006; Kim, 2007; Payne, 2009), „to socialise" (Klenosky, 2002; Richards & Wilson, 2003), and „education and participation" (Richards & Wilson, 2003; Kim *et al*., 2006; Payne, 2009). However, Kim *et al*. (2006) also found that the main motivations were „good party reputation", „friends going there" and „friends/family living there".

An interesting finding was that the travel motive „education and participation", which Richards and Wilson (2003) had identified as an important factor, had the lowest mean value of 2.98. Kim *et al*. (2006), however, found that „knowledge" had the highest composite mean score (3.54). Although previous studies identified „participating in activities" as an important factor (Cha *et al*., 1995; Michael *et al.*, 2003), this is not the case for the South African tourism students who participated in this study.

Aspects influencing holiday choices

Students" holiday choices are influenced by personal factors, predetermined factors, external factors, financial factors, destination factors and image-related factors. The most important influence, with a mean value of 3.3, was finances, which includes the distance travelled to the destination and the finances. McLellan and Sirakaya (1997) and Donaldson and Gatsinzi (2005) also found that the cost of the vacation (finances) was an important factor for the student market. However, these results contradict research by Shoham *et al*. (2004), who identified entertainment as the motive for South African students. Destination factors were the second most important factor and include transport, security, entertainment and the type of accommodation available.

Implications

The student market is a market worth considering, especially since today"s student is tomorrow"s tourist. However, a more comprehensive study of students" travel behaviour at different tertiary institutions is recommended, as these results contradict similar studies conducted in South Africa. Therefore, it is not possible to generalise the findings. Product owners and marketers have to take into account the different needs of the student market, such as offering new experiences. This is important if they want students to return and implies that any new development has to be communicated to this market. The advantage of the student market is that they are easily accessible and can be reached effectively through promotions on the different campuses.

A key finding, which is also supported by other similar studies, is that this market is price sensitive, which implies offering student discounts on different packages. Many product

owners and destinations already give discounts to tourists if they show their student cards. Destinations could also consider forming loyalty clubs that give students a discounted rate on various products at the destination. Low-budget accommodation is also a way for product owners or destinations to attract this market. Furthermore, destinations and attractions need to

provide a variety of entertainment in a safe environment, as the student market considers safety and security to be important when choosing a holiday destination. This is not to say that destinations and attractions should focus only on the student market, but they do need to make provision for this market, which is growing.

CONCLUSIONS

The purpose of this paper was to analyse the travel behaviour of tourism students in South Africa. Results revealed some interesting findings in particular, that „novelty" is the most important travel motive. This finding contradicts most similar studies. In fact, only one study on student travel behaviour referred to this motive and in general „escape" is the most common and important travel motive. Ideally, this research should be expanded to students in other programmes in order to obtain a comprehensive view of student travel behaviour in South Africa. In addition, it would be interesting to analyse the travel behaviour of different cultures. It was the first time that this kind of research has been conducted on tourism student behaviour and the findings indicate that this market requires a different approach, since students have specific needs and are price sensitive.

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SCHOOL PHYSICAL EDUCATION IN FOUR SOUTH AFRICAN PROVINCES: A SURVEY

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ABSTRACT

Post-apartheid educational transformation in South Africa (SA) reduced Physical Education (PE) from a stand-alone subject to a learning outcome of the Learning Area/Subject Life Orientation (LO) in Grades 7-12. The main purpose of the current study was to determine the implementation of LO in selected secondary schools with specific reference to Physical Development and Movement, a learning outcome in the Senior Phase (SP), and Physical Education in the Further Education and Training Phase (FETP) in the Eastern Cape, Free State and North West Provinces (n=88). The data was combined with the data obtained in selected Western Cape secondary schools (n=62) in 2008. The combined sample was N=150. In the SP, 57% of the schools had qualified PE teachers on the staff compared to 42% of the schools in the FETP. Fifty-eight per cent of LO teachers in the SP and 40% in the FETP who facilitated the movement component of LO were not qualified to present PE. Higher Education Institutions (HEI's) and other stakeholders in SA need to convince government that there should be a discipline-based approach to PE and it should be a stand-alone school subject. The way that LO is compiled does not allow for subject specific training implying that generalist teachers are responsible for teaching the movement component of LO.

Key words: Education; Physical Education; Life Orientation; Curriculum 2005; National Curriculum Statement; Curriculum and Assessment Policy Statement.

INTRODUCTION

Sedentary lifestyles, especially among the youth, increasingly challenge active lifestyles because of the demands of modern life (AG, 2010). The basis of the physical activity (PA) pyramid within the school context is Physical Education (PE) (Seghers *et al*., 2009). The only school subject that focuses on physical and mental development and prepare almost all learners for an active lifestyle is PE (Malina, 2001; Talbot, 2001; Seghers *et al*., 2009).

The first South African Youth Risk Behaviour Survey (SAYRBS) of 2002 (N=10 699), indicated that 44.6% of learners in Grades 8 to 11 participated in adequate vigorous PA, 25.9% did not want to participate in PA the week before the survey and 25.2% watched television or played video/computer games for more than three hours per day (DoH, 2003). In the SAYRBS of 2008 (N=10270), 43.2% of learners in Grades 8 to 11 participated in adequate vigorous PA, 28.8% did not want to participate in PA the week before the survey and 29.3% watched television or played video/computer games for more than three hours per day (DoH, 2010), indicating a decline in participation and an increase in sedentary pursuits.

Health 24 (2011) reported that a panel of health scientists gave South African children an overall health grade of C- in 2007 and 2010. This mark included unhealthy eating, tobacco use and participation in PE for children in primary and secondary schools. In 2007, 45% of South African children participated in vigorous PA and in 2010 it declined to 42%. Learners from low socio-economic backgrounds or from single-parent homes participated less in leisure-time PA (Health 24, 2011). In 1992 the Senate Standing Committee on Environment, Recreation and the Arts in Australia found that "…ironically there is no dispute about the importance of physical education, yet there is a serious problem with its delivery*"* (AG, 2010:3).

However, cognisance should be taken that education is a political enterprise (Craig, 1991), which also applies to PE (Fisher, 2003; Kidd, 2003; Klein, 2003). The birth of democracy in SA brought about a new national curriculum, Curriculum 2005 (C2005), based on Outcomes-based Education (OBE), which was the master plan to eradicate the inequalities of the Apartheid education system (Jansen, 1998; Manganyi, 2001; Harley & Wedekind, 2004; Rooth, 2005; Vambe, 2005; DBE, 2009; Rajput & Van Deventer, 2010). Curriculum 2005, a radical paradigm shift, reduced PE from a stand-alone subject to a Learning Outcome of Life Orientation (LO), a new Learning Area/Subject in C2005 (Van Deventer, 2002; Van Deventer, 2005; Van Deventer & Van Niekerk, 2008; Toriola *et al*., 2010), which had a political rather than an educational undercurrent (Toriola *et al*., 2010).

Craig (1991:22) believes that education *is* "a process based on people"s cultural existence". Yet, in SA it is believed that educational practices can be transplanted from one social context to another (De Wet & Wolhuter, 2009). Bloch (2009:115) is of the opinion that OBE was "a case [of] uncritically drawing on unworkable proposals from New Zealand and Australia".

Educational change in SA failed because the unique milieu in which it had to take place was not considered (Blignaut, 2009). Historical and situational constraints in education limit the potential of OBE to enhance learning (Mathieson, 2001; Botha, 2002; Fiske & Ladd, 2004; Todd & Mason, 2005; Vambe, 2005; Prinsloo, 2007; Bloch, 2009). A lack of management capacity and support, and weak infrastructure in Provincial Departments of Education and most schools further erode the success of policy implementation (Chisholm, 2000; Fiske & Ladd, 2004; Todd & Mason, 2005; Vambe, 2005; Blignaut, 2009; Bloch, 2009).

Over several years considerable criticism has been raised against the revised National Curriculum Statement (NCS) that replaced C2005 in 2000 (DBE, 2009). A major challenge was that subject specific training was not addressed, as was the case with C2005 (Chisholm, 2000; Bloch, 2009; DBE, 2009). Van Deventer and Van Niekerk (2008) revealed that 60% of the LO teachers in selected Western Cape (WC) primary and secondary schools were not qualified to present PE, which is at the core of the battles regarding the successful implementation of the NCS (Campbell & McGhie, 2007; Blignaut, 2009; Jacobs, 2011). Van Deventer *et al*. (2010) found in a study conducted in selected primary and secondary schools in the Eastern Cape (EC), Free State (FS) and North West (NW) Provinces that 50% of the LO teachers compared to those in the WC Province were not qualified in PE.

Life Orientation, with its underlying constituents (e.g., School Guidance, Religious Education, Youth Preparedness, PE), does not denote an academic discipline (Rajput & Van

Deventer, 2010). International studies of curriculum indicate that a strong, *discipline-based* approach to subjects is a feature of school curricula associated with countries performing better on international standardised tests (DBE, 2009:38). In SA, 60-80% of the schools are dysfunctional indicating a national education disaster (Bloch, 2009).

It took the Department of Education (DoE) some time to admit that C2005 did not work: "The new curriculum was never researched or properly trialled and there was inadequate preparation" (DBE, 2009:12). Future expectations of the youth in SA are of particular importance owing to the extent of social problems that they face (poverty, unemployment, crime, violence, corruption, HIV/AIDS) (Steyn *et al*., 2010). In dysfunctional schools learners remain trapped in the "poverty cycle, without skills, without jobs, without hope" (Gaum, 2008:1; Bloch, 2009). Steyn *et al*. (2010:185) allege that: "An education system which blocks adolescents‟ future hopes … creates a formidable ethical dilemma and can actually stand accused of a crime against humanity".

It seems, however, that efforts to improve the NCS have been on going. Prior to 2008 the national DoE housed both the schools and Higher Education Institution (HEI) sectors, but since the general political elections of 2008 it was divided into the Department of Basic Education (DBE), responsible for the school sector, and the Department of Higher Education and Training (DHET) who is responsible for the HEI sector. In 2009 the Minister of Basic Education had the NCS (Grades R-12) reviewed by a Ministerial Task Team. In response to this report (DBE, 2009), the Minister announced that a *Ministerial Project Committee* was appointed to develop *National Curriculum and Assessment Policy Statements* (CAPS) for each subject in the NCS, with the exclusive goal to improve the NCS‟s performance (DBE, 2010b).

The Ministerial Task Team (2009) recommended in their report that "the training of teachers … should be specific" (DBE, 2009:10). However, the new CAPS policy does not allow HEI‟s to train teachers specifically for LO, because LO with all its topics within the CAPS again does not constitute a specific discipline at HEI‟s. However, *Action Plan 2014*, announced in March 2011, aims to facilitate the implementation of PE in schools with training workshops that will commence in April 2011 (DBE, 2011).

To determine the state and status of PE within the context of LO, a study was undertaken in 2007 in selected primary and secondary schools in the WC Province (Van Deventer & Van Niekerk, 2008). The aim of the current study was to extend the 2007 study to primary and secondary schools in the EC, FS and NW Provinces.

PROBLEM STATEMENT

The problem emerging from the above literature is that the state and status of PE in the context of LO is still uncertain in different provinces of SA, and that research in this regard was deemed necessary. The main purpose was to determine the implementation of LO with specific reference to *Physical Development and Movement* as a Learning Outcome in the SP

and *Physical Education* in the FETP in selected secondary schools in the EC, FS and NW Provinces. The following objectives were addressed:

- To determine whether schools had qualified PE teachers on their staff;
- To determine whether the LO teachers who facilitated *Physical Development and*

Movement in the SP and *Physical Education* in the FETP were qualified in PE;
- To determine whether LO teachers had in-service training needs;
- To determine whether schools had the necessary facilities and equipment to present PE, sport and recreation;
- To compare the perspectives of LO teachers in the SP to those of LO teachers in the FETP.

METHODOLOGY

Research design

The study can be typified as descriptive research making use of qualitative and quantitative data. A pilot study was conducted in 2006 to determine the content validity of a self-designed questionnaire to capture quantitative data.

Sample

Secondary schools (N=150) were randomly selected in the EC (n=50), FS (n=50) and the NW Province (n=50). Life Orientation teachers were requested to complete the questionnaire, as this would reflect a more realistic and hands-on perspective of LO.

The 88 questionnaires returned amounts to a response rate of 59%. A further analysis indicated that 40 SP and 48 FETP teachers returned questionnaires. In the EC, 28 secondary schools reacted (14 SP and 14 FETP). In the FS, 14 schools reacted (5 SP and 9 FETP), while in the NW Province 46 schools reacted (21 SP and 25 FETP). In the study of Van Deventer and Van Niekerk (2008) the 62 secondary schools included 30 SP and 32 FETP teachers. The combined sample of the four provinces consisted of 150 teachers.

Questionnaire

The questionnaire used in the study only discriminated between the grades of the different phases of the NCS and had four sections. The first section focused on *demographic information*, while the main section focused on the *NCS*. The third section focused on *extramural activities* and in the fourth section, teachers had to reflect on *general issues* related to the implementation of LO in general.

Statistical analysis

Summary statistics were done using frequency tables and histograms. Comparisons to test associations of ordinal variables between the SP and the FETP in the four provinces were done using cross tabulation and the Chi-square test. Statsoft Statistica 8.0 (Statsoft, 2007) was used to analyse the data. The level of statistical significance accepted throughout the study was $p<0.05$.

RESULTS

Demographic information

In the EC and FS the schools mainly served the Black communities, while White and Coloured communities were mainly served in the NW and WC. The schools were classified as urban (53%) and rural (47%) respectively. In 54% of the schools the total number of

learners in the SP ranged between 500 and 999 as opposed to 45% in the FETP, while in 29% of the FETP the learners ranged between 100 and 499.

Curriculum information

In the four provinces the LO teachers in the SP indicated that their schools had more teachers qualified in PE in comparison to the FETP (Figure 1).

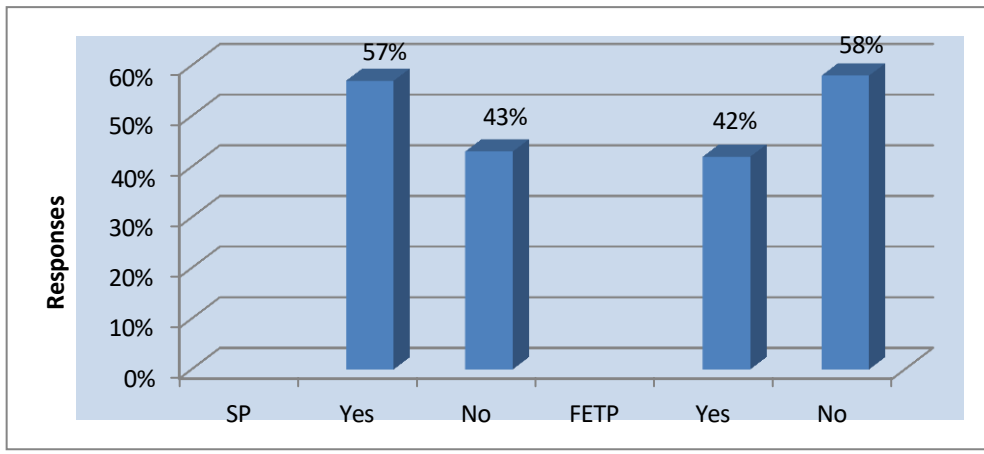

FIGURE 1: **TEACHERS QUALIFIED IN PHYSICAL EDUCATION**

No statistical difference (p=0.07) was found between the phases (Figure 1). The raw data indicated that 96% (n=144) of the total number of respondents (N=150) responded to this question. In combination it seemed as if 57% of the secondary schools had qualified PE teachers on their staff.

The training of LO teachers in the principles of OBE was done in the majority of cases (87% and 90%) by the Provincial Departments of Education. Only 36% of the SP and 33% of the FETP teachers received training at Higher Education Institutions. In the four provinces, teachers in the SP and the FETP attached more or less the same importance to LO. No statistically significant difference was found between the phases (p=0.82) (Figure 2). The majority (99%) of the teachers in both the phases responded and most attached either an important or very important category to LO.

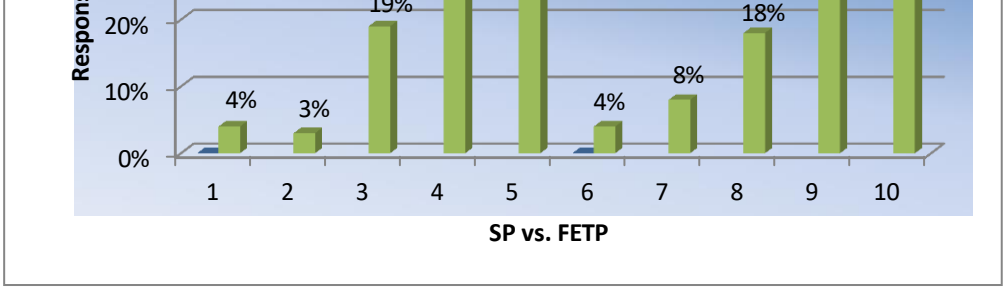

FIGURE 2: **IMPORTANCE ATTACHED TO LIFE ORIENTATION**
(1/6=Not important; 2/7=Reasonably important; 3/8=Average; 4/9=Important; 5/10=Very important)

In the sample, 58% of the SP teachers who facilitated the Learning Outcome, *Physical Development and Movement* were not qualified in PE. In the FETP, 40% were not qualified in PE (Figure 3). No statistical significant difference (p=0.06) was found between the SP and the FETP.

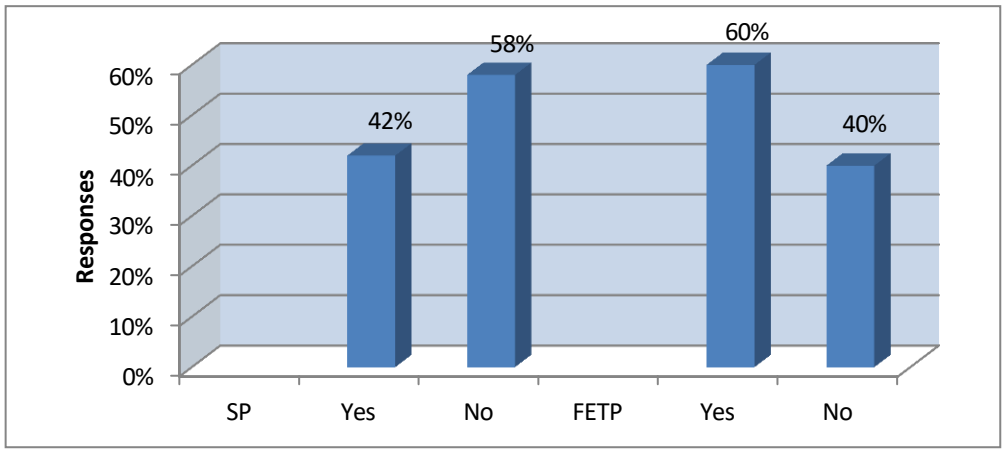

FIGURE 3: **LIFE ORIENTATION TEACHERS QUALIFIED IN PHYSICAL EDUCATION**

In combining the raw data, an even number of LO teachers who facilitated PE in Grades 7 to 12 was either qualified (50%) or not qualified (50%) in PE. Regarding a question whether "outside" persons or an "outside" organisation were brought in to provide PE, 84% of the SP and 69% of the FETP teachers reacted negatively. No statistical significant difference (p=0.11) was found between the SP and the FETP.

In the sample, 73% of the SP teachers believed that the time allocation for PE was sufficient, as opposed to 63% of the FETP teachers. No statistical significant difference (p=0.21) was found between the phases (Figure 4). Therefore, most of the LO teachers in both the SP and the FETP believed that the time allocated for PE was sufficient.

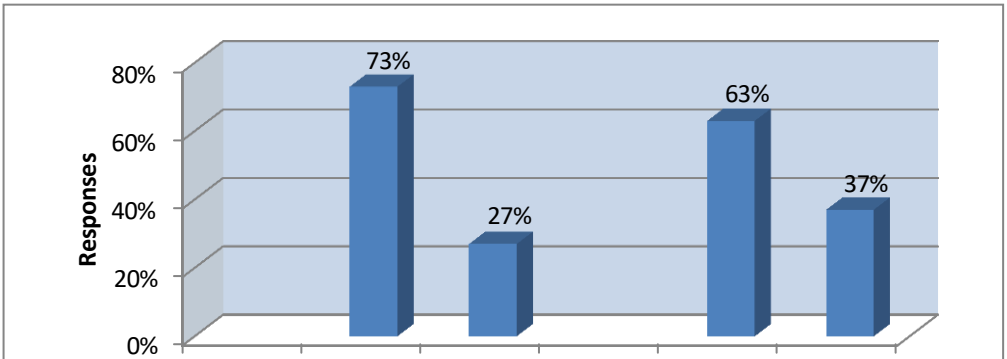

FIGURE 4: **TIME ALLOCATED FOR PHYSICAL EDUCATION**

The findings of a question regarding whether the teachers knew how to assess the movement content is also in stark contrast to the number of LO teachers qualified in PE. In the SP, 73% and in the FETP, 69% of the respondents reacted positively to the question. No statistical significant difference was found (p=0.60). In combining the two phases Table 1 indicates that 71% of the LO teachers indicated that they knew how to assess movement content.

TABLE 1: **KNOWLEDGE ON ASSESSMENT OF MOVEMENT CONTENT**

Phase	**Yes**		**No**		**Total**
	n	%	n	%	
SP	49	73%	18	27%	67
FET	54	69%	24	31%	78
Total	103 (71%)		48 (29%)		145 (97%)

In Figure 5 it is clear that the majority of the LO teachers wanted to know more about new developments, such as programme planning, content ideas and presentation skills, within LO in both phases. No significant difference (p=0.28) was found between the SP and the FETP. The majority of LO teachers indicated that they have in-service training needs.

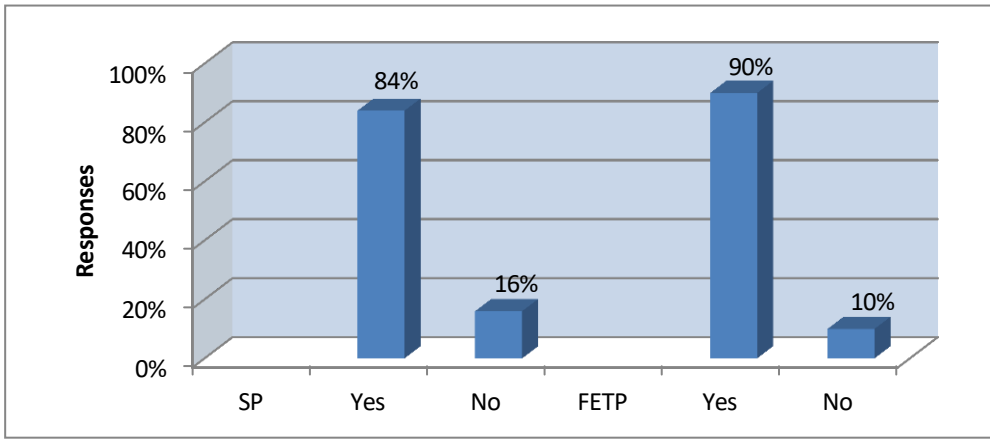

FIGURE 5: **NEED FOR IN-SERVICE TRAINING WORKSHOPS**

According to the results of this study it would seem that most secondary schools in the four provinces did have problems regarding sufficient facilities and equipment to present PE, sport and recreation. No statistical significant difference was found between the phases (p=0.61)

(Figure 6). Most of LO teachers in both phases indicated that the schools did not have sufficient facilitates and equipment.

FIGURE 6: **FACILITIES AND EQUIPMENT TO PRESENT PHYSICAL EDUCATION**

General issues

Soccer, hockey, tennis, badminton, cricket, swimming, rugby, drum majorettes, netball, karate, wrestling and athletics were the main extramural sports presented for the SP and FETP learners. Volleyball and modern dancing were activities presented for the SP rather

than the FETP learners, whereas learners in the FETP were exposed to canoeing, basketball, horse riding, gymnastics, judo and ballet (Figure 7).

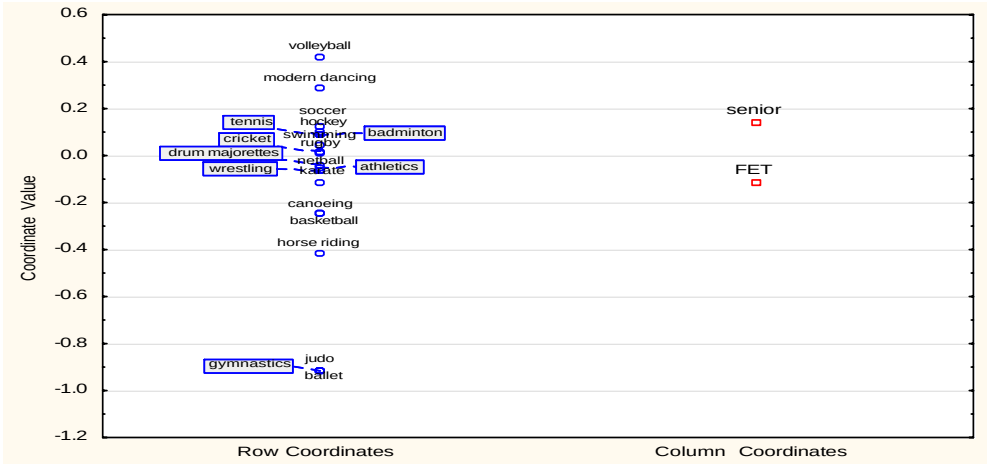

FIGURE 7: **EXTRAMURAL SPORT IN THE FOUNDATION AND INTERMEDIATE**

PHASES

Regarding facilities and equipment to present PE, sport and recreation (Figure 8), hockey fields, open spaces outside, gymnastic halls, rugby fields, swimming pools and tennis courts seemed to feature predominantly at schools according to the FETP teachers. Senior Phase teachers indicated that halls, netball courts and soccer fields feature at their schools.

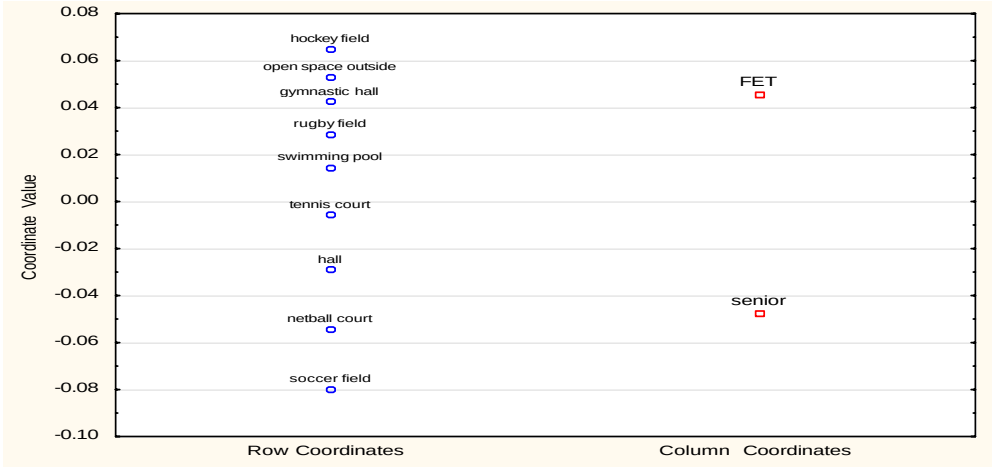

FIGURE 8: **FACILITIES AND EQUIPMENT TO PRESENT PE, SPORT AND RECREATION**

CONCLUSIONS

The selected samples of secondary schools in the four provinces could be regarded as inclusive by representing previously disadvantaged, as well as former Model C schools. Although more schools could be classified as urban, a fair number were situated in rural areas. In most schools the total number of learners ranged between 500 and 999.

Regarding secondary schools who had qualified PE teachers on their staff, it can be concluded that a greater percentage of SP than FETP teachers indicated that their schools had the services of qualified PE teachers. However, the teachers in the SP and the FETP of the current study did not necessarily teach the LO learning outcome, PE. The in-service training of LO teachers in the four provinces was mainly performed by the respective Provincial Departments of Education. Higher Education Institutions (HEI‟s) only featured in a few cases. In the SP and in the FETP most teachers who facilitated LO thought of the Learning Area/Subject to be of high importance.

A conclusion that relates to, yet contradicts, the number of qualified PE teachers on the staff of the secondary schools, especially in the SP, is that most teachers who facilitated PE were not qualified PE specialists. In the FETP, more LO teachers who facilitated PE were qualified in PE, but in a large number of secondary schools PE was not facilitated by a specialist in Grades 10 to 12. Most schools in the four provinces did not make use of “outside” persons or organisations to present PE. In contrast to the qualifications of LO teachers who facilitated PE, especially in the SP, most LO teachers of Grades 7 to 9 indicated that they knew how to assess the movement content. In the FETP this finding more or less correlates with the

number of LO teachers qualified in PE.

More LO teachers in the SP, as opposed to the FETP, believed that the time allocated to PE on the school timetable was sufficient. This could relate to the previous finding regarding the qualifications of the LO teachers who facilitated PE. In the FETP more LO teachers who facilitated PE were PE specialists and would therefore know what the time requirements should be for learners to reap the benefits of PE.

The final conclusion regarding the curriculum was that the majority of LO teachers in both the SP and the FETP needed in-service training workshops to learn more about new developments in LO. Regarding facilities and equipment to present PE, sport and recreation paradoxical findings were made. Most schools in both the SP and the FETP indicated that they did not have the necessary facilities and equipment. However, in subsequent questions it was established that a number of sporting codes were presented at the schools and that these schools did have facilities to present these sport codes. It could, however, be inferred that the secondary schools who indicated a shortage of facilities and equipment to present PE, sport and recreation could have been the former disadvantaged schools in the four provinces.

RECOMMENDATIONS

The major problems experienced with the implementation of LO in secondary schools in the four provinces were qualified PE teachers, time on the school timetable for PE and facilities and equipment to present PE, sport and recreation. These findings support those of Rooth

(2005), Christiaans (2006), Van Deventer (2008), Van Deventer and Van Niekerk (2008), Van Deventer (2009), Van Deventer *et al*. (2010). In the past much has been reported in the literature regarding subject specific training of teachers (Chisholm, 2000; Rooth, 2005; Christiaans, 2006; Van Deventer & Van Niekerk, 2008; Blignaut, 2009; Bloch, 2009; Van Deventer, 2009, Van Deventer *et al*. 2010). In the *Report of the Task Team for the Review of the Implementation of the National Curriculum Statement* even the DBE emphasised that there should be a strong *discipline-based* approach to school subjects (DBE, 2009:38).

In both the SP and the FETP, Life Orientation, as defined in the CAPS documents is not a discipline. In these phases PE is one of the many topics of LO (DBE, 2010a,b), which has major implications not only for the status of the subject, but more importantly for the total well-being of learners and of future generations. Jacobs (2011) clearly states that Grade 7 to 12 learners thought that LO was a waste of time that nothing new was learned and they hardly did any work. Life Orientation was a period where the learners could relax, do homework, or simply have a free period (Jacobs, 2011). This also impacts negatively on sport development, transformation within sport and the sport-for-all concept.

Life Orientation with its broad topics does not constitute a specific discipline and has major implications for PE Teacher Education (PETE) at HEI‟s for the simple reason that it is not a scientific discipline or field of study at HEI‟s. This is in contrast to a recommendation made by the DBE in 2009 that subject specific training is necessary (DBE, 2009). The benefits of PE for the learner, for future generations and for sport will only be realised when PE is explicitly re-instated as a stand-alone school subject.

The announcement in March 2011 that the DBE aims to promote mass participation in

schools and facilitate the implementation of PE in schools is met with much scepticism (DBE, 2011). This political rhetoric has been heard in the days of the former Minister of Education, but nothing materialised. Again no plans on how *Action Plan 2014* is going to be implemented are provided and no indication is given as to who is going to finance the aims of the DBE. The DBE and HEI‟s need dialogue urgently to discuss their aims as announced in March 2011 and how the training of PE teachers will take place as announced. With a one-sided approach to Physical Education Teacher Education, history will repeat itself and the same situation regarding unqualified PE facilitators and the resultant negative impact on the health of the nation and sport development will continue. As stated earlier, the DBE aims to allocate time within the timetable in the CAPS for PE. In the SP (Grades 7-9) and in the FETP (Grades 10-12), 60 minutes per week is allocated for PE (DBE, 2010a,b). However, according to international standards 60 minutes per week is not sufficient to reap the health-related benefits of PE (Seghers *et al*., 2009). At least three 60 minute periods of moderate-to-vigorous physical activity at secondary school level would be sufficient (Seghers *et al*., 2009).

It is time that the SA government listens to the voices of the learners. One of the positive features that came out of the study of Jacobs (2011) was that the learners in Grade 7 to 12 regarded exercise as the only applicable aspect of LO to their daily lives. It was the only aspect that the learners experienced as positive and would like to see more of in LO (Jacobs, 2011). Maybe it is time that Government should come to the table as the Australian government did recently. As part of Australia‟s Building the Education Revolution (BER)

initiative, they have already embarked on a significant infrastructure upgrade by providing 16.2 billion Australian$ for world-class educational facilities (AG, 2010). These facilities include multi-purpose halls, sports grounds and facilities to increase participation in physical and recreational activities (AG, 2010).

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ROLE OF SLEEP IN PERFORMANCE AND RECOVERY OF ATHLETES: A REVIEW ARTICLE

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ABSTRACT

An increasing body of evidence indicates that sleep plays a major role in the performance and recovery of athletes, yet all the complex processes of sleep are still unknown. Understanding the effects of sleep, disturbed sleep and sleep deprivation, promotes a deeper appreciation of its impact on athletes. This review provides insights into the role of sleep in physiological growth and repair, neuro-muscular performance, cognitive functioning and memory, emotional well-being, and immune function. Issues regarding the amount of sleep needed, as well as factors affecting quality sleep, are discussed.

Key words: Sleep; Sport performance; Recovery; Athletes.

INTRODUCTION

Sleep is a basic human need and a healthy adult will spend about one-third of his/her life sleeping (Lee, 1997). Although all the functions of sleep are still unknown (Madje & Krueger, 2005), it has been reported through the years that sleep is closely related to physical and mental health, cognitive processes and metabolic function (Samuels, 2008). Complete rest or sleep is still seen as the main means of restoring physical working capacity, as well as mental restoration (Dale, 2004; Bompa & Haff, 2009). Although many regard sleep as the most significant aspect of recovery, Walters (2002) maintains that athletes often neglect this fact. Research findings indicate that athletes generally sleep less than non-athletes and often

have difficulty sleeping (Walters, 2002). It is important for athletes to understand how sleep affects performance and recovery, know which factors could affect sleep quality and be able to develop optimal sleeping habits.

DEFINING SLEEP

Sleep is defined as "…the natural and regular state of inactivity in which consciousness ceases and the bodily functions slow down or cease" (Watson, 1976:1042). Lee (1997) described sleep as a period of diminished responsiveness to external stimuli, while Hobson (1995:1) referred to sleep as "… a dynamic behaviour. Not simply the absence of waking, sleep is a special activity of the brain, controlled by elaborate and precise mechanisms. Not simply a state of rest, sleep has its own specific, positive functions." The state of sleeping is physiologically very different from other states of relative inactivity such as unconsciousness, coma, or hibernation (Stores, 2001). Athletes should be aware of the fact that, although sleep is a state of diminished consciousness and slower bodily functions, it plays a key role in the rest-activity cycle with very specific functions occurring during quality sleep (Davenne, 2009).

STAGES OF SLEEP

There are two types of sleep, namely Non Rapid Eye Movement-sleep (NREM), divided into four stages, and Rapid Eye Movement-sleep (REM). The onset of sleep under normal circumstances in adult humans is through NREM-sleep. This is a fundamental principle of normal human sleep and abnormal entry into sleep via REM can indicate pathological conditions (Carskadon & Dement, 1989). The four NREM stages roughly parallel a continuum of sleep depth. Stage-one sleep is light sleep, and generally persists for only a few (one to seven) minutes. Stage two usually lasts from 10 to 20 minutes. The sleeper then moves to stage three and finally into stage four sleep, the stage of deepest sleep. Normal functions such as blood pressure, respiration and heart rate diminish. Stage-four NREM-sleep generally lasts for about 20 to 40 minutes in the first cycle. Researchers often refer to the combined stages three and four sleep as slow-wave sleep, or deep sleep (Carskadon & Dement, 1989; Gunning, 2001; Stores, 2001).

After 30 to 40 minutes, REM-sleep begins. The brain reactivates into a fast-activity state. Blood flow, heart rate, respiration, body temperature and blood pressure of the person rise, and the eyes, underneath closed eyelids, dart back and forth as if scanning the environment, which may be accompanied by intermittent small muscle twitching (Brassington, 2002; Walters, 2002). REM-sleep episodes become longer as sleep progresses, with the longest REM-sleep episodes occurring in early morning. In normal adults, 20-25% of total sleep time is spent in REM-sleep (Stiller & Postolache, 2005). Dreams are often experienced during REM-sleep and REM-sleep has also been called "dream sleep" (Siegel, 1989; Reisser, 2006). It has been proposed that memory consolidation occurs during this time (Davenne, 2009). REM-sleep is thus essential when complex techniques or tactics are being learnt or explored (Meier-Koll *et al*., 1999; Gunning, 2001), and new motor skills are acquired (Buchegger *et al*., 1991).

In adults, cycles of NREM-sleep and REM-sleep recur within a period of 90 to 100 minutes. NREM- or slow-wave-sleep makes up approximately 75-80% of this time and REM-sleep the remaining 20-25%, occurring in four to six episodes (Carskadon & Dement, 1989; Hobson,

1995; Gunning, 2001). If sleep loss was experienced for one or more nights, slow-wave sleep will be prominent. REM-sleep will recover only after the recuperation of slow-wave sleep. Chronic deprivation of nocturnal sleep, an irregular sleep schedule or frequent disturbance of nocturnal sleep can result in changed distribution of sleep stages. It is most frequently characterised by premature REM-sleep: sleep onset with REM-sleep (Carskadon & Dement, 1989).

BODY RHYTHMS AND SLEEP

Circadian rhythm

Internal clocks that control biological rhythms with periods of about the length of a day (24-hour intervals) are called circadian rhythms. It is derived from the Latin *circa*, which means about, and *dies*, meaning day (Hobson, 1995:31). Mistlberger and Rusak (1989) noted that most human behavioural and physiological processes are characterised by a temporal structure that matches about a 24-hour day-night cycle, with daily patterns of sleep and wakefulness as the most familiar aspect. These daily rhythms are internally generated due to

bio-chemical processes and not just reactions to alarm clocks, sunsets or external temperature changes, and persist under constant environmental conditions (Davenne, 2009).

It is proposed that there is a relationship between circadian rhythms and athletic performance with peak athletic performances at a specific time of day. Disturbance of circadian rhythm can influence the athlete's performance negatively; therefore, the timing of athletic performance is important. Most sport performances peak in the afternoon or early evening and the time period between 12:00 and 21:00 is seen as a window for optimal performance (Drust *et al*., 2005; Davenne, 2009). Aerobic capacity peaks during the evening. Research findings reported that performance in swimming trials and competitions (Reilly, 2009), running, shot putting and rowing was significantly better during the evening than in the morning (Winget *et al*., 1985). The ability to perform mental tasks, as well as skills depending on reaction time and sustained attention, is reduced during the early morning (Davenne, 2009). Monk (1989) reported a well-defined peak in subjective alertness in the late morning or early afternoon. This has implications for scheduling coaching instructions.

Drust *et al.* (2005) presented a review on circadian rhythms in sport performance. They concluded that world record-breaking performances in sport indicated a circadian variation, with world records broken by athletes competing in the early evening, when body temperature is highest. Performances in competitive cycling time trials were better in the afternoon and evening compared to those in the morning. Sport events that require throwing, 100m and 400m running performances improved in the afternoon and early evening. Muscle strength peaked in the early evening, while tasks demanding fine motor control, mental arithmetic and short-term memory peaked in the morning. The performance of skill-based sport and those requiring complex competitive strategies, decisions and recall of coaching instructions peaked earlier in the day, while those requiring gross motor skills and substantial physical effort should be completed later in the day. The highest values in body temperature, strength, reaction time, pattern recognition and heart rate occur during the afternoon, as well as reduced levels of perceived exertion (Brooks *et al*., 2005; Reilly & Edwards, 2007). Reilly (2009) suggested that sport practitioners should take these circadian rhythms into account when they plan their training programmes.

Sleep and light

Circadian rhythm is acutely sensitive to environmental photic cues (Mistlberger & Rusak, 1989). Light is one of the universal environmental time cues, or *zeitgebers.* The supra-chiasmatic nucleus (SCN) within the hypothalamus regulates the body's circadian system and has been established as the master circadian pacemaker or master clock (Arendt, 2009). The retinohypothalamic tract is a direct neural pathway from the retina to the SCN. The visual receptors involved are independent of the classical rod and cones, and act to assess the time of dusk and dawn according to the quantity and quality of light. The SCN-cells have receptors for melatonin. As darkness falls, melatonin is secreted by the pineal gland, and its vasodilatory effect causes body temperature to drop and other physiological functions to slow down to prepare for sleep. Exposure to light inhibits the release of melatonin (Reilly *et al*., 2005; Stiller & Postolache, 2005; Waterhouse, 2007). The alteration of light and darkness is seen as the most important factor that can be used to reset the body clock (Arendt, 2009).

Sleep and body temperature

The circadian rhythm of sleeping and waking is also closely related to the daily rhythm of body temperature (Mistlberger & Rusak, 1989). Oral temperature follows a daily rhythm with body temperature at its lowest in the early hours of the morning (04:00), then rising throughout the day to peak between 17:00 and 21:00 (Kräuchi *et al*., 2005). Sleep onset normally occurs as distal-blood skin flow begins to increase and the body temperature starts to drop. When participants are isolated from time cues, they can only fall into long periods of sleep when they are near their minimal body temperature (Gunning, 2001). Results from physiological and neuro-anatomical studies showed that changes in body temperature trigger brain areas to initiate sleep (Kräuchi *et al*., 2005). REM-sleep occurs with a circadian distribution that coincides with the lowest point of body temperature, in the early morning hours. If sleep is delayed until the early morning, REM-sleep will dominate and even occur at the onset of sleep (Carskadon & Dement, 1989).

Extreme temperatures in the sleeping environment will disrupt sleep (Carskadon & Dement, 1989; Glotzbach & Heller, 1989). Often this is why individuals find it difficult to sleep in hot weather or after a very hot bath or shower. The body temperature may not fall due to high external temperatures. Sleeping under very thick bedding, in lots of clothes or with a heater on high may also maintain an individual's body temperature and affect the quality of sleep (Gunning, 2001).

Napping

When sleep-wake cycles were studied in isolation chambers where participants were allowed to sleep whenever they wanted, it was found that they spontaneously took naps. Dinges (1989) monitored nocturnal sleep episodes and daytime naps of healthy young adults over a five-week period. Naps occurred relative to body temperature cycles. Longer sleep began prior to the minimum temperature, while shorter sleep or naps (*siestas*) occurred near the maximum temperature. If the 24-hour day was divided into four six-hour zones, the probability of sleep onset and wakefulness could be projected relative to the phase of the circadian temperature cycle. A high probability of nocturnal sleep was between 24:00 and 07:00. Morning wakefulness occurred between 07:00 and 13:00. A high probability of a short sleep or siesta was found between 13:00 and 18:00. Evening wakefulness occurred from 19:00.

Zarcone (1989) confirmed the biphasic tendency of sleep and refers to a second peak of sleepiness approximately eight hours after termination of the long consolidated nocturnal sleep. Napping at any time other than 10 to 15 minutes during this peak may have negative effects on sleep in the next consolidated sleep period of the 24-hour day. He stated that naps 10 to 12 hours after the major sleep period are particularly likely to disturb subsequent nocturnal sleep. Postolache *et al.* (2005:435) referred to the two "sleep gates" as two distinct periods when it is easy to fall asleep, which usually occurs between 13:00 and 16:00, and then in the late evening. A 20-minute nap about eight hours after nocturnal sleep should have, according to the authors, positive effects on performance. Loehr and Schwartz (2005:60) used the term "breaking point" which refers to the time around 15:00 when individuals usually experience a high level of fatigue. This greater sleepiness in the early afternoon is also referred to as the "post-lunch dip" (Stores, 2001; Reilly & Edwards, 2007).

A relative short daytime nap (20 minutes) can be beneficial to the learning of visual and motor skills (Walker & Stickgold, 2005), alertness (Reissner, 2006), as well as improved performance levels, self-confidence and daytime vigilance levels (Hayashi *et al*., 1999). Waterhouse *et al*., (2007) also reported that a post-lunch nap positively affected mental and physical performance in partially sleep-deprived individuals. Alertness, short-term memory, accuracy at a choice-reaction time test and sprint times improved. These results have implications for athletes with restricted sleep during or before competitions. Athletes could implement a napping-strategy to manage periods of restricted nocturnal sleep. Because motor-skill learning is also dependent on sleep, naps may be used as a prophylactic strategy against learning deficits if the athlete expects some overnight sleep loss (Reilly & Edwards, 2007). Although many regard a well-timed nap as an essential strategy for athletes in relation to performance and recovery, research by Venter (2008) revealed that team athletes (n=890) from field hockey, netball, rugby union and soccer in South Africa did not regard napping as an important recovery modality.

ROLE OF SLEEP IN WELL-BEING AND PERFORMANCE

Sleep serves multiple purposes. It has been emphasised that sleep helps, for example, with physical and psychological restoration and recovery, conservation of energy, memory consolidation, discharge of emotions, brain growth and maintenance of the immune system, although the complexities of sleep are not yet fully understood (Samuels, 2008). Nadler *et al*. (2003) maintain that sleep is essential for physical and emotional health and it plays a significant role in recovery from illness and injury. Sleep loss, on the other hand, leads to a general decline in performance (Davenne, 2009).

Physiological growth and repair

Although the body is continually in a process of revitalization, this process peaks during stage-three and stage-four sleep. Physiological processes that cause this effect during slow-wave sleep are facilitated by metabolic activity being at its lowest at this point, as well as an increased secretion of growth hormone by the endocrine system (Walters, 2002; Loehr & Schwartz, 2005). Significant neuro-endocrine activity is present with the release of growth- and sexual-maturation hormones.

More than 95% of the daily production of these hormones occurs during NREM-sleep

(Gunning, 2001). In normal young adults, the 24-hour profile of growth hormone secretion takes place at low levels, which is intermittently interrupted by large secretary pulses. Major secretion usually occurs shortly after sleep onset in temporal association with the first episode of slow-wave sleep. A large pulse of growth hormone secretion occurs more than 90% of the time during the first slow-wave period, and there is a quantitative relationship between the duration of the slow-wave stages and the simultaneous amount of growth hormone secreted (Van Cauter *et al*., 1997; Stores, 2001). NREM-sleep is considered to be the time during which the body can repair and restore itself (Gunning, 2001). Sleep deprivation is therefore regarded as a stressor that has a significant detrimental effect on physiological growth and repair.

The pulsatile pattern of human growth-hormone secretion follows a circadian rhythm. The most powerful, non-pharmacological stimuli to initiate the secretion of growth hormone are sleep and exercise (Godfrey *et al*., 2003). If energy expenditure increases during the day, the blood levels of growth hormone rise during the following night, but when an athlete loses slow-wave sleep, these levels fall significantly (Davenne, 2009). The elevated secretion of growth hormone is often given as one of the reasons why athletes are encouraged to sleep during the day to stimulate the release of growth hormone. This could be useful for athletes who are due to perform strength-training sessions after sleep.

Neuromuscular performance

While learning new skills, athletes often believe that practice is the only prerequisite for improvement. Although correctly repeating a new task will result in learning benefits, it has been shown that the human brain continues to learn in the absence of further practice, and this delayed improvement develops during sleep (Walker & Stickgold, 2005). Walker and Stickgold (2005:301) rephrased the old saying "practice makes perfect" to: "it's practice, with sleep, that makes perfect". The authors conducted a series of studies on the effect of sleep on motor-sequence learning. The significant delayed learning without further practice was only observed after a night of sleep, and not over the equivalent period of wake time. It is suggested that optimal skill learning in athletes is dependent on sleep. Walker and Stickgold (2005) also demonstrated that when participants were deprived of sleep on the first night after training, and then took a night of recovery sleep before being retested, normal overnight improvements in learning were blocked. This indicates that quality sleep on the first night following training is critical, and that the sleep-dependent motor sequence learning depends on quality sleep within the first 24 hours after training.

Cognitive functioning and memory

Sleep is not only about resting the body, but it also has important implications for brain functioning (Gillis, 1996). It is believed that sleep influences brain activity patterns. During sleep, newly formed memories are being organised in the brain resulting in better recall and more accurate memory the next day (Andrews, 2005). Stickgold (2005) referred to the familiar concept of "sleeping on a problem" and reported that evidence indicates that memory reprocessing during sleep is an important component of the forming and shaping of memory. Song (2006:83) referred to results from various researchers: "sleep helps consolidate memory, improve judgment, promote learning and concentration, speed of reaction time and sharpen problem solving and accuracy."

Relationships between sleep-wake patterns and academic performance have been found.

Higher levels of sleep problems were related to lower academic performance, as well as significantly higher levels of risk-taking behaviour in adolescents. Students with more consistent week and weekend wake times experienced better sleep quality and academic performance (O'Brien & Mindell, 2005). Students who got eight hours of sleep, but shifted their sleep schedules by two hours, reported greater depressive symptoms, lowered sociability and more frequent attention and concentration difficulties (Brown *et al*., 2006). The effects of sleep loss among students are evident on higher cognitive functions, such as attention, memory and problem solving. Learning capacity and academic performance may consequently be negatively affected by sleep deprivation (Curcio *et al*., 2006).

One night's sleep deprivation can affect verbal working memory, storytelling, arithmetic calculations, object naming, and delayed recall. These aspects of executive functioning depend largely on the activity in the prefrontal cortex. The prefrontal cortex is affected negatively by acute sleep deprivation, and cognitive work tasks might therefore be impaired (Nilsson *et al*., 2005). According to Reilly and Edwards (2007), sport performance often incorporates decision-making, and errors as a result of low sleep quality will be reflected in performance outcomes.

Emotional well-being

Emotional well-being has an effect on every aspect of life. It has been shown that being optimistic, sociable, and happy can protect individuals against stroke and cardiovascular disease, accelerate wound healing, increase resistance to infectious illnesses, is associated with lower levels of bodily pain and higher pain tolerance. Haack and Mullington (2005) revealed that sleep restriction (four hours per night over a period of 16 days) leads to a significant decrease in optimism-sociability, with the lowest values at awakening and at the end of the day. Bodily discomfort (ratings of generalised body pain, stomach pain, backache, headache, joint pain and muscular pain) increases. Because optimism and positive mood states are associated with better mental and physical health, it is possible that chronic sleep deprivation could be involved in decreasing psychosocial functioning and optimism. Insufficient sleep might also contribute to a high prevalence of localised and generalised pain (Haack & Mullington, 2005).

Mood was strongly affected by sleep deprivation, and poor sleep quality was associated with significantly higher self-reported negative moods in a sample of 1125 male and female students (Lund *et al*., 2010). A reduced ability to deal with emotions is one of the first symptoms associated with sleep deprivation. Sleep-deprived individuals consistently show increased levels of depression, stress, anxiety, worry, frustration, irritability, diminished vigour, lower confidence and difficulty in coping with new environmental stressors (Brassington, 2002; Walters, 2002). It seems that REM-sleep specifically is necessary for hypothalamic functioning, because these are hypothalamic-related symptoms (Lee, 1997). For example, with even minimal sleep loss, perceived exertion is increased and the threshold for containing anger is lowered.

The potential health impact of insomnia has received increased attention and insomnia is regarded as a serious risk factor for depression, anxiety disorders, the development of alcohol and substance abuse problems and suicide (Taylor *et al*., 2003). When healthy, young adults had their sleep restricted by 33% to 4.9 hours per night for seven consecutive nights, this sleep restriction resulted in significant effects on fatigue, confusion, tension, as well as total mood disturbance (Dinges *et al*., 1997).

The sleep-wake patterns of college students and its effects on their lives have received considerable attention. A reduction in total sleep time, delayed bedtime and increased nap episodes were found in this population. Sleep deprivation or fragmented sleep leads to a disturbance in mood states in healthy persons, with an increase in negative mood states, tension, confusion and depression. Students who fell asleep in classes experienced greater negative mood states than those who did not, and also reported greater use of alcohol and

smoked more than those who did not fall asleep (Jean-Louis *et al*., 1998). Students who reported earlier bedtimes were in a healthier psychological state, which strengthens the notion that earlier onset of sleep is associated with a better mood (Asaoka *et al*., 2004).

Immune functioning

It is suggested that there is a link between the recovery effects of sleep and the immune system. Interference with immune functioning through impaired cellular and hormonal influences has been noted in sleep-deprived individuals. It is believed that melatonin and growth hormone, released during the sleep cycle, stimulate and enhance the immune system. Sleep deprivation may thus have a negative effect on tissue healing and recovery (Nadler *et al*., 2003). Chronic low-quality sleep, or successive nights of disrupted or shortened sleep increases vulnerability to infections, emphasising the negative effects of sleep loss on neuro-endocrine and immune functioning (Basta *et al*., 2007). Samuels (2008) also reported impaired immunological functioning in athletes with non-restorative sleep.

In a review on the role of sleep in the immune system by Bryant *et al*. (2004:457,465), the authors concluded: "an increasing body of evidence indicates that even minor sleep loss, accumulated over time, … has a considerable impact on the immune response". Sleep loss and sleep disruption are seen as occupational hazards. It is suggested that the ever increasing pressures to train for longer hours and perform well, combined with other non-training stressors, could affect the quality of the athlete's sleep and compromise immunity.

AMOUNT OF SLEEP NEEDED

"For a lot of people, the body's need to sleep is treated as a waste of time. In our 24-hour society, we often steal night time hours for daytime activities, depriving ourselves of precious sleep" (Ferrara & De Gennaro, 2001:155). The question can be asked: Is there a specific optimal amount of sleep?

The average length of sleep for people in the developed world has reduced quite dramatically over the years. Hicks and Pellegrini (1991) reported that the average hours of sleep among college students dropped by one hour from 7.75 hours per night in 1969 to 6.75 hours in 1989. According to Ferrara and De Gennaro (2001), the number of nocturnal hours of sleep for healthy adults has fallen from 8-8.9 hours per night in 1959 to 7-7.9 hours per night in 1980. About 27% of people had 6-6.9 hours of sleep per night.

The 2005 *Sleep in America Poll* (National Sleep Foundation, 2005), indicated that individuals older than 18 years tend to sleep an average of six hours 40 minutes during the week and seven hours 15 minutes over weekends. Fifty per cent of the respondents reported that they felt tired and not up to par during wake time. Seventy-five per cent reported sleep problems,

with 27% of respondents using alcohol, over-the-counter sleep aids or prescription medicine to help with their sleeping problems.

Kamdar *et al*. (2004) stated that every human being needs a specific amount of sleep in order to meet the daily homeostatic sleep requirement. When participants were placed in isolation without exposure to clocks and natural light, they slept seven to eight hours out of every 24

hours (Loehr & Schwartz, 2005). "Sleep research has consistently shown that most adults actually *do* need the proverbial eight hours of sleep a night in order to perform at their best and avoid general tiredness, daytime drowsiness, and even fatigue-related illnesses" (Reisser, 2006:1).

Many young people suffer from a chronic lack of sleep. Many adolescents have "arousing" activities available at all hours in their bedrooms, such as television, play stations, Internet connections and cellular phones. Outside employment, consumption of alcohol and caffeine and lengthy athletic practice can all contribute to short nights and irregular sleep patterns (Carskadon, 2005). Bompa and Haff (2009) believe that athletes require 9 to 10 hours of sleep, 80-90% of it during the night. The balance may be completed by naps during the day. Samuels (2008) assessed the sleep quality of competitive athletes and found a substantial prevalence of poor sleep quality. Because of individual variations with regard to the optimal amount of sleep, Bonnet and Arand (1995) suggested that the best way to achieve sleep requirements is to go to bed when tired and sleepy and get up in the morning feeling refreshed, without any alarm, for a few days.

FACTORS AFFECTING SLEEP PATTERNS

Various factors could make it difficult for athletes to sleep as well as they would like. They might not be totally sleep-deprived, but may feel the consequences of fragmented or disturbed sleep.

Arousal in the sleep setting

Many factors can lead to arousal in the sleep setting. Some are related to psychological stressors, for example, deadlines, examinations, job crises or marital conflict. Tension and stress were the most important factors predicting sleep quality among the college students (N=1125) in the study conducted by Lund *et al.* (2010). Athletes are often under pressure to keep up with the demands of work and/or study, family commitments, training and social life, all of which could affect the quantity and quality of sleep (Bompa & Haff, 2009). Worry is regarded as a major contributor to pre-sleep cognitive arousal, leading to interfered sleep (Carney & Waters, 2006). Other factors might not be related to any particular psychological stressor, but might still be major sources of excitation, for example, someone working on a task related to his/her occupation right up to the moment he/she turns off the lights prior to sleep (Zarcone, 1989). Playing computer games at night can affect sleep patterns and sleep quality negatively. Heart rate was found to be significantly higher after playing games than after the control conditions. Sleep latency was significantly longer, and REM-sleep was significantly shorter after playing the games (Higuchi *et al*., 2005).

Sleep environment

People are sensitive to their sleep environment and might find it difficult to fall asleep in a

strange setting. Noise affects sleep by causing awakening or making sleep shallower. A number of studies showed that the noise of traffic has a disturbing effect on sleep, such as a decrease in total sleep time and REM-sleep (Kawada & Suzuki, 1995). It was also found that traffic noise was more disturbing for sleep quality than ventilation noise, giving support to the notion that intermittent and fluctuating noise such as traffic noise disturbs sleep more than an

even constant noise (Öhrström & Skånberg, 2004). It is recommended that athletes select a bedroom next to the courtyard (even if there is ventilation equipment), rather than one that is located next to the road. Venter (2010) found that 41% of the 890 elite team-sport players experienced problems falling asleep at night. Noise and light were reported as the two main factors affecting the quality of their sleep.

Travel

Long journeys usually cause tiredness in athletes. This might be due to cramped conditions, dehydration as a result of low humidity on board a plane, air turbulence, reduced barometric pressure, vibration, noise, flight anxiety and whole-body stiffness due to relative inactivity while travelling. The athlete might also feel stressed due to the generally high level of activity surrounding any long trip, transport arrangements at departure and arrival and control checks when crossing national borders. Mood states may also be negatively affected by the above-mentioned factors (Reilly *et al*., 2005; Reilly & Edwards, 2007).

A greater problem becomes evident when athletes cross multiple time zones, rather than covering the same distance in a northerly or southerly direction. Some of the symptoms that the athlete might experience include an inability to sleep at the local time, bowel irregularities, increased incidence of headaches, irritability and moodiness, fatigue, reduced cognitive skills and poor psychomotor co-ordination (Brooks *et al*., 2005). The athlete's circadian rhythms are disturbed by trans-meridian travel, when the time in the new environment no longer matches the body's internal circadian rhythm. This psychophysiological impairment of well-being and performance is known as circadian dysrhythmia or "jet lag" (Dale, 2004; Reilly *et al*., 2005). Reilly and Edwards (2007:278) maintain: "The body's circadian rhythm initially retains the characteristics of the point of departure. The body attempts to adjust to the new context, but core temperature is relatively slow to do so. Athletic performance will be adversely affected until the whole range of biological rhythms has adapted to the new local time." The severity of jet lag is directly related to the direction of flight (worse after flying eastwards compared to westwards), and the number of time zones crossed. The general rate of adjustment was traditionally seen as one day for each time zone crossed, but large inter-individual variations in this rate became evident (Reilly *et al*., 2005).

Coping with jet lag has been dominated by problems concerning the sleep-wake cycle, with the focus on how to improve nocturnal sleep, how to eliminate sleep disturbances and how to promote adjustments of the body clock. A behavioural approach should focus on optimum flight arrangements and planning the itineraries for athletes to arrive in sufficient time for the body clock to adjust before competitions (Waterhouse *et al*., 2002; Reilly *et al*., 2005). The researchers recommended that flight schedules should be arranged to allow athletes to arrive at their destination as close to their recommended sleep time as possible. Brooks *et al*. (2005) advised athletes to make eastbound flights during daylight hours with an earlier start for the longer flights. Westbound flights should be late in the day to arrive as close to the athlete's sleep time as possible.

In-flight activity should be considered with the planning of activities focusing on the local time at the destination. Watches can be reset and rest-activity cycles can be controlled. Arendt

(2009:252) refers to the "nudging technique" where athletes can even start to adapt to the new time zone before flight by adapting sleep cycles and manipulating exposure to bright light.

Athletes' dietary programme during and after a flight has received some attention in an attempt to apply dietary counter measures to jet lag. The macronutrient content of the diet could be manipulated to promote circadian resynchronisation. Protein is suggested to raise plasma tyrosine levels to activate the body's arousal system, while carbohydrate can raise plasma tryptophan levels, promoting the synthesis and release of serotonin, a precursor of melatonin. Caffeine, as a central nervous stimulant, can also increase alertness (Winget *et al*., 1985; Reilly *et al*., 2005). Waterhouse (2007) stated that the effect of such a dietary intervention seems to be small, and that appropriate times of exposure to and avoidance of bright light, might be better alternatives.

It is suggested that natural daylight or bright artificial light, when appropriately timed, is therefore more effective at phase resetting than the use of melatonin (Carskadon, 2005; Reilly & Edwards, 2007). Melatonin is produced at night and suppressed by daylight. Exposure to daylight might enhance the phase adjustment process and lessen the jet lag experience. Graeber (1994) found that a group confined to their hotel room after a transatlantic flight experienced more severe jet lag than a parallel group allowed outdoors. Postolache and Oren (2005) cautioned against indiscriminate exposure to light, because of the alerting properties of light. They advocate appropriately timed light exposure and light avoidance to be effective in the treatment of jet lag symptoms. Dark glasses could be worn during the morning in the new zone as dim light conditions assist with adaptation to the new time zone (Arendt, 2009).

Alcohol, caffeine and drug ingestion

The acute ingestion of ethyl alcohol, even at relatively low doses in normal subjects, leads to changes in sleep patterns. According to Hobson (1995) alcohol has profound short- and long-term effects on the quality and quantity of sleep. Blood alcohol levels below 10mg/dl may be associated with increased total sleep time and reduced awake activity. More than 10mg/dl will cause a decrease in REM-sleep, particularly during the early part of the night. Between three and eight drinks will lead to disturbed sleep. The awakenings are part of the sympathetic arousal that occurs along with catecholamine secretion following even moderate doses of ethanol near bedtime. Ethanol is metabolised at approximately the rate of one drink per hour. Sympathetic arousal can persist for as long as two to three hours after the blood concentration returns to zero. Chronic ingestion of alcohol will cause a loss of slow-wave sleep and disruption of sleep patterns (Hobson, 1995).

Sierra *et al.* (2002) investigated the sleep quality of Spanish university students, as well as the effects of alcohol, caffeine and tobacco consumption on sleep quality. They concluded that students who drank between two and four alcoholic drinks daily, or between two and four cups of coffee, or who daily smoked between 20 and 30 cigarettes, had poor sleep quality, greater sleep latency, a greater number of sleep disturbances and greater daytime dysfunction. Lund *et al.* (2010) also found that students who were poor-quality sleepers drank more alcohol per day than optimal-quality sleepers. The poor-quality sleepers were twice as likely to use alcohol to induce sleep compared to students with better sleep quality and had a more

frequent use of over-the-counter drugs to regulate their sleep-wake cycle. Lund *et al.* (2010:130) described the "stimulation-sedation loop" where students use caffeine and other stimulants during the day and depressants at night to counteract the effects of the stimulants, which increases the risk of developing drug dependence. Research has shown that intercollegiate athletes have significantly higher proportions of risky lifestyle behaviour patterns when compared with non-athletes, with intercollegiate athletes having been identified as an at-risk group for heavy alcohol consumption (O'Brien & Lyons, 2000; Nelson & Wechsler, 2001;Vampley, 2005; Martens *et al*., 2006; Maughan, 2006;), which could negatively affect sleep quality.

Sexual activity

Studies on the effect of sexual activity on athletic performance tended to indicate that sexual activity did not have a big effect on the athlete's performance (Sztajzel *et al*., 2000). The effect of sexual activity on sleep in humans has been poorly studied. Relaxation, quiescence of the body, reduced tension, a hypnotic effect, sleepiness and sleep are often found to be after-effects of an orgasm (Anshel, 1981; Brissette *et al*., 1985; Thornton, 1990). Refinetti (2005) found that most sexual encounters in a university student population (N=38) occurred at night between 23:00 and 01:00. Coaches therefore may be favouring abstinence because they want to make sure that athletes get enough sleep (Lovgren, 2006).

BEHAVIOURS PROMOTING SLEEP

Sleep is a vital part of the recovery process. A lack of sleep can cause a decrease in work capacity and increased feelings of fatigue. This can decrease performance and reduce the effectiveness of a training programme (Gunning, 2001). It is therefore crucial for athletes to sleep well and be optimally rested and ready to perform on a particular day at a particular time. Athletes must be able to fall asleep as planned, either at night or when taking a nap.

Conditions that may impair sleep are an upright posture, excessively hot or cold temperatures, bright light, noise and stress. This suggests that the opposite conditions might promote sleep: lying down comfortably, appropriately warm or cool temperature, motor relaxation, sensory withdrawal and cognitive relaxation (Cole, 2005). It is recommended that the athlete should identify the amount of sleep that is needed and keep a regular sleep schedule (Walters, 2002). Inconsistent sleep patterns disrupt the internal biological clock and tend to increase the amount of time it takes to fall asleep. Adjustments to earlier or later sleep times than the regular schedule should not exceed 30 minutes. Changing the schedule for more than two days or sleeping one hour longer on weekends disrupts the biological clock. It usually takes four to five days to adjust to a particular bedtime. The athlete should get up in the morning at the same time, even if he or she experienced low quality sleep the previous night, and therefore establish consistent sleep and wake-up times (Nicol, 1988; Reisser, 2006).

Many people are aware that they need a period of relaxation between the concerns and psychological stressors of the day and their major or nocturnal (night) sleep. Athletes should be encouraged to follow a bedtime ritual and develop a "winding-down routine" that serves as a cue to the mind and body to get ready for sleep (Reisser, 2006:9). A period of as little as 10 minutes can be effective. Simple techniques of stress management can include making a list of the psychological stressors that occurred and some plans to deal with them the next day,

assuring oneself that the sleep environment is safe and reading entertaining material. An easily visible clock could be an arousing stimulus, which should be dealt with by athletes (Zarcone, 1989).

Postural immobility and muscle relaxation are critical factors in facilitating sleep onset and can be voluntarily controlled. One's posture should be supported to allow complete muscle relaxation and physical stillness. An individual could adopt a posture that he/she finds particularly favourable for sleep onset for him/her, called the "sleep-launch position" (Hobson, 1995:106). Voluntary breathing and relaxation techniques can produce a feeling of calm (Cole, 2005). It has been known that music has psychological effects on humans and can be used to create a relaxing environment. Athletes should choose music with a tempo slower than their heartbeat to induce a calming and relaxing effect (Le Roux, 2005,2006).

CONCLUSION

Many athletes are subjected to intense, high-volume training sessions in combination with many non-training stressors. It is suggested that sleep has a central role to play in aiding the short-term and long-term recovery of the athlete. Acute and chronic sleep disturbances could negatively affect physical performance, emotional well-being, and immune functioning. Athletes should be educated with regard to the role of sleep on performance and recovery, as well as various factors that could negatively affect or promote sleep. There might be a growing need for athletes and coaching staff to focus on the quality and the quantity of sleep among athletes. Pro-active screening could be done to identify athletes with sleep difficulties. Reasons for poor sleep quality could be identified and athletes could be assisted to develop coping strategies.

Internationally, adolescents and young adults (ages:12-25) have been identified as a population at high risk for sleep problems (Wolfson, 2010). While many athletes from the above mentioned age group compete in sport at various levels in South Africa, little sleep research has focused on athletes within the South African context. Although sleep has been identified as an important aspect of the recovery process and critical for optimal performance, most studies on sleep interventions have not focused on athletes. Recently, there has been concern about the effects of concussion on sleep quality in athletes participating in contact sport (Gosselin *et al*., 2009; Schreiber & Pick, 2009), which could be another area for research.

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