Research in emotional and behavioural defensive techniques in Basketball.

Michael Nichols, Jordan Lansley
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An observational study of behavioural cues from attacking players from a defenders perspective in Basketball that might indicate intent; thereby enabling a defender to be proactive in breaking or defending an attack. Players were filmed five times, the clips were then analysed and coded in order to highlight patterns that might help a defender to read intent in an attacker. The study revealed specific behaviour codes which, when taught to defenders can lead to an increase in proactive defensive performance and awareness. This paper outlines the observational study and the current research being carried out to further increase the validity of the developed training.

Background

Michael Nichols is a basketball coach for a UK aspiring team and consultant with amateur and professional teams across the UK. Emotional Intelligence Academy (EIA) was formed in 2009 to provide emotion awareness and management, and deception detection, whether focused on self or on our interactions with others. EIA's courses are based on cutting edge reliable research and science to provide educational designed courses, tools and diagnostics for real world applications. The applications of this work range from day-to-day interactions between individuals through to forensic investigative communications and truth/deception related contexts. EIA aims to help others to develop their capabilities to make finer distinctions between emotions and credibility to support better decisions about actions and behaviour.

Michael's passion for the sport and his interest in research by Dr. Paul Ekman led him and EIA to begin research and applications of behavioural science into Basketball, specifically around defensive techniques.

Basketball has generally been taught using the same methods for over 20 years with British basketball following the lead from other Nations, predominantly the USA. At the 2012 Olympics

we failed to reach the “Game On” British basketball strategy of making the quarterfinals, meaning funding would be drastically cut. As of February 4th 2014
British Basketball will receive zero funding from UK Sport because the targets laid out by UK Sport were not met. Liz Nicholl (UK Sport Chief Exec) stated,

"Basketball men and women did not meet their target for last year. Basketball can still be a big sport in the UK, just not through Team GB success. There is still significant investment from the home nations. The inspiration from success is only one element of the portfolio of things that can inspire youngsters to participate. We treat every sport equally."

With no funding, a new way to develop the athletes needs to be explored.

Initial findings from a major observational research project in the UK is revealing common signals from attacking players that defenders can use to disrupt an attack. Michael studied and video-recorded 200 players from professional and amateur teams, some revolutionary discoveries are emerging from the 998 clips involving a controlled setting with an attacker attempting to beat a defender (1 on 1).

Cliff Lansley (EIA) stated that he 'reviewed the proposals and EIA are excited about the potential for basketball and other competitive sports so are sponsoring this work. There are four key elements around eyes, facial expressions and body language. We are particularly interested in this as it has parallels with attacking intent in other sports (e.g. rugby, football, martial arts), and deadly intent in the criminal/military world. We hope there are lessons from each of these contexts that might inform the others’.

Introduction

Many sports benefit from certain aspects of applied psychological knowledge, principles and methods. Continually looking for the upper hand; coaches, sport scientists, managers, athletes and psychologists are driven to research, record and develop cues, systems, mental imagery and everything in-between to improve the mental state, awareness, anticipation, skill and performance of athletes.

Studies are carried out across many different disciplines with similar aims in mind - to understand the attributes of top athletes. Football is widely studied and high- level players are described as ‘technically gifted’ and able to ‘read the game’, this is described by Dicks (2011) as ‘experts in perception and action’. The focus in this area is regarding how top player’s process visual information and perception to obtain an advantage. One particular football situation that has received a large amount of research attention is the penalty kick (Savelsbergh, 2010). Goalkeepers are required to initiate their defensive movements before the striker makes contact

with the ball, the ball may take as little as 400ms to reach goal (Morya, 2005). Whereas a goalkeeper takes between 600ms and 1000ms to dive from the centre of the goal to a corner location (Dick, 2010). Take Ipswich Town (1979-80) Goalkeeper Paul Cooper who holds the record for saving 8 out of 10 penalties in a season (not including penalty shootouts). What is it that Paul Cooper 'read' from the strikers that led him to successfully anticipate at such a high rate?

One aspect studied in visual anticipation research is deception. Penalty takers can use deceptive techniques to intentionally throw off or hide their kicking actions, increasing the difficulty for the goalkeeper to use visual anticipation. Dicks (2011) found that to increase goalkeeper performance a variable training on penalties should be used so goalkeepers can learn a variety of striking and deceptive techniques such as:

- Different penalty takers executing combinations of both left and right-footed kicks. - Penalty takers executing kicks from different angles and lengths of run-up. - Penalty takers aiming kicks to variable goal locations. - Penalty takers instructed to vary their technique (e.g., deception) as much as possible. - Goalkeepers forced to defend variable sized goals with penalty kicks taken from a range of different distances – e.g., 11 m, 10.5 m, 12 m, 9.5 m, 13 m, 10 m, 8 m, 9 m. - Two or three penalty takers run to kick the ball, but only one pre-determined player will execute the kick – the goalkeeper will be unaware of which player.

This research has provided great insight into the anticipation and stresses put on both attackers and defenders. Further research is needed to characterise specific trends, methods and cues consciously or unconsciously observed which provide higher success rate of intent. The study also doesn't touch on whether the actions or behaviours of the goalkeepers influence the decision of the striker.

Aglioti (2008) carried out a similar study on anticipation accompanied with motor resonance in elite basketball players. The research compared athletes to coaches, sport journalists (comparable visual experience) and novices on predicting success of viewing free throws (similar to the penalty kick in football). The study used video footage of players shooting free throws. The subject's ability to predict the outcome of the shots was measured. In half of the video clips of free basket shots, the ball landed in the basket and in the other half the ball landed outside the basket. The clips were stopped at specific intervals of the action (initial movements, point of release, ball trajectory). Athletes predicted the success of free shots quicker and more successfully than individuals with comparable visual experience and novices. Performance between athletes and the other groups also differed before the ball was seen to leave the model's hands, this suggests that athletes predicted the shot's fate by reading the body kinematics of the model (Aglioti, 2008). All groups showed an increase of success rate once the ball trajectory could be seen, this would be usually too late to make a defensive move. Statistics comparisons of correct responses found that elite players (66.7%) were significantly more accurate than novices (40.4%) and expert watchers (43.8%). Incorrect responses also showed significance, expert watchers (16.9%) made significantly more incorrect responses than elite players (3.8%). Aglioti

suggests that ‘achieving excellence in sports may be related to the fine- tuning of specific anticipatory ‘resonance’ mechanisms that endow elite athletes’ brains with the ability to predict others’ actions ahead of their realisation.’

Michael’s proposed research is to outline a cluster of specific visual cues and behaviours from attacking players to help defensive players be more proactive in preventing a successful attack.

Aims and Objectives

Basketball defenders, just like in other similar sports are taught to look at the torso of the attacker because that is the only part of the body they can’t fake movement easily, so this method is taught at all levels, local to national.

> ‘Watch the offensive player’s belly-button, especially if he/she is quick and hard to stay with. The offensive player can fake you with a head fake, eye fake, arm or shoulder fake, or a jab-step, but the belly-button will always go only in the direction that he/she is going.’ (http://www .coachesclipboard.net/BasicDefense.html)

This method leaves defensive players with a reactive strategy; they are one step behind. Players are taught a stance, which varies depending on who is coaching, most are directed to slide and react to the attacker’s movements. Michael felt he was successful by adopting the traditional techniques, and implementing learnt techniques from watching and analysing videos of successful NBA players, such as Michael Jordan, who was able to lock down his opponent and steal the ball easily. Michael learnt techniques that worked and helped not only his development but also the team development. The next step was to match theory to science, to help others develop and raise their game.

The aim of the research was to analyse the eyes, face and the body language of the players in order to determine what clues or ‘tells’ were given away unconsciously or consciously during play that might signal their immediate intention. The objective of the research was to enable players of Basketball and any similar sport to learn a new, world-leading type of defensive technique, which could aid in the improvement of their play, helping the player to become a more proactive defender. A primary aim of the study was therefore to develop a training programme that could teach defending players how to anticipate the movements of the offense and always be one step ahead during a game. This method of training could be made available to coaches, so they can use the technique when mentoring teams in order to increase their chances of success. It involves training athletes and coaches to detect intentions in others in real time by helping them to spot ‘fakes’ and intentions using observational cues from the eyes, the face and body language. If this technique is taught successfully, it could result in more stops within the defence section of a team, therefore leading to a higher chance of the team winning games, an increased happiness for the owners, agents and fans. This could also lead to a higher earning capacity if used within professional teams. Finally, with regards to basketball, it could result in more minutes

of attacking play, which is of vital importance during a game.

Method

A group of 200 participants from various amateur and professional basketball teams across the North West of England, ranging from the ages of 12 to 60+ years were filmed using a HD camera. The study involved an offensive and defensive player in a 'one-on-one' situation using one basket, with the offensive player starting at the free throw line and the defender facing the attacker. When in this position, the offensive player was instructed to take five consecutive attacks with one attempt at goal per attack, whilst the defender tried to prevent the goal. Once each shot had been taken the ball would be retrieved and the play would recommence from the beginning. After one player had reached their five attempts they would swap positions and repeat the process.

Each player was filmed for around 30 seconds. The players were filmed from either a side angle or from behind play and the camera focused on the offensive's movements to maximise observation. In order to prevent response bias, (e.g. where the participants may alter their behaviour in order to please the researcher or where they believe they know what findings the researcher is looking for and change their behaviour in order to match them), the true aim of the research was not disclosed to the players before the recordings.

Following the recordings (998 clips, 2 recording failures) the videos were reviewed and coded according to any specific traits portrayed by the individual during play. When coding each clip various factors needed to be considered - for example, both the defender's and the analyst's perspective needed to be taken into account, as well as ensuring that the language used in the coding system could be understood by people who were not familiar with basketball. Another vital point to acknowledge was the varied abilities in skill level of the players filmed. Finally, due to basketball being such a fast paced sport there was the possibility that too many traits would be noticed during the clips, so therefore it was necessary to limit the number of possible codes to 10 key traits. These 10 offensive player traits were coded as followed:

- Code 1- Eyes looking at feet = Weighing up the defender
- Code 2- Eyes moving quickly to head or ring level and/or raising of the ball = Shot 'fake'
- Code 3- Taking the ball out wide to one side= Crossover
- Code 4- Bent torso= considering drive forward towards the goal
- Code 5- Eyes looking towards vacant spot = considering a shot/drive towards goal from that spot
- Code 6- Eyes looking at torso or ring, bent torso = considering a shot
- Code 7- Eyes looking at ring, balanced body, steady feet = Shot
- Code 8- Straight torso, body at angle to basket = No threat
- Code 9- Eyes looking straight ahead = considering a fake
- Code 10- Pursed lips = about to make a move

Each video was coded in one of three specific areas of play, either the first move the player made, the most obvious tendency within play or the initial move a player made and what they did at that moment. The coding and results were collated on a spreadsheet. The table below shows the various basketball teams visited and the number of players recorded at each location.

Team Name/Location and Skill Level	Number of players filmed
Bury (Men's Amateur Team)	8
Bury (Men's U18 Amateur Team)	12
Manchester Giants (Professional)	6
Local Team (11-50+ Amateurs)	20
Rossendale (Amateur Team)	9
Burnley (Amateur Team)	6
Burnley and Blackburn (Amateur Teams)	25
Warrington Ball Hall (Amateur Team)	24
Rochdale (40+ Amateur Team)	5
Huddersfield (Amateur Team)	11
Stockport (Amateur Team)	6
Burnley (Amateur Team)	6
Bury (Women's Senior Amateur Team)	7
Moss Side (Amateur Team)	3
Manchester Magic (Semi-Pro Team)	13
Bolton University (Amateur Team)	12
Manchester U16 (Boys Amateur Team)	10
Manchester U16 (Girls Amateur Team)	10

Results

Through the study Michael found that there were consistent and repeating observational cues. The above codes were reapplied to the videos and reinforced certain cues, specifically around the eyes, attacking intent displays on the face and body language. 6 codes stood out, 4 of which were frequent and 2 that were apparent but not so frequent.

Conclusions

From the footage Michael was able to identify tendencies in the attacking player that traditional methods of coaching defence fail to focus upon. Michael concluded the new techniques worked and develop the mindfulness of a player's defensive capabilities. Having revisited the footage, Michael created the following core codes focusing on the moment before the "deadly intent" (Deadly intent being the point of attack in the form of a shot or drive).

- Code 1- Eyes looking at feet + loaded knees and bent torso = drive
- Code 2- Eyes looking at feet + bent knees, slightly bent torso, ball in triple threat position = Shot
- Code 3 - Eyes look at vacant spot, bent torso, loaded knees = Driving to that spot
- Code 4 - Eyes looking straight ahead or at ring, bent knees, slightly bent torso, ball in triple threat position = shot
- Code 5 - Ball out wide, hand on the outside of the ball, loaded knees = crossover
- Code 6 - Pursed lips/open mouth inhaling = about to make a strong definite move

	Code 1	Code 2	Code 3	Code 4	Code 5	Code 6
% of total	38.78	14.23	39.98	7.52	1.6	4.41

The percentages are results out of 998 clips. So 38.78% of players demonstrated code 1. 52.01% of offensive players make a decision based on the position of the defenders feet and **78.76%** of players drive after demonstrating a 'tell' with their eyes.

It also demonstrates that 100% of players leaked information from their eyes of their intentions. Codes 5 and 6 are additional 'tells' and aren't included in the total percentage. Only the percentages of codes 1 – 4 are used to calculate the total from 998 clips

These specific behavioural signals can be trained to improve athletes:

- In new world leading defensive techniques.
- Becoming a highly attentive proactive defender.
- To successfully anticipate the offensive movement.
- Gain a psychological edge over your competitor.
- Limit your opponent's opportunities.

By making these subtle changes and awareness shifts, these techniques can result in huge improvements for players.

Further research is on-going to strengthen, validate and reliably test Michael's findings.

A between subjects experiment is being carried out by Michael with the aid of EIA and student's from MMU to discover the effectiveness of the training in division level basketball teams.

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