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**CARDIFF SCHOOL OF SPORT**

**DEGREE OF BACHELOR OF SCIENCE (HONOURS)**

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# SCORE-LINE EFFECT ON WORK RATE IN AMATEUR SOCCER

**Performance Analysis**

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# SCORE-LINE EFFECT ON WORK RATE IN AMATEUR SOCCER

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## ABSTRACT

The purpose of this study was to investigate the effect score-line has on the work rate of amateur soccer players at university level. Previous literature on the score-line effects on work rate has only investigated elite players (O'Donoghue and Johnston, 2002; Shaw and O'Donoghue, 2004; Clark and O'Donoghue, 2013) where amateur soccer cannot be compared to. The study consisted of 20 outfield amateur soccer players, where two players were observed on different teams in the same match, for a full 90 minute game. Central defenders, external defenders, central midfielders, external midfielders and forwards were the positional categories used. The computerised time motion analysis system was used to manually code the voice recorded clips on an electrical device. The reliability study of the system found to have a Moderate level of agreement (Altman, 1991) using a Kappa test on an inter-reliability study. Data was analysed using descriptive statistics to determine percentages, frequencies and durations of player movements to identify any significant differences in work rate between the different score-line states. A further statistical analysis was conducted using a Wilcoxon Signed Ranks Test, which was used to compare the seven movements between the Level-Behind and Level-Ahead groups. The overall result of this study found that there is no score-line effect on percentage of time spent performing high intensity activity. Within the level-behind group, possible explanations for no significant differences could be a number of reasons; one possibility could be players work rate remains the same to regain possession and score enough goals to level. Regarding the level-ahead group, it is possible that players lose concentration, resulting in teams sitting on the lead. However, other possible explanations could be due to substitutions and coach motivation. If all features of amateur soccer stay unaffected by score-line states, coach motivation tactics and substitutions should aim to decrease player perceptions that the final outcome of the match is inevitable and should inspire belief of control over the final outcome.

# CHAPTER ONE
# INTRODUCTION

# 1.0 Introduction

## 1.1 Background

Association football is one of the most widely played sport in the world (Bangsbo, 1994) and is a team game characterised by short bursts of sprints, rapid acceleration or deceleration, turning, jumping, kicking and tackling (Bangsbo and Michalsik, 2002). An estimated 100 million registered players exist worldwide within genders, youth and veteran competitions (Reilly, 1997) with millions more spectators and fans. There are eleven players on each team who are all organised into a formation including goalkeeper, defenders, midfielders and strikers. However the skills required in football are more dominant to various positions and roles within the teams, with the task of individuals differing depending on whether the team is in possession or not (Van Lingen, 1997).

Performance analysis has previously been defined by Hughes and Bartlett (2008) as the process through which actual sporting performance can be analysed. The use of performance analysis in football has become more prevalent to supply help to coaches and athletes to identify strengths and weaknesses, team performances and opposition performances (Hodges and Franks, 2008). Performance analysis as a whole is now believed to be more widely accepted among coaches, athletes and sport scientists as a valuable input for the feedback process (Drust, 2010, p.921).

There have been many methods to evaluate different aspects of football with performance analysis; possession and goal scoring strategies being the most common of interest to analyse. However, analysing sporting performance is not a new concept as there has been at least five centuries of attempts to devise and develop systems for notating movement (Hughes and Franks, 1997). Time-motion analysis in football has been heavily evaluated as it is an important aspect of the game, and can be used to improve sporting performance by providing coaches with another type of feedback tool (Carling et al., 2005).

When evaluating a footballer's performance, several performance indicators have to be considered including work-rate, strategy and technical components. Hughes and Bartlett (2002) defined a performance indicator as "an individual or combination of variables that aim to define some or all aspects of performance". Other indicators could include aspects such as set-pieces, skill, and possession (Jones, James and Mellalieu, 2004).

It is common to view score-line as a potential aspect of a game to impact a player's performance. In tennis, score-line has been found to affect various aspects of performance (Scully and O'Donoghue, 1999; O'Donoghue, 2006; O'Donoghue, 2007; Knight and O'Donoghue, 2012). In soccer, score-line has previously shown to impact technical aspects (Redwood-Brown, 2008; Taylor *et al*., 2008) and tactical aspects of play (Bloomfield, Polman and O'Donoghue, 2004; Lago and Martin, 2007).

## 1.2 Purpose

There has previously been a lot of research investigating the possibility that score-line state can affect different factors of performance. In soccer particularly, extensive research has found that score-line has an influence on work rates, tactical aspects and technical effectiveness. However, there has not been any research comparing the effects of the different score-line states; behind, level and ahead and how this impacts players' work-rates within the amateur soccer level.

Therefore, the purpose of this investigation was to assess the impact to which the score-line has on the work rate of performance of amateur soccer players at university level. The outfield player positions included; central defenders, external defenders, central midfield, external midfield and forwards. The seven movements that will determine the work rate of the players will be; standing, walking, backing, jogging, running and football specific (where the player has possession of the ball). The results and information taken from this study can be used as a tool for coaches and players to gain a better understanding of what effects can occur when score-line changes state.

## 1.3 Aims

The aim of the study was to examine the effect of different score-line states on the work-rate of outfield amateur players. The analysis of matches will be conducted to compare the differences of work-rate when teams are behind, level and ahead. The players would be split into two groups (level and ahead, and level and behind) depending on the score-line of that match.

## 1.4 Limitations

1. The time available for the study completion (12 months), resources available, and the word count allocation (10,000 words).
2. Windy conditions made it difficult to hear voice recordings.
3. Players vary in terms of typical work-rate and movement patterns, where situations, opposition, and styles of play can differentiate between players.
4. The external factors that could influence a players performance such as weather, time of day and venue was not taken into consideration for the study.

## 1.5 Delimitations

1. The study was conducted on amateur level (university standard) players and cannot be applied to higher or lower levels of soccer.

# CHAPTER TWO

# LITERATURE REVIEW

# 2.0 Literature Review

## 2.1 Match Analysis and Performance Analysis

Match analysis in football can be used as academic investigations into sports performance or for a feedback tool to coaches and players for matches and training. The use of match analysis can be as simple as the end result of a game or as complex as the work-rate or passing distribution. It is commonly used in sports as a tool that gives coaches the ability to collect objective information that can be used as feedback on performance (Carling et al., 2005, p.10). Hughes (1996) classifies the four main purposes of match analysis as:

1) Analysis of Movement – consists of the measurements of speed, duration of different activity and work rates of individual players.

2) Technical Evaluation – quantification and assessment of technical skill.

3) Tactical Evaluation – assessment of and qualification of tactical skills in a particular game.

4) Statistical Compilation – combination of both technical and tactical information for quantitative evaluation.

The use of video-based time-motion analysis has widely been used (Krustrup *et al*., 2003; Mohr *et al*., 2003; Bangsbo *et al.*, 1991) with such research providing evidence that distance covered at high intensities depend on the position, level of competition, physical abilities of the player, and also the physical performance of opponents (Krustrup *et al.*, 2003; Rampinini *et al.*, 2007). Additionally, previous time-motion analysis studies have shown that performance of players declines after the highest intense periods of a game, being the start of the second half and towards the end of a game (Mohr, Krustrup & Bangsbo, 2005).

## 2.2 Performance Indicators

Performance indicators are termed as a grouping, or a selection of action variables that aims to explain what happens within specific aspects or all aspects of a performance (Hughes and Bartlett, 2002). In the Hughes and Bartlett (2002) study, soccer had been categorised into 'Invasion games', and reported there are four categories of performance indicators within this classification: Match classifications indicators, Technical indicators, Tactical indicators and Biomechanical indicators. However these indicators were advised with regards to the use of performance indicators, but no recommendations were made that concerns which indicators would suit different research questions.

Technical indicators, according to Hughes & Bartlett (2002), are concerned with player performances including dribbles, tackles won and lost and on and off target crosses for invasion games like soccer. Tactical indicators however are related to those variables of technical indicators, which are analysed by the use of space and possession, fitness and movement. Hughes & Bartlett (2002) continued to suggest that, technical and tactical indicators should be used and analysed in the same way in a sense were both types of indicators are action variables, consistent with respect to the total frequency of that aspect, or in some cases, the total occurrence of all actions.

Previous studies have tried to create performance specific indicators, particularly in rugby union, where Vivian *et al*. (2001) attempted to develop profile specific indicators to suit individual playing positions. Therefore to construct these types of profiles, a number of attacking and defending behaviours of flankers, number 8 and scrumhalf positions were used. The results found suggested that there was evidence of different numbers of behaviours within all three of the positions. Similarly, Parsons and Hughes (2001) investigated professional rugby union player's patterns of play in the Six Nations, World Cup and European club competitions. Each position was investigated with regards to on and off the ball actions carried out throughout matches. The outcomes of Parsons and Hughes (2001) study were in agreement with Vivian *et al*.'s (2001) study with regards to players performing certain skills more frequently depending on their position.

## 2.3 Work Rate

The first original study towards analysis of football matches and player work rates was devised by Reilly and Thomas (1976). The findings from this pioneering paper produced the platform for future research to be studied in more depth and detail which is still being improved over the years. Within the Reilly and Thomas (1976) study, the authors analysed 51 games in the English first division, and specifically looked at the player's work rate by recording a variety of variables. Movements performed that were observed included; walking, backing, and running (running was divided depending on the intensity into; jogging, cruising and sprinting). The distance covered by each player was also looked at, and was estimated by the use of pitch cuttings. This was not an accurate method to go by in terms of consistency, due to the different angles of movements that the player may have produced. However at the time this was a ground-breaking study, and the first real initial indication of the prospect for the future of investigations into performance analysis and work rate.

In saying this, there are some limitations of the study that should be addressed. Firstly, the 79 player performances were from 5 matches where particular stoppages in play may have influence the observed work rate. Secondly, the method did not account for expectations and upsets, meaning a higher placed team drawing to a lower placed team may be considered a disappointing result; although on the other hand, the lower placed team may see the result as a good one. Therefore the work rate and motivation of the players may be affected as a consequence.

O'Donoghue *et al*.'s (2005) study analysed 15 minute videos of 226 elite soccer players, finding means of high intensity work durations of 2.9 s followed by a mean recovery period of 26.3 s. The analysis system used to carry out this research was the Periods of Work Efforts and Recoveries (POWER) system which only produces results on two broad classes recorded, being 'work' and 'rest'. Though, the POWER system does provide a basic distribution between high intensity and low intensity work rate. A limitation of this study was the authors use of two classes of positions, being 'defenders' and 'midfielders' which resulted in little attention paid to the specific positions of defenders and midfielders, which both have external and central positions. The assumptions of positions played have similar intensity movements and frequency has been proven wrong, as a recent study from

Lago-Penas *et al*. (2009) suggested that external midfielders differ in respect to intensity and frequency for different durations.

The research conducted by Lago-Penas *et al.* (2009) investigated work rate profiles and exercise patterns in relation to positions within elite soccer players. Likewise to the Reilly and Thomas (1979) paper, the authors used five categories of movement which were; walking and jogging, low speed running, moderate speed running, high speed running and sprinting. However, an implication of this study is that all five movements are classed as forward motions, which does not comply with the variety of movements performed within a game (Bangsbo *et al.*, 1991; O'Donoghue, 1998).

Lago-Penas *et al*. (2009) used a computerised time-motion analysis system AMISCO Pro, which stored the data, distance covered, duration in different intensities and the frequency of skill that was attained in each position. This software has previously been used in studies such as Di Salvo *et al.* (2007), Djaoui *et al.* (2013) and Rey *et al.* (2010), and has recently been evaluated in terms of showing reliability and validity within the software (Zubillaga, 2007; Zubillaga *et al.*, 2009).

Lastly within the work rate literature, Di Salvo *et al.* (2009) produced a study into the amount of high intensity of activity in Premier League matches, analysing a high participant number of 563. Di Salvo *et al.* (2009) found that positions have different total high intensity distances, highlighting positional demands on players. It was found that external midfield players performed the furthest high intensity running of 1049 m, while central defenders ran the lowest high intensity distance of 681 m.

### 2.4 Score-line Effect

Score-line has also been looked at in regards to influencing the work rate of soccer players (O'Donoghue and Johnston, 2002; Shaw and O'Donoghue, 2004; Clark and O'Donoghue, 2013). However, there is limited research on the score-line effect on the positional work-rate of soccer players.

It is often thought that situational variables such as opposition quality, match location and score-line are all factors shown to have significant effect on a player's performance (Lago

and Martin, 2007; Taylor *et al*., 2008; Lago-Penas and Lago-Ballesteros, 2011). Although in previous literature, the topic of score-line effect on work rate has been widely discussed in terms of when individuals perform different intensities when score-line changes (Redwood-Brown *et al*., 2012). Shaw and O'Donoghue, (2004), O'Donoghue, (2003), Redwood-Brown, (2008) have all proven in each study that score-line can affect a players performance.

A study conducted by Scully and O'Donoghue (1999) investigated men's singles tennis at different Grand Slam tournaments, and looked at the strategies used by the winning and losing players where both experienced serving and receiving serve when level, ahead and behind on service breaks. The findings of this study showed that the successful players did not alter their strategy significantly between different score-lines, however the unsuccessful players attacked the net less when leading on service breaks than when the score was level on service breaks. The change in strategy for the losing player however became a disadvantage to the player as it made them more prone to a break back from the opposition. However a criticism of this study was the generalisation of class of players within the Grand Slam tournaments. O'Donoghue (2003) later addressed this issue by using a cluster analysis to compare the strategies used by different players with respect to score-line effect. The findings in this study found that some players were found to attack the net more when ahead than when behind, and others attack the net more when behind. The study showed that score-line is affected in tennis, however the affect is different and dependant on the class of player.

In the O'Donoghue and Tenga (2001) paper, the authors discussed the possibility that score-line can be viewed as a performance accomplishment, which effectively has an influence on the effort of individual players in a game. The subjects that were observed and vocally recorded in this study were elite soccer players, as the movements and effort exerted by the player was recorded. There were eight sub-categories of values that were split, ranging from standing to high intensity activity. Results in this study showed that teams had a tendency to work harder when level than when behind or ahead and teams that were in the lead tended to relax which inevitably allows the opposition back into the game. It was also suggested that the teams that were losing may have resulted in a reduction of motivation to work hard. However the limitation to this study is the issue with the method of data collection as it has a large number of sub-categories, making it difficult

to adopt that a player is walking and not jogging or jogging and not running. It is also the transition between the categories that make it difficult to quantify and different operators may code these actions differently producing uncertainty in the system.

Within the O'Donoghue and Tenga (2001) paper, a speculative model for the mechanisms behind score-line was produced. The authors also referred to a sport psychological approach to the effects that score-line can have on individuals, mainly focusing on the areas of efficacy expectation (Bandura, 1977) and casual attribution (McAuley, 1992). Bandura (1977) defined self-efficacy as a set of beliefs and expectations of ones capability of performing the necessary behaviours to achieve the outcome desired. A pathway was suggested from a goal scored or conceded to motivation of effort that included score-line state, causal attribution and perceived locus of control. However, the argument was that when a team was leading or behind, the players would attribute the score-line state to aspects outside of their control. It is possible that when a team is in the lead, players may attribute this accomplishment to factors outside of their own control, which can come from the weakness of the opposition, quality of teammates, the officials or the venue. If these perceptions occur, it could lead a player to believe the final result of a match is obvious and outside of their control, this may reduce the work rate of a player.

This speculative model can be criticised by a number of differences. Clark and O'Donoghue (2013) criticised the model by suggesting that there is not much evidence that supports such a mechanism, with aspects between performance accomplishment (score-line) and observable movement being left as 'black boxes'. Clark and O'Donoghue (2013) also expressed another limitation of the O'Donoghue and Tenga (2001) was that in seven matches there was no more than one goal between the two teams, suggesting that the outcome of these matches had been considered within the players control until the very end of the match. This criticism suggested that the mechanisms proposed by O'Donoghue and Tenga (2001) were not completely responsible for a decline in perceived work-rate when players were level or leading (Clark and O'Donoghue, 2013).

Likewise to O'Donoghue and Tenga (2001), Shaw and O'Donoghue (2004) produced a similar paper with regards to the categories used to examine the differences of work-rates depending on score-line. Even though a large group of categories were used, the agreement levels between both authors were high; producing a difference of only 0.3% for

time spent performing high intensity activity. The work rate for these matches was compared between teams that were level and ahead with teams that were level and behind. The results reinforced the outcomes of those in the O'Donoghue and Tenga (2001) study, stating that players work harder when level than when ahead or behind.

A recently published study by Redwood-Brown *et al*. (2012) investigated the effects of score-line on work rate in the English Premier league using the Prozone3® player tracking system, which has been proven and demonstrated to have good inter- and intra-operator reliability agreement for distance covered at different speeds (Di Salvo *et al*., 2009). This study used 79 player performances during five 0-0 draws in the English Premier League matches, establishing a typical fatigue pattern. However the study on work-rate and fatigue pattern was then used in a second study to adjust work rate of 90 player performances in five English Premier League matches for the evaluation of whether score-line has an effect on player work rate. The first study of the Redwood-Brown *et al*. (2012) work rate investigation found that intensity is higher in the first 15 minutes of matches than other periods and that in the second half decrements in total distance covered, as well as percentage of time spent performing high intensity work. This study is within agreement of previous studies which found the same results (Barros *et al*., 2007; Mohr *et al*., 2003; Bangsbo *et al*., 1991).

There is speculation that soccer players are effected by score-line and described as 'sitting on their lead' where players relax when ahead and also described as 'chasing the game' when behind (Shaw and O'Donoghue, 2004). Research in sports specific psychology (Feltz, 1992) and in general psychology (Stajkovic and Luthens, 1998) support this speculation. However, there is a concern that work rate is reduced during the end of the match due to fatigue. When Robinson *et al*. (1995) presented the study on fatigue of female field hockey, there was a rising concern to whether the work rate reduction towards the end of matches is due to fatigue or even where players believe the outcome of the match was an obvious result. The 18 field hockey players used in Robinson *et al*.'s (1995) study was based on players from both sides in two games; one ending 6-1 and the second ending 4-0. Therefore it is possible to speculate that in the final stages of the two matches, both teams may have believed that the outcome of the match may have already been decided, which could have resulted in the reduction of motivation and lowered levels of work rate.

## 2.5 Summary

Extensive research has found that score-line has an effect on the work rate of players. However, it has previously been vigorously researched that work-rate can also be influenced by situational factors such as opposition effect and the venue of the match. There is, however, limited research on the effects score-line has on work rate for different types of skill levels within soccer. Different levels of soccer cannot be applied to all levels, therefore gives justification for the score-line research in amateur soccer.

# CHAPTER THREE

# METHODOLOGY

# 3.0 Methodology

## 3.1 Research Design

The purpose of this study was to investigate the effect that score-line has on 20 outfield players' work rate in amateur football. The observer would chose a subject which is suitable for the position and vocally record each time the player performed one of the seven movements, while noting down the minute and vocally recording when each goal was scored. This recording was then played back in real time after the game for the movements and goals scored to be coded into the DOSBox system on the Apple Mac. The reliability of data collection was studied by two independent researchers, which coded a 94-minute amateur soccer match of the BUCS League. By using Kappa values, the level of agreement was found for each movement that the observers coded.

## 3.2 Time-Motion Analysis

To allow the author to correctly code each movement, definitions of each movement must be titled and rehearsed before recording any events. The 7-movement time-motion analysis system in DOSBox was used to analysis each of the player's movement. The current study used a classification scheme of the following seven movements, adapted from those in O'Donoghue's (1998) and Huey *et al*. (2001) investigations:

- Standing; any time the player is in a static position including standing, sitting or lying down and is not in possession of the ball.
- Walking; when the player is walking in a forward direction and is not in possession of the ball.
- Backing; is when the player is travelling in a low intensity backwards or sideways movement, and is not in possession of the ball.
- Jogging; low intensity running in a forward direction, not in possession of the ball.
- Running; high intensity speed running with significant effort and not in possession of the ball.
- Shuffling; high intensity backwards, sideways and on the spot movement requiring significant effort, not in possession of the ball.

- Football/on the ball; any time the player is in possession of the ball during the match (including stoppage time).

The high intensity movements were classified as running, shuffling and football, with the remaining movements being classified as low intensity activity.

### 3.3 Reliability of Data Collection

In order to check the reliability of the data collection system, two independent observers analysed a live 94 minute match of a centre back amateur soccer player and vocally recorded movement patterns according to the seven categories of intensity. Each observer recorded the seven movement categories performed into a Samsung Galaxy S4 GT-19505 voice recorder device, then played back and manually coded into the DOSBox system on an Apple Mac.

Table 3.1 shows the results of the agreement scores of each category over the 94 minute period of the match observed. From this table, it can be seen where the common overlap in agreement from both observers occurred, as well as amount of time(s) spent performing each of the seven movements. It must be taken into consideration that there will be differences of human error, delay in speaking into the voice recorder and in pressing the keyboard keys. However, these are the issues which Kappa intends to eliminate and therefore enhance the overall reliability of the system when a very good level of agreement score is found.

Table 3.1 showing the volume of time when the two independent observers recorded different activities (s).

| Observer 1 | Observer 2 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | ST | WA | BA | JO | RU | SH | GA | Total |
| ST | 345.67 | 368.74 | 29.11 | 16.61 | 0.00 | 0.00 | 0.00 | 760.13 |
| WA | 103.51 | 1768.07 | 175.24 | 365.84 | 3.47 | 0.00 | 41.78 | 2457.91 |
| BA | 30.02 | 182.73 | 233.42 | 73.58 | 1.16 | 1.05 | 10.23 | 532.19 |
| JO | 41.08 | 384.76 | 118.73 | 967.59 | 24.83 | 4.45 | 123.05 | 1664.49 |
| RU | 5.53 | 9.27 | 12.61 | 28.93 | 6.27 | 1.05 | 13.73 | 77.39 |
| SH | 1.41 | 10.47 | 16.03 | 10.01 | 1.66 | 0.00 | 10.21 | 49.79 |
| GA | 0.14 | 11.58 | 5.92 | 12.83 | 0.18 | 0.53 | 19.19 | 50.37 |
| Total | 527.36 | 2735.62 | 591.06 | 1475.39 | 37.57 | 7.08 | 218.19 | 5592.27 |

The statistical test Kappa was used to measure the levels of agreement between the two observers on the activity performed (O'Donoghue *et al*., 2005). Altman's (1991) guidelines for interpreting the Kappa values show that a value of 1 is interpreted as a perfect agreement.

The initial results of the kappa calculation showed an amount of time where the observers agreed, $P_0$ of 0.597. However, kappa also produces a value of expected proportion of time where observers could be expected to agree by chance, $P_c$ 0.317. This then meant a kappa value, $\kappa$, of 0.411 would be interpreted as a moderate strength of agreement.

### 3.4 Procedure

The current study analysed 20 university soccer players and work rate was observed from one player on each team in a match, with the goals noted on paper when scored for later evaluation of the changes in work rate when teams were ahead, level and losing. The number of matches for the study was used for the purpose of having enough matches where both teams were behind, level and ahead. The players were observed live during games where the game was held. The observer then verbally coded player movement for a whole game, recording the information onto a Samsung Galaxy S4 GT-19505 voice recorder application. The recording was then played back and manually coded into a '7-movement Time-Motion Analysis system in DOSBox' on an Apple Mac. The times of which the goals were scored were then put into the DOSBox system to determine the percentage of time players spent in different intensities when the score changed, and if work rate was altered if teams were either level, ahead or behind.

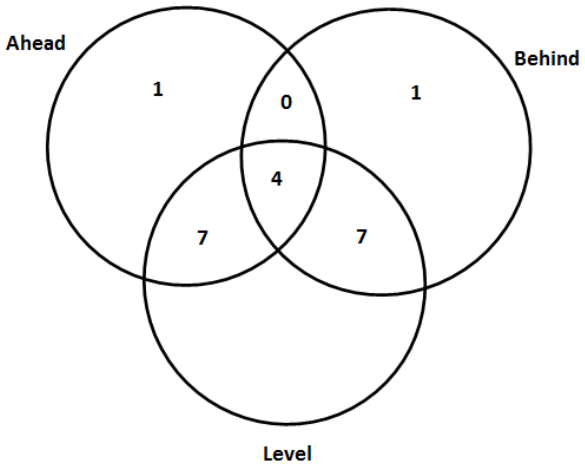


Figure 3.1 Venn diagram showing how the groups were split into LB and LA.

Once all players had been manually coded into the DOSBox system, the next step was to put these players into groups. The two groups used for this study would be level and behind (LB) and level and ahead (LA). To split the players into two groups, a Venn diagram was completed to determine how many players were level and ahead, level and behind, or all three score-line states (as shown in figure 3.1). For performances to be included in this study, the score had to remain in two or three of the score-line states for a minimum of 10 minutes each. There were a total of 4 players which data could be used for both groups, due to all three score-line states happening in that game. A total of 7 players were found in the level and ahead group, and a total of 7 players were found to be in the level and ahead group. However, there were two players' data that could not be used for this study, due to the score-line changing from level to ahead or level to behind in under 10 minutes and remaining that state throughout the rest of the match. This allowed for 9 players each in both the LB and LA groups to be analysed.

## 3.5 Participants and Matches

A total of 20 different outfield players were used as subjects for the current study where all players were of University standard and were passive participants in the data collection process. To achieve a fair and equal representation of the different outfield positions, players were classified into five positional groups with four players representing each group. The classifications of each group were central defenders, external defenders (also

known as left and right backs), central midfielders, external midfielders (also known as wingers) and forwards (also known as strikers). All participants were not required to undergo any specific tasks for the study, only their actions were observed and analysed.
The subjects were primarily observed at matches taking place at Cardiff Metropolitan's home ground at Cyncoed Campus. Therefore permission was granted by the club manager to vocally record player movements on a digital dictation machine, providing that players were not distracted and that player identities would not be used.

### 3.6 Data Collection

For the observer to correctly code movements made over the period of the match, the observer would verbally speak into a Samsung Galaxy S4 GT-19505 to record movements being performed, according to the definitions made. However, it is important for the observer to classify the movement and ensure consistency throughout the study, eliminating any possible overlap in what is perceived to be performed.

After the data had been collected, it was then transferred from the voice recorder to a Dell (Inspiron N5030) laptop device for the purpose of creating a backup copy. It is then played back in real-time from the voice recorder and simultaneously entered into 7-movement Time-Motion Analysis system in DOSBox, which is run through an Apple Mac device. After coding each position in the system, a window which reported a summary after each period and a final report for that position was presented and print screened for back up and entry for further analysis. Furthermore, the goals scored in each game had to be put into the system for further analysis.

### 3.7 Statistical Analysis

The statistical Programme for Social Sciences (Version 20 SPSS; An IBM Corporation, Armonk, NY) was used to assess the differences between score-line states and work rate in different positional roles. Score-line was compare with the different classifications of movement to determine the work rate of each player.

The first analysis completed in the SPSS programme was the descriptive statistics which included the mean (±SD) frequencies, percentages, and durations of movements and high intensities (HI) within LB and LA groups. The mean (±SD) frequencies and durations were then put into two tables for both score-line groups. In order to present the percentage of each score-line state in both groups, a pie-chart was conducted to show movement percentages over a whole match. For both score-line groups, a Wilcoxon Signed Ranks Test was completed in SPSS, which was used to compare the seven movements concerning the different score-line states (Level v Behind and Level v Ahead). The significant difference level was set at $p<0.05$ (Hughes *et al*., 2004).

# CHAPTER FOUR

# RESULTS

## 4.0 Results

Figure 4.1 shows the pie chart produced in aid to find what percentage of all matches were spent in the three score-line states. This shows that on average, all matches spent an equal amount of time ahead and behind, with the percentage of time spent level being slightly less at about 1%.

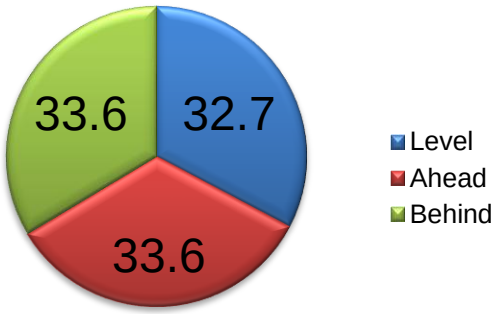


Figure 4.1 % Time spent in all score-line states for all players.

Table 4.1 shows a summary of all players' frequencies and durations of match time spent in all seven movements within the LB group. Within this group, the durations of the high intensity activities; running, shuffling and game are all shorter than the low intensity movements, by an average of 5 s. The most frequent of movements, as well as longest by duration, is walking and jogging. The lowest activity of duration and less frequent of movements is shuffling in both score-line states of level and behind. In terms of match time, running is the most performed high intensity activity with an average frequency of 57.18±35.54 when scores were level and an average frequency of 53.62±31.52 when behind. All high intensity movement frequencies and durations are lower in the behind score-line state than those within the level score-line state. A significant difference was found between level and behind jogging frequencies ($p$=.033) which show that players performed significantly less jogging activity when losing.

Table 4.1 Summary of frequency per 90 minutes and duration of players in the LB group.

| Movement | Level | | Behind | |
|---|---|---|---|---|
| | Frequency | Duration (s) | Frequency | Duration (s) |
| Stationary | 61.75±46.21 | 9.97±5.92 | 63.06±39.46 | 10.29±3.55 |
| Walking | 200.83±84.1 | 13.18±6.93 | 190.97±86.53 | 14.22±6.64 |
| Backing | 65.17±32.97 | 6.83±5.27 | 59.42±17.79 | 7.38±3.88 |
| Jogging | 218.1±106.14 | 10.1±4.55 | 203.98±99.34* | 10.38±5.05 |
| Running | 57.18±35.54 | 3.56±0.61 | 53.62±31.52 | 4.44±1.52 |
| Shuffling | 29.45±26.44 | 2.6±0.67 | 24.57±16.87 | 2.91±1.08 |
| Game | 52.39±10.21 | 4.16±1.44 | 47.93±16.19 | 3.98±1.13 |

*Significantly different to level frequencies ($p$<0.05)

Table 4.2 summaries the frequencies and durations of all players' movements in the LA group. When the score was level, the most performed activity was jogging with a frequency of 233.28±99.74, and the longest activity with regards to duration was walking which averaged 12.78±6.75. However, when the score-line changed and players were ahead, the most performed activity was walking with a frequency of 188±71.41, but the longest duration of activity was stationary, averaging 13.47±5.4. Similar to the LB group, the table shows that shuffling was the lowest activity by frequency and duration in both score-line states. Different frequencies of jogging show significant differences between level and ahead score-lines, which shows that players perform less frequent jogging activity when winning.

Table 4.2 Summary of frequency per 90 minutes and duration of players in the LA group.

| Movement | Level | | Ahead | |
|---|---|---|---|---|
| | Frequency | Duration | Frequency | Duration |
| Stationary | 72.81±45.5 | 10.19±6.81 | 64.04±34.31 | 13.47±5.4 |
| Walking | 205.46±69.51 | 12.78±6.75 | 188±71.41 | 15±7.55 |
| Backing | 55.61±28.87 | 5.9±4.5 | 47.84±26.4 | 6.17±2.2 |
| Jogging | 233.28±99.74 | 8.56±2.91 | 179.13±88.6* | 9.19±3.72 |
| Running | 55.7±29.25 | 3.5±1.4 | 46.9±18.85 | 4.06±1.3 |
| Shuffling | 36.75±26.6 | 2.99±1.66 | 25.9±19.01 | 2.97±0.63 |
| Game | 50.83±13.33 | 4.05±1.13 | 48.48±13.22 | 3.64±1.38 |

*Significantly different to level frequencies ($p$<0.05)

In order to make the percentage of match spent performing each activity in the different score-line states more comparable; two pie charts have been produced for the LB group (figure 4.2). This clearly demonstrates the considerable amount of time spent in low intensity activities in both score-line states with the highest percentages coming from walking (40%-41%) and jogging (32%-34%) throughout a whole 90 minute match. While looking at the differences between high intensity and low intensity, high intensity activity totals an average of 8% in both score-line states, with the remaining 92% of match time was spent in low intensity activities.

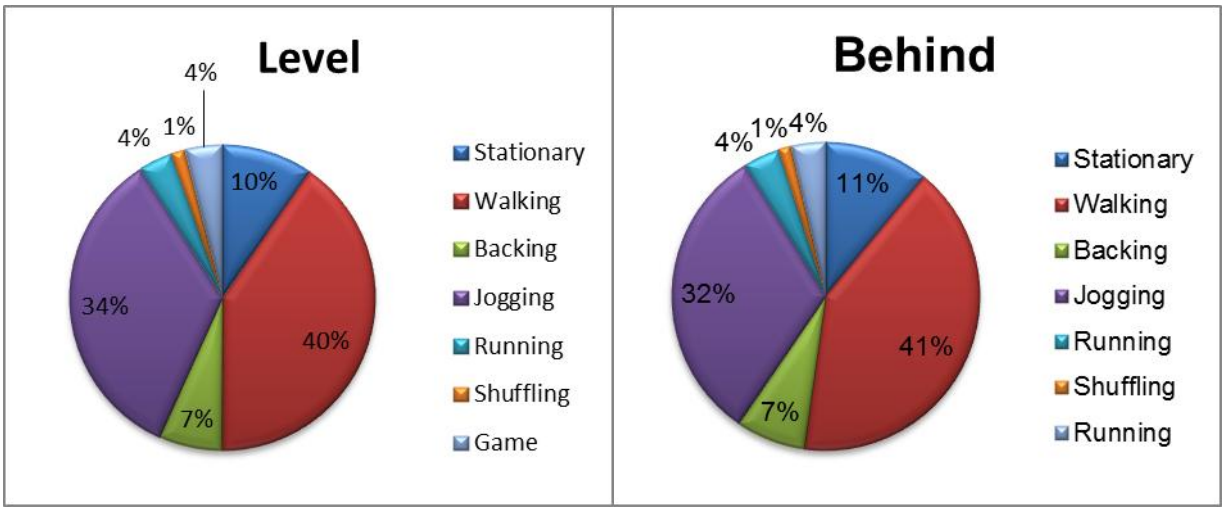

Figure 4.2 LB group % of Time spent performing each movement when level and behind.

In the interest to compare differences in percentage of time spent in all movements between LB and LA group, a further two pie charts were produced (figure 4.3). Similar to the LB group, the LA group also produced the most amount of time spent in low intensity activities, particularly walking and jogging. With regards to high intensity, players when level totalled 9% for all high intensity activities in a match. However, when players were ahead, the total percentage of time spent in high intensity activities decreased to 8%. The obvious difference between all four pie charts is the time spent walking when players were ahead with a total of 46% which decreased time spent jogging by on average 6%.

A further statistical test was conducted to find if any significant differences ($p$<0.05) occurred between the two groups using Wilcoxon signed test on the SPSS program. Within the LA group, a comparison of level and ahead states found only two significant differences, which occurred in the percentage of time spent walking ($p$=.041) and jogging ($p$=.013) throughout a game.

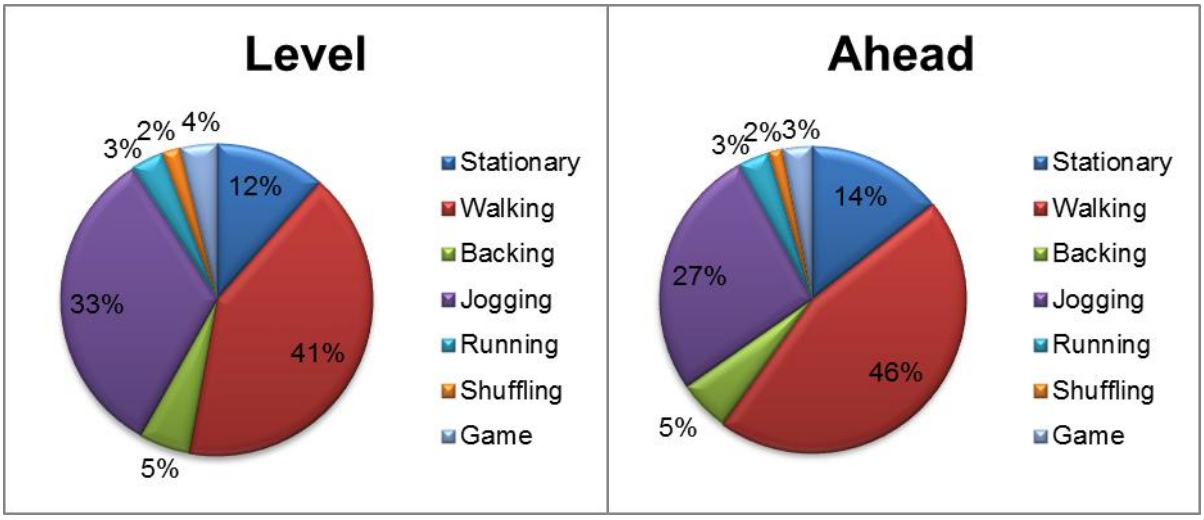


Figure 4.3 Level and Ahead group % of Time spent performing each movement when level and ahead.

Lastly, a graph was conducted to show the mean percentage (%) times that was spent performing high intensity activities from descriptive analysis (figure 4.4). This graph was produced to visually see the differences between groups when the players team was level and behind and level and ahead. This graph shows there is not much differences in both groups when level, however players spent more time performing high intensity activity when behind (~8.8%) compared to when ahead (~7.9%).

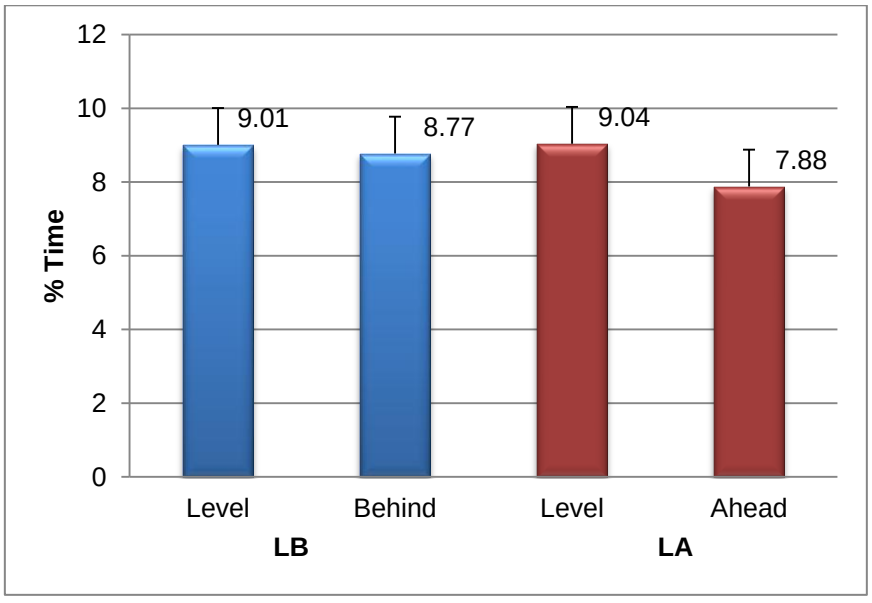


Figure 4.4 Mean % of time spent performing HI for LB and LA groups in different score-line states (±SD).

# CHAPTER FIVE

# DISCUSSION

# 5.0 Discussion

## 5.1 Introduction

The aim of the study was to examine the effect of score-line on player behaviour in terms of work rate in amateur soccer. The study involved analysing seven movements during game play, and whether score-line changed player's work rate. The variables of this examination were compared in different score-line states, including level to behind, and level and ahead and a comparison of these two groups combined to identify differences in the data set.

It is important to acknowledge in the current study, the author used data from two players in the same match, on opposing sides, whereas previous studies have only analysed one player each match (Clark and O'Donoghue, 2013; O'Donoghue and Tenga, 2001). Therefore, this study is a new unique way of analysing score-line effects on work rate.

## 5.2 Similarities between both groups

On a whole, soccer performance for this level found no significant differences for high intensity activity during all score-line states. The percentage of time spent performing all seven movements in the level-ahead and level-behind group showed the majority of results to have no significant differences. This shows that score-line is not an influencing factor on work rate of amateur soccer. The differences between score-line states can be discussed in relation to the variability in percentage of time spent performing high intensity activity within performances. Previous research on the effect of score-line for elite players have found that score-line does effect the work rate (O'Donoghue and Tenga, 2001; McStravick and O'Donoghue, 2004; Bloomfield *et al*, 2004b) suggesting that different standards of soccer players are effected differently towards score-line states.

The current investigation had four significant differences overall, which were found in two significant differences in frequencies of jogging in both groups, and percentage of time spent walking and jogging in the LA group. This finding is in contrast with many previous studies where players are found to spend greater percentage of time performing higher intensities when the score was level (O'Donoghue and Tenga, 2001; Clark and

O'Donoghue, 2013; Shaw and O'Donoghue, 2004). This contrast to previous investigations could be due to the difference of level, as the current study investigates the work rate of amateur players rather than elite players. Dellal *et al.* (2011) found that differences between elite and amateur soccer players was the total of distances covered in high intensity running and sprinting, explaining that elite players need to be able to complete a number of repeated sprints bouts without an adequate amount of rest, showing the vast difference in pace between elite and amateurs.

Taylor *et al*. (2008) suggested that situational variables such as match status in soccer do not affect the outcomes of possessions, due to the sample being elite players. It has previously been stated that elite players are said to be in the autonomous stage of Fitts and Posner's (1967) learning phases. Anderson and Fincham (1994) explained the characteristics of autonomous performers are increased accuracy and speed when performing skills. Therefore it can be hypothesised that in amateur soccer, high intensity activity will not be as high or as long in duration compared to elite. Redwood-Brown ***et al.'s*** (2012) study found that in elite soccer, the most high intensity action happened in the first 15 minutes of the first half, allowing for the value of overall high intensity for the level score-line to be much higher. However, in amateur soccer, players would not start the game as fast as elite players. An explanation for this could be the physical ability of different levels of soccer (Gall *et al*, 2010), which can be the result of difference in training such as specific strength training and speed training programs (Gissis *et al.,* 2006).

When discussing the difference in score-line effects, it is worth considering that matches typically start level, with ahead and behind score-line states being experienced further into the match. Previous research has described that players perform greater high intensity activities in the first half of a match than second half, with the score more likely to be level in the first half (Redwood-Brown *et al*., 2009). However, the Redwood-Brown *et al.* (2009) paper was a study of elite subjects, and therefore cannot be taken into consideration for this study.

Another possible explanation for score-line to have no significant impact on work rate could be that the coaches may encourage players to play to their best potential irrespective of the score, or whether the opposing team is superior or inferior. This theory incorporates the idea that the quality of opposition has an effect on players' performances

(McGarry and Franks, 1994). Before a match has started it is possible for teams to believe that a loss is inevitable, this assumption can come from knowing the opposing team is superior. When this happens, the coaches may use the concept of 'stationarity' to motivated teams. Knight and O'Donoghue (2012) termed stationarity in Tennis as the assumption that the likelihood of all points are the same, irrespective of any score-line states. Coaches can apply this idea to soccer matches, to encourage players to play to their best independently of score-line.

Hirotsu and Wright (2002) conducted a study that examined the optimum phase at which a coach should make substitutions in soccer. This study prompted the need to evaluate coaches' behaviour in different score-line states, finding that substitutions should be made subject to match situations, score-line state and time remaining. Carmichael *et al*. (2002) suggested that coaches are responsible for team selections, substitutions, and match tactics, however these may change due to score-line. Substitutes may be made if the coach feels the outcome of the match is inevitable, where the team is significantly in the lead or losing. This may be the case because coaches want to avoid the possibility of injury to important players, which is likely to occur if the player is fatigued (Fuller, 2010).

Scarf and Shi (2008) explained the importance of an individual match in a tournament or contest can have an influence on team selection and player assignment. It has been speculated that coaches may field a stronger team if they feel the team can do well in that tournament, or put out a weaker team in matches where are unlikely to win on paper (Scarf and Shi, 2008). It is also possible that coaches may wish to rest their best players for upcoming matches which they see as more important to avoid risking injury (Fuller, 2010). This strategy can prove to have an effect on the outcome of the match, therefore can influence the work rate of players on both teams.

### 5.3 Psychological Explanations

Previous research has stated that players have different psychological responses to performance and outcomes. Anshel (2003) conducted the following distinction between external and internal locus of control; those with external dispositions feel events are beyond their control, have lower levels of self-confidence and self-esteem, and similarly gain little reinforcement importance from achievement. Those athletes with internal

dispositions feel they take responsibility for life events, set high performance goals and generally have higher self-confidence and self-esteem. Bandura (1977) argued that when people have higher levels of self-efficacy, they will believe that they are capable of performing the desired actions to meet situational demands. When a team comes from behind to win, it is likely many of the players have an internal locus of control. The players will feel like the outcome is in their control, and are willing to take responsibility of them (Cox, 1998). Internal locus of control can provide the players with the confidence to apply more tactical changes and turn the match around. Therefore, a player with internal locus of control will have more of a positive impact on the match, and those players with external locus of control will have a negative impact on performances. McAuley and Gross (1983) suggested that attributing failure to internal causes can lower self-efficacy levels. This psychological state could lead to perceived feeling of lack of control. This state is common in amateur athletes, with negative thoughts potentially affecting performance. A losing team, which may feel the outcome is out of their control, could alter performance in attempt to gain back control of the game.

### 5.4 Level-Ahead

Within the level-ahead group, results found there to be two significant differences in percentage of time spent walking and jogging. A further significant difference was found in frequency of jogging between level and ahead score-lines. This significant difference shows that players perform less moderate intensity activity when ahead. This descriptive statistic showed there to be an increase of 5% of walking and 1% decrease of high intensity when ahead.

A criticism of previous studies that have looked at score-line effects on work rate (Bloomfield *et al*., 2004b; Shaw and O'Donoghue, 2004; Redwood-Brown *et al*., 2012) is the analysis only focusing on two intensity groups (low and high), suggesting players either work at low intensities and high intensities throughout a match. Though, the movement jogging can be looked at as a medium intensity, signifying that players can perform movements in between low and high intensities. Therefore, differences in walking and jogging within level and ahead states show the players perform less moderate intensity activity.

A potential reason as to why leading teams' percentage of high intensity decreases, and perform significant less frequencies of jogging could be related with psychological reactions. Burke (2005) proposed that score-line can have a significant amount of influence on a player's psychological reactions. Previous research from Dosil (2005) suggested there is a possibility for a reduction in concentration levels when the team goes ahead. Redwood-Brown (2008) reinforced this theory which found that in elite soccer, for five minutes after a team scored a goal to take the lead, the success rate of passes decreased compared with the average for that half suggesting teams are in no hurry to score immediately after. Mohr *et al*. (2003) suggested that when teams go ahead in a game, they tended to 'sit on the lead' as a result of reduced concentration. Another study that follows the same trend was conducted by Scully and O'Donoghue (1999) in men's singles tennis, where players were more reluctant to use uncertain attacking strategies once they had achieved a break of service.

### 5.5 Level-Behind

In the current study, comparing score-line states when teams were behind and when teams were winning, there was just under 1% increase of high intensity activity occurred when teams were behind. This is similar to those results in the Rampinini *et al.* (2009) study where the authors observed greater distances covered in high intensity speed ranges by the losing team. This can suggest that losing teams are prone to chase the ball and work harder to regain possession and control of the game. In contrast, the winning teams are in control of the game and possibly have more possession and pass the ball around more. Bloomfield (2004b) explained that when teams pass the ball around it involves less running activity, making the opposition chase the ball around. Previous research has proposed that players may relax if they believe their team is far enough in the lead (Cornelius *et al*., 1997; Higham, Harwood and Cale, 2005). Di Salvo *et al*. (2009) also proposed that high intensity activity was higher for the losing team.

There was a significant difference found in the frequencies of jogging between level and behind score-line states. The results showed that when teams went behind, players performed significantly less frequent jogging activity. A possible explanation for this could be players may lose motivation are feel that the final outcome of the match is out of their control (Bandura, 1977) therefore putting less effort into performance.

There is a .24% decrease in time spent performing high intensity activity when teams went from level to behind. Nevertheless, this is not a significant difference and therefore can be perceived as players maintaining a similar work rate throughout a match regardless of conceding. A possible explanation for this could be due to the nature of scoring goals in amateur soccer. It is believed that if a team at an amateur level concedes a goal or two, it is not necessarily the final outcome of the match and can change quickly. In the Premier League 2012-2013 season, the top five finishing teams scored on average 1.9 goals a game, whilst amateur soccer goals are scored more frequently. This proposes that it is much harder to score in elite soccer, whereas amateur soccer goals are easier to be both conceded and scored. In relation to the current study, work rate may not be altered too much when a team scores or concedes, given that there are no significant differences between score-line states for high intensity activity.

Similarly to the level-ahead group, there are subsequent psychological responses to being behind in a match, therefore effecting players performance. Previous research has found to have detrimental effects on self-control and arousal levels when losing a game (Dosil, 2005; Martens, 1987).

### 5.6 Limitations of the study

The current study's outcomes may be limited due to the isolation of score-line state being investigated, when previous studies have reported various situational variables to have an influence on soccer performance (Lago and Martin, 2007; Taylor *et al*., 2008). In previous studies, the quality of opposition has found to influence players' performance in team sports (Largo-Penas and Lago-Ballesteros, 2011; O'Donoghue *et al*., 2008). Although, within the O'Donoghue *et al*. (2008) literature, no account for any influences that could occur when teams play against teams of either greater, similar, or lower quality in skill. The differences in performance when teams were behind in the current study could have been simply due to the fact the opposition were of greater standard, and the same could be an influencing factor for the ahead score-line state, where the opposition are of a lower standard.

There is also no account for expectation of outcome, for example, for a higher placed team to lose or draw to a lower placed team may be an unacceptable result; while the opposition

may see this as a good result. This consequently may have an impact on work-rate and motivation. It is thought to be that a team, who are performing better than they are expected, could gain psychological momentum and potentially could affect the momentum of the opposition (Kerick *et al*., 2000).

Another situational variable that limits the strength of this study is the effect of match location, as this factor has been shown to have an effect on soccer (Tucker *et al*., 2005; Sasaki *et al.,* 1999). Taylor *et al*. (2008) proposed the consistent nature of behaviour outcomes in relation to venue of the match suggests performance is enhanced when playing at home, this is in contrast to literature by Nevill and Holder's (1999) study. It is possible that situation variables such as match location, has a unique effect upon individuals (Clarke and Norman, 1995; Nevill and Holder, 1999), due to many reasons such as environment familiarity, rules, travel, spectators, referee bias (Polman *et al*., 2007). However, it is unclear to which of these aspects contribute to enhanced performance at home. A study by Balmer *et al*. (2002) found that environmental familiarity had an effect on Alpine Skiing performances, while there was no effect on Bobsled performance. In netball, Bishop (2004) found that points scored were considerably higher when matches were played at home. Yet, this study did not account for match venue as an inter-related element on the effect of score-line.

In the current study, there was no explanation for any differences in score-line influence between individual players. As previously mentioned in the literature review section, O'Donoghue (2003) conducted a cluster analysis of elite tennis players which found individuals react in different ways to score-line states. The study found that some players altered their tactics to attack fewer times when behind, whilst others kept the same tactics irrespective of score-line. The results from this study challenged the assumption of normative paradigm which suggests there is an 'average' player (Burrell and Morgan, 1979). Therefore, this study is limited to assessing the effects of score-line on soccer players, as the assumption that all individual players will respond to different score-line states in the same way, which effectively may not be the case.

Lastly, another limitation of the current study is there is no consideration for the potential effects of fatigue on player performances. Previous research has demonstrated that physical performance added to the function of cognitive behaviour has a negative impact

when fatigued (Bangsbo *et al*., 2006). Shaw and O'Donoghue (2004) reported that the decrements in performance could be due to players experiencing fatigue, instead of score-line having an effect on performance, which is likely to have happened within the current study's subjects.

# CHAPTER SIX

# CONCLUSION

# 6.0 Conclusion

## 6.1 Conclusions

The current study has investigated the effects of score-line on players work rate. It was found that there to be two significant differences within the level-ahead group (walking and jogging), and significant differences in frequencies of jogging activity in both groups.
However, due to these significant differences occurring in what is classed as low intensity activities, the overall conclusion of the study is that there is no influence of score-line on work rate, because no significant differences were found in high intensity activity.

Within the level-ahead group, a decrease in high intensity activity of 1% occurred, which could have been a result of decreased concentration levels (Dosil, 2005) which results in teams 'sitting on the lead'. In comparison, the level-behind group was found to perform more high intensity activity than the level-ahead group, which can be a result of players chasing the the ball to regain possession. It can be assumed that, due to the amount of goals that can be scored in amateur soccer, if a team were to concede one or two goals, the final outcome of the match is not certain. Therefore, if a team goes behind, they may continue to maintain a similar work rate to regain possession and score goals.

The results of this study are contrast to previous research that has found score-line to have an impact on work rate (O'Donoghue and Tenga, 2001; Bloomfield *et al*., 2004b) however these findings are of elite standard, whereas the results from the current study suggest work rate is not influenced on different score-line states in amateur soccer. However, overall possible explanations for these findings could be down to coach motivation, opposition, psychological responses and use of substitutions throughout a match.

## 6.2 Future Research Directions

The study only examined the effect score-line has on work rate in soccer. Score-line is not the only aspect that can influence performance, other variables such as quality of opposition, match location and fatigue should be taken into consideration. Previous research has investigated the impact of these variables, but very few have combined all

variables. There are other outside influences and interactions such as locus of control and individual skill that can impact winning or losing a match. A combination of these variables and also the level of importance that both coach and players view the match as should be investigated.

Further detailed analysis should be created to introduce more categories than just behind, level, and ahead. The severity of score-line states behind should be included, as if a team is 4-0 behind they will play very differently to if they were 1-0 behind, because the outcome of the match would be inevitable or the team could equalise. This was not included in the current study and should be addressed in future research.

Finally, further studies should investigate the influence score-line has on individual players and also the different playing positions in soccer, for example, centre defending midfield, wing forward and support striker. This type of investigation of the score-line effect would supply a framework upon which to base individual player and position-specific performance evaluations (Taylor *et al*., 2008).

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# APPENDICES

APPENDIX A: Matches attended and observed

| | Match | Date | Competition | Position Observed |
|---|---|---|---|---|
| **1** | Cardiff University V **Cardiff Metropolitan** | 13/11/2013 | BUCs League | L.B |
| | **Cardiff University** V Cardiff Metropolitan | | | R.B |
| **2** | **Cardiff Metropolitan** V Haverfordwest FC | 16/11/2013 | Welsh League | C.F |
| | Cardiff Metropolitan V **Haverfordwest FC** | | | C.B |
| **3** | **Cardiff Metropolitan** V Bath | 20/11/2013 | BUCs League | C.M |
| | Cardiff Metropolitan V **Bath** | | | L.M |
| **4** | **Cardiff Metropolitan** V Bath Spa | 27/112013 | BUCs League | C.B |
| | Cardiff Metropolitan V **Bath Spa** | | | C.F |
| **5** | Cardiff Metropolitan V Penybont FC | 30/11/2013 | Welsh League | R.M |
| | Cardiff Metropolitan V **Penybont FC** | | | C.M |
| **6** | **Cardiff Metropolitan** V Treowen Stars | 18/01/2014 | Welsh League | C.M |
| | Cardiff Metropolitan V **Treowen Stars** | | | C.B |
| **7** | **Cardiff Metropolitan** V Swansea | 22/01/2014 | BUCs League | R.M |
| | Cardiff Metropolitan V **Swansea** | | | L.B |
| **8** | **Cardiff Metropolitan** V Bristol | 29/01/2014 | BUCs League | C.B |
| | Cardiff Metropolitan V **Bristol** | | | C.M |
| **9** | **Cardiff Metropolitan** V Marjon | 05/02/2014 | BUCs League | C.F |
| | Cardiff Metropolitan V **Marjon** | | | S.T |
| **10** | **Cardiff Metropolitan** V Bristol | 12/02/2014 | BUCs League | R.B |
| | Cardiff Metropolitan V **Bristol** | | | R.M |

APPENDIX B: Ethics Status

When undertaking a research or enterprise project, Cardiff Met staff and students are obliged to complete this form in order that the ethics implications of that project may be considered.

**If the project requires ethics approval from an external agency such as the NHS or MoD**, you will not need to seek additional ethics approval from Cardiff Met. You should however complete Part One of this form and attach a copy of your NHS application in order that your School is aware of the project.

The document ***Guidelines for obtaining ethics approval*** will help you complete this form. It is available from the Cardiff Met website.

Once you have completed the form, sign the declaration and forward to your School Research Ethics Committee.

**PLEASE NOTE:**
**Participant recruitment or data collection must not commence until ethics approval has been obtained.**

**PART ONE**

| | |
|---|---|
| Name of applicant: | David Jenkins and Chelsea Coker |
| Supervisor (if student project): | Peter O'Donoghue |
| School: | School of Sport |
| Student number (if applicable): | 20007691 |
| Programme enrolled on (if applicable): | Sports Coaching |
| Project Title: | Work rate analysis and comparison between different positions in association football. |
| Expected Start Date: | 22/09/2013 |
| Approximate Duration: | 8 months |
| Funding Body (if applicable): | N/A |
| Other researcher(s) working on the project: | N/A |
| Will the study involve NHS patients or staff? | No |
| Will the study involve taking samples of human origin from participants? | No |

| In no more than 150 words, give a non technical summary of the project |
|---|
| After gaining permission from the players I will be filming them and comparing the different levels of work between different positions in a game of football. I will do this using methods of performance analysis learnt during my time at university. After gaining the results, I will analyze |

| |
|---|
| the results to see which position in football has higher work rates; analyzing different ways in which work rate is used in the different positions, i.e. jumping for headers or slide tackles. |

| Does your project fall entirely within one of the following categories: | |
|---|---|
| Paper based, involving only documents in the public domain | No |
| Laboratory based, not involving human participants or human tissue samples | No |
| Practice based not involving human participants (eg curatorial, practice audit) | No |
| Compulsory projects in professional practice (eg Initial Teacher Education) | No |
| If you have answered YES to any of these questions, no further information regarding your project is required.<br>If you have answered NO to all of these questions, you must complete Part 2 of this form | |

| **DECLARATION:**<br>**I confirm that this project conforms with the Cardiff Met Research Governance Framework** | |
|---|---|
| Signature of the applicant:<br>David Jenkins<br>Chelsea Coker | Date:<br>20/10/2013 |
| **FOR STUDENT PROJECTS ONLY** | |
| Name of supervisor:<br>Peter O'Donoghue | Date:<br>25/04/2013 |
| Signature of supervisor: | |

| **Research Ethics Committee use only** | |
|---|---|
| Decision reached: | Project approved<br>Project approved in principle<br>Decision deferred<br>Project not approved<br>Project rejected |
| Project reference number: Click here to enter text. | |
| Name: Click here to enter text. | Date: Click here to enter a date. |
| Signature: | |
| Details of any conditions upon which approval is dependant:<br>Click here to enter text. | |

**PART TWO**

| **A RESEARCH DESIGN** | |
|---|---|
| A1 Will you be using an approved protocol in your project? | No |
| A2 If yes, please state the name and code of the approved protocol to be used[3] | |
| | |
| A3 Describe the research design to be used in your project | |
| After researching thoroughly why it is important to research this chosen area I will gain permission to begin the filming. Once I have finished filming I will analyze the data collected in the Performance Analysis lab. I will recruit the participants by asking the Men's football teams at my University if it is okay to use them within my study. | |
| A4 Will the project involve deceptive or covert research? | No |
| A5 If yes, give a rationale for the use of deceptive or covert research | |
| Click here to enter text. | |

| **B PREVIOUS EXPERIENCE** |
|---|
| B1 What previous experience of research involving human participants relevant to this project do you have? |
| None |
| B2 **Student project only**<br>What previous experience of research involving human participants relevant to this project does your supervisor have? |
| Many studies have been conducted by Peter O'Donoghue. |

| **C POTENTIAL RISKS** |
|---|
| C1 What potential risks do you foresee? |
| No physical risks, however participants may not want you to use footage of them after being filmed. |
| C2 How will you deal with the potential risks? |
| Make sure I ask each individual player. |

When submitting your application you **MUST** attach a copy of the following:

- All information sheets
- Consent/assent form(s)

Refer to the document ***Guidelines for obtaining ethics approval*** for further details on what format these documents should take.

[3] An Approved Protocol is one which has been approved by Cardiff Met to be used under supervision of designated members of staff; a list of approved protocols can be found on the Cardiff Met website here