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CARDIFF METROPOLITAN UNIVERSITY
Prifysgol Fetropolitan Caerdydd

CARDIFF SCHOOL OF SPORT

DEGREE OF BACHELOR OF SCIENCE (HONOURS)

SPORT AND EXERCISE SCIENCE

2014-5

**PENALTY AREA OUTCOMES AND ATTACKING PLAY
AGAINST VARYING OPPOSITION LEVELS IN ELITE
FOOTBALL**

PERFORMANCE ANALYSIS

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Abstract

Research in performance analysis in football has established that opposition effects are a major contributor to team performance and that penalty area entries are an effective indicator of successful and unsuccessful teams. Studies have shown that the number of penalty area entries does not vary against different levels of opposition however there seems to be a lack of a direct comparison between top, middle and bottom teams in terms of methods of attacking play leading up to a penalty area entry and the outcome of this entry. Post event analysis on matches involving Manchester United against the teams that finished in the top three places (n=6), middle three positions (n=6) and bottom three positions (n=6) of the 2013/2014 Barclays English Premier League was undertaken, using SportsCode analysis software to record actions relevant to attacking play.

Intra observer reliability testing was conducted on the system, with Kappa scores indicating strengths of agreement ranging from very good to moderate for the variables.

Results showed that top level teams allowed less final third entries and box entries than middle and bottom teams whilst positive outcomes from these entries was also lower in matches against top teams. The number of successful attacks from possessions originating in the final third did not differ depending on opponent level and the number of passes prior to a successful penalty area entry was not reliant on the level of opposition. The method used to enter the penalty area did not depend on the level of the opposing team however the outcome of each entry method was dependent on the opposition level. Set pieces were found to be less successful against middle and bottom teams with free kicks resulting in particularly low numbers of positive outcomes against top and middle teams.

In conclusion the level of opposition does have an effect on the outcome of penalty area entries whilst a team does not appear to significantly change its style of attacking play when facing different levels of opposition. Results also showed less penalty area entries against top teams, in contrast to previous research.

CHAPTER ONE:
INTRODUCTION

1.1 Principles of Attacking Play in Football

Football is a team sport based on scoring more goals than the opponent in order to win a game, scoring requires possession of the ball, meaning that scoring a goal is the result of attacking play (James, Jones, & Mellalieu, 2004). Attacking play is therefore vital for coaches and players in order to be a successful football team. According to Wade's principles of play (1996), attacking play should involve width, improvisation, mobility, penetration and support; these are the key components to a successful attack. These principles look to exploit weaknesses in the opposition defense whilst the opposition defense also influences the effectiveness of the attacking play of a team (O'Donoghue 2006; O'Donoghue and Williams, 2004).

1.2 Performance Analysis in Football

Performance analysis has traditionally recorded the frequency of occurrence of events and used these statistics as indicators of performance, which provide important information for coaches and athletes and enables advancements in the coaching process (Sarmiento et al., 2013). Before the development of computerised systems, Carling et al. (2005) state that forms of shorthand were required in order to record events accurately. This was due to the findings of Franks and Miller (1986), who discovered that international level football coaches could recollect only 30% of incidents that determined successful performance, whilst having a significantly better recall of set piece play in comparison to any other situation.

Performance analysis research by Reilly et al. (1993) suggested that coaches, managers and scouts had developed systems for data gathering at this point in time by designing hand notation systems. These were considered the most conventional and available method that can provide instant data, despite the limited detail of this data. This paper was produced prior to the advancements in technology that allowed the development of computerised data analysis systems, which have since allowed analysts to gather vast amounts of information on both individual and/or team performance (Allen et al., 2001).

1.3 Performance Analysis and the Coaching Process

Match analysis is widely accepted as part of the coaching process (Carling, Williams and Reilly, 2005; Lyle, 2002) and video analysis software has been used in both team and

individual sports for multiple purposes (Jenkins, Morgan and O'Donoghue, 2007). The development of improved analysis systems and the increasing recognition of its importance in the coaching process have led to performance analysis of some kind being pursued by professional football (Groom and Cushion, 2004) with professional clubs employing individuals to directly provide performance analysis or access to performance analysis data (Dvorak et al., 2004). This has led to the acceptance of performance analysis as an integral part of the coaching process by sport scientists, coaches and athletes (Drust, 2010).

1.4 Barclays English Premier League

The English Premiership is the highest league in the English professional football league system and is made up of 20 teams. It is watched worldwide and television coverage of premiership matches is easily accessible throughout the season.

1.5 Direction of Study

Given the increased acceptance of performance analysis in the coaching process (Drust, 2010; Carling, Williams and Reilly, 2005; Lyle, 2002), the important nature of attacking play to football (James, Jones, Mellalieu, 2004) and the opposition factors that effect this attacking performance (O'Donoghue et al., 2003; O'Donoghue and Williams, 2004), the intention of the current study is to carry out a comparison of the attacking methods and outcomes of penalty area entries for a professional football team when faced with different levels of opposition. Matches from the Barclays English Premier League will be used to explore any possible findings.

1.6 Hypotheses

A total of 18 matches from the Barclays English Premier League, three home and three away matches against the bottom three teams, top three teams and teams that finished 9th, 10th and 11th will be used to test the following hypothesis:

- Penalty area entries against top level opposition will result in a higher percentage of negative outcomes than middle and bottom level teams
- Penalty area entries against bottom level opposition will result in a higher percentage of positive outcomes compared to top and middle teams

- Bottom level teams will allow more total shots and shots on target than top and middle level teams
- Methods of penalty area entry will be consistent regardless of opposition
- More successful outcomes will result from possessions originating in the attacking third

CHAPTER TWO:
LITERATURE REVIEW

2.1 Performance analysis in Sport

The primary objective of sports performance analysis is to investigate the relevant aspects of player and/or team performance in competitive sport. These aspects include technical aspects, tactics, patterns of play and work-rate (O'Donoghue, 2005).

The volume of performance analysis research in sport has significantly increased in recent years (Lago, 2009). The development of computerized systems as well as the presence of the less expensive hand notation analysis has led to performance analysis becoming widely accepted as an integral part of the feedback process by sports scientists, athletes and coaches (Drust, 2010).

2.2 Performance Analysis in Football

The earliest football notation systems can be accredited to Charles Reep, who was considered the pioneer of notational analysis in football (Pollard, 2002). In 1950 Reep devised a notation system to record every "on the ball" action during a match that remained unchanged for over 50 years, allowing him to record almost 2500 games.

With the advancements in technology came the opportunity to develop a computerized method of recording data from matches and Franks (1983) was one of the first performance analysis researchers to do this. The system involved recording frequency tallies with a specially devolved keyboard that resembled a football pitch (Hughes and Franks, 2004).

2.3 Feedback

It has been stated that the most successful team athletes are those who receive more tuition, encouragement and information from the coaches (Wuest et al., 1986). Consequently, it is important that there is appropriate feedback and interventions from coaches with all players within developmental programmes.

Research into the effectiveness of feedback from interactive video analysis systems cannot be controlled in the same way that laboratory experiments can, which has discouraged many researchers from investigating the effectiveness of performance analysis support for athletes and coaches (O'Donoghue and Mayes, 2013). Despite this,

there are still some studies that have provided evidence that performance analysis support can be effective. Brown and Hughes (1995) and Murray et al., (1998) both produced papers demonstrating how performance analysis feedback in squash can improve performance whilst Olsen and Larsen (1997) demonstrated similar findings when working in Norwegian football.

There is general agreement that coaching is a process that primarily focuses on aiding athletes in achieving their peak performance (Woodman, 1993) with performance analysis in football being an established part of the coaching process (Carling, Williams, & Reilly, 2005; Groom, Cushion, & Nelson, 2011; Hodges & Franks, 2002; Stratton, Reilly, Williams, & Richardson, 2004). If performance analysis is carried out in a way that produces useful and relevant data, the information gathered can be used to help explain certain outcomes. It can also provide valuable information to coaches in terms of what to expect from opposing teams as well as areas for improvement in their own team (Carling, Williams, & Reilly, 2005).

2.4 Match Analysis

Match analysis refers to the objective recording and examination of events that occur during matches and competition (Carling, 2006, p.2). It can be focused on the activity of one player, or may integrate the actions and movements of multiple players around the ball. Match analysis may range from discrete data about the activity of a specific individual player, or of each member of a team as an individual profile, to a combination of interplay between individuals in accordance to a team plan.

Hughes (1996) identified four main purposes of match analysis as:

1. Analysis of movement – velocities, times and work rates
2. Technical evaluation – assessment and quantification of technical skill
3. Tactical evaluation – assessment of tactical skills in a particular game
4. Statistical compilation – combination of both technical and tactical information for quantitative evaluation

2.5 Hand Notation vs. Computerised System

Hand notation systems are a lot cheaper and far more accessible to athletes and teams with a lower budget however computer analysis systems can provide far more detailed information. Data collected from computer analysis systems is also more easily converted into graphical information. Both systems can provide instant quantitative feedback to coaches and players however computer systems are more effective when providing instant qualitative feedback in the form of graphs and tables. Launder and Pitz (2000) state that quantitative feedback alone is not sufficient when explaining why errors have occurred whilst it has been found that a combination of quantitative and qualitative feedback is the most effective way of providing feedback and information (Winkler, 2001; Launder and Pitz, 2000). This gives computer analysis systems an advantage over hand notation systems when deciding on an appropriate method of data collection, if the resources allow the analyst the choice.

This study will involve the use of the computerised system StudioCode, which is a digital video analysis system produced by Sportecinternational. It is a system widely used by professional football teams and professional match analysis laboratories. The interface of the system can be designed and altered to include specific code buttons that can be used to gather data, dependent on the requirements of the user or study. Carling et al. (2005) describes how the overall ease of use and versatility of the system clearly allows statistical information on both player and team performance to be collected.

2.6 Operational Definitions

In order for an analyst to interpret events in the same way throughout the analysis process, clear definitions need to be put in place prior to the start of the procedure (Hughes and Franks, 1997). Research has highlighted that it can be considered crucial to identify and define performance behaviours before designing a coding system (O'Donoghue, 2007; Cooper et al., 2007) in order to ensure that data gathered is both reliable and valid. Yiannis (2008) also stated that these definitions are used in the explanation of results and comparison of the findings once data has been analysed.

James et al. (2002) declared that operational definitions tend to be re-defined in the analysis of sport, in a case where analysts are examining the same action in separate studies whilst their individual definitions of this action varies. This tends to only be an issue

though when comparing data sets from multiple studies, whereas it is possible to carry out this particular study using definitions that can be kept consistent throughout the duration of the research, increasing the reliability and validity of the findings.

2.7 Validity/Reliability

Reliability of measurement is important in all disciplines of scientific research and in performance analysis of sport, reliability of measurement is a common feature of work both notational analysis and biomechanics (Bartlett, 2001). Wilson and Batterham (1999) define reliability as the consistency over time of measurements made using an analysis system. It is important that data gathered from a new analysis system is reliable (Cooper et al., 2007) and James et al. (2007) state that reliability in performance analysis relates to the extent that the events noted by the analyst portray what actually happens during the game i.e. the accuracy of the notation (validity). In order to demonstrate the consistency of the observation and processing of events, more than one analyst should analyse the same footage (Franks and Goodman, 1986). The similarity of the data gathered from each of these processes will give an indication of the reliability of the system. It is common that errors will occur when notating events therefore it is important to take actions in order to best reduce the amount of these errors (Johnson and Franks, 1991).

There are two types of error that can occur when recording events, either systematic errors or random errors. A systematic error is defined as when the errors are out of control and all in the same direction, whilst random errors are the result of experimental uncertainties from repeated measures. When using computerised notation to code events, James et al. (2007) suggested three sources of error:

- Observer errors: this is where the observer presses the incorrect button
- Observational errors: the observer fails to code an action or event
- Definitional errors: the observer labels an action inappropriately

2.8 Attacking Play In Football

Attacking play in football is defined as whenever a team has possession of the ball and the actions of the team in possession are considered as attacking play. The fact that in order to win a football match the team must score more goals than the opposition places large

importance on attacking play, because scoring a goal is a result of successful attacking play or a successful possession (James, Jones, & Mellalieu, 2004). A team would therefore look to find the most effective style of attacking play to suit both the players in that particular team and also the defensive qualities and weaknesses in the opposition in order to maximize their chances of winning matches.

Attacking performance in football is a complex process that is affected by several situational variables (James, Mallalieu & Holley, 2002). Taylor et al. (2008) conducted a study that examined the influence of match location, quality of opposition and match status on technical performance in football and found that all on ball behaviours were affected both interactively and independently by at least one of those factors. This suggests that the quality of opposition does have an effect on attacking play however there is little research into the area when it comes to analysing how teams choose to attack against different qualities of opposition as well as the technical effectiveness of these attacks. Technical effectiveness is a measurement used in performance analysis to contextualize raw data. It is calculated by comparing positive outcomes from a specific action to negative outcomes from the same action using a positive to negative ratio system (O'Donoghue, 2010).

As time and generations pass, the styles of attacking play considered desirable and most associated with success in football generally go through cycles (Marchioli, 2014). Marchioli stated that an example of this would be the successful "tika-taka" style of play adopted by the Barcelona team that won the UEFA Champions League twice in three years between 2009 and 2011 and also the Spain national team that won the European Championships in 2008 and 2012 as well as the 2010 World Cup. This style of attacking play brought success to both of these teams, which lead to a large number of copycat styles, which in turn brought about the most recent development in the cycle of most successful styles of attacking play. According to Marchioli, the possession based "tika-taka" requires technically gifted players who can select the correct time and type of pass to open up the opposition defence so when a team tries this style of play without these players the games often end up being dull encounters. However in the 2014 UEFA Champions League, Bayern Munich, who employed this style of possession were beaten comprehensively by Real Madrid who went on to win the competition. Real Madrid attacking using "verticality" as their preferred method of attacking play. This involves passing the ball forward whenever possible and as quickly as possible in order to attack before the opposition can

regain defensive shape. In the following World Cup teams such as Chile and Colombia were also successful using this style of play, exceeding many pre-tournament expectations. This would lead to the assumption that certain styles of attacking play are more successful than others, while research into the choice of style of attacking play in relation to the strength of the opposition is limited.

Machado, Barreira and Garganta (2014) analysed the influence of match status on attacking patterns of play, which provided evidence that styles of play when attacking can change during a match however it does not look for any common patterns when comparing matches versus strong opposition as opposed to matches versus weaker opposition. It is therefore unable to draw conclusions from this study in order to explain attacking methods and styles of play when faced with different strengths of opposition.

2.9 Influence of Opposition

Quantitative research in both football and rugby provides empirical evidence that the quality of the opposition influences performance (O'Donoghue 2006; O'Donoghue and Williams, 2004). The Interacting Performance Theory (O'Donoghue, 2009) considers the influence of the opponent and identifies four key aspects which make up the theory:

1. Performance is influenced by the particular opponent
2. The outcome of a performance is influenced by both the quality and the type of opponent
3. The process of a performance is influenced by the quality and the type of opponent
4. Different players are influenced by the same opponent in different ways

The outcome of a performance refers to both the outcome of the whole match and also more specific outcomes such as the outcome of a final third entry in football. The process of performance is reference to the way a team or individual plays rather than how successful they are, an example of an indicator of this would be the number of passes a team makes in a possession in football. The quality of opposition is determined by their ranking or probability of success and this aspect of the model is concerned with how well the opponent plays rather than the team or player. The type of opponent is determined by the way the opponent plays rather than their ranking. According to this theory, the opponent will influence performance in football, with McGarry and Franks (1994)

identifying the opposition as one of the largest causes of variation in performances in sport.

This provides evidence to support the idea that the opponent is very influential in football performance and this study can therefore use this as a rationale. The ranking of the opponent in terms of premier league position can be used to determine the strength of the opposition whilst performance indicators from the matches can be used to examine different aspects of attacking play when facing opponents of varying strength. This information can then be used to try to explain certain outcomes in specific performances as well as the general trend of results across the course of a season.

Considering this evidence, it is surprising that there are few studies that have assessed either the direct or indirect opponent interactions during the analysis of match-performance in football (Bloomfield, Polman & O'Donoghue, 2005; Jones, James & Mellalieu, 2004).

2.10 Performance Indicators

A performance indicator is an action variable or combination of action variables that aim to define either certain aspects of performance or overall performance (Hughes & Bartlett, 2002).

Catellano, Casamichana and Lago (2012) conducted a study aiming to identify the match statistics that best discriminate between successful and unsuccessful teams in football. Match statistics were taken from games from the three most recent world cups at the time of publication and both attacking and defensive statistics were analysed. The statistics relating to attacking play were goals scored, total shots, shots on target, shots off target, ball possession, number of off-sides committed, fouls received and corners. The study found that of these variables, total number of shots, shots on target, and ball possession were the strongest indicators when differentiating between winning, losing and drawing teams. It can therefore be assumed that these three variables are effective performance indicators in attacking play and in order for a team to be successful they would aim to have more total shots and shots on target than the opposition as well as have more ball possession.

Hughes and Bartlett (2002) state that completed passes are an effective performance indicator in football as well as the number of shots a team has. This confirms that research in the area of attacking play in football should take note of the number of shots as well as possession statistics when analysing the effectiveness of a team.

Ruiz-Ruiz et al. (2013) produced a research paper that examined entries into the penalty area as a performance indicator during the World Cup in Germany in 2006. All of the 64 matches were analysed and a comparison was made between the number of penalty area entries in winning, losing and drawing teams. The study found that losing and drawing teams received significantly more penalty area entries than winning teams, which suggests that penalty area entries are an effective performance indicator in football. Teams that allowed more penalty area entries than their opponents were found to be significantly more likely to concede a goal ($P < 0.001$). It was also found that the strength of the opposition had no effect on the number of penalty area entries that a team would make which, despite seeming illogical, is similar to previous research (Lago, 2009; Taylor et al., 2008). One possible explanation for this is the fact that penalty area entries were recorded regardless of the result of the entry, meaning that even if entering the penalty area meant losing possession, the team would still have gained a penalty area entry. This could lead to the belief that stronger teams are more effective with their penalty area entries than weaker teams however there is no research to confirm this.

2.11 Aim of Study

It seems that the literature fails to explain if the strength of the opposition has an influence on the outcome of penalty area entries in attack, which have already been identified as a key performance indicator by Ruiz-Ruiz et al., (2013), for football teams. Several studies have shown that there is no difference in the total number of penalty area entries when comparing the strength of the opposition (Lago, 2009; Taylor et al., 2008) however there is little or no research to explain why this is the case. The aim of this study is therefore to discover if the strength of the opposition affects the outcome and method of attacking penalty area entries in professional football. The methods and outcomes of attacking play when facing opponents of varying strength will also be examined in an attempt to explain possible results or outcomes of performance.

CHAPTER THREE:
METHODS

3.1 Research Design

A post event analysis of (n18) matches from the Barclays English Premier League Season 2013/2014 was undertaken. The development of the analysis system used involved detailed preparation and planning as well as the experimentation of operational definitions. Considering the aim of the study, the selection of an appropriate template for data collection was required in order to ensure that valid information could be obtained. Initial templates and ideas were hand drawn and assessed before the selection of a chosen template was created as a computerised code input window to collect the required data. Data was collected using the commercial match analysis package StudioCode (Sportstec, Australia), before data exports were processed for further processing and analysis.

3.2 Equipment

The equipment used to collect the data needed to be easily accessible, it included:

- Apple iMac with StudioCode V5 video analysis software
- Microsoft Excel
- SPSS V22
- WD External Hard Drive

3.3 Data Sample

The matches used for analysis involved the same team in all the matches, with different opponents of varying strength so that comparisons could be made between matches with varying opponent strength. In the case of this study the team was Manchester United and the matches were taken from the Barclays English Premier League 2013/2014 season. Manchester United were chosen because they finished the season in seventh position in the league table, which allows matches against the sides finishing in the top three, the middle three and the bottom three league positions to be used for analysis. Using the ranking of an opponent is an indicator of opposition strength according to the Interacting Performances Theory (O'Donoghue, 2009). These particular teams provided a clear difference in opponent strength whilst both home and away fixtures against each opponent were used in order to eliminate the possibility of results being altered by home advantage.

The matches were saved onto the WD External Hard Drive and the footage was taken from Sky Sports and BT Sports television coverage.

Table 1. Matches used for analysis.

Strong Opponent	Medium Opponent	Weak Opponent
Man United 0 - 3 Man City	Man United 3 - 2 Stoke	Man United 4 - 0 Norwich
Man City 4 - 1 Man United	Stoke 2 - 1 Man United	Norwich 0 - 1 Man United
Man United 0 - 3 Liverpool	Man United 0 - 1 Newcastle	Man United 2 - 2 Fulham
Liverpool 1 - 0 Man United	Newcastle 0 - 4 Man United	Fulham 1 - 3 Man United
Man United 0 - 0 Chelsea	Man United 2-0 Crystal Palace	Man United 2 - 0 Cardiff
Chelsea 3 - 1 Man United	Crystal Palace 0-2 Man United	Cardiff 2 - 2 Man United

3.4 Template Design

In order to ensure that the correct data was collected, the design of a code input window template required specifically programmed buttons to record certain actions. This enables match footage to be viewed whilst pressing the appropriate buttons when certain actions occurred to gather the corresponding information.

Possession is the only code button present in the template used for this study and is therefore identified by the red diamond in the top left of the button. This is because the focus of this study is the analysis of attacking play, so once the possession code button is activated, the actions that take place during that particular phase of attacking play (possession) can be recorded and logged against that specific phase. This allows the collection of information regarding each phase of play considered to be “attacking play” (James, Jones, & Mellalieu, 2004).

The buttons used to log the specific actions during a possession are text label buttons, and every button apart from the possession button in this template is a label button. Each button was labelled with text to indicate its purpose. Also included was a picture of a football pitch divided into nine different pitch areas, which did not have visible text titles due to the placement of the buttons on the picture of the pitch demonstrating the meaning of the button, rather than labelling the button with text (see fig. 1).

Each set of buttons were grouped together in order to organise the data and make it easier to interpret when viewing it in a Sorter Window within the software. Buttons belonging to

each group were colour coordinated and arranged in columns to ensure only one button from each group was pressed for each possession.

Both activation links and deactivation links are used in this template in order to improve the efficiency of the system. A deactivation link was applied to each of the number of passes buttons because this was the last piece of information entered for a possession when following the sequential method of coding. This caused the possession code button to be deactivated, therefore closing that possession. Activation links were also applied to each source of possession in order to turn the possession code button on. Activation links were also applied to buttons indicating lost possession to activate the other lost possession links further on in the sequence, for example if possession was lost before making a final third entry, this button would activate the lost possession buttons in the final third, entry method, outcome and second outcome groups. This saves the analyst having to press each of these buttons individually, therefore improving the efficiency of the system in terms of time.

Hot keys were included on the number of passes buttons because the buttons were arranged below the other buttons and were therefore not part of the flowing sequence from left to right. This allowed the analyst to use a button on the keyboard rather than scrolling down to the bottom of the input window to select the button and therefore turn the possession code off.

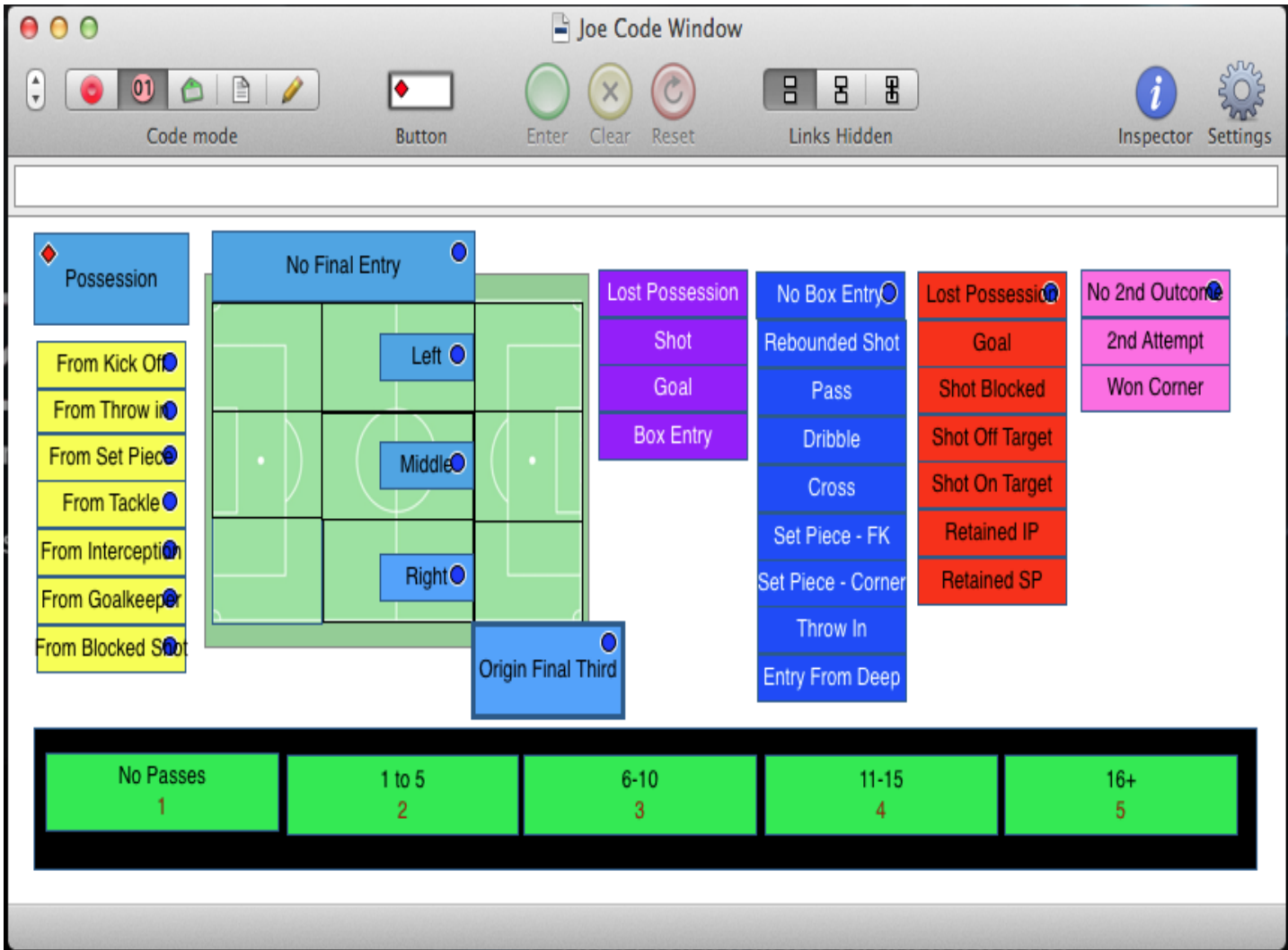


Figure 1. The final code input window

3.5 Performance Indicators and Operational Definitions

In order to assess the performance of attacking play in the study, the following performance indicators will be measured from the data gathered:

- Percentage of possessions resulting in a final third entry
- Percentage of possessions resulting in a penalty area entry
- The outcome of penalty area entries; positive, negative or neutral
- The number of shots per match
- The percentage of shots on/off target
- The number of passes prior to a penalty area entry or loss of possession

The operational definitions in table 1 were devised for the purpose of this study with support from previous research (Ruiz-Ruiz et al., 2013; James, Jones, & Mellalieu, 2004).

Table 2. The operational definitions of the various groups, performance indicators and action variables used in the study

	Performance indicator or Action Variable	Operational Definition
Group Labels	Possession	This is when the team has control of the ball. This would not include the brief possessions involved when a defender is clearing the ball for example. A possession would be coded if a player has the ball under control or if a pass is made.
	Penalty Area Entry	This is when the team in possession plays the ball into the opposition penalty area. This was recorded regardless of whether the team retained possession in the penalty area or not, for example if a cross was put into the penalty area but the opposition goalkeeper came and caught the ball, this would still count as a penalty area entry.

	Final Third Entry	This would be any possession that involved transferring the ball into the opposition final third. In this case a final third entry would only be coded if the attacking team had possession of the ball in the final third.
	Final Third outcome before penalty area entry	This would be any outcome that resulted in the end of a possession before entering the penalty area such as a shot, a goal or losing possession through a misplaced pass or being tackled.
	Number of Passes	This was the number of passes a team made before entering the penalty area. Throw ins were not counted as a pass however any other transfer of the ball from one team mate to another in a controlled manner was considered a pass.
	Secondary Outcome	This would be the secondary outcome after a primary outcome such as a shot. A secondary outcome is any further outcome

		such as winning a corner from a saved or blocked shot or retaining possession after a shot.
Source of Possession	Kick off	This is when a team has possession from the start or restart of a game
	Throw in	When a team gains possession from their own throw in
	Set piece	When a team gains possession from their own free kick
	Tackle	Possession gained from dispossessing an opposing player
	Interception	Possession gained from intercepting a pass or picking up a loose ball. This also included winning headers from opposition clearances, balls from deep or crosses.
	Goalkeeper	Possession gained from the goalkeeper from either a saved shot, a claimed cross, an interception or a goal kick.
	Blocked shot	Possession gained from an outfield player blocking an opponent shot

Final Third Outcome	Shot	A shot that does not result in a goal from outside the box
	Goal	A goal from a shot from outside the box
	Box entry	When a possession reaches the final third and the ball is then played into the penalty area
Penalty Area Entry Method	Rebounded shot	Possession gained in the box from a shot from outside the box that has been blocked
	Pass	When the ball enters the penalty area via a pass. A pass would be an attempt to pick out a specific player rather than just playing the ball into the area without any observable intention to find a particular player.
	Dribble	When a player enters the penalty area whilst in possession of the ball.
	Cross	When the ball enters the penalty area from a wide position when the player in possession looks to hit a particular area rather than pick out a particular player.
	Set piece free kick	A free kick that puts the

		ball into the penalty area.
	Set piece corner	A penalty area entry via a corner without any passes before the entry
	Throw in	When a player receives the ball in the box from a throw in from a teammate.
	Entry from deep	When the ball enters the penalty area without being played through the final third.
Penalty area outcome	Goal	When a goal is scored after the ball has entered the penalty area
	Shot blocked	A shot that has been blocked or deflected off target by a defender
	Shot off target	A shot that does not result in a goal and also does not require the goalkeeper or defender to stop the ball going into the net.
	Shot on target	A shot that causes the goalkeeper to make a save
	Retained in play	When a ball enters the penalty area but the team in possession keeps the ball but leaves the penalty area.
	Retained set piece	When the ball enters the penalty area but the ball

		is put out of play by a defender
Secondary Outcome	Second attempt	A shot or effort on goal after an initial shot has been blocked or parried
	Won corner	When possession has ended but has resulted in a corner for the attacking team
	No second outcome	The possession has ended as a result of an initial action such as a shot off target
Final third entry area	Origin final third	When the possession originates in the final third without leaving the final third before either losing possession or entering the penalty area.
	No final third entry	When possession is lost prior to entering the final third, to be deemed as entering the final third, the ball must be in control of the team in possession. For example a pass that enters the final third but does not reach its target would not be classes as a final third entry
Type of outcome	Positive	An attempt on goal, either on target, off target or blocked

	Neutral	When possession is retained either in play or as a set piece such as a free kick, corner or penalty
	Negative	When possession is lost

3.6 Procedures

To analyse each match the WD External Hard Drive was inserted into the Apple iMac and each game was opened in StudioCode. Each match analysed employed the same StudioCode template design in order to ensure that the same data was collected. This allows comparisons to be made between sets of data. The code window employed in the study followed a sequential pattern with coding beginning at the start of a possession of the team being analysed. From this point, the origin and method of the possession was noted before coding any final third entries, possible outcomes from these entries and also entries into the opposition penalty area. The method of the penalty area entry and the outcome of each entry were also recorded. Whenever a relevant action variable occurred, the respective button was pressed, which occasionally activated other buttons, and from then on the sequence of play was coded by pressing the appropriate buttons when certain outcomes or actions took place. The buttons were arranged sequentially from left to right, which allowed the analyst to move across the screen pressing the appropriate button before moving onto the next group.

The order to of the coding would follow this pattern:

1. Source of possession
2. Origin of possession
3. Area of final third entry
4. Outcome of final third entry (if there was an outcome prior to a penalty area entry)
5. Method of box entry
6. Outcome of box entry
7. Secondary outcome of box entry
8. Number of passes in the possession prior to box entry or loss of possession

Collected data is displayed on a timeline, which allows the data to be viewed in a matrix and then put into a matrix organiser. This allows different variables to be selected and then copied to Microsoft Excel for analysis.

3.7 Pilot Study

Once the initial code input window had been designed it was important to test the system on a match to assess whether the data collected was valid and also to identify any areas of weakness in the system or any operational definitions that were not clearly defined enough. For this study the pilot test was carried out on the first half of the World Cup 2010 match between England and Germany. Upon completion of this half it was clear that alterations had to be made to the initial input window. This included putting more deactivation links into lost possession buttons in order to ensure data was not missing from certain groups and also applying both hot keys and deactivation links to the number of passes buttons in order to switch the possession code button off. Another modification included adding a button that represents a possession that originates in the final third because some possessions start in the attacking third and therefore have no entry area to the final third. This scenario was not taken into account when developing the initial code input window. Further updates to the window included adding sources of possession such as a blocked shot, from the goalkeeper and also from kick off.

3.8 Reliability Testing

In order to test the reliability of the system, the analyst was tested for accuracy by the intra-analysis method. This test involves the observer coding a game twice on two separate occasions and comparing the results from each observation. James et al. (2007) point out that this method will give a good indication of an analyst's accuracy if the test is carried out correctly. In this case the analyst used the code window to analyse the first half from the Euro 2012 match between France and England on two separate days. This was to ensure that the analyst could not rely on memory from the first test when analysing the half on the second occasion, which would have reduced the reliability of the results.

Kappa values were chosen to represent the reliability test results, which evaluates the reliability of performance indicators collected when utilizing computerised notational analysis systems (Robinson and O'Donoghue, 2007). The kappa statistic looks at the percentage of occasions where observers agree whilst also takes into consideration the

chance of agreement by guessing. The scale for Kappa values is from Altman (1991) and is as follows:

- 0.8 – 1.0 = Very good strength of agreement
- 0.6 – 0.79 = Good strength of agreement
- 0.4 – 0.59 = Moderate strength of agreement
- 0.2 – 0.39 = Fair strength of agreement
- 0.0 – 0.19 = Poor strength of agreement

Figure 2. shows the strength of agreement for each of the groups included in the code input window. It should be noted that there was a no observation in each of the separate observations, which has affected the Kappa values. Dark green represents scores of 0.8 or higher, light green represents scores 0.6 – 0.79 and the yellow bar represents Kappa values of 0.4 – 0.59. It should also be noted that although the Kappa value for final third outcomes falls under the moderate strength of agreement category, the value was 0.59, which places it at the highest end of this category.



Figure 2. Kappa scores for recorded data

3.9 Data Processing

The technical effectiveness from each variable was calculated using the positive to negative ratio system proposed by O'Donoghue (2010), which will put the data into perspective when comparing matches. Descriptive statistics were produced using Microsoft Excel by using pivot tables and putting the relevant information into graphical format and tables.

CHAPTER FOUR:
RESULTS

In order to examine the hypothesis proposed for this study, findings are presented in graphical and table format. The descriptive results have either been presented as mean values (\pm SD), percentage breakdowns (\pm SD) or on occasion where appropriate as total frequencies. Throughout the section, positive outcomes have been grouped and displayed in green, whereas negative outcomes are in red. Outcomes neither, positive or negative (neutral) are displayed in yellow.

The section initially provides detail at a broad level on possessions leading to successful and unsuccessful final third entries before more specifically exploring box entries in detail.

4.1 Overall Possessions and Final Third Entries

Table 3. Mean (\pm SD) number of possessions, final third entries and possessions without an entry.

Level of Opposition	Total Possessions	Final Third Entries	No Final Third Entry
Bottom	130.8 \pm 17.5	63.8 \pm 29.9	67.2 \pm 24.6
Middle	137.5 \pm 12.9	66.3 \pm 16.9	70.8 \pm 12.1
Top	126.8 \pm 8.1	58.8 \pm 7.1	67.8 \pm 7.9

Table 3 displays the mean number of possessions per match against each level of opposition as well as the mean number of final third entries and possessions without an entry. The highest mean value is seen in matches against middle level opposition although variation in this variable was slight. Furthermore, a slightly lower number of mean final third entries per match can be observed when comparing top level opposition to middle and bottom level opposition.

Table 4 shows the breakdown of final third outcomes, the mean number of penalty area entries against top level opposition is lower compared to middle and bottom teams.

Table 4. Means (\pm SD) for final third conversion into box entry

Opposition Strength	Final Third Outcome	Mean (\pmSD)
Bottom	Box Entry	42.2 \pm 27.5
	Lost Possession	18.5 \pm 4.6
Middle	Box Entry	41.5 \pm 12.7
	Lost Possession	20.3 \pm 3.4
Top	Box Entry	32.0 \pm 4.4
	Lost Possession	24.5 \pm 4.0

Figure 3 shows the percentage breakdown of total possessions, leading to final third entries and then the transition into a box entry. The percentages of possession leading to a final third entry are similar, though the progression final third entry to a box entry is noticeably lower when facing top level opposition.

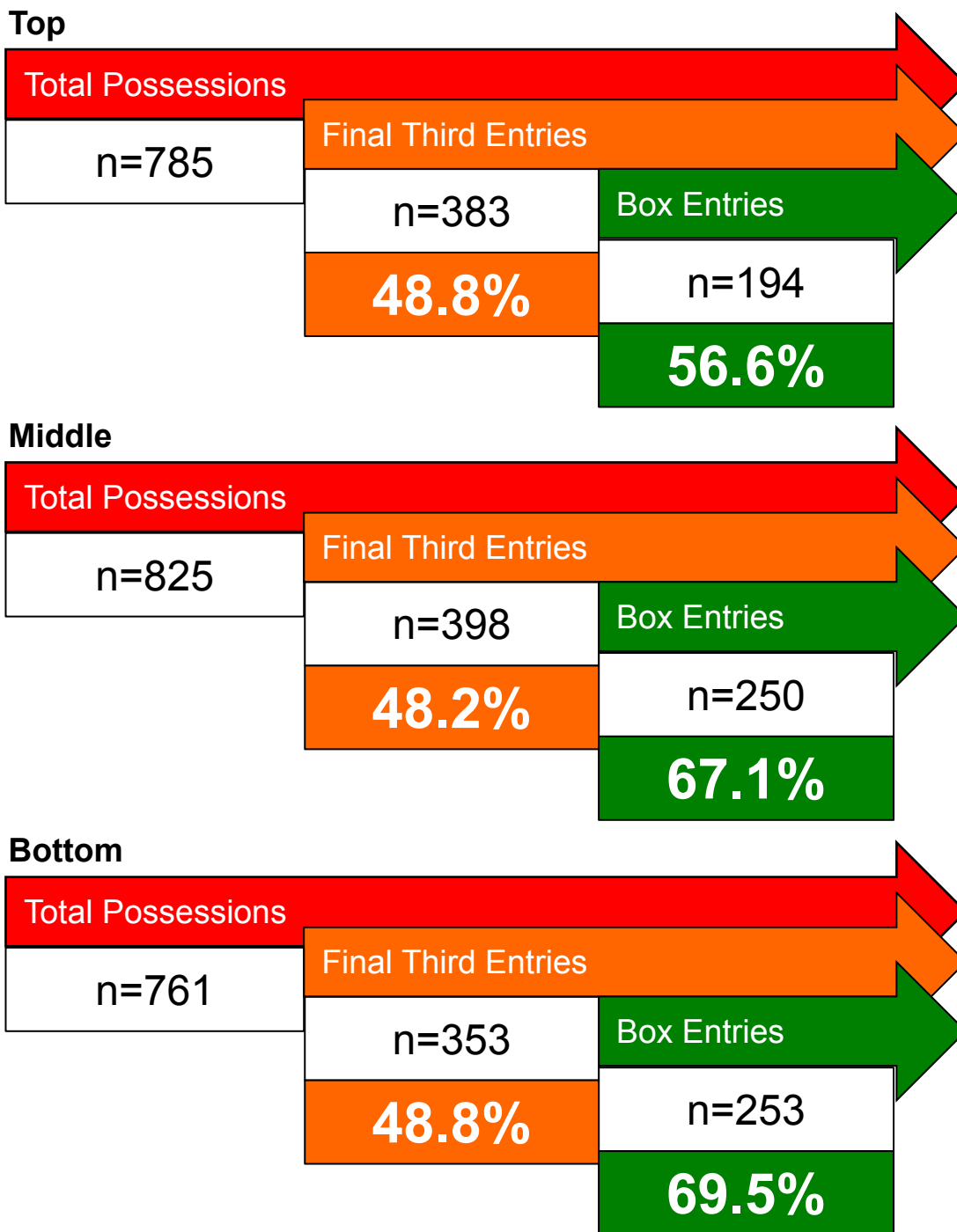


Figure 3. The percentage transition of possessions, final third entries and penalty area entries

4.2 Box Entries

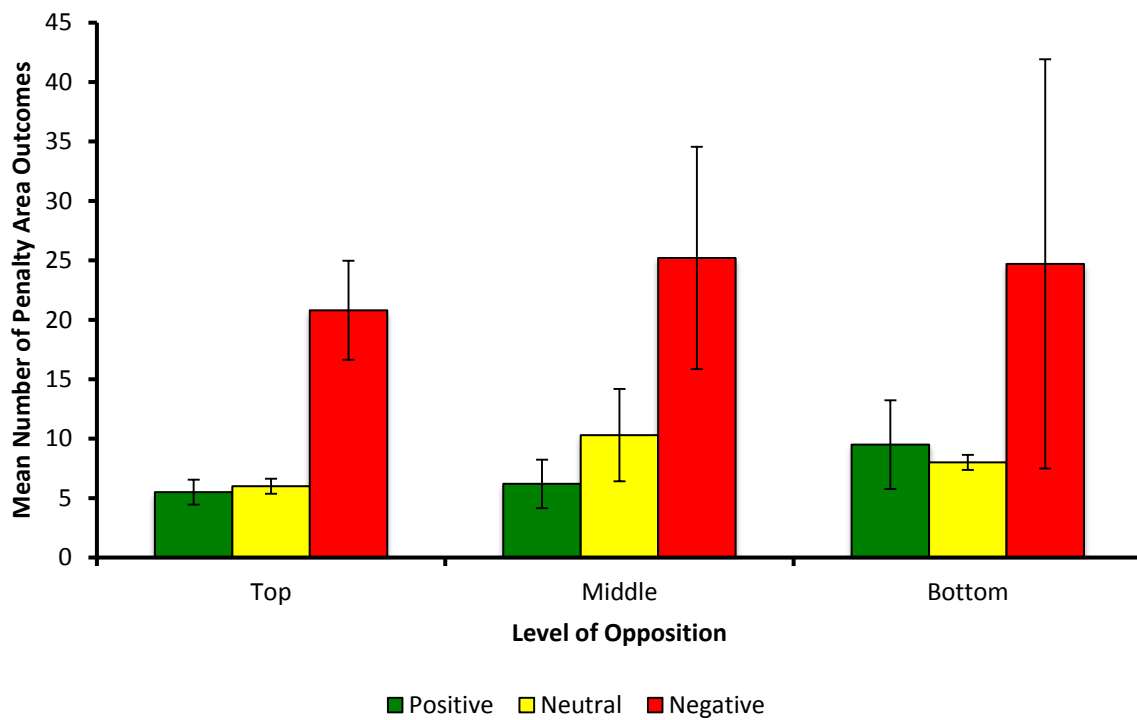


Figure 4. Mean number of positive, negative and neutral penalty area entry outcomes for varying opposition levels

Both Figure 4 and Figure 5 display the breakdown of penalty area outcomes and categorises them into positive, negative and neutral outcomes. Figure 5 shows the mean number of outcomes per match against each level of opposition.

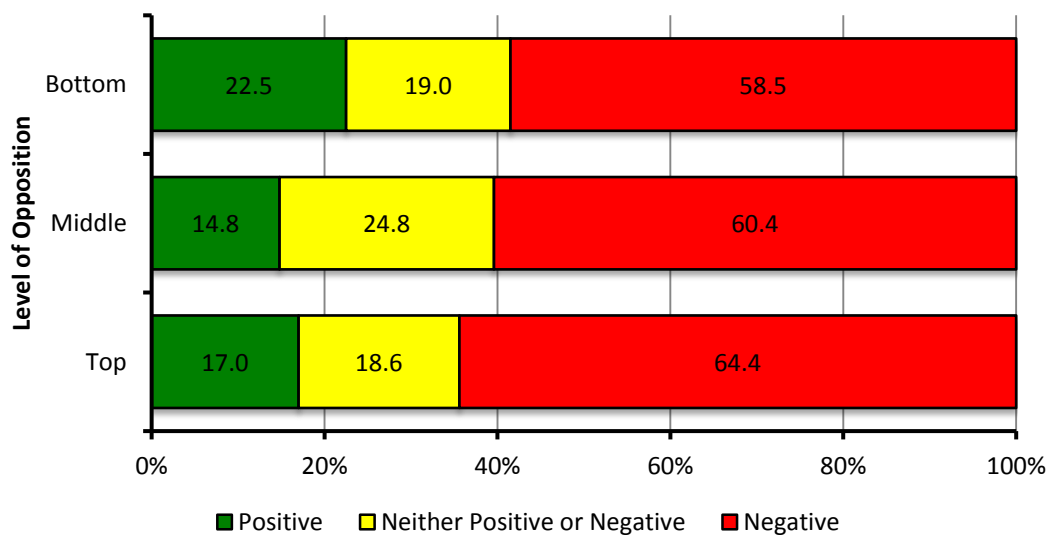


Figure 5. Percentage breakdown of positive, negative and neutral penalty area outcomes

Figure 5 shows the percentage breakdown of these categories. Both the mean number of positive outcomes and the percentage of positive outcomes are lower in penalty area entries against strong and medium strength opposition in comparison to low strength opposition.

Table 5. Percentage breakdown of shots on target/shots off target and percentage of shots that result in goals

	Bottom	Middle	Top
Shots on Target %	54.4	45.9	45.5
Shots off Target %	45.6	54.1	54.5
Goal %	21.1	27.0	6.1

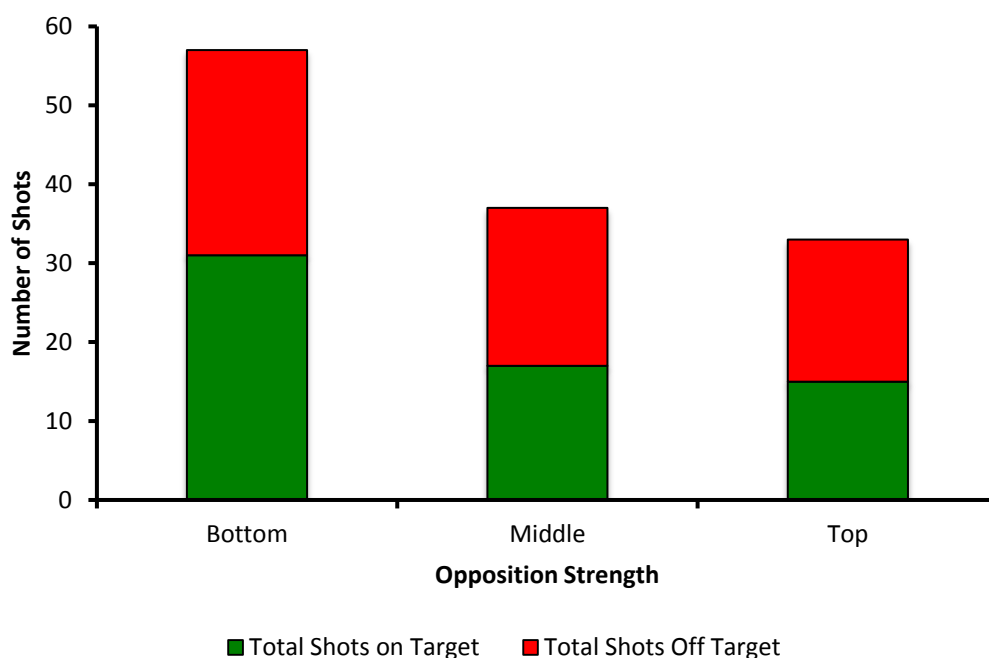


Figure 6. Total number of shots on and off target

Figure 6 shows the total number of shots from the games against top, middle and bottom teams and shows a considerably higher number of shots against lower strength opposition. Table 5 shows the number of goals as a percentage of the total shots, or a shot conversion rate. This is also considerably lower in matches against top level

opposition in comparison to middle and bottom level opposition. Table 5 also displays the percentages of shots on and off target against varying levels of opposition strength.

4.3 Origins of Successful Attacks

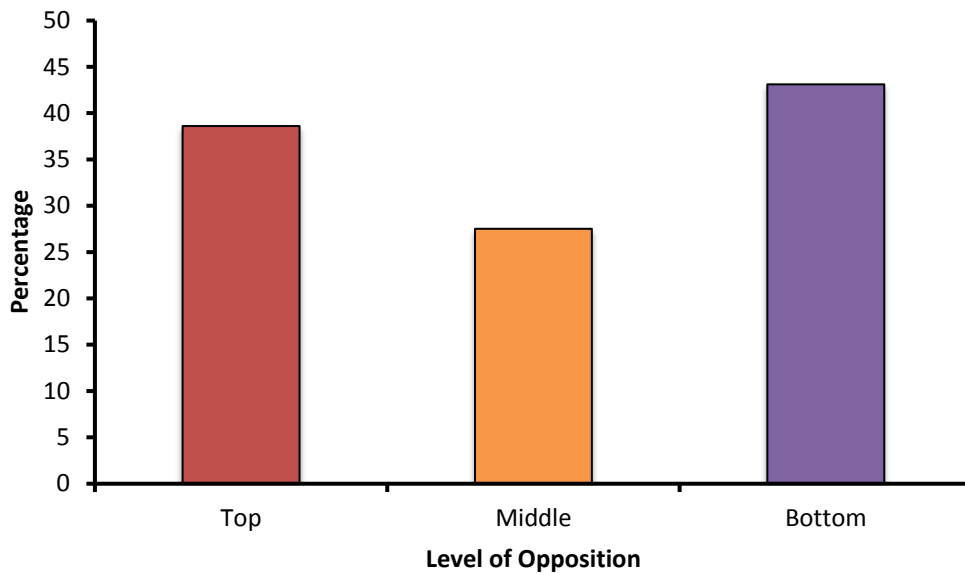


Figure 7. The number of efforts on goal as a result of possessions originating in the final third as a percentage of total efforts on goal in matches against different levels of opponent

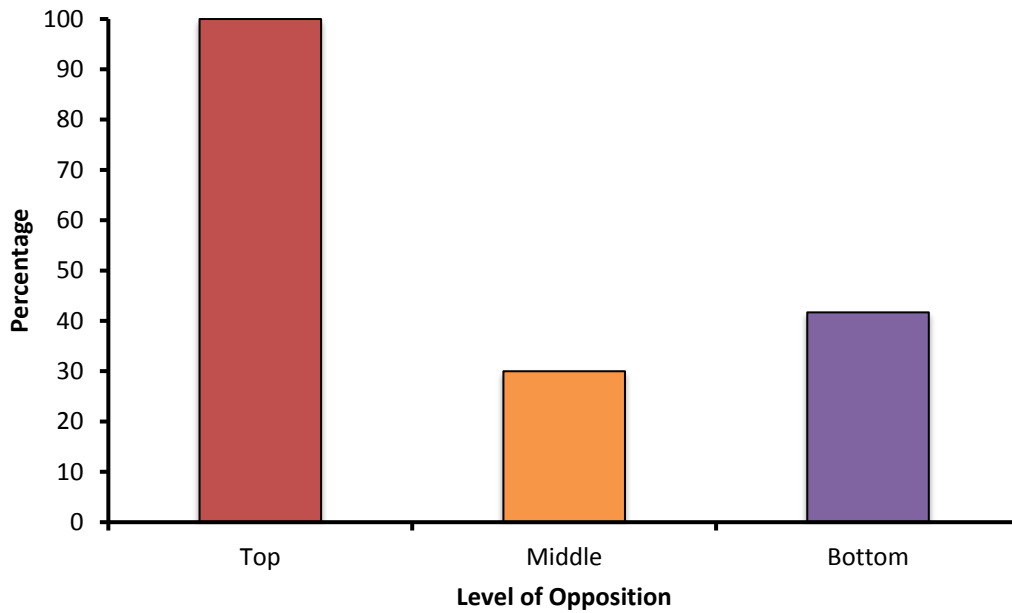


Figure 8. The number of goals as a result of possessions originating in the final third as a percentage of total goals scored in matches against different levels of opponent

Figure 7 shows the number of efforts on goal from possessions that originate in the final third as a percentage of total efforts on goal whilst figure 8 uses the same template however it displays this information on goals scored. No obvious trend is observable in the percentage of efforts on goal shown in figure 7 however figure 8 shows a considerably higher percentage of goals scored as a result of possessions that have originated in the final third in matches against top level opposition compared to middle and bottom level opposition.

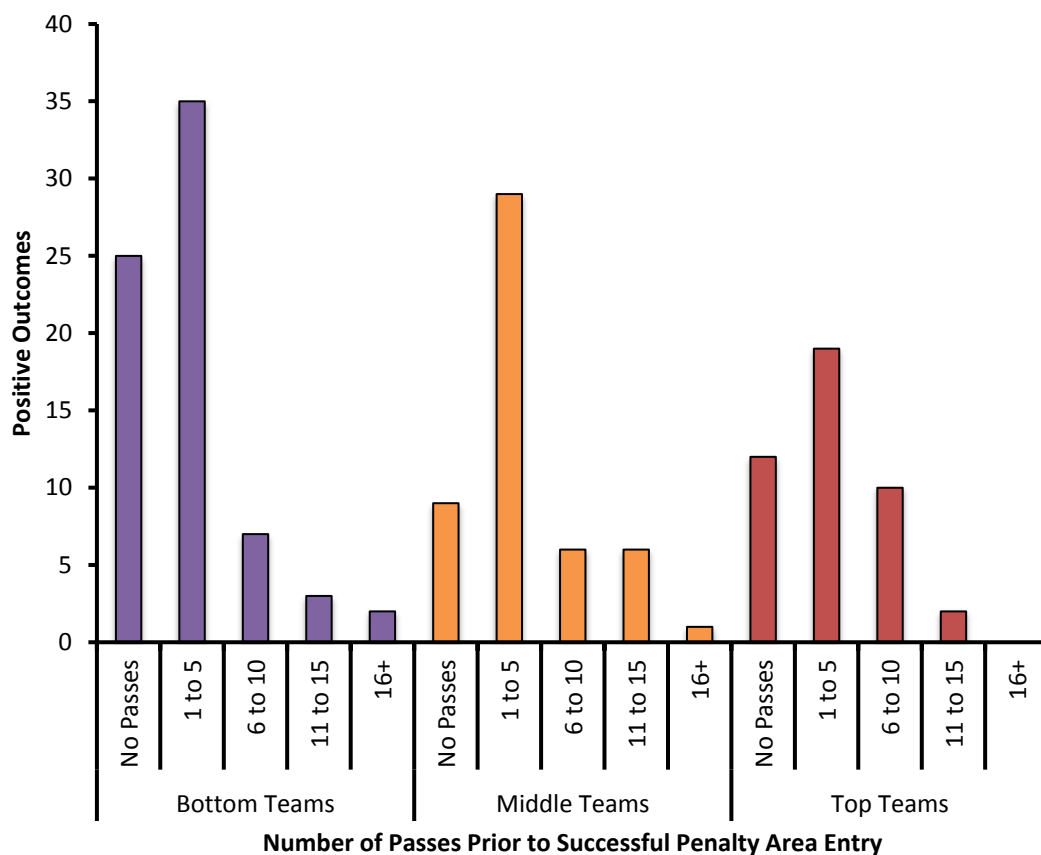


Figure 9. The number of passes made prior to a penalty area entry with a successful outcome in matches against opponents of varying level

Figure 9 shows the number of passes made before a penalty area entry that results in a positive outcome. The majority of successful attacks or penalty area entries followed possessions of either no passes or 1 to 5 passes, as these data series are higher in matches against all three levels of opposition. There is also a visible trend of a reduced number of successful penalty area entries as the number of passes made prior to the entry increase. The number of positive outcomes also decreases as the level of opposition increases.

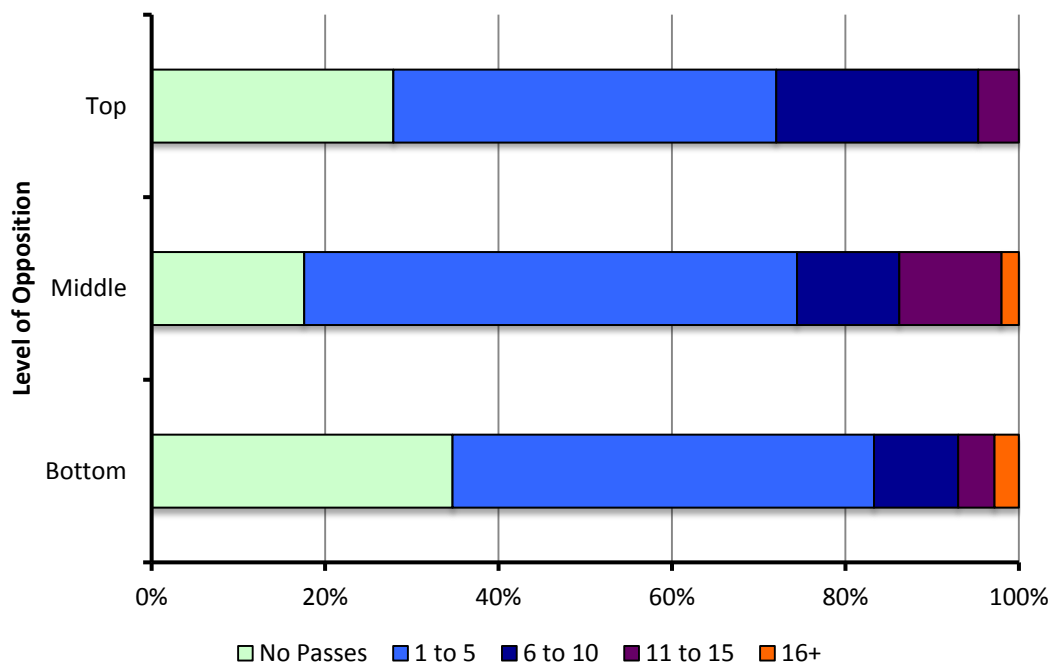


Figure 10. The number of passes before a successful penalty area entry as a percentage of total successful penalty area entries

Figure 10 displays the data from figure 9 as a percentage. The number of successful entries from either no passes or 1 to 5 passes prior to entry makes up over 70% of successful entries in each group of opponent level. There are also no successful entries following 16 or more passes in matches against top level opposition whilst this figure is also noticeably low in matches against both middle and bottom level opposition.

4.4 Entries From Set Pieces

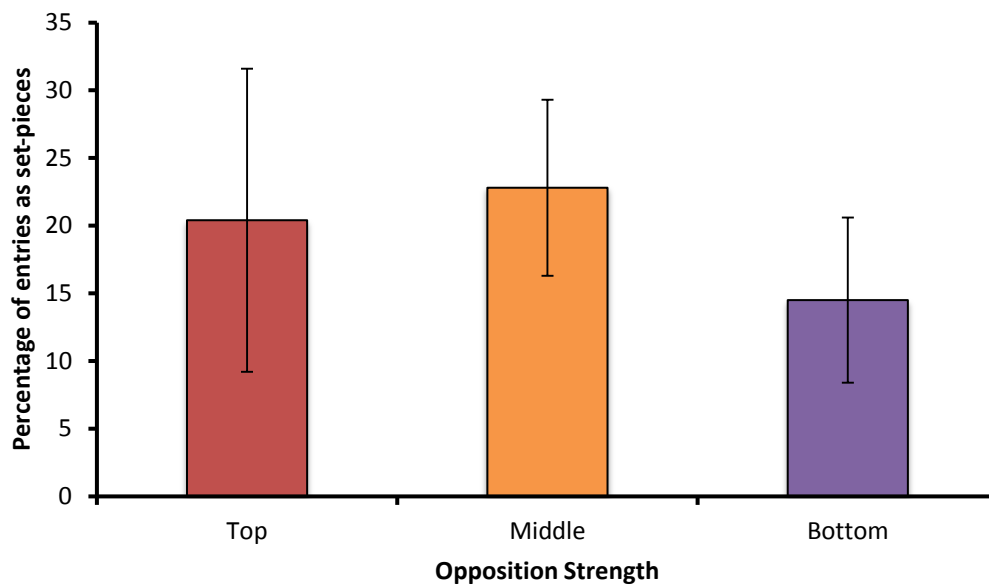


Figure 11. The mean percentage of penalty area entries as set pieces

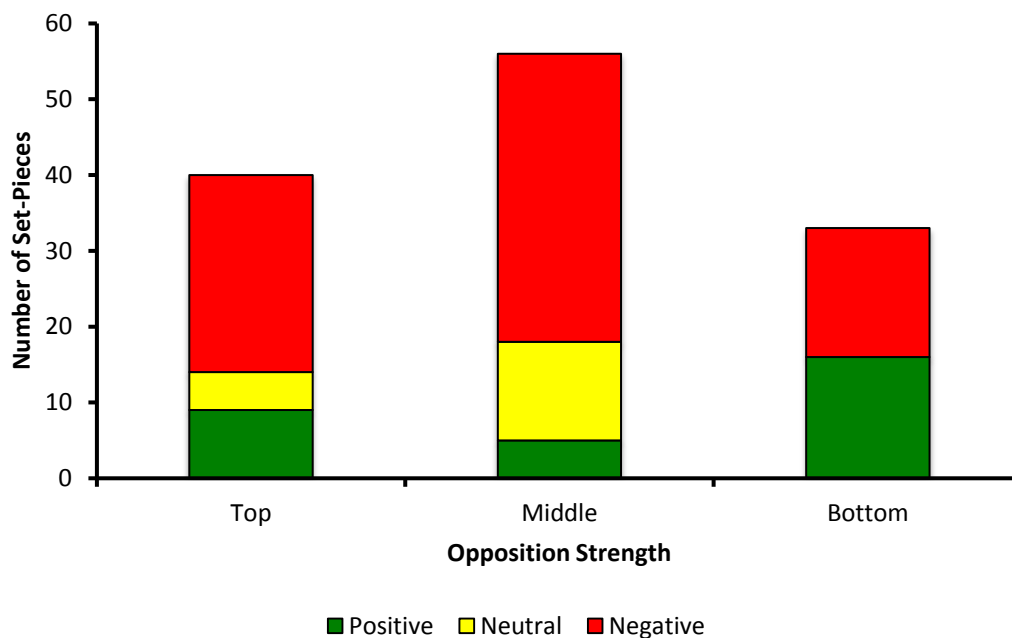


Figure 12. The total number of positive, neutral and negative outcomes from penalty area entries made from set-pieces

Figure 11 displays the number of penalty area entries made as a result of a set-piece such as a free-kick or a corner as a percentage of the total number of penalty area entries made across the total matches used for analysis. Figure 12 shows the outcome of these entries. As can be seen in figure 11, there appears to be a lower percentage of penalty area

entries from set-pieces when playing against bottom level opposition when compared to middle and top level opposition. Figure 12 however shows that there were still a higher number of positive outcomes from these type of entry, despite there being a lower percentage of entries from this method compared to middle and top level opposition.

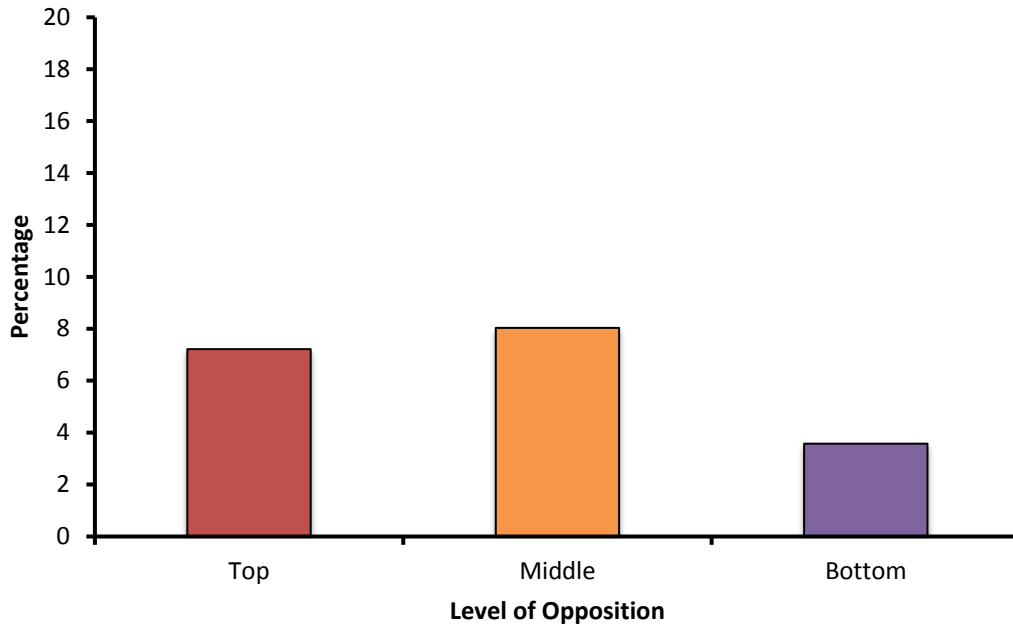


Figure 13. The penalty area entries via a free-kick as a percentage of total penalty area entries

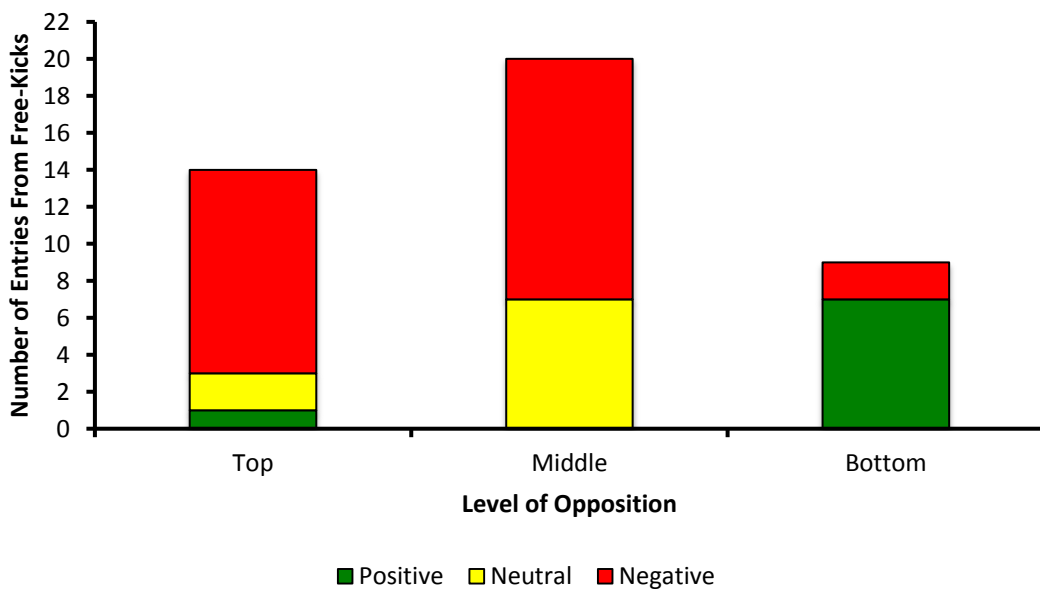


Figure 14. Total number of positive, negative and neutral outcomes from penalty area entries made from free-kicks

Figure 13 shows the percentage of penalty area entries made via a free-kick and shows that a lower percentage of these entries is made against bottom level opposition in comparison to top and middle level opposition. Figure 14 however shows that there is a considerably higher number of successful outcomes following a free-kick entry against bottom level opposition. It also shows that there was one successful outcome against top level opposition and no successful outcomes against middle level opposition following a free kick entry.

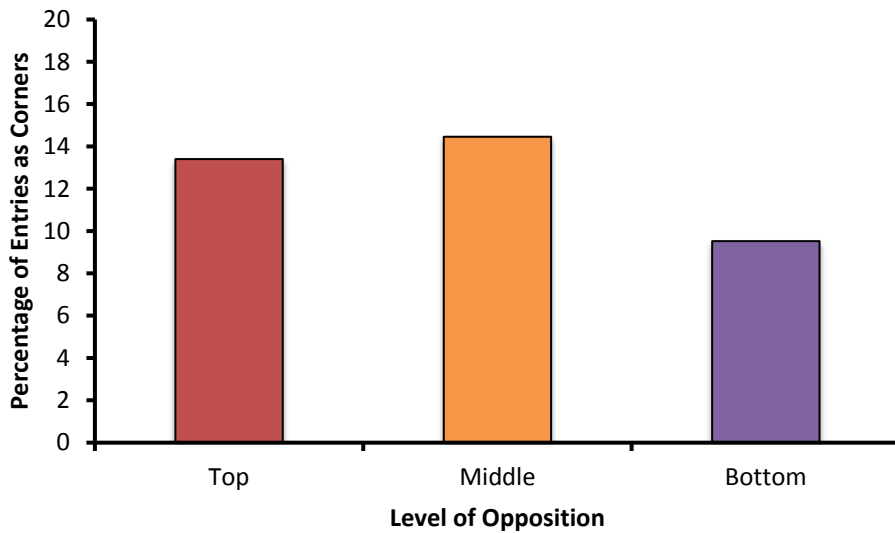


Figure 15. The penalty area entries from a corner as a percentage of total penalty area entries

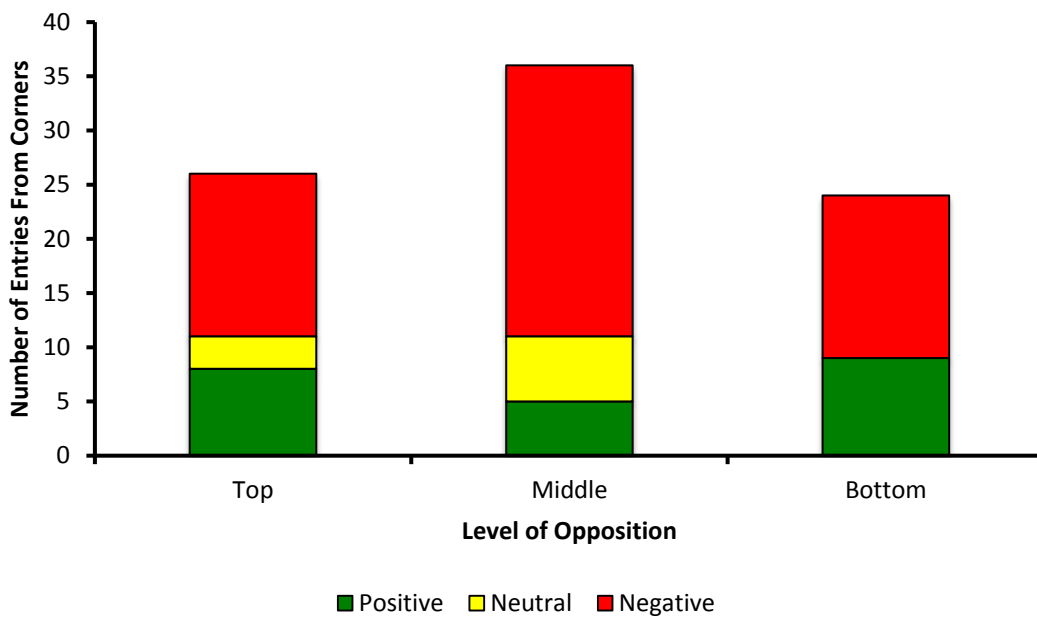


Figure 16. Total number of positive, negative and neutral outcomes from penalty area entries made from corners

Figure 15 shows the number of entries made from corners as a percentage of total entries made. More entries are made from corners than free kicks against all levels of opposition whilst there are more successful outcomes from corners in top and middle level opposition than free kicks against the same level of opposition. There are also more positive outcomes against weaker opposition than the other two opponent levels however there are more negative outcomes when facing middle level opposition in comparison to both weak and strong opposition. This is shown in figure 16.

4.5 In Play Entries

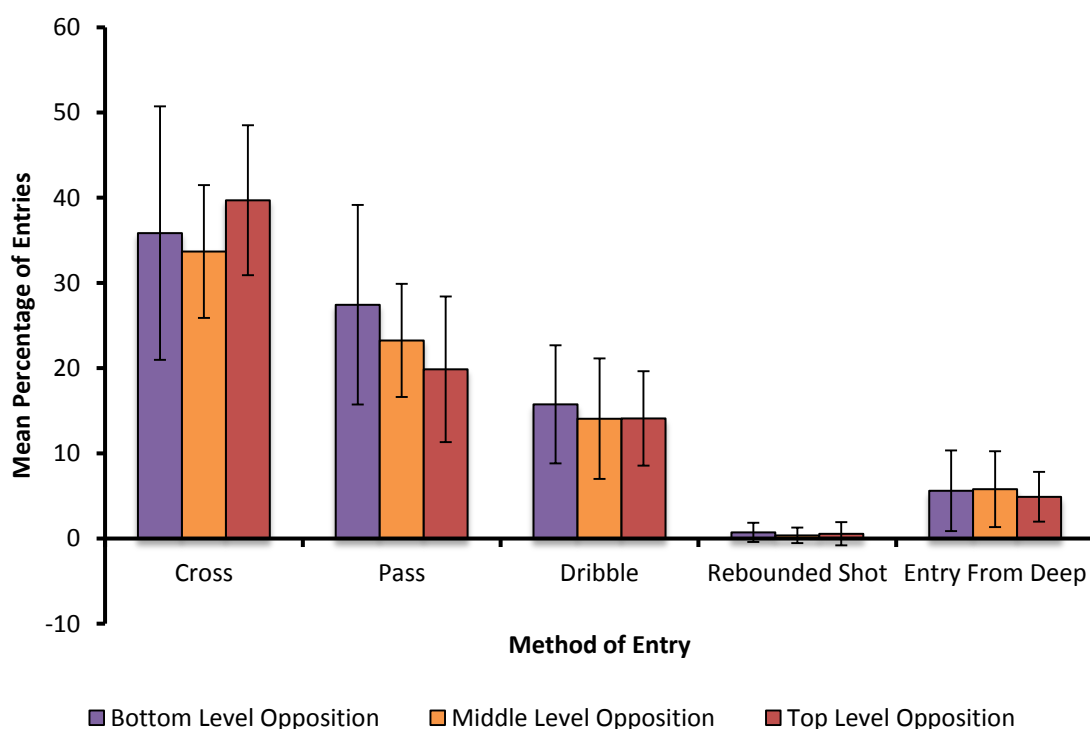


Figure 17. The mean percentage of penalty area entries made via different entry methods for matches against top, middle and bottom level opposition

Figure 17 shows the mean percentage of each method used to enter the penalty area from each match against different levels of opposition. Crossing is the most commonly used method in all levels of opposition, followed by passing and then dribbling. Entries from deep position are used against all opponent levels to a lesser extent whilst entries via a rebounded shot are relatively low in comparison to other methods. There is no apparent difference in the methods of entry when comparing different levels of opposition.

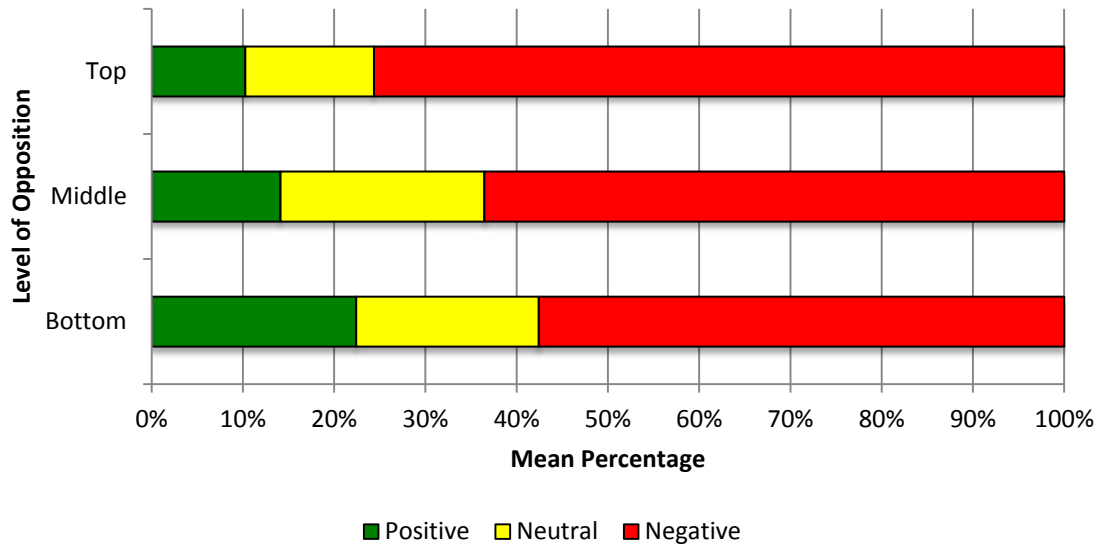


Figure 18. The mean percentage breakdown of positive, neutral and negative outcomes for entries made from crosses against different levels of opposition

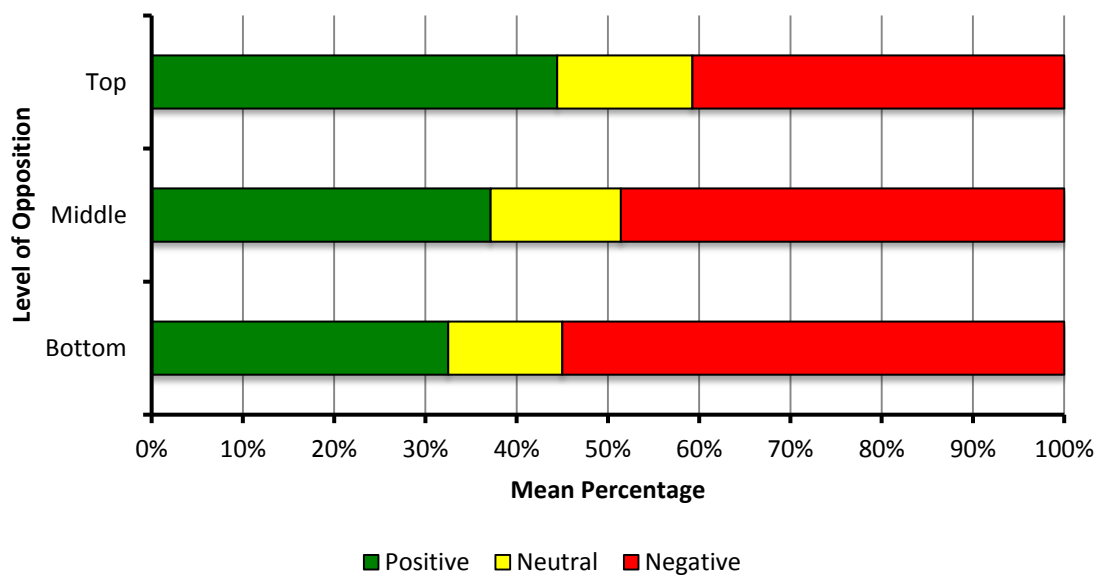


Figure 19. The mean percentage breakdown of positive, neutral and negative outcomes for entries made from dribbling into the area against different levels of opposition

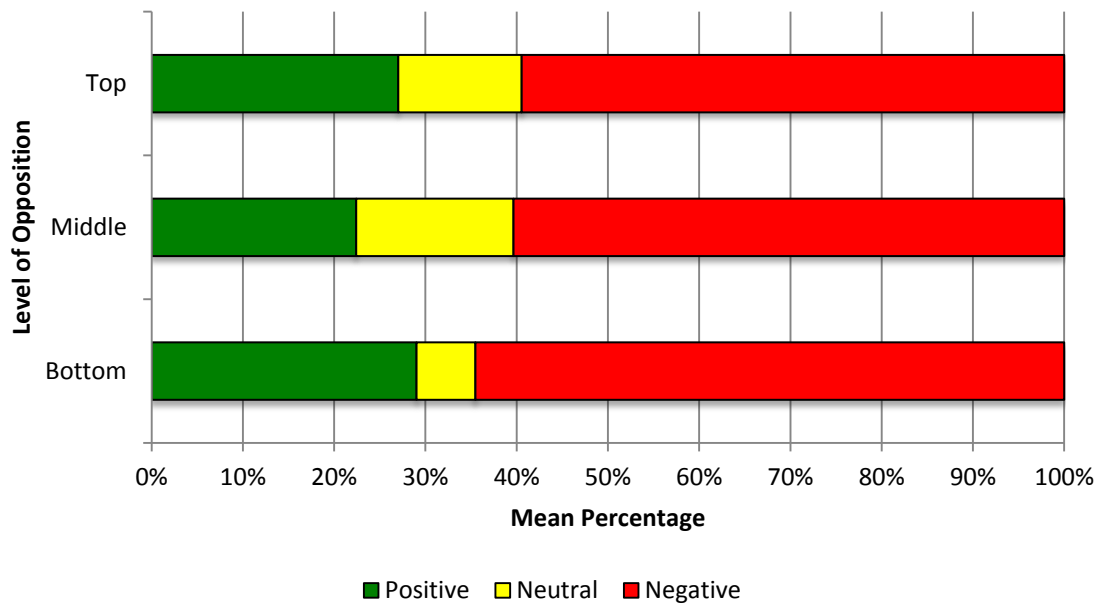


Figure 20. The mean percentage breakdown of positive, neutral and negative outcomes for entries made from passes into the area against different levels of opposition

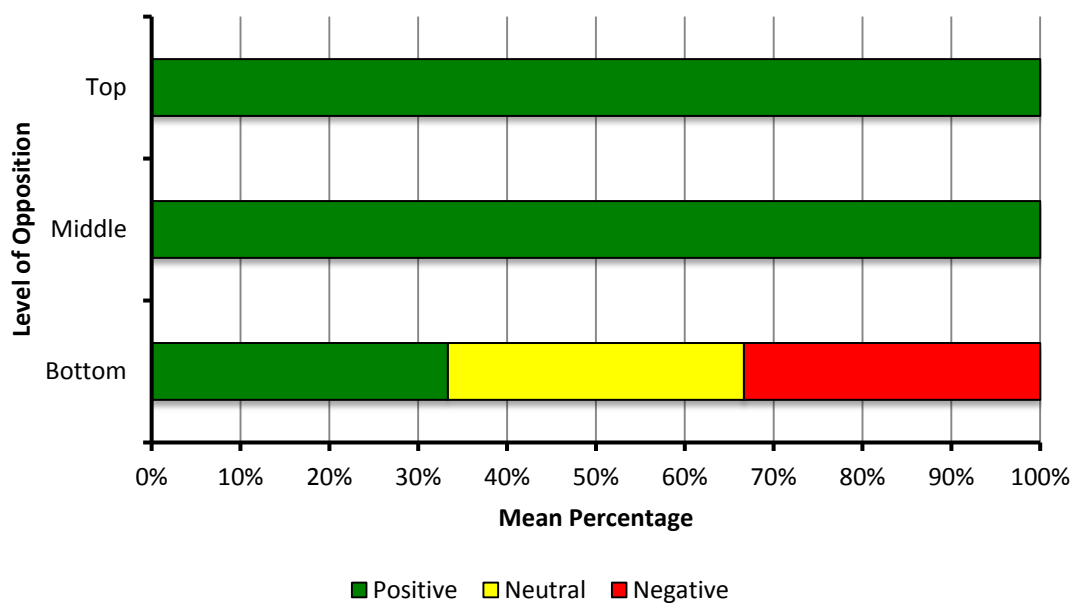


Figure 21. The mean percentage breakdown of positive, neutral and negative outcomes for entries made from rebounded shots into the area against different levels of opposition

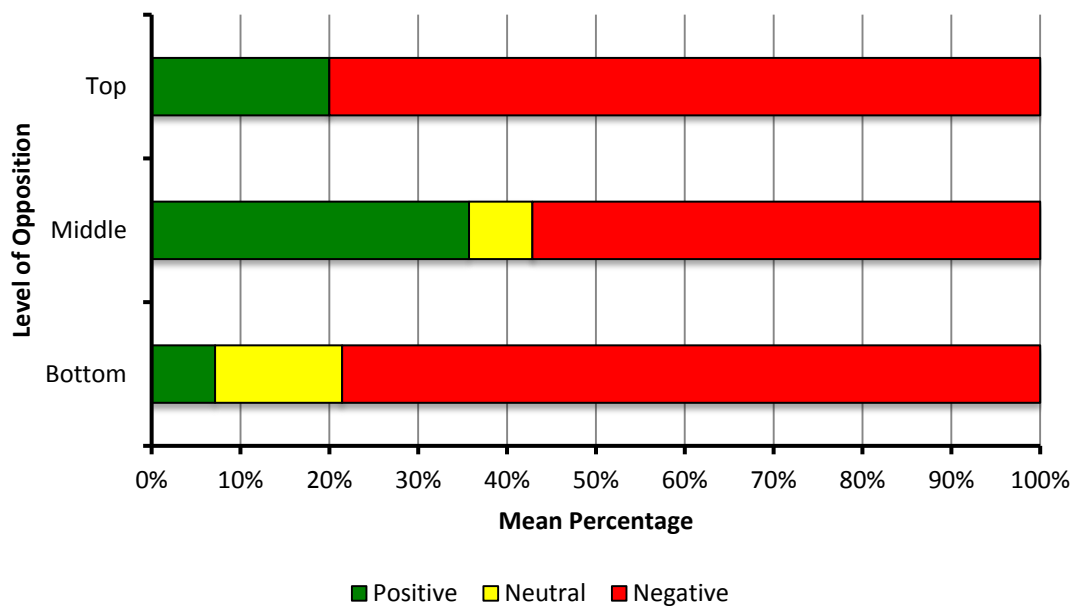


Figure 22. The mean percentage breakdown of positive, neutral and negative outcomes for entries made from deep against different levels of opposition

Figures 18 to 22 display the mean percentage of positive, neutral and negative outcomes for entries made via different methods. The method with the highest mean percentage of successful outcomes is a rebounded shot, however figure 17 shows that the frequency of these occurring is low in comparison to other entry methods. Dribbling into the area provides the next highest mean percentage of successful outcomes against all levels of opposition whilst entries from deep were found to be fairly successful against middle level teams. The lowest mean percentages of successful outcomes are visible in figure 18, which shows entries made from crosses. This however is the most commonly used entry method, as is observable in figure 17.

CHAPTER FIVE:
DISCUSSION

5.1 Overall Possessions and Final Third Entries

The mean number of possessions against each level of opposition varied, however there was not a large amount of deviation (see table 3). Figure 3 does however demonstrate there were fewer final third entries in matches against top level teams in comparison to middle and bottom. This is despite the fact that the number of possessions that resulted in no final third entries were higher against top level teams than bottom level opponents (a mean of 67.8 ± 7.9 compared to 67.2 ± 24.6 against bottom level opponents). There were more possessions that resulted in no final third entry in matches against middle level opposition however these matches involved a higher mean number of possessions per game, which may explain why there were also more final third entries per game against this level of opponent.

Table 4 identifies the mean number of final third entries that result in a penalty area entry as well as the mean number of final third entries that result in a loss of possession in each game. Similarly to table 3, the number of box entries against top level opposition is considerably lower than against middle and bottom level opposition (32.0 ± 4.4 compared to 41.5 ± 12.7 and 42.2 ± 27.5 respectfully). This suggests that top level opposition are more effective in defending their own penalty area than bottom and middle level opposition. Table 4 also displays a larger difference between opposition levels than Table 3; this suggests that although there appears to be a slight difference in the number of final third entries when facing opponents of different levels, there is a far more noticeable difference in the number of penalty area entries against the same opposition. This is in contrast to Ruiz-Ruiz et al. (2013), however Tenga et al. (2010) stated that defences with more balance and cover are less likely to concede penalty area entries and goal scoring opportunities than an imbalanced defence, which suggests that top level opponents from this study utilise a balanced method of defending. Furthermore, Tenga et al. (2010) found that direct or counter attacking play produced more scoring opportunities/box entries when facing an imbalanced defence than elaborate possession play; whereas there was no difference when facing balanced defences. From these findings and in preparation for matches against top level opposition coaches should be encouraged to develop training sessions to work on strategies for creating scoring opportunities against balanced defences. Whereas consideration should be given to the application of direct or counter attacking play when facing lower level opposition to increase the number of box entries and scoring opportunities during a match. More focus however should be given to finding ways to increase the number of box entries against top level opposition.

5.2 Box Entries

The mean number of positive outcomes is highest in matches against bottom level opposition whilst the lowest mean number of positive outcomes came from matches against top opposition, which supports the hypotheses identified prior to the study. Figure 5 shows the percentage breakdown of this information with 64.4% of penalty area entries against top level opposition resulting in a negative outcome, the highest of any of the levels of opponent strength. The middle level opponent provided the lowest percentage of positive outcomes from a box entry per match (14.8%) however it should be noted that the total number of positive outcomes was higher against these opponents and also the mean number of positive outcomes per match was also slightly higher than against top level opposition (6.2 ± 2.0 compared to 5.5 ± 1.0 positive entries per match).

In order to support the conclusions of Tenga et al. (2010), the defensive traits of the opposition need to be considered to establish whether the findings of the study are consistent with those of this study. It is proposed the results from the current study are linked to the defensive organisation of the opposition rather than the attacking tactics used against them. This reinforces the idea previously stated that coaches should look to find alternate attacking methods to increase the likeliness of successful penalty area entries against such defences. These results in figures 4 and 5 may explain why Ruiz-Ruiz et al. (2013) did not find a difference in the number of penalty area entries when facing different levels of opposition however a larger sample size than that of the current study and statistical would need to be conducted in order to confirm this. Future research is therefore encouraged in this area.

Figure 6 shows the total number of shots on target and off target from all the matches analysed against each opponent level. It is clear that there are considerably more shots as well as more shots on target against bottom level opposition whereas middle and top level opposition receive fewer total shots and shots on target. This was hypothesised prior to the study so these results support this. Table 5 demonstrates these findings and shows that although the percentage of shots on target is similar when comparing top and middle level opposition, the percentage of shots that are converted to goals against top level opposition is far lower than the other two opponent levels. Only 6.1% of shots result in goals against top level opposition however 27% and 21.1% of shots result in goals against middle and bottom level opposition respectively. Although shot to goal conversion against middle level opposition is higher than against bottom level opposition, bottom level

opposition receive considerably more shots on their goal (as is seen in figure 6). These results show that there are more opportunities to score created against bottom level opposition, whilst shot to goal conversion differentiates the middle and top level opponents. Considering football is a low scoring game, successful teams tend to be able to convert their opportunities. Tenga and Sigmundstad (2011) found that top level teams scored more goals per game from open play than mid-table and bottom level teams. It is therefore proposed that top level teams are also superior in defensive play because the number of goals scored against them is lower in comparison to other teams. This may be why shot to goal conversion is so low against top level opposition as the defending team make it difficult to convert such chances. Further research in this area would be required to confirm these findings.

5.3 Origins of Successful Attacks

Figure 7 shows the percentage of efforts on goal that came as a result of possessions that started in the final third. There is no apparent link between this percentage and the level of the opposition however the percentage against bottom teams is 43.1%. This shows that almost half of all the efforts on goal are a result of possessions originating in the final third and implies a style of play that involves winning the ball back higher up the pitch. Against weaker opposition it would be easier to win the ball back and therefore this style of play would produce more positive results in terms of efforts on goal, which may explain why the highest percentage observable in figure 7 is against bottom level opposition. These results support the findings of Bate (1998) and Garganta, Maia and Basto (1997) and also reinforce the claim made by Hughes (1990) that the best and most positive defensive style of play is to pressurise opponents in order to regain the ball as far up the pitch as possible. Coaches would therefore be encouraged to employ high pressing tactics when facing weaker opposition in order to increase the number of efforts on the opponent's goal. The results also partially support the proposed hypothesis however results cannot be taken as conclusive due to the variation amongst opposition levels

It would be expected that figure 8 would show the same pattern as figure 7 however all of the goals against top level opposition were a result of possessions that originated in the final third. It should be noted though that only two goals make up the total number of goals scored against top level opposition and both of these goals originated as set pieces so do not necessarily point to a style of play that involves winning the ball back in the attacking third.

Figure 9 shows the number of passes that preceded a successful outcome of a penalty area entry for matches against different levels of opposition. Reep and Benjamin (1968) found that 80% of goals were scored as a result of possessions of four passes or less and findings from this study are similar, with the highest number of positive outcomes resulting from either possessions with no passes prior to the penalty area entry or possessions with 1 to 5 passes prior to entry. Bate (1988) expanded on the findings of Reep and Benjamin (1968) and promotes a direct style of attacking play however Hughes and Franks (2005) found that possessions consisting of longer passing sequences resulted in more shots relative to the total number of each type of possession however possessions with shorter passing sequences produced better conversion rates of shots to goals. These findings are partially reproduced in this study, as is shown in figure 9 with the majority of successful outcomes coming from shorter passing sequences.

5.4 Entries From Set Pieces

The findings from this study show that the mean percentages of box entries as a result of set pieces (as is seen in figure 11) are between 15% and 25% for all three levels of opposition. No obvious difference is observable in the figure with the middle strength opposition having the highest mean percentage and bottom level opposition having the lowest. Figure 12 however displays the total number of positive, negative and neutral outcomes from these set pieces and shows that in matches against bottom level opposition there are more positive outcomes. This is despite the fact that the total number of set pieces against this level of opposition was lower than the other two opponent levels. This suggests that lower level opposition are not as effective as defending set pieces as middle and top level opposition and in a practical context would encourage coaches to deliver as many set pieces into the box as possible when facing bottom level opposition in order to increase the chances of scoring a goal.

The percentage of entries as free kicks is shown in figure 13 and has an almost identical pattern to that of figure 11, with the lowest number of free kick entries coming against bottom teams and the highest against middle teams. Figure 14 shows the outcomes of these entries and the highest number of positive outcomes coming against bottom teams, with only two negative outcomes and no neutral outcomes against this opposition. This would again suggest that in order to maximise the chances of scoring, a team should look to play as many free kicks into the box as possible when facing weaker teams. In contrast, the number of positive and neutral outcomes against top level opposition was very small in

comparison to the number of negative ones whilst there were no positive outcomes against middle level opposition. This points to the idea that playing free kicks into the box against middle to top level teams is very unproductive and further research into this area may cause questions to be raised to coaches about whether to play the ball into the box from a free kick when the opportunity arises or to keep possession and try to make an entry in play. It should be noted that the number of free kick entries across all the games was relatively low so further research with a larger sample size would be required in order to draw conclusive findings.

Figure 15 shows the percentage of box entries from corners and this figure also shows a similar pattern to figures 13 and 14 however the mean percentage of entries from corners is larger than free kicks (13.4% compared to 7.2% in top teams; 14.5% compared to 8.0% in middle teams; 9.5% compared to 3.6% in bottom teams). Figure 16 shows again that the highest number of positive outcomes came from matches against weak opposition despite the number of total corner entries being lowest in this group. The number of positive outcomes from corners against top opposition is also fairly high in comparison to middle level opposition and considering that the total number of corner entries was lower in top teams compared to middle teams, it could point to using corners as effective attacking methods when facing top teams. Again the sample size does not allow for conclusive results to be taken from this study however this trend may be of use to coaches and athletes if further research can provide confirmation of this pattern.

5.5 In Play Entries

Figure 17 shows that the most common method of entering the penalty area in play was crossing, which was the case for matches against all three different levels of opposition. The next most used method of entering the penalty area was passing, followed by dribbling, entrances from deep and finally rebounded shots. This was the pattern observable in matches against all three opposition levels. This suggests that the method of entry does not vary facing different opponents of varying strength, supporting the hypothesis proposed previously. Sarmiento et al. (2013) stated that temporal patterns of play exist in football, namely in Manchester United and Barcelona teams, as these were the teams used in this particular study. The findings from this study seem to reinforce this statement as the methods of entry follow a similar pattern despite varying levels of opponent. It should be noted however that the study by Sarmiento et al. (2013) used matches from the 2009/2010 season whereas this study draws findings from matches from

the 2013/2014 season. During this time Manchester United have changed their manager, which may affect the style of play, making it difficult to directly compare results from the two studies.

Sarmento et al. (2013) also state that tradition, identity and history of the club is a determining factor when selecting a style of play. Manchester United are a club associated with a style play that involves width and pace with crossing a key component to the attacking identity of the club. This explains the high percentage of penalty area entries via crosses. There is a large variation in the results obtained for the number of crosses against bottom level opposition, with the match against Fulham (home) there were 51 observed crosses which is considerably higher than the next largest number of crosses per game, which was 22. At the time of this match there was increasing pressure on the manager David Moyes to improve results, which may have caused him to instruct his team to put as many crosses into the box as possible due to the history and tradition of the club and bowing to pressure from the media and fans to revert back to these traditions. This does not necessarily guarantee success however, as figure 18 shows.

The mean percentage breakdown of the outcome of these crosses (figure 18) in comparison to figures 19-22 shows that crossing has the lowest mean percentage of successful outcomes. This is the case for all three different levels of opposition and suggests that in order to maximise the chance of scoring a goal, the team needs to improve the quality of crosses, improve the movement and efficiency of the attacking players in the box or look to enter the penalty area via a more successful method of entry. This may lead the coach to alter training sessions to solve this issue.

Figure 21 shows the mean percentage breakdown of the outcome of penalty area entries made from a blocked shot and shows that this is the most effective method of entry in terms of the highest number of positive outcomes. The figure shows that this method of entry also results in 100% of outcomes being positive against top and middle level opposition compared to 33% against bottom level opposition. This may be due to the fact that it could be considered good defending to block the initial shot and therefore has left the defence disorganised when the ball arrives at the attacker following the block. This inevitably gives the attacker more time and therefore more opportunity to make an effort on goal. It should also be noted that this is the least common method of entry observable in figure 17 and considering it is not a deliberate method of finding a team mate it is hard

for a coach to tailor training sessions in order to maximise the chances of exploiting this method of entry.

Figure 19 shows outcomes of penalty area entries from dribbling. This method has a higher mean percentage of positive outcomes when comparing to figures 18, 20, 21 and 22. This is the third most commonly utilised method of entry from open play from figure 17 and considering this as well as the fact that it is a deliberate action unlike a rebounded shot, a coach may look to exploit this method of entry more and work towards doing this in training.

Entries from deep were also a method employed by Manchester United in the matches used for this study, however this was the second least commonly used method (see figure 17). Figure 22 shows the mean percentage of positive, neutral and negative outcomes from this method per game and there is no observable trend when increasing or decreasing the opposition strength. Bate (1988) expanded on findings from Reep and Benjamin's (1968) study to explore the tactical idea of moving the ball to a shooting position as directly as possible, advocating this style of play. The findings portrayed in figure 22 however do not provide evidence that these possessions produce more positive outcomes, contrary to what was proposed by previous research (Bate, 1988; Hughes and Franks, 2005). This is because this method of box entry does not provide a clear advantage over other entry methods in terms of the number of positive outcomes that result from the entry. Football has evolved since the findings of Reep and Benjamin (1968) were published as Hughes and Franks (2005) advocated a possession-based style before (Marchioli, 2014) proposed the new verticality style, which relies on short direct passes. The findings from the current study support this idea with dribbling and passing into the penalty area producing high numbers of positive outcomes.

5.6 Practical Implications

The practical implications of these findings would suggest coaches should look to attack swiftly with shorter passing sequences in order to gain more box entries however trying to be too direct is not as fruitful as passing based possessions (Hughes and Franks, 2005). Marchioli (2014) stated how the current model for successful teams should play short quick passes, playing forward whenever possible, which falls in line with the findings of the current study and previous research (Benjamin and Reep, 1968; Bate 1988). As is stated by Sarmiento et al. (2013) the identity and history of the club also contributes to the style of play employed by teams so coaches also need to take this into consideration when

deciding on attacking tactics. There is also evidence to suggest that winning the ball back high up the pitch is an effective style of play when playing weaker opposition who are not as effective at keeping the ball as top and middle teams. The current study found that set piece box entries from free kicks was extremely ineffective against top and middle level opposition so coaches may look to play free kicks short in order to try to disorganise the opposition defence before entering the penalty area however corners against all levels of opposition were more effective. This suggests that both free kicks and corners are effective against bottom level opposition so teams may look to put the ball in the box from these sources whilst against top and middle level opponents it seems only corners are effective in producing positive outcomes. In terms of in play entries dribbling into the area was the most effective method of deliberate box entry in terms of the number of positive outcomes so coaches should look to exploit this method against all opposition when possible. Crossing produced the lowest percentage of positive outcomes however this was the most utilised method. This may be because the team was either crossing the ball with no particular target or the quality of crossing was poor, both of which reasons would be worth addressing by the coach.

It is clear that the combination of findings and results from this study as well as influencing factors from the opposition and history and traditions of a club that football is a complex sport and that a coach has many factors to consider when devising a style of play. Coaches could use some of the trends and patterns found in the results of this study to assist the coaching process and decision making however complete reliance on these findings with no consideration of other factors would be ill advised.

CHAPTER SIX:

CONCLUSION

6.1 Conclusions of the Study

The study aimed to draw comparisons between attacking methods and the outcomes of penalty area entries between different levels of opposition, which has been achieved. The main findings of the study are that penalty area entries against top level opposition result in more negative outcomes than other opposition levels whilst entries against bottom level opposition result in more positive outcomes. This supports the hypothesis proposed prior to the study. Less final third entries and penalty area entries were observed in matches against top teams than middle and bottom teams, which is a contrast to previous research (Ruiz-Ruiz et al., 2013; Lago, 2009; Taylor et al., 2008), whilst there was no observable difference in the number of successful attacks from possessions originating in the final third.

The number of passes prior to a successful penalty area entry was highest in possessions of either no passes or one to five passes against all levels of opposition, which supports previous research (Benjamin and Reep, 1968; Bate, 1988; Hughes and Franks, 2005).

It was also found that the method a team uses to enter the penalty area does not vary depending on opposition level, which supports the proposed hypothesis. This reinforces the statement by Sarmiento et al. (2013) that play is influenced by factors such as the history and traditions of a club. The outcome from each method of entry however appeared dependent on the level of opposition against which the method was used.

Entries from set pieces were found to be more successful against bottom level opposition than against top and middle level opposition with free kicks in particular yielding very few positive outcomes against top and middle teams. Corners were slightly more successful against these teams however they were still more effective against bottom teams.

6.2 Limitations and future research

The present study analysed the attacking performance of a single team and consequently any observable results may be a reflection of the particular style or playing standard of this team. This means care should be taken when generalising the findings to other teams. Despite this limitation, case studies of teams over a sustained period can provide an appropriate research design for performance analysis in football because combining data sets from multiple teams can potentially mask the contributing or determining factors of success or failure in each team (Taylor, Mellalieu, James and Shearer, 2008).

The current sample of 18 matches, has allowed the effective collection, presentation and discussion of descriptive statistics. This data has allowed comparisons to be made between the teams' performance against top, middle and bottom teams. It is important that descriptive results are presented as they provide summary information on the variables and performance indicators collected. Understandably, inferential statistical testing could have been undertaken to identify if any differences are significant or not, but as stated by O'Donoghue (2010), 'p values produced by inferential statistics are the icing on the cake, but we need the cake first and foremost. Future analysis would therefore consider a larger number of matches as well as the exploration of statistical testing.

A possible limitation is the fact that the analysis did not measure or note any of the defensive actions of the opposition. The aim of the study was to analyse the attacking play of a team against varying opposition however the defensive traits of these opposition levels would provide a greater understanding and explanation of why these attacking methods were employed. Future research should look at exploring how the defensive organisation of the opposition affects the attacking team.

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APPENDICIES

APPENDIX A

Source of possession

8x8	From Blocked Shot	From Goalkeeper	From Interception	From Kick Off	From Set Piece	From Tackle	From Throw in	No Obs	Total
From Blocked Shot	1								1
From Goalkeeper		7							7
From Interception			12			2	1		15
From Kick Off				2					2
From Set Piece					4				4
From Tackle			2			9			11
From Throw in						1	6	1	8
No Obs			1						1
Total	1	7	15	2	4	12	7	1	49

P0 0.84
 PC 0.20
Kappa 0.80

Final third outcome

3x3	Box Entry	Lost Possession	No Obs	Total
Box Entry	4	2	1	7
Lost Possession	1	39		40
No Obs		1		1
Total	5	42	1	48

P0 0.90
 PC 0.74
Kappa 0.59

Number of passes

5x5	1 to 5	11 to 15	6 to 10	No Obs	No Passes	Total
1 to 5	21			1	1	23
11 to 15		3				3
6 to 10	2	1	7			10
No Obs					1	1
No Passes	1				11	12
Total	24	4	7	1	13	49

P0 0.86
 PC 0.33
Kappa 0.79

Origin of possession

8x8	From Attack Right	From Def Centre	From Def Left	From Def Right	From Mid Centre	From Mid Left	From Mid Right	No Obs	Total
From Attack Right	2								2
From Def Centre		7		1	1				9
From Def Left			3						3
From Def Right		2		6					8
From Mid Centre					10				10
From Mid Left				1		7			8
From Mid Right					1	1	4	1	7
No Obs		1						1	2
Total	2	10	3	8	12	8	5	1	49

P0 0.80
 PC 0.16
Kappa 0.76

Final third entry area

6x6	Left	Middle	No Final Entry	No Obs	Origin Final Third	Right	Total
Left	2	0	2	0	0	0	4
Middle	0	1	0	0	0	0	1
No Final Entry	0	0.5	32	0	0	2	34.5
No Obs	0	0	0.5	0	0	0	0.5
Origin Final Third	0	0	0	0	2	0	2
Right	0	0	1	1	0	4	6
Total	2	1.5	35.5	1	2	6	48

P0 0.85
 PC 0.55
Kappa 0.67

Outcome

4x4	Goal	Lost Possession	No Obs	Shot Off Target	Total
Goal	1				1
Lost Possession		45	1		46
No Obs		1			1
Shot Off Target				1	1
Total	1	46	1	1	49
P0	0.96				
PC	0.88				
Kappa	0.65				

Penalty area entry method

6x6	Cross	Dribble	No Box Entry	No Obs	Pass	Set Piece - FK	Total
Cross	2						2
Dribble			2				2
No Box Entry			39		1		40
No Obs			1				1
Pass				1	1		2
Set Piece - FK						1	1
Total	2	0	42	1	2	1	48
P0	0.90						
PC	0.73						
Kappa	0.61						