

# **Introducing Children to Rugby Union: Retaining Players and Developing Talent**

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## ABSTRACT

The design of age-appropriate organized activities has become a key issue for National Governing Bodies when introducing children to organized competitive games during childhood. For the Rugby Football Union, the complexity, physicality and structure of adult rugby union provides unique challenges when introducing children to organized mini rugby games. Although organized competitive team games are one of the key childhood developmental activities in sport, empirical research examining the development of this type of activity is sparse.

A mixed methods convergent parallel research design was used where qualitative and quantitative data was collected and analyzed separately, and merged for overall analysis. Using the Developmental Model of Sports Participation as a conceptual framework, elite rugby union coaches' views on mini rugby participation were explored. The rules of play of under-9 mini rugby matches were modified to investigate whether the principles of practice from the Developmental Model of Sports Participation could be applied to rugby games; and coaches and players attitudes and opinions towards key components of under-9 rugby explored.

In the first study, the elite coaches identified organised competition and appropriate adult involvement as beneficial to player development, with an emphasis on less-structured games and sampling a variety of sports. In the second study, under-9 games based on the principles of practice from the Developmental Model of Sports Participation had 25% more ball-in-play time; 55% more runs with the ball; more than twice as many successful passes; and nearly twice as many tries scored. In the final two studies all under-9 players felt strongly that the game should involve limited structure, no playing positions and focus on passing and tackling. In contrast, under-9 coaches favoured a hybrid version of mini rugby with high amounts of engagement, skill learning opportunities, and structure.

The findings show support for an alternative pathway for childhood rugby union participation, where organized competitive matches are a key developmental activity, alongside sampling a variety of sports. The results also

suggest that deliberate play principles can be applied to the rules of under-9 rugby to produce a developmentally appropriate game for children.

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## DECLARATION

The material contained within this thesis is original work conducted and written by the author. The following communications and publications are a direct consequence of this work.

## PUBLICATIONS

Thomas, G., & Wilson, M.R. (2013). Introducing children to rugby: Elite coaches' perspectives on positive player development. *Qualitative Research in Sport, Exercise & Health*, DOI. 10.1080/2159676X.2013.819373.

Thomas, G., & Wilson, M.R. (revision). Playing by the rules: A developmentally appropriate introduction to rugby union. *Journal of Sports Sciences*.

## CONFERENCE COMMUNICATIONS

Thomas, G.L. & Wilson, M.R. (2012). Producing a developmentally appropriate game for Under-11 Rugby Union players. British Psychological Society, Expertise and Skill Acquisition Network Annual Meeting, Liverpool, UK.

Thomas, G.L. & Wilson, M.R. (2012). Producing a Developmentally Appropriate Game for Under-9 Rugby Union Players. *ICSEMIS, Glasgow, UK*

Thomas, G.L., Wilson, M.R., Coles, T.E. (2013). Introducing children to rugby: Exploring mini rugby coaches views on U9 rugby. *Second International Coaching Conference, Crewe, UK*

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Diolch mam a dad am yr holl gefnogaeth dros y blynyddoedd. Cariad xxx

# Chapter 1

## Introduction

### 1.1 Background and context

Since the latter part of the twentieth century, there has been an increase in the number of organized (or competitive) team sports played by children in the United Kingdom (UK), with a corresponding decrease in informal child driven activities, such as street soccer (Coakley & Pike, 2009). In adult-led organised sport, early specialization in one or two sports is common, and serious competition often replaces fun and enjoyment (DeKnop, Engström, Skirstad, & Weiss, 1996). While the emphasis of competitive sport has arguably been on the development of highly skilled and specialized individuals, there has been a steady growth in children pursuing alternative, unstructured child-led activities such as skateboarding (Coakley & Pike, 2009). For the Rugby Football Union (RFU) in England these are significant issues as they aim to ensure mass participation and elite player development within the game. The RFU has a responsibility to continuously retain and attract children to rugby union (Sport England, 2013) and faces an ongoing challenge to ensure that participation in the sport does not decline.

The complexity, physicality and structure of the adult rugby union game, provides the RFU with unique challenges when introducing children to competitive mini rugby games during childhood (7 to 11 years old). The complicated rules and early emphasis on physical contact skills have been identified as possible explanations for children dropping out of the game (MORI, 2003). At each age group level, there are key issues to be resolved around the rules and structure of the game. One of the most contentious issues is whether the development of complex specialised skills (e.g., scrummaging, mauling, kicking) and contact skills could be hindered if not trained from an early age. However, the design of age-appropriate competitive sport is a wider issue in organized children's sport and is not solely an issue for rugby union (e.g. see recent report by Football Association, 2012a).

## 1.2 The RFU Shaping the Game Pilot

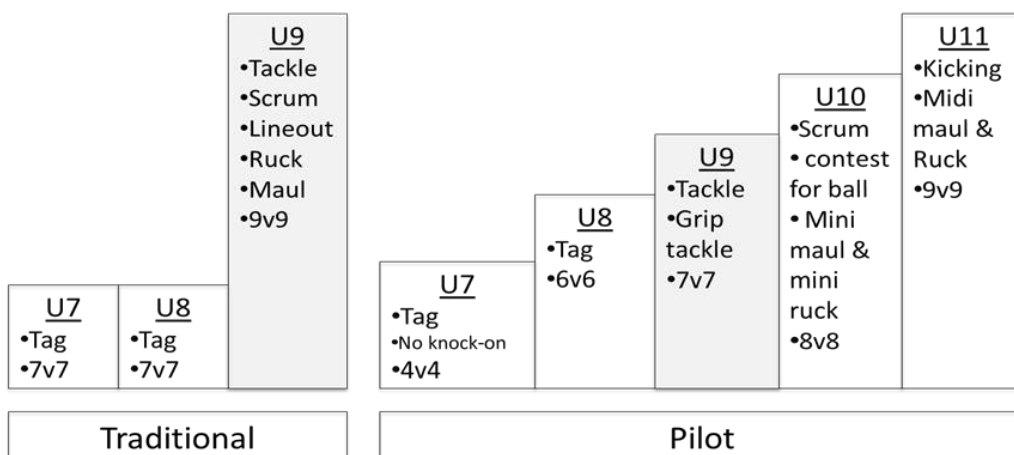
In September 2010, the RFU implemented a 3 year pilot project called Shaping the Game, to trial new (pilot) rules in competitive games from under-7 (U7) through to under-11 (U11). The long-term objectives for the pilot are shown in Table 1.1.

*Table 1.1. The RFU's long-term objectives for the Shaping the Game pilot.*

- Provide a progressive player pathway that will enhance the way in which our players are developed in a more incremental manner.
- Provide a game that is in line with the principles of Child Development based on extensive research and expertise.
- Increase involvement of all players.
- Emphasis on competitive performance not competitive outcome.
- Encourage less structure (encourage skills and discourage fear of failure).
- Make the game easier to understand and referee.
- Less emphasis on contact and more on continuity in early years.
- Rewarding intention to tackle in early years as much as ability to tackle.

The pilot rules were based on recommendations made by the University of Exeter from research commissioned by the RFU (Wilson, Byrne, & Eston, 2009). Previous research for the RFU had highlighted that participation levels in rugby union in England were on the decline and that modified versions of the game were crucial to retaining players and increasing participation levels (MORI, 2003). The primary proposal emerging from the Exeter reports was that mini rugby games were overly based on 'pruned-down' versions of the adult game, and designed without consideration to the development of the child (Wilson et al., 2009). The pilot laws aimed to develop players in an incremental manner by introducing complex skills, such as scrums, at the appropriate age levels (Figure 1.1). The main changes were introduced in the step up from under-8 (U8) to under-9 (U9) where only tackling was introduced in the pilot game. In contrast, in the continuum (traditional) game not only was tackling introduced, but also the set pieces (scrums and lineouts) and breakdown skills (rucking and mauling). The U9 pilot game was intended to be unstructured (more like 'backyard rugby') allowing the other skills to be incrementally added

in following years, while the key skills (evasion, running, passing, catching, tackling) were embedded during the year.



*Figure 1.1. A graded approach to introducing rugby specific skills.*

The Centre for Sport, Leisure and Tourism Research at the University of Exeter worked in partnership with RFU on the Shaping the Game pilot research project. Funded by the Economic Social Research Council (ESRC) and RFU, the Case Studentship Award (i.e. the PhD) informed a Working Party within the RFU with reports on some of the potential implications of making changes to the rules of the game between the ages of 7 and 11. Initially the aim of the PhD had been to focus on analysing matches at all levels from U7 through to U11. However, the focus changed as it became apparent during the first year that the significant changes made at U9 level had raised contentious issues among the coaches and players. Therefore, the U9 age group became the sole focus of the PhD where data collection involved surveys, interviews and match analysis. The behavioural data for the other age groups (U7, U8, under-10 (U10) and U11) were collected and presented in the annual written reports and road-show presentations for the RFU (see Appendices A & B; U11 report to be completed August 2013). While the collection of U9 data occurred during all three years of the pilot, the U7 data was collected during year 1; U8 and U10 data during year 2; and U11 data in year 3.

### 1.3 Theoretical background

National Governing Bodies (NGB) have been urged recently to design practice and competitive activities that are more play orientated and more closely aligned with the informal games children play (Ford & Williams, 2013; Renshaw,

2010). It has been suggested when creating the appropriate game form for children the adult version of the game should be represented in its simplest form to limit demands on players (Almond, 2010). Furthermore, the game should be shaped in order for children of all levels of abilities to progress and develop. Renshaw (2010) argues, when adults design games for children, they should learn from how children design informal games for themselves. He explains that children will design games at a suitable level so that all individuals on the field can be involved in the action.

There has been little empirical focus on the structure of organised competitive *games* for children, however a large body of research has examined the structure of developmental activities in *practice* (e.g. Côté, Baker, & Abernethy, 2007; Williams & Hodges, 2005). Sports participation development models such as the Long-Term Athlete Development Model (Balyi, 2002; LTAD) and the Developmental Model of Sports Participation (Côté, 1999; Côté et al., 2007: DMSP) seek to develop an understanding of the complex engagement, development and dropout patterns that emerge from sports participation (Bailey et al., 2011). The LTAD model proposes that there are five main stages spanning from 6 to 18+ years of age, which provide 'windows of opportunity' to optimize physical athletic development. For example, during the first stage it suggests that developing overall physical ability and fundamental movement skills (FMS) should be prioritised for children U9 years old. The primary aim of the LTAD is to provide a framework for developing children into elite athletes, and according to the model failure to take advantage of the 'windows of opportunities' at each stage will result in unfulfilled athletic performance during adulthood.

The LTAD model has had a worldwide impact on player development; and in the UK it has been adopted and applied in a variety of sports such as rugby union, badminton and gymnastics (Badminton England, 2006; Irish Rugby Football Union, 2006) However, despite its high application in practice the model has been criticised for being one-dimensional; focusing only on physiological factors, and lacking in empirical evidence (Bailey, et al., 2011; Ford, et al., 2011). Although, scientific studies evaluating the application of the LTAD model have been proposed (Ford, et al., 2011), the participant development model that

currently has the most supporting empirical research evidence in sports science is the DMSP (Côté, 1999).

According to the DMSP (Côté et al., 2007), whether sport participation leads to recreational or elite involvement, late specialisation (or early diversification) through the concepts of sampling and deliberate play should be key components of childhood (12 and under) sports experiences (Strachan, Côté, & Deakin, 2011). Deliberate play activities, such as street football, are modified unstructured versions of adult games that place a high emphasis on enjoyment and are usually led by the participants themselves (Côté et al., 2007). Sampling involves participating in a number of different sports during childhood instead of specialising in one sport (Baker, Côté, & Abernethy, 2003; Soberlak & Côté, 2003).

In contrast, the early specialisation pathway suggests that children begin sport participation from an early age; focus on one sport with limited involvement in play in other sports; participate in high amounts of deliberate practice activities, and are involved early in competitive sport (Baker, Cobley, & Fraser-Thomas, 2009). *Deliberate practice* activities are a specific form of training characterised by specialised activities that have the main aim of improving the level of performance beyond its current level. The process demands a high amount of cognitive and physical effort, and is undertaken to improve future performance and not for enjoyment (Ericsson, Krampe, & Tesch-Römer, 1993).

Recent research examining the developmental activities of elite child football players has challenged the interpretations of early specialisation and late specialisation within the DMSP (Ford et al., 2012; Ford, Ward, Hodges, & Williams, 2009; Ford & Williams, 2012). Consequently, a third 'early engagement' pathway to the development of skill expertise in sport has recently been proposed (Ford & Williams, 2013; Ford et al., 2009). This single sport pathway focuses on elite level player development and explains that during childhood players who have reached expert status participate in meaningful amounts of single sport-specific play activities (e.g. modified games). It has been suggested that having three different developmental activity pathways



may be the result of oversimplifying a complex process, or to between-country or sport differences (Ford et al., 2012).

Although the DMSP has been developed to help guide the practice structures that coaches put in place (Côté & Gilbert, 2009), it is suggested that its principles may be general enough to be applied to competitive rules by which sports are played. However, there is a potential philosophical issue in attempting to apply DMSP to the design of competitive rules for sampling years' sport. The DMSP suggests that the sampling years should consist of backyard, unsupervised games without the need for structured, competitive sport (Côté et al., 2007). It is argued that many of these individuals will not yet have the cognitive and social abilities they need to fully understand competitive relationships (Côté & Fraser-Thomas, 2007; Selman, 1971). However, in recent years the growth of organized sporting activities has coincided with the decline in the number of children playing informal sporting activities (Coakley & Pike, 2009). It has been suggested that organized competitive games, alongside deliberate play and deliberate practice, are one of the key developmental sport participation activities during childhood. (Côté, Erickson, & Abernethy, 2013; Ford et al., 2012). With over 700 clubs playing mini rugby union at U9 level alone, it may be productive to guide NGB to make the rules governing these games as developmentally appropriate as possible, in line with the concepts of the DMSP.

To date the research that has attempted to experimentally assess the benefits of deliberate play activities has been sparse. Indeed, the research supporting the DMSP has been retrospective in nature, and there has been no research exploring the opinions of current stakeholders (e.g. coaches and players) regarding the key components of competitive sports participation during childhood.

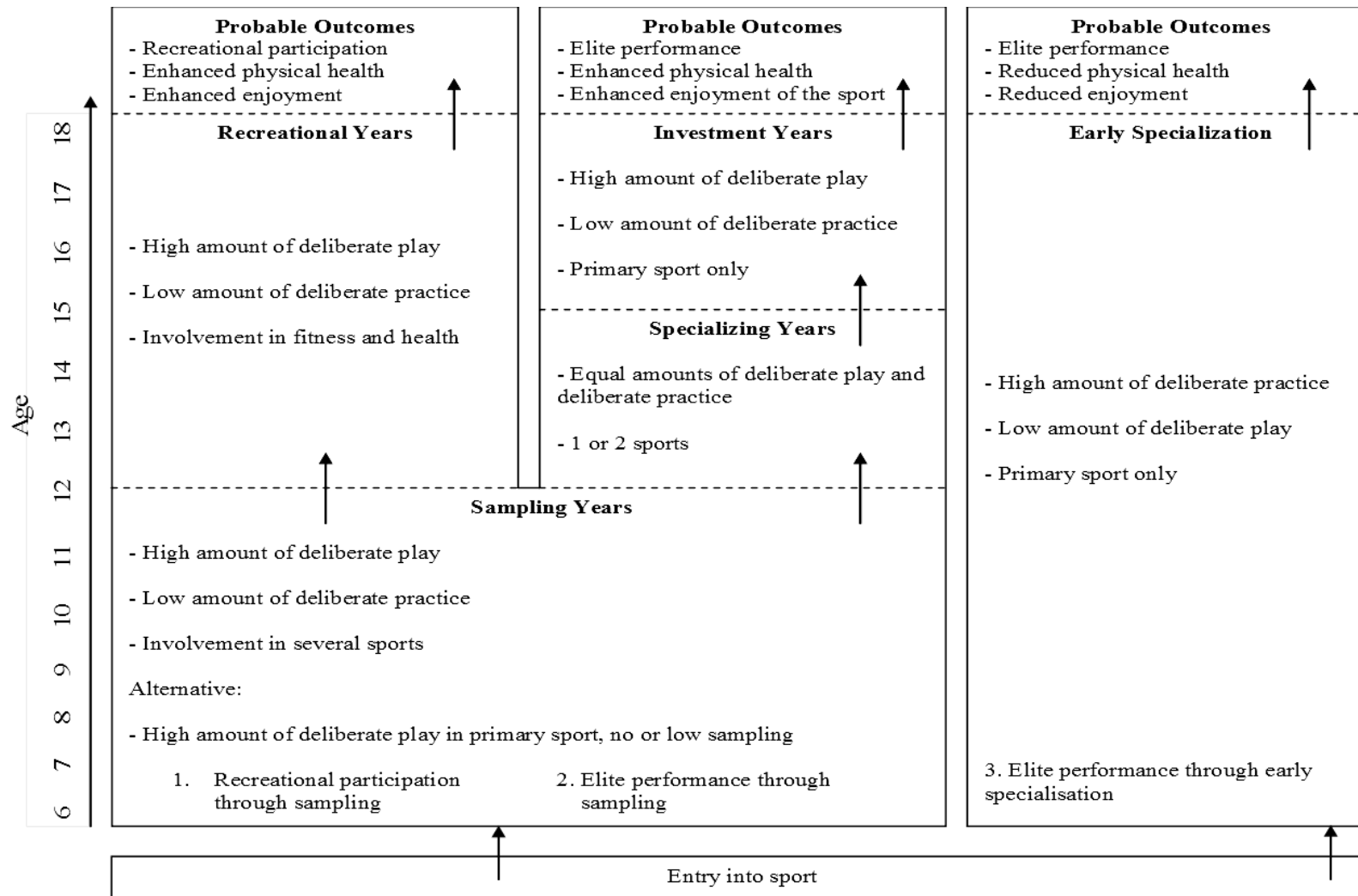


Figure 1.2. Developmental Model of Sports Participation (Côté, 1999; Côté et al., 2007)

## 1.4 Aims and Objectives

The thesis had three aims:

- To explore children's introduction to organized competitive mini rugby union.
- To explore if the current U9 rugby union game should be modified.
- To discuss the practical implications of the findings for the RFU.

To meet these aims the research objectives were:

- To identify what elite coaches, U9 coaches, and U9 players believed were the key components for rugby union participation during childhood.
- To investigate if the conceptual framework from the DMSP could be applied to competitive U9 rugby union games, by manipulating the rules of play.
- To explore whether there were distinct groups of U9 coaches differentiated on the basis of their perceptions of key components for competitive U9 games on principles related to early (i.e. traditional rules) or late (i.e. pilot rules) specialisation.
- To examine whether the opinions of U9 players favoured game behaviours and experiences associated with early (i.e. traditional rules) or late (i.e. pilot rules) specialisation.
- To examine reactions to the introduction of the new pilot rules across a cross-section of U9 rugby coaches.
- To discuss to what extent there is agreement in the opinions of elite coaches, U9 coaches, and U9 players in relation to key components of U9 rugby and the pilot laws.

## 1.5 Research methodology

A mixed methods convergent parallel design was used, where qualitative and quantitative data were collected during the same research phase, separately analysed, and then merged. In order to achieve the aims and objectives of the research, quantitative data from competitive U9 rugby matches and surveys with U9 players and coaches were collected; and qualitative data through interviews with elite coaches. The reason for collecting both types of data was to compare children's introduction to competitive rugby union from different

perspectives, and to develop a more complete understanding of introducing children to rugby than would be obtained by collecting either type of data separately (Creswell & Plano Clark, 2011).

### **1.6 Outline of the research studies**

The first study (Chapter 4) gathered an overview of expert rugby union coaches' opinions of introducing children to competitive rugby through conducting nine semi-structured interviews. The overall aim was to collect qualitative data to identify what these coaches believed were the key components for rugby participation during childhood. Areas of enquiry included identifying the coaches' opinions of participating in competitive game activities during childhood and key components of mini rugby matches. In the second study (Chapter 5), the focus turned specifically to the rules of U9 mini rugby matches. Performance analysis was used to examine the effect of rule changes on the game behaviours of U9 rugby union players. Eight-nine games were filmed to compare matches playing the pilot rules and traditional rules. The aim was to investigate if the deliberate play principles from the DMSPP could be applied to competitive U9 games, by manipulating the rules of play. Both final studies (Chapter 6) concentrated on gathering the opinions of key participants in U9 rugby, the coaches and players, following a season playing the traditional and pilot laws. 202 U9 mini rugby coaches took part in an Internet questionnaire survey that explored participants' opinions and attitudes towards competitive games at U9 level. Opinions of the U9 pilot rules were examined and the coaches provided their thoughts on key elements required for U9 rugby matches. The final study was a survey conducted with 272 U9 rugby players. The study explored the players' opinions of important behaviours and key experiences when playing organized U9 games.

### **1.7 Outline of thesis**

The thesis is comprised of seven chapters, with the first chapter an introduction to the research. Chapter 2 examines the literature on organized competitive activities during childhood, while Chapter 3 presents the research methodology used. The following three chapters present the research studies as stand-alone articles as they were written with the intention of being published as in academic journals. The elite coach qualitative study (Chapter 4) has already been accepted for publication; while the U9 match analysis (Chapter 5) has

been re-submitted for consideration. Following the completion of the thesis, the survey studies identifying the opinions of U9 coaches and players (Chapter 6) will be submitted for publication. The thesis will conclude (Chapter 7) by merging the findings from all studies and presenting an overall interpretation of the research.

### **1.8 Summary**

In the opening chapter, the initial focus was on establishing the background and context for the research, and outlining the project's aims and objectives; the research methodology; and outline of the studies. In the next chapter, attention will turn to reviewing the literature on participant development in rugby union and sport through competitive activities during childhood.

## Chapter 2

### Literature Review

#### 2.1 Introduction

Following on from the introduction to this thesis, this chapter reviews the literature on participant development in rugby union and sport through organised (competitive) activities during childhood. This will be achieved initially by focusing on the most prominent sports participation development models; the LTAD (Balyi, 2002) and the DMSP (Côté, 1999; Côté et al., 2007), to evaluate how they interpret participation and player development through competitive games during childhood. The focus will then turn specifically to discussing the modified rugby union competitive games and practice research conducted at youth and adult level. Next, attention will turn to applying a constraints-led approach to designing competitive games in childhood rugby union. The chapter will conclude with a rationale for the research project, by identifying the gaps in knowledge and explaining why it is necessary to explore children's introduction to competitive rugby union during childhood.

#### 2.2 Player Development and Participation Models

Models of player development in sport seek to develop an understanding of the complex engagement, development and dropout patterns that emerge from sports participation (Bailey et al., 2011). In recent years, many of the sports NGB in England have presented their player development strategies in the form of models (England and Wales Cricket Board, 2005; Rugby Football Union, 2005). These national models set out what are believed to be the key elements in developing player participation and performance from childhood through to adulthood (Bailey et al., 2010). A number of models portraying pathways of youth sport participation and development especially in the UK, have been presented in the literature (Bailey et al., 2010). These include Abbott and Collins' Psychological Characteristics of Developing Excellence (Abbott & Collins, 2004) (Abbott & Collins, 2004); Bailey and Morley's Model for Talent Development (Bailey & Morley, 2006); the DMSP (Côté, 1999; Côté et al., 2007); and the LTAD (Balyi, 2002). However, the focus in this review will first be on the LTAD, which has been one of the most influential models within rugby union (International Rugby Board, 2012a; Irish Rugby Football Union, 2006) and

other sports (Badminton England, 2006; Gymnastics, 2006). The focus will then turn to the DMSP, which has been identified within the sports science literature as the most prominent conceptualization of player development (Bruner, Erickson, McFadden, & Côté, 2009; Bruner, Erickson, Wilson, & Côté, 2010).

### **2.2.1 Long-Term Athlete Development Model**

The LTAD (Balyi, 2002) model has had a worldwide impact on player development; and in the UK it has been adopted and applied by a variety of sports, including the RFU and all other home rugby union nations (i.e. Ireland, Scotland, and Wales). Its influence had been far reaching with the model also being adapted as a coaching framework for athletic development (Balyi & Williams, 2009; Stafford, 2005). The model is split into five main stages that span from 6 to 18+ years of age: FUNdamental phase (6-9 years), learning to train (9-12 years), training to train (12-16 years), training to compete (16-18 years), and training to win (18+ years). As our interest is in childhood rugby, the focus of our discussion will be on the first two stages of the model (for other stages see Balyi, 2002).

These stages of the LTAD model are based on physiological development, with the primary aim of developing children into elite athletes with no reference to the development of recreational participants. A key element of each individual stage is that they provide 'windows of opportunity' to optimize physical athletic development during childhood. For example, during the first FUNdamental stage (boys 6 to 9 years of age and girls aged 5 to 8 years) developing overall physical ability and FMS are prioritised. In the learning to train stage (girls ages of 8 to 11 years, boys 9 to 12 years old) learning general sports skills is the main objective as well as continuing the development of FMS.

According to the LTAD failure to take advantage of these opportunities at both these stages will result in unfulfilled athletic performance during adulthood. However, it appears that there is no evidence to show that failing to take advantage of these "windows of opportunity" with the correct training will restrict development (Ford et al., 2011). The timing and nature of each stage can be influenced by whether the sports consider themselves to be early-specialisation or late-specialisation sports. If a sport places an emphasis on specific sports

training from a young age alongside developing general skills, then it can be considered an early-specialisation sport. However, the model has been adopted by sports that probably consider themselves as late specialisation sports (e.g., rugby NGB).

The main criticisms of the model are that it is one-dimensional; focusing only on physiological factors, and is lacking in empirical evidence (Bailey et al., 2011; Ford et al., 2011). The single dimensional element results in a model that focuses on training and practice with little reference given to the interdisciplinary nature of the development process (Bailey et al., 2010). The model also does not consider different types of developmental activities that are relevant to each stage, and focuses on player development through the development of specific physical skills with no mention of psychological, or social elements. While scientific studies evaluating the application of the LTAD model have been proposed to increase understanding of the developing youth athlete (Ford et al., 2011) the participant development model that currently has the most supporting empirical research evidence in the sports science is the DMSP (Côté, 1999).

## **2.2.2 Developmental Model of Sport Participation**

The DMSP (Côté, 1999; Côté et al., 2007) is a talent development model which outlines two skill acquisition pathways in sport; late specialisation (or early diversification) and early specialisation, which start from childhood through to adulthood (see Figure 1.2). Deliberate play activities form the basis of a late specialisation pathway, while the early specialisation pathway is often linked to deliberate practice activities.

### **2.2.2.1 Late specialisation pathway and deliberate play**

The late specialisation pathway proposes a pathway to continued involvement in sport that consists of four distinct developmental stages: the sampling years (age 6–12), the specializing years (age 13–15), the investment years (age 16+), and the recreational years (ages 13+) (Côté, 1999; Côté et al., 2007). According to the DMSP, whether sport participation leads to recreational or competitive involvement, the concepts of sampling and deliberate play should be key components of early (under 12) sport experience (Strachan et al., 2011). Children in the sampling years should participate in a wide range of sports with the focus being primarily on deliberate play activities; with participation in



competitive sport delayed until the specializing years (age 13–15). Deliberate play activities, such as street football, are modified unstructured versions of adult games that place a high emphasis on enjoyment, and are led by the participants (Côté et al., 2007). These activities are theorized to be essential during early sport experiences because such activities provide an opportunity for young athletes to develop fundamental motor skills, such as running, throwing and jumping, in an enjoyable environment (Baker et al., 2003; Côté, Baker, & Abernethy, 2003).

Support for the benefits of a relatively unstructured and generalised (as opposed to specialised) introduction to sport has been garnered from retrospective interviews with elite performers. For example, (Weissensteiner, Abernethy, & Farrow, 2009) interviewed 14 male expert cricket batsmen to help generate a conceptual model of batting expertise. An important theme to emerge was that a vast investment in unorganised play during the sampling years was important in fostering creativity, problem-solving ability and adaptability. Research in Australian Rules Football (Berry, Abernethy, & Côté, 2008) and other Australian team sports (field hockey, netball and basketball; Baker, et al., 2003) has also revealed the importance of deliberate play activities during the sampling years for developing game related decision-making skills. Players categorised as expert decision-makers by their coaches invested a greater amount of time in a range of deliberate play activities compared to coach-categorised non-experts.

It has been suggested that children who became elite athletes took part in a high amount of deliberate play activities sampled a number of different sports during childhood (Baker et al., 2003; Soberlak & Côté, 2003). With the late specialisation approach there is limited focus on specialising in one sport, structured competition and deliberate practice activities, until the specializing and investment years (Baker, 2003; Côté & Fraser-Thomas, 2008). By adopting a late specialisation pathway individuals are provided with the opportunity to develop a foundation of FMS, sample a variety of playing positions and to discover a sport that they enjoy. Table **2.1** shows seven postulates associated with the DMSP and its various outcomes (Côté, Lidor, & Hackfort, 2009). The first five emphasise the benefits of sampling different sports (postulates 1 to 3)

and high amounts of deliberate play (postulates 4 and 5) during childhood, and the associated performance, participation, personal development outcomes.

*Table 2.1. Postulates associated with the DMSP*

<b>Postulate 1:</b> Early diversification (sampling) does not hinder elite sport participation in sports where peak performance is reached after maturation.
<b>Postulate 2:</b> Early diversification (sampling) is linked to a longer sport career and has positive implications for long-term sport involvement.
<b>Postulate 3:</b> Early diversification (sampling) allows participation in a range of contexts that most favourably affects positive youth development.
<b>Postulate 4:</b> High amounts of deliberate play during the sampling years build a solid foundation of intrinsic motivation through involvement in activities that are enjoyable and promote intrinsic regulation.
<b>Postulate 5:</b> A high amount of deliberate play during the sampling years establishes a range of motor and cognitive experiences that children can ultimately bring to their principal sport of interest.
<b>Postulate 6:</b> Around the end of primary school (about age 13), children should have the opportunity to either choose to specialize in their favourite sport or to continue in sport at a recreational level.
<b>Postulate 7:</b> Late adolescents (around age 16) have developed the physical, cognitive, social, emotional, and motor skills needed to invest their effort into highly specialized training in one sport.

### **2.2.2.2 Early specialisation pathway and deliberate practice**

In the early specialisation pathway children start sport from an early age (e.g., seven years old); focus on one sport with limited involvement in play in other sports; participate in high amounts of deliberate practice activities; and are involved early in competitive sport (Baker et al., 2009). The early specialisation approach emerged from studies in behavioural science where a positive relationship between time spent practicing and level of achievement was confirmed. (Newell & Rosenbloom, 1981). In one of the key studies of chess, a 10 year rule emerged, as it was shown that this amount of time was necessary to reach expert level (Simon & Chase, 1973). This rule has been shown to apply to the development of expertise in a variety of areas such as music (Ericsson et

al., 1993), swimming (Kalinowski, 1985), mathematics (Gustin, 1985), and field hockey (Helsen, Starkes, & Hodges, 1998).

Ericsson and colleagues (1993) introduced the term *deliberate practice* to describe a specific form of training characterised by specialised activities that have the main aim of improving the level of performance beyond its current level. It was indicated that a minimum of 10 years of deliberate practice was a necessary to reach expert status. This type of training demands a high amount of cognitive and physical effort, and is undertaken to improve future performance and not for enjoyment (Ericsson et al., 1993). In team sports such as football and hockey it has been shown that elite athletes can be distinguished from non-elite athletes based on the amount of time spent practicing specific skills (Helsen, Hodges, Van Winckel, & Starkes, 2000; Helsen et al., 1998). Research supporting the deliberate practice approach has identified that sport-specific practice is essential from an early age due to the lack of transferrable skills between sports and is a key to developing anticipatory and perceptual skills displayed by experts in a variety of sports (Renshaw & Fairweather, 2000; Wood & Abernethy, 1997).

Further evidence supporting early specialisation has been shown among elite gymnasts (Law, Côté, & Ericsson, 2007) and in English football where youth football players in the sampling years didn't play a variety of sports, didn't appear to take part in more play activities, and specialised in one sport from a young age (Ward, Hodges, Starkes, & Williams, 2007). However, research has also suggested that early childhood specialisation may lead to negative consequences such as reduced physical health (Law et al., 2007), dropout, burnout, overuse injuries, and decreased enjoyment (Baker et al., 2009).

### **2.2.3 Early engagement pathway to elite performance**

Recent research examining the developmental activities of elite child football players, has challenged the interpretations of early specialisation and late specialisation within the DMSP (Ford et al., 2012; Ford et al., 2009; Ford & Williams, 2012). Consequently, a third 'early engagement' pathway to the development of skill expertise in sport has recently been proposed (Ford & Williams, 2013; Ford et al., 2009). This single sport pathway focuses on elite level player development and explains that during childhood players who have

reached expert status participate in meaningful amounts of single sport-specific play activities (e.g. modified games). This pathway was investigated by Ford and Williams (2012) with two groups of soccer players in England, who had either progressed to professional status in late adolescence or those who had not reached professional status. Those who became professionals spent a greater amount of hours in soccer play activities and soccer practice activities compared to those who did not during childhood (for developmental activities in different countries, see Ford et al., 2012). The early engagement pathway suggests that in order to develop expert football players there needs to be an appropriate balance between deliberate practice activities in the primary sport and soccer-specific play activities during the sampling years (Ford & Williams, 2013). Findings from national basketball, handball, field hockey, and soccer players have also shown that both deliberate practice and unstructured play-like activities both have crucial roles to play in player development (Memmert, Baker, & Bertsch, 2010). It has been suggested that having three different developmental activity pathways may be the result of oversimplifying a complex process, or to between-country or -sport differences (Ford et al., 2012).

As this review demonstrates, although there has been a significant amount of research examining participation and the structure of children's practice, to date there has been little research exploring the development of competitive games during childhood. Findings have shown that there is participation in organized competitive activities during childhood. Research has shown that ice hockey players from minor to elite level participated in organized competitive sports activities during the sampling years (Soberlak & Côté, 2003; Wall & Côté, 2007). In soccer, alongside deliberate practice and play activities competitive games form part of a player development pathway during childhood (Ford et al., 2012).

### **2.3 Informal and formal childhood games**

Observations of informal player-controlled and formal adult-controlled games during childhood suggest that child-led games have different aims to adult-led games (Coakley & Pike, 2009). Over a 12-month period, 84 informal games were observed in settings such as back gardens and parks, and interviews conducted with participants. The result indicate that when children designed their own games and played without adults they were interested in four things:

being involved in the action; having action situations that lead to scoring; an exciting experience; and playing with friends (Coakley & Pike, 2009). Although these informal games shared similarities with organized games, they were modified to keep the score close; and to produce the highest possible levels of action, scoring and personal involvement (e.g., by applying handicapping systems). In contrast to these *action*-centred observations of informal games, formal organized adult-controlled games are described as *rule*-centred (Coakley & Pike, 2009). As part of the research process, 121 formal games were observed over a 12-month period and interviews conducted. A key element of these games was the strict application of the rules by adults (i.e. referees or coaches), with the importance of structure highlighted, for example, through playing positions. The skill level of players determined the amount of playing time, with the less skilled individuals playing least often. Overall, informal game experiences revolved around maintaining action, through making decisions and managing relationships between players. On the other hand, in the formal games, learning and following the rules of the game were crucial, as was complying with the referee.

## **2.4 Modified Games Research**

The observations discussed above appear to be the only research on informal and formal games. To date, there has only been one study, to the author's knowledge, which has attempted to experimentally assess the benefits of deliberate play activities. The study analysed whether a deliberate-play training programme would have an effect on the tactical game intelligence and tactical creativity of 22 basketball players, aged 10 to 12 years (Memmert et al., 2010). Over a period of 18 lessons' one group took part in deliberate-play training program involving a series of small-sided games (e.g. 1v1, 3v3), while the other group trained in more traditional unopposed blocked exercises (e.g. dribbling). Tactical intelligence and creativity was assessed before and after each lesson, and it was found that the deliberate-play training programme had positive effects on tactical creativity.

### **2.4.1 Modified competitive childhood games research**

To date no scientific research investigating the impact of rule manipulations on player behaviours in childhood competitive rugby games appears to have been conducted. Indeed, experimental studies exploring player behaviours in

any team game during childhood is sparse. To the author's knowledge there have also been no studies exploring the views of coaches on competitive sport participation during childhood in any sport; while there have been limited studies examining players' views. None of the studies have used mixed methods research.

The Australian Rugby Union recently conducted a review into its rugby pathway from under-6 (U6) to under-12 (U12) (Australian Rugby Union, 2010). At U8 where contact is first introduced, competitive matches were filmed (there was no record of how many games in the 'published' report) across a four week period in two different areas, and an online survey conducted with 77 coaches and parents. Team numbers were reduced from 10v10 to 7v7. Data was collected from matches involving 24 teams allowing for comparisons to be made between team and player involvement in categories such as runs, tries, passes, and tackles. The results showed that in 7v7 matches there was a 31% increase in player activity with 50% more tries and 65% more evasion and ball handling per player per 30 minutes of play. In 30 minutes of 7v7 mini rugby player activity matched that of 40 minutes of 10-a-side mini rugby matches. The survey results showed that 91% of parents and 89% of coaches said their child enjoyed the 7v7 pilot and felt that they were highly involved in the game. Overall, it was suggested that the 7v7 pilot was an effective game to increase activity levels and the number of tries scored, while allowing for increased continuity and confidence when introducing the tackle to children.

Another relevant example of competitive games research was the Manchester United Football Club (MUFC) U9 soccer experiment in the 2002-03 season, where rules in competitive matches were also manipulated (Fenoglio, 2004). Instead of playing a single 8v8 competitive match, players were divided into teams of four and then played four different conditioned small-sided games on a rotational basis. Quantitative data was collected through an analysis of matches (number of games not stated) and qualitative data from feedback and interviews with 23 Academy Directors and club coaches, 26 parents, and 22 players. The fundamental concept guiding the developers of the scheme was to recreate more street soccer (i.e. deliberate play) scenarios. Compared to 8v8 games of similar durations, the players involved had 585 more passes, 481 more scoring attempts, 301 more goals, 525 more 1v1 encounters and

demonstrated 436 more dribbling skills (across 15 fixtures; Fenoglio, 2004). The qualitative data revealed positive feedback for the 4v4 games; with 361 (80%) positive comments and 80 (20%) negative comments. 75% of responses from the Manchester United FC players revealed they preferred the 4v4 games, although they enjoyed 'shooting into real goals' in the 8v8 games. The 4v4 games brought significantly more challenges to players in passing, shooting, scoring, dribbling and handling 1v1 situations. According to the negative responses, these challenges were perhaps at the expense of increases in tactical awareness, physicality and 'competitiveness'. Neither the Fenoglio or Australian Rugby Union studies undertook a rigorous peer review process or were published in scientific journals.

One of the few studies published in a scientific journal, focused on the effect of rule modifications and player perceptions of these changes in a 4<sup>th</sup> grade (8 to 9 years old) flag (non-contact) American football league (Burton, O'Connell, Gillham, & Hammermeister, 2011). Quantitative data was collected to examine the impact of introducing a new defensive rule and a modified ball size on scoring and player dropout during the season. The changes in scoring and dropout were measured through official league records and participants opinions collected through a post-test survey; however, no matches were filmed to examine player behaviours. The results showed that compared to the previous season, scoring during games increased by over 100% and player dropout levels fell by more than 50% (Burton, et al., 2011). The player surveys showed that two-thirds of respondents preferred high scoring, games with lots of action, while three-fifths enjoyed close scoring games.

#### **2.4.2 Youth practice (small-sided) games**

To date there has been no research examining the impact of manipulating game rules on youth participants' behaviours in rugby union practice environments. Indeed, there has been limited research examining the impact of small-sided games in youth practice settings. In a childhood soccer game practice study, the number of players on both teams were manipulated in second (7 and 8 years old) and fourth-grade (9 and 10 years old) practice soccer matches (Brown, Wisner, & Kontos, 2000). The findings suggest that there were significant increases in the number of passing and dribbling skills

performed by players in games played with 7-a-side on a smaller pitch, compared to 11-a-side on a normal pitch.

In a similar study in basketball, playing numbers were manipulated to examine the total amount of learning opportunities for 30 participants aged 10 to 11 years old (Tallir, Philippaerts, Valcke, Musch, & Lenoir, 2012). Video analysis was conducted on five minute game situations comparing 3v3 sided games with 5v5 situations. The results suggest that there were more learning opportunities during 3v3 game play, with significantly higher scores for cognitive decision making opportunities, and motor skill execution. However, players playing 3v3 on a smaller court had significantly lower average heart rates when compared to the 5v5 games.

#### **2.4.3 Adult modified games research**

Studies in adult practice environments have examined manipulating the number of players on a team and the size of pitches in small-sided football games.

When changes were made to the number of players on each side it has been shown that ball possession (per individual) increases three fold when comparing 3v3 to 7v7 games over a twenty-minute period (Rampinini et al., 2007). This would suggest that small-sided games can provide more opportunities to be in possession of the ball (or be about to receive the ball) and to make decisions about what to do next. It has also been found that changing the pitch size can increase the amount of technical action completions in a small-sided game. While the player numbers were kept the same to determine the effects of changing the pitch size, it was found there were more shots and more tackles on the smallest pitch (Kelly & Drust, 2009).

The majority of studies into small-sided games with adults have focused on physiological responses to game-based training. The bulk of research has shown that game-based training reliably simulates the physiological demands of competition; and provides a training stimulus that improves fitness to a similar or greater extent than traditional conditioning exercises with no skill element included (for review, see Hill-Haas, Dawson, Impellizzeri, & Coutts, 2011). The majority of studies reported that an increase in pitch size and fewer players results in an increase in physiological and perceptual stimuli responses (Hill-



Haas, Coutts, Rowsell, & Dawson, 2008; Kelly & Drust, 2009; Rampinini et al., 2007).

Game-based training in rugby union and other sports has been studied infrequently (for review, see Gabbett, Jenkins, & Abernethy, 2009). From the limited research in both rugby codes research has indicated that skill-based conditioning games improved endurance fitness of elite-level rugby union players over a 9-week pre-season training period (Gamble, 2004). In more recent research (Kennett, Kempton, & Coutts, 2012) focused on the influence of manipulating the number of players on each team and pitch size on training stimulus during small-sided rugby union games. Twenty semi-professional players played in three small-sided game formats of 4v4, 6v6, and 8v8, on small (32 x 24m) and large pitches (64 x 48m). Significant differences were found in mean speed, high-speed running and distance, and perceptual responses; with fewer players and larger size pitches producing greater perceptual and physiological responses, and time-motion demands.

Research in rugby league has focused on the effects of manipulating small-sided games pitch sizes on the skill and physiological demands of elite youth and senior rugby league players (Gabbett, Abernethy, & Jenkins, 2012). Over a period of two days, teams played two small-sided games of 8-minutes duration on a small field (40m x 10m), and a larger field (70m x 40m). The results suggested that in small-sided games the physiological demands increased with an increase in pitch size but had little influence on the volume or quality of skill executions in elite rugby league players. Research in this area has identified the importance of game-based training from a physiological development perspective and also highlighted the need for future research to identify the role of different small-sided games formats in developing tactical awareness and decision making (Gabbett et al., 2009; Hill-Haas et al., 2011).

## **2.5 A constraints-led approach to age-appropriate competitive games**

A constraints-led approach presents a framework for designing developmentally appropriate competitive rugby union matches based on deliberate play principles (Davids, Button, & Bennett, 2008; Ford & Williams, 2013). The constraints model has been applied in practice environments by coaches to develop motor learning skills of athletes (Davids et al., 2008; Davids, Williams,

Button, & Court, 2001). Within a learning environment, players' actions and decisions are influenced by factors that act as constraints (Newell, Broderick, Deutsch, & Slifkin, 2003). Three types of constraint can interact to elicit behaviours: *Individual constraints*, such as technical skills and motivation; *task constraints*, such as the rules of the game or number of players on each team; and *environmental constraints*, such as the behaviour of the coach (Newell, 1986). For instance, reducing the number of players and playing with a smaller sized ball could encourage greater individual involvement for all participants and increase passing attempts. Understanding how constraints influence players' actions and decisions can inform the design of U9 mini rugby games, to promote positive behaviours and enhance understanding of the principles of play (Ford & Williams, 2013).

## **2.5.1 Manipulating constraints**

### **2.5.1.1 Individual constraints**

Understanding the needs of children can assist in providing optimal opportunities for learning and development in competitive U9 rugby matches. The physical, cognitive, and affective domains have been identified as important areas of learning for young children and can be the foundation for lifelong participation in sports (Murphy & Ni Chroinin, 2011). Within the physical domain, key elements for designing developmentally appropriate games are to understand how children grow, mature and develop FMS (Newell, 1986). FMS are the gross motor movements, such as stopping, dodging and throwing, that lay the foundations to complex and specialised skill development (Murphy & Ni Chroinin, 2011). It has been identified that childhood presents the optimal window for developing FMS as following this period they become more difficult to master (Gallahue & Ozmun, 2006; Thomas & Thomas, 2008).

At U9 level children are in the transitional stage of the specialized movement phase, where they seek challenging situations to test their fundamental motor skill capabilities (Gallahue & Ozmun, 2006). Fundamental movement patterns, such as dodging, passing and running, once mastered can be combined in more complex forms as specialized skills, such as in attack during a game. Typically, at U9 children are more proficient in manipulative tasks, such as passing, and are beginning to demonstrate skills in sports and

physical education settings (Doherty & Hughes, 2009). It has been suggested that FMS can be impaired if children begin to focus on complex movement skills before establishing a solid foundation of basic skills (Gallahue & Ozmun, 2006). It is recommended that the introduction of complex skills should wait until the teenage years (Application stage: 11 to 13 years old) when physical and cognitive skills are advanced (Gallahue & Ozmun, 2006).

From the age of six years onwards within single-year age groups, children advanced in maturity are, on average, taller and heavier than peers who are average or late in maturity status. This can result in children with significantly different levels of biological maturity despite being of the same chronological age (Malina, Cumming, Kontos, et al., 2005; Malina, Cumming, Morano, Barron, & Miller, 2005). In U9 sport, a one-year age difference can exist between the oldest and youngest players. Between these individuals, this relative age effect is linked to significant differences in cognitive, physical, emotional and skilled performance (Helsen, Van Winckel, & Williams, 2005).

As well as these physical elements, the level of cognitive development is crucial for decision making where children must decide when to pass the ball, based on their understanding of their own body and movement potential (Gallahue & Cleland Donnelly, 2003). Based on Piagetian theory (Piaget, 1969) at U9, children are in the concrete operations phase (7- to 11-years). Here, players are beginning to make simple decisions based on what the present display affords (i.e. what is in front of them); for instance to close down space and tackle a player in possession. McMorris and colleagues (2006) contend that in the concrete operations stage, the child would be able to think through a series of events or actions and, as such, understand what happened and why.

It has been suggested that U9 players should not be exposed to early position specialization, as they do not have the cognitive capabilities or social experience to understand a specific role within a team (Coakley & Pike, 2009). Understanding their position on the field is extremely difficult for children as they have to mentally visualise the continuously changing positions of teammates and opponents covering the whole pitch; be able to consider the spatial relationship between all players in relation to the ball; and combine both to decide their position on the field, (Coakley & Pike, 2009). In rugby union there is

also the added complexity of the ever-changing location of the offside line, especially in relation to set-pieces, rucks, mauls and open play.

Personal and social development during rugby matches, provide opportunities for affective growth such as increasing self-esteem and promoting positive socialisation. According to Weiss and Williams (2003), children are looking for experiences that are challenging, fun and enjoyable, that lead to increased self-esteem and confidence. Game involvement has been linked to fun (Bengoechea, Spence, & McGannon, 2005) and experiencing fun and excitement through deliberate play is also seen as key for developing intrinsic motivation for sport (Côté et al., 2003).

### **2.5.1.2 Environmental constraints**

In England, factors such as the weather have to be considered when deciding when to play competitive games. For example, wet and windy conditions can impact playing behaviours and motivation of individual players. Positive parental involvement has been linked to athlete enjoyment (Ericsson, 2007; Fraser-Thomas & Côté, 2009; McCarthy & Jones, 2007), and the touchline behaviour of coaches and parents can have an influence on performance. In childhood team sports matches, research has shown coaches have a tendency to use more negative comments than positive comments in competitive environments (Walters, Schluter, Oldham, Thomson, & Payne, 2012). For many individuals, having constant shouts of 'spread out' and 'run straight' in U9 matches may have a detrimental effect on their game experience (Coakley & Pike, 2009). However, coaches also have the potential to be a positive influence on performance by focusing on 'why', 'how', and 'judgement' questions during breaks in play to enhance player game understanding (Morgan, 2012).

### **2.5.1.3 Task Constraints**

For a governing body, like the RFU, rules are perhaps the most obvious constraint to adapt in order to elicit a positive change in players game behaviours. Manipulating task constraints can be achieved by "bending the rules" to allow for the development of desired skill behaviour in players and to promote learning during matches (Davids et al., 2008). This category of constraints also includes the numbers of players involved in games, the size of the playing area, and the type of equipment used. When creating the

appropriate game form for children the adult version of the game should be represented in its simplest form to limit demands on players. Furthermore, it should be shaped in order for children of all levels of abilities to progress and develop (Almond, 2010). Renshaw (2010) argues that when adults design games for children, they should learn from how children design informal games for themselves. He explains that children will design games at a suitable level so that all individuals on the field can be involved in the action.

Recent research has suggested that game understanding should begin in rugby union by developing tasks that allow players to become familiar with the principles of play (Passos, Araújo, Davids, & Shuttleworth, 2008; Passos, Araújo, Davids, & Shuttleworth, 2010). The principles of play are simple guidelines for team play, which in attack are: to gain possession; go forward; support the ball carrier; maintain continuity; apply pressure; and score. The defensive principles are: to move forward to reduce time and space for the attacking team; to provide support for teammates by covering the field and communicating effectively; to apply pressure to force mistakes; and to regain possession to set-up a counter attack (International Rugby Board, 2012b; Passos et al., 2010).

Mitchell and colleagues (2006) suggest that when creating a game in a training environment it is essential to identify key tactical problems and associated skills so that task constraints can be manipulated to match the players' developmental level (see table 2.2).

Table 2.2. Framework to identify key tactical problems and skills at U9

<b>Under - 9</b>	
<b>Skills in possession and defence.</b>	<ul style="list-style-type: none"> <li>- Running with the ball.</li> <li>- Passing.</li> <li>- Tackling.</li> </ul>
<b>Off the ball movement</b>	<ul style="list-style-type: none"> <li>- Supporting the ball carrier.</li> <li>- Adapting field position as play develops.</li> <li>- Covering teammates</li> <li>- Returning to restart positions.</li> </ul>
<b>Tactical – Problems.</b>	
<i>Scoring: Attacking</i>	Keeping possession of the ball through running forward. Scoring tries. Drawing a defender to pass.
<i>Preventing Scoring: Defending</i>	Defending the try-line/space. <ul style="list-style-type: none"> <li>- Tackling a player.</li> <li>- 2 v 2 marking an opponent.</li> <li>- Pressuring the ball as a team.</li> </ul>
<i>Restarting Play</i>	Free pass to teammate.

As a player's game understanding and skills develop, they move on to the next age group where the complexity of the game increases through the adjustment of task constraints. For example, at U9, one solution to the tactical problem of scoring is to apply the principles of the game - gaining possession of the ball and moving forward effectively towards the try-line. The player in possession needs decision-making skills such as the tactical ability to identify space and the fundamental motor skills to run and evade opponents. Players in support need to be able to run and change direction and place themselves in the best position to support the ball carrier. The ability to make a decision during games with or without the ball is equally as important as how a skill is performed (Mitchell et al., 2006; Williams & Ward, 2007).

## **2.6 Gaps in knowledge**

This review of the literature focused on participant development in rugby union and sport through organised (competitive) activities during childhood. As the review shows, although there has been a significant amount of research examining participation and the structure of children's practice, to date there has been little research exploring the development of competitive games during childhood. To date, research supporting the DMSP has been retrospective in nature, and there appears to be no research exploring players' and coaches' views on competitive participation. Indeed, there have been few experimental studies assessing the benefits of deliberate play. Performance analysis research investigating the impact of rule modifications on player behaviours in childhood competitive rugby or any sport is also limited. To the authors' knowledge there have also been no studies exploring the views of coaches on competitive sport participation during childhood in any sport; while there have been limited studies examining the players' views. The studies in Chapters 4, 5 and 6 will attempt to address the gaps identified in the knowledge by exploring the introduction of children to competitive rugby union during childhood. Research exploring elite coaches, U9 coaches, and U9 players' views will add to an area that to date has been overlooked; while the U9 match analysis investigating deliberate play is novel and original contribution to this research area.

## **2.7 Summary**

In this chapter, the literature on participant development in rugby union and sport through competitive activities during childhood was reviewed. In the next chapter, the philosophical and methodological underpinnings of the research will be discussed, and the value of using a mixed methods approach highlighted.

## Chapter 3

### Methodology

#### 3.1 Introduction

In this chapter, the focus initially will be on the philosophical and methodological underpinnings of the research, and the value of using a mixed methods approach. The opening section will present the research background by presenting an overview of the Shaping the Game project. Following this, there will be a discussion of the philosophical issues involved; and the dialectic pluralism approach introduced as the most effective approach to fulfilling the research objectives. Next, the mixed methods research designs will be introduced and the convergent parallel approach used in the research explained. Finally, there will be an introduction to the research methods used in the four studies.

#### 3.2 Background

In England, the rules of age-group rugby union are overseen by the RFU (Rugby Football Union, 2011). As part of the Shaping the Game research, the counties of Durham, Hampshire, and Warwickshire volunteered to play the U9 pilot rules throughout the 2010/11 season and 2011/12 season and were selected to represent the north, midlands and south of England. Devon, Gloucestershire and Cheshire, from the remaining 26 counties still playing the traditional laws, were selected on the basis of a similar geographical spread.

At U8, the children played a modified game (6v6) involving no contact, where 'tackles' were made by removing a velcro tag from an opponent's belt (Tag rugby). In the traditional rules at U9 (Table 3.1), not only was tackling introduced, but also set pieces (scrummaging and lineouts) and breakdown (contact) skills of rucking and mauling. In the pilot rules at U9, only tackling was added to the evasion game played at U8, and there were fewer numbers playing compared to the traditional rules (7v7 compared to 9v9) and there was negligible difference in the dimensions of the playing field. As the pilot game had no competition for the ball in a standing tackle (a maul), a 'tackle' was called by the referee after 3 seconds if the attacker was not brought to ground.



*Table 3.1. Key differences in traditional rules and pilot rules in U9 rugby*

	<b>Traditional</b>	<b>Pilot</b>
<b>Number of players</b>	9 v 9	7 v 7
<b>Scrum and Lines-out</b>	Yes	None
<b>Rucks and Mauls</b>	Yes	None
<b>Tackling</b>	Yes	Yes
		3 second tackle allowed.
<b>Field of play</b>	60 x 35m	60 x 30m

The rationale for the U9 pilot rules was based on the concepts of late specialisation and deliberate play (Wilson et al., 2009). The aim was to provide an unstructured game; promoting high involvement and fewer breaks in play; less emphasis on contact skills; and a greater focus on developing key FMS such as passing and evasion. On the other hand, the traditional rules are very much aligned the concept of early specialisation, with a highly structured game focused on the complex specialised team and individual skills (scrums, lineouts, rucks and mauls) from the full adult game.

### **3.3 Philosophical foundations**

In this section, I will briefly summarise the key philosophical issues that informed the mixed methods research approach adopted. All types of research have an underlying philosophical foundation relating to gaining knowledge, and these philosophical assumptions shape the research process and guide inquiry (Guba & Lincoln, 2005). These “basic set of beliefs that guide action” are often referred to as paradigms (Guba, 1990, p. 17). In this mixed methods research thesis, paradigms are defined as epistemological stances with unique belief systems (Morgan, 2007). Within this definition ethical, ontological and epistemological assumptions result in different assumptions about the nature of systematic inquiry (Guba & Lincoln, 2005). Therefore, each paradigm has different philosophical assumptions, resulting in different methodological assumptions, influencing the choice of research methods (Mertens, 2012).

In this mixed methods research a dialectic pluralism philosophical stance was adopted (Greene & Hall, 2010). By locating the research within this stance,

all paradigms could contribute to the research, allowing for a greater understanding of the research problem. As Greene and Hall (2010) explain,

a dialectical stance actively welcomes more than one paradigmatic tradition and mental model, along with more than one methodology and type of method, into the same inquiry space and engages them in respectful dialogue one with the other throughout the inquiry (page 124).

Within this stance, a researcher can collect quantitative data in line with the beliefs of the positivist paradigm, and qualitative data with the interpretive paradigm. A positivist paradigm, which underpins a scientific method, produces objective knowledge allowing for the generalization of findings (Cohen, Manion, & Morrison, 2011). On the other hand, an interpretive paradigm sees the world from multiple realities, using the participants' perspective to gain a deeper understanding of experience (Cohen et al., 2011). Consequently, these assumptions influence the choice of research methods, with a positivist approach generally using traditional deductive approaches such as experiments; and the interpretive paradigm using inductive techniques such as participant observation. The strength of a dialectic pluralism stance is that the divergence found between these different research approaches enhances understanding (Mertens, 2012). Table 3.2 provides a summary of the philosophical underpinnings of positivist and interpretive paradigms drawing from Cohen and colleagues (2011), Creswell and Clarke (2011), and Sparkes (1992). Given that the objectives of the thesis was to examine behaviours of players during U9 matches and to explore the attitudes and opinions of players and coaches, dialectical pluralism was considered the appropriate stance in which to frame the research.

### **3.4 Research in the Sports Sciences**

In the sports sciences mixed methods research has been sparse, with positivism the dominant influence on research methods (Moran, Matthews, & Kirby, 2011). The extent of this influence is illustrated in the sport and exercise psychology literature, where from 500 papers published over a ten-year period in the three leading journals (Journal of Applied Sport Psychology, Journal of Sport and Exercise Psychology and The Sport Psychologist) 83% used traditional quantitative methods (Culver, Gilbert, & Trundel, 2003).

*Table 3.2. Philosophical assumptions underlying positivist and interpretive paradigms.*

<b>Assumptions</b>	<b>Positivist</b>	<b>Interpretive</b>
<b>Ontology:</b> What is the nature of reality?	Reality is objective, singular, and can be measured.	Reality is subjective, multiple as seen by research participants.
<b>Epistemology:</b> What is the relationship between the researcher and those being researched?	Researcher keeps distance and impartiality.	Closeness between researcher and those being researched.
<b>Axiology:</b> What is the role of values?	Research is unbiased.	Acknowledgement by the researcher that biases are present their work.
<b>Methodology:</b> What is the process of research?	Idiographic and deductive. Test on a priori theory to discover general laws.	Nomothetic and inductive. Focus on participants views, to build up patterns, theories and generalizations.

Positivism generally leads to the adoption of quantitative methods, and its strengths lie in the belief that human behaviour can be studied through general and universal laws. However, the approach is less successful in the study of complex human behaviour and interaction (Cohen et al., 2011). Over the past 20 years, this has led to the gradual growth in studies using the interpretive paradigm, through qualitative research methods (Moran et al., 2011). Generally, qualitative researchers use small samples to gather data on the complexity of individual participants' experiences and perspectives; while inductive methods generate theories to further gain an in-depth understanding of individuals.

In recent years, mixed methods research has been advocated as an approach to combine the strengths of quantitative and qualitative approaches, to overcome the limitations of individual use (Creswell & Plano Clark, 2011; Moran et al., 2011). The limited amount of journal articles in the sports sciences

have included conducting notational analysis and interviews with female middle distance runners (Brown, 2005); analysing heart rate, self-report questionnaires and focus groups data with university college swimmers (Kennedy, Tamminen, & Holt, 2013); and mixing methods to assess a coach's decision making with an injured gymnastic athlete (Vergeer & Lyle, 2007).

In this thesis, a mixed methods approach was identified as the most effective approach to address the research aims and objectives. Using quantitative research enabled the generalization of U9 players' behaviours during matches; and their opinions of playing the game at this level alongside the opinions of U9 coaches. On the other hand using qualitative methods, (semi-structured interviews) allowed elite coaches to express their in-depth opinions of competitive participation in mini rugby. Consequently, using these different methods enabled the triangulation of findings to corroborate meaning, and enhance research findings (Camerino, Castañer, & Anguera, 2012).

### **3.5 Mixed methods research**

#### **3.5.1 Definitions and characteristics**

There are several definitions of mixed methods research that focus on methods, philosophy, methodology, research process, and research design (Creswell & Plano Clark, 2011). Although a general definition has been sought there has been no agreement on an appropriate version to use in practice (for discussion, see Johnson, Onwuegbuzie, & Turner, 2007). Johnson and colleagues (2007) identified 19 different definitions in published mixed methods research that included a number of diverse perspectives such as the scope for mixing and the elements driving the research. They offered the following composite definition that will be used in this research,

Mixed methods research is a type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g. use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration (Johnson et al., 2007, p. 123).

Although debates over a definitive definition continue there are a number of key characteristics associated with mixed methods research (Teddlie & Tashakkori, 2011). These characteristics include the belief that multiple

methods are compatible and that the underlying philosophy can consist of a variety of paradigms. Other elements identified by Teddlie and Tashakkori (2011) are that a continuum of options can be applied instead of either-or dichotomies (e.g. thematic or statistical analysis); while both deductive and inductive logic are considered as part of the cycle of research. Finally, despite different names used there's general agreement on basic mixed methods research designs and analytical procedures. The importance of the research objectives is crucial to determining the selection of research methods.

### **3.5.2 Mixed methods research designs**

Three mixed methods research designs were considered for use in this thesis, which were convergent parallel; explanatory sequential; and exploratory sequential (Creswell & Plano Clark, 2011). In a convergent parallel design qualitative data and quantitative data are collected and analysed separately during the same research stage; and the results merged to produce an overall interpretation. On the other hand, the explanatory sequential design has two phases. The first is the collection and analysis of quantitative data, followed by qualitative data collection and analysis. The second qualitative phase aims to explain and enhance the quantitative results. Alternatively, the exploratory sequential design differs from the explanatory sequential design, through the collection and analysis of qualitative data instead of quantitative data during the first phase.

### **3.5.3 Convergent parallel design**

A mixed methods convergent parallel design was used in this study, where qualitative data and quantitative data was collected and analysed during the same research stage and the results merged to produce an overall interpretation (Creswell & Plano Clark, 2011). This approach was selected to collect diverse but complementary data ensuring a more thorough and comprehensive understanding of the research problem (Smith & Smoll, 2007). A convergent parallel design differs from the explanatory and exploratory sequential approaches as both types of data play an equally important role in addressing the research objectives and aims. This allows both strengths of qualitative research, such as small samples and in-depth interpretations, to be combined with the strengths of quantitative research, large samples and

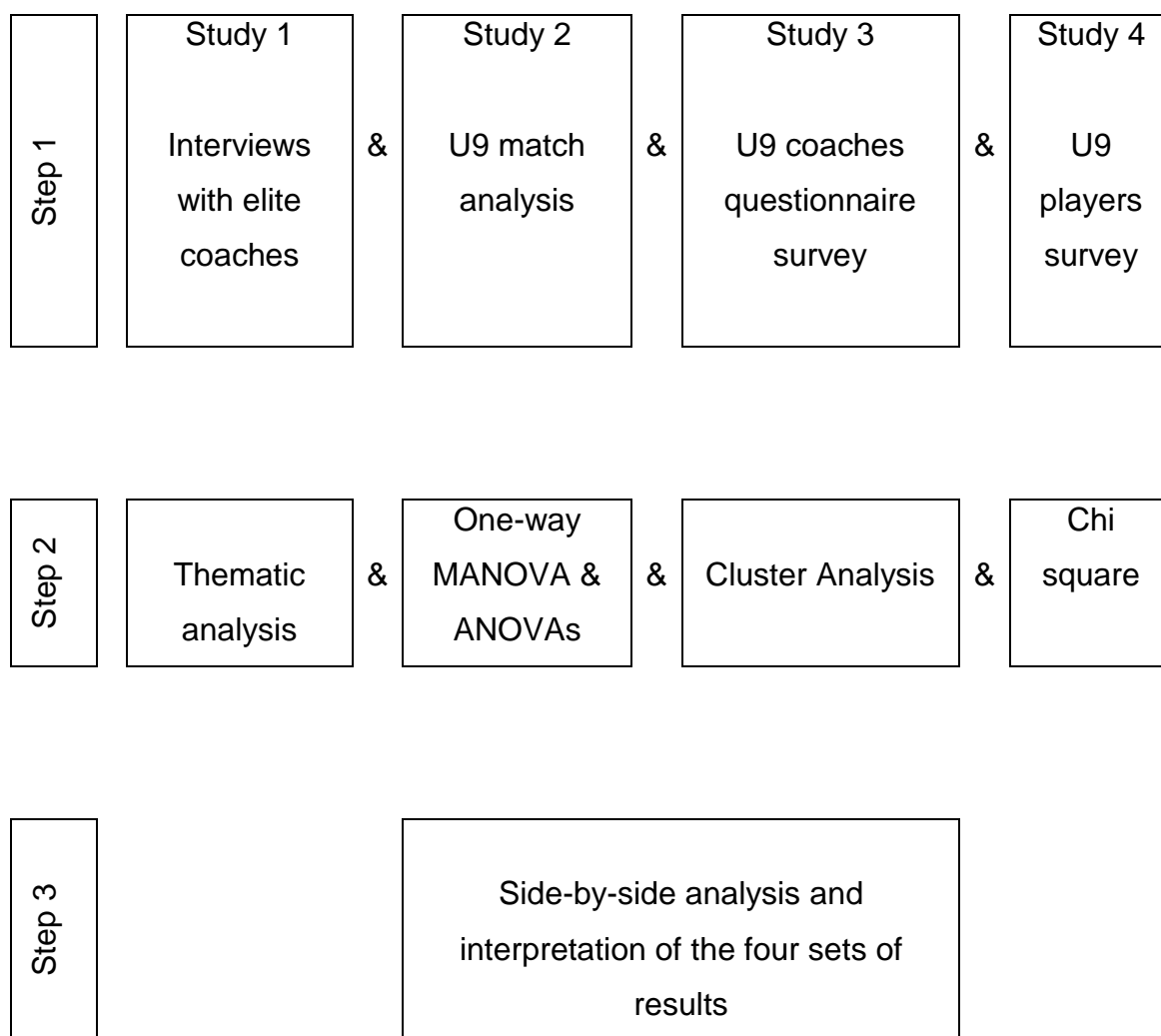
generalization (Patton, 2002). There were three main steps in implementing this design (see

**Figure 3.1).**

During step 1 (Figure 3.1) both qualitative data and quantitative data were collected in line with the objectives and aims of the research. The data from the four studies were collected concurrently but separately as the results from each study did not depend on the results from another (Creswell & Plano Clark, 2011). In study 1 qualitative data was collected through semi structured interviews with elite rugby coaches; while performance analysis observations measured player behaviours from U9 matches in study 2. Both studies 3 and 4 used surveys to collect quantitative data from U9 mini rugby coaches and players.

The second step (figure 3.1), involved analysing the sets of data from all four studies separately using suitable qualitative and quantitative analytical methods. Thematic analysis was used in the interviews with elite coaches and MANOVA & ANOVAs analysed the U9 matches. Two different methods were used to analyse the surveys, with cluster analysis applied to the U9 coaches' responses and chi square U9 players' replies (for steps 1 & 2 see Chapters 4, 5, and 6).

Following the separate data analysis at step 2 the results from all four studies were merged in the third and final step (see Chapter 7). The results were initially merged using side-by-side comparison to identify subjects represented in the separate studies. The merged results were then interpreted by discussing how they converged or diverged, related to each other, and produced a more comprehensive understanding of the research topic.



*Figure 3.1. The convergent parallel mixed method design used in the thesis*

### 3.6 Methods

In the following three chapters, the four research studies will be presented as stand-alone articles as they were written with the intention of being published in academic journals. In order to avoid repetition, the data collection and data analysis methods used during step 1 and step 2 will be discussed and described in detail in the methods section of each individual chapter.

In convergent parallel mixed method research the data analysis involves two separate stages of analysis. The first stage of data analysis occurred in step 2 where the interview (Chapter 4), performance analysis (Chapter 5) and survey (Chapter 6) data were all analyzed separately. The third step involved comparing the results of the four separate data analysis conducted in the studies in order to merge and triangulate the results (Camerino et al., 2012;

Creswell & Plano Clark, 2011). The options available for merged data analysis in a convergent parallel design included side-by-side comparisons in a discussion or summary table, a comparison through a joint display in the results section, or the data transformation of the results (Creswell & Plano Clark, 2011). The data was analysed using a side-by-side comparison of the merged results, as it was felt that this would be the most effective way of presenting the data to show similarities or differences.

### **3.7 Summary**

In this chapter, the philosophical and methodological underpinnings of the research were introduced, and the value of using a mixed methods approach highlighted. In the next chapter, attention will turn to the first research study *Introducing children to rugby: Elite coaches' perspectives on positive player development*. This study has been accepted for publication (Thomas & Wilson, 2013).



## Chapter 4

### **Introducing children to rugby: Elite coaches' perspectives on positive player development**

#### **4.1 Abstract**

The overall aim of the study was to identify what elite coaches believed were the key components for organized rugby union participation during childhood (7 to 11 years old). Nine elite male rugby union coaches participated in individual semi-structured interviews. Thematic analysis (Braun & Clarke, 2006) identified the importance of an age-appropriate competitive games pathway, where more specialized skills were built sequentially on top of the foundations of basic evasion, handling and tackling skills. The findings were generally supportive of the principles of the DMSP (Côté, 1999; Côté et al., 2007). In particular, elite coaches identified that an emphasis on less structured games (deliberate play) and early diversification (sampling) were beneficial for player development in the mini rugby years (under 12). However, contrary to a strict interpretation of the DMSP, the coaches also identified that appropriate adult involvement and organized competition could be beneficial to development in these sampling years.

Keywords: Skill Acquisition, Deliberate Play, Early Diversification, Rugby, Competition.

## 4.2 Introduction

Rugby Union is a complex and structured invasion game where the basic pattern of play is of an alternate concentration and dispersal of players (Greenwood, 2003). Within this basic pattern, the game has a variety of different methods to restart play (e.g., lineouts and scrums); complex rules for infringements; specialized playing positions; and a high degree of physical contact. The complexity, physicality and structure of the senior game therefore presents a real challenge for the governing body in England, the RFU, when introducing children to the game during childhood (7 to 11 years old). However, while the design of age-appropriate competitive games is a wider issue in organized youth sport (e.g., see recent report by Football Association, 2012b) there is little research by which to guide age-appropriate rules changes. The current study sought to initiate enquiry into issues for consideration when introducing children to rugby union, by asking elite coaches to express their views on the structure of organized participation during childhood.

While there has been little empirical focus on the structure of organized *competitive* games for children, a large body of research has examined the structure of developmental activities in *practice* (e.g., Côté et al., 2007; Williams & Hodges, 2005). The DMSP (Côté, 1999; Côté et al., 2007) proposes a pathway to participation in sport that consists of four distinct developmental stages: the sampling years (childhood; 5–12 years); the specializing years (early adolescence; 13–15 years); the investment years (late adolescence; 16+ years); and the recreational years (adolescence; ages 13+ years). From when children first engage in sport during the sampling years, the DMSP suggests that there are two types of learning activity associated with two different player development pathways. The first pathway highlights deliberate practice activities through early specialization in one sport, while the second focuses on deliberate play activities and sampling a variety of sports (Côté & Abernethy, 2012). Whether sport participation leads to recreational or competitive involvement, the DMSP highlights that the concepts of early diversification (sampling) and deliberate play should be key components of early childhood sport experience (Strachan et al., 2011). In effect, children should participate in a wide range of sports, with the focus being primarily on deliberate play activities, such as street football, which are modified versions of adult games

with a high emphasis on enjoyment and limited if any adult involvement (Côté et al., 2007).

Research has identified the benefits of an emphasis on deliberate play in childhood in terms of both performance enhancement and psychological well-being. From a performance perspective, a vast investment in unorganized and unstructured play during the sampling years has been associated with future success in team sports (e.g. Weissensteiner et al., 2009), and the development of expert decision makers specifically (Baker et al., 2003; Berry et al., 2008). Playing a variety of sports during childhood has also been linked to more positive psychological outcomes than specializing early (Côté, Horton, MacDonald, & Wilkes, 2009). For example, university level athletes who had a more diverse sport experience during childhood fostered more positive peer relationships and leadership skills (Wright & Côté, 2003). Furthermore, children's motivation to stay involved in sport at a recreational or elite level is largely influenced by positive experiences in the sampling years (Côté et al., 2003; Côté & Fraser-Thomas, 2008; Gilbert, Côté, Harada, Marchbanks, & Gilbert, 2002).

The DMSP proposes that not only should children under twelve participate in lots of deliberate play activities, but, they should spend limited time in deliberate practice and organized (formal) competitive activities (Côté et al., 2007). Deliberate practice is a key feature of an early specialization approach, where activities are highly structured, adult-led, effortful, low in inherent enjoyment, and aim to improve performance (Ericsson et al., 1993). From a deliberate practice standpoint, intensive practice activities should be introduced at an early age to enable the accumulation of the vast hours of practice required to reach elite status (see, Ericsson, 2007). However, early specialization does not always guarantee future success and has been linked to athlete dropout, burnout and decreased enjoyment (for review, see Baker et al., 2009). These limitations may be magnified in rugby union where body shape is a key determinant of positional specialization. Children who are advanced in biological maturity are, on average, taller and heavier than their year-group peers (Baker et al., 2009; Malina, 2013), and these early differences can cause children to be assigned into a specialized position that may not suit their post-adolescent frame. The danger of early position-specific specialization is

exacerbated because differences in biological maturity are also influenced by the one-year age difference that can exist between the oldest and youngest players in an age-group team (the 'relative age effect'; Till, Cobley, Wattie, O'Hara, & Cooke, 2010).

The DMSP also postulates that organized competition is unnecessary for children's development in the sampling years and therefore the model does not explicitly consider the structure of this activity (Côté et al., 2007). However, a significant proportion of the overall time children spend in sport-related development activities in soccer (Ford & Williams, 2012) and ice hockey (Ford & Williams, 2012; Soberlak & Côté, 2003; Wall & Côté, 2007) is made up of participation in organized (competitive) games. It may therefore be naive to ignore the impact of this form of activity on the development of children involved in organized sport. Indeed, with over 700 clubs currently participating in regular organized competitive mini-rugby union matches (U7to under-11) in England alone, the impact of (inappropriate) competition on player development needs to be considered. The current rules of mini rugby union (Rugby Football Union, 2011) appear to be aligned with an early specialization pathway, with all the highly specialized skills from the full adult version of the game (such as scrums and lineouts), introduced from U9onwards, following two years of unstructured, non-contact rugby (Tag rugby).

There have been recent calls for an increase in the amount deliberate play activities within organized sport programmes (Côté, Coakley, & Bruner, 2011). While the emphasis has been on the structure of practice, the overarching principles behind the DMSP (early diversification and reduced structure) could feasibly guide the development of organized competitive rules for children in the sampling years. A competitive setting that has less structure (adult enforced rules and positions), and more of the qualities of deliberate play, should provide a more supportive environment for child development through sport. For the RFU, both the proposed performance *and* psychological benefits of such an approach are promising, because of its objectives to increase recreational playing numbers, as well as develop players on an elite pathway. The overall aim of this study was therefore to identify what expert coaches believed were the key components for rugby participation during childhood. To achieve this

aim the study was directed by the following research question: How do expert coaches make sense of player development through mini rugby?

### **4.3 Methods**

Elite coaches' opinions of participation in mini rugby were investigated through qualitative semi-structured interviews, and the data analysed using thematic analysis (Braun & Clarke, 2006). A qualitative approach was adopted because there is (to the authors' knowledge) no published research exploring the development of appropriate rules for organized sport during the sampling years. The aim of the study was to gain a deeper understanding from the perspective of individual coaches rather than to generalize results (Maykut & Morehouse, 1994). The research was located within a naturalistic and interpretive paradigm to gather rich, detailed and complex accounts of coaches' opinions of the development of rugby skills and rugby knowledge during childhood in order to inform practice and theory (Kvale & Brinkmann, 2009).

#### **4.3.1 Participants**

The participants were nine elite male rugby union coaches whose ages ranged from 32 to 65 years ( $M = 42.33$ ,  $SD = 9.02$  years). An elite coach was classified as an individual who made his living from coaching and had experience of coaching at English Championship level or above. During the interview period the participants were coaching at international ( $n = 3$ ), European ( $n = 2$ ), English Premiership ( $n = 1$ ) and English Championship level ( $n = 3$ ). Seven coaches had experience of coaching mini rugby, while three of these were involved with coaching mini-rugby teams when the interviews were conducted.

#### **4.3.2 Design and procedure**

Ethical approval was granted by the University Ethics Committee and a sample of nine elite coaches was chosen using a purposive approach to ensure access to knowledgeable people (Cohen et al., 2011). The first author is a level three rugby coach whose "insider identity" within the English coaching community enabled him to approach "gatekeepers" who helped facilitate access to the coaches (Kvale & Brinkmann, 2009).

Prior to the interviews, participants were sent an information sheet by e-mail giving them an outline of the research study and time to raise any concerns and prepare for the interview. Informed consent was provided by all participants

to audio record the interviews and their anonymity was preserved. Each of the semi-structured individual interviews were audio recorded and lasted between 30 and 70 minutes; and took place in the autumn over a two-month period at a time and venue selected by participating coaches. An interview guide (Appendix C) was used that included an outline of topics to be covered and specific questions (Kvale & Brinkmann, 2009). The guide was based on themes emerging from game and player development literature, such as the DMSP model, and focused on coaches' opinions of player development; key aspects of competitive mini rugby matches; and player retention. Themes and questions were written in advance, although the exact order of questioning sometimes varied between participants as themes naturally emerged at different stages of the interview (Cohen et al., 2011). Initial questions focused on coaching background and were open and general, allowing the participant to be descriptive and to build rapport (e.g., 'Do you have a coaching philosophy?' 'What is your main coaching achievement?'). This also allowed the interviewer to demonstrate firm knowledge of the subject which is essential in interviews with elite individuals to gain symmetry in the interview relationship, gain credibility, and increase rapport (Kvale & Brinkmann, 2009). The more searching "how" and "why" questions were kept for either later in the interview or for when it was an appropriate time to ask (Cohen et al., 2011). Prompts were used to clarify subjects or questions, while probes added depth to answers.

#### **4.3.3 Data analysis**

The interviews were transcribed verbatim by the first author and pseudonyms were given to each coach to ensure anonymity. A six-phase inductive thematic analysis procedure was conducted on the interview transcripts to help gather and understand elite coaches' opinions of the key components for age appropriate competitive rugby matches (Braun & Clarke, 2006). Thematic analysis was used due to its theoretical freedom and flexibility and its ability to provide a wide range of analytical options (Smith & Sparkes, 2012). By exploring the themes that emerged from the participants' comments, a rich, detailed and complex account of the data was possible (Braun & Clarke, 2006).

An inductive analysis approach was applied to ensure that the themes were not restricted by a pre-existing coding frame and emerged from the data

(Braun & Clarke, 2006). Each of the six stages was documented clearly in order to ensure the thematic structure was not influenced by any of the author's pre-conceived ideas. However, as the DMSP was used as a framework for questioning, there was a possibility that the codes may have been influenced by the questions asked. During the first two steps all nine transcripts were read in order to produce as many categories as possible, and in the third stage this list was condensed to produce candidate themes. The fourth phase involved refining the candidate themes by identifying links or relationship between the themes. Patton's (2002) dual internal homogeneity and external heterogeneity criteria was applied to ensure that data within a theme should be similar and fit together meaningfully and the differences between themes should be distinguishable and clear. The 'coaching background' theme was removed at the fourth phase as it was decided it was not relevant to the research question. During the remaining two phases, themes were merged when appropriate. For example, 'coaching mini rugby during games' and 'positive player development' themes were merged to create an 'adult involvement' theme.

The importance of judging the quality of qualitative inquiry has emerged as an important theme in the sport, exercise and health literature (see Smith & Sparkes, 2012, p. for detailed discussion; Smith, 2009) for detailed discussions). In this study, the criteria for judgment was informed by a relativist position, where evaluation is considered through a list of characteristics as opposed to a preordained and universal standard (Smith, 2009). Characteristics of the research such as; the worthiness of the topic; the rigour applied in the collection and analysis of data; the credibility of the researchers; and the potential contribution of the work, were considered, and should allow readers to draw their own conclusions in terms of the validity of the research (Tracey, 2010). We feel that the study can be deemed worthy as it was relevant and timely, considering the interest in the design of age-appropriate competitive games in a variety of sports in England (e.g., Association Football, Rugby League). The conclusions on playing competitive sport make the study interesting as it contrary to widely held beliefs and assumptions on competition. We believe that rich rigour was achieved and is evidenced through the data collection and analysis procedures outlined and the rich data presented in the results. Credibility was established by triangulating the coaches' comments to

produce themes, and through respondent validity, where eight of the nine coaches verified their quotes. All coaches were also ready to waive their anonymity if the RFU wanted to reproduce their comments in published documents. Finally, the results of the research could have practical benefit by assisting the RFU in developing the structure of organized participation in mini rugby.

#### **4.4 Results**

The analysis identified five themes associated with competitive activities within a player development pathway in rugby union. These themes were Introducing Competition, High Involvement, Scaffolding Skills (Introducing Contact), Adult Involvement, and Early Diversification (Sampling).

##### **4.4.1 Introducing competition**

The first theme emerging from the data was that all the coaches believed it was appropriate for children to play competitive rugby games during childhood. For example, Eric explained the benefits of starting with an introductory competitive game (Tag rugby):

I have no problem with five and six year old playing tag personally. I don't see that as a problem as long as emotionally they are able to deal with that and they're well coached and people understand that they are working with five year olds and the length of session, the type of session and nature of the session reflects their age and they are playing within their own age profile. I don't see why five, six year olds can't run around passing a rugby ball.

The coaches emphasised that it was important that these competitive games were played within an appropriate competitive structure. Coaches' opinions varied however, with some suggesting that games should be competitive but not played to win tournaments or cups. Frank explained that in competitive games "you're going to keep score and that's not a problem. Somebody will win and someone will lose, but handing out all these medals and all that is nonsense." Eric added, "I think every game should be competitive. I don't mean they are playing for cups, but I think there needs to be a winner and a loser because I like competition. I believe it's how you develop lots of different attitudes." Seth believed that organised competitions were a waste of time because of the effect they have on adults:



It makes coaches select what they perceive to be their best team at nine years of age, which you can't identify who's going to be the best player at that age. It makes coaches want to take less risks, because they want to win and I think kids want to win anyway; so there's no point in putting a trophy at the end of it. I think competition is healthy but when kids play football in the playground against each other they want to win - there's no league or county cup competition on the end of it, it's just their competitive instincts. I think they should play games but you should let the inner competitive spirit kind of dictate it.

Some of the coaches felt that at the older mini-rugby levels a minimal amount of tournament rugby was acceptable as it provided learning opportunities to encourage positive behaviours. Henry said, "they need to learn to deal with defeat, they need to learn how to win properly, but it doesn't need to be the be all and end all of every time they play the game." Lee offered similar opinions:

I think all the values that you pick up in life in terms of, you know understanding how to win with humility, lose with good grace, deal with disappointment, be humble when you win all that sort of stuff. I think that ultimately rugby and life is competitive and you want to see that people are prepared to roll their sleeves up a bit in adversity; but that's not to say that I would overdo it at under 11's by any stretch of the imagination.

Although some coaches encouraged playing games in tournaments, it was felt that they should be the exception rather than the norm. According to Henry, players in competitive games should "be performing week in week out to enjoy playing the game and love scoring tries." Hugh expressed similar feelings, "When you are dealing with eight, nine, ten year olds they should be promoting fun, enjoyment, camaraderie, team ethics. There's enough about winning later on when they're fourteen, fifteen, sixteen."

#### **4.4.2 High involvement**

The second theme emerging from the data was that elite coaches identified high involvement as an important element for everyone taking part in competitive rugby union matches. They believed that playing unstructured small-sided matches at mini rugby level and scaffolding the introduction of key elements at each level was the key to providing high involvement for all players. Frank suggested that:

We need to de-clutter the game, less laws, we need to introduce contact later, introduce kicking and various other things at an appropriate time and really focus on catch, pass decision making....We start reasonably

well with tag and one or two other things and then we just, we just put on too many layers.

According to Mike it was important that we should not be looking “for the game that the adults play” and instead asking, “if they were doing it as a group of kids in the street what would they be doing?” He added:

So why have 15 a side or 11 a side? You know, why not be running five, six, seven a side little games in small areas with the ball the right size that they can make sure they can control. And if you've got that high involvement then you get the natural skill development which you can then build on later.

Although there were slight variations on the ideal number of players for each team at different age levels, there was a consensus that having smaller numbers on each side would lead to an increase in the number of involvements for each player. Seth explained:

It's not rocket science. The more somebody can get a ball in their hands and make decisions the better they are going to get at it and if you are playing eleven a side, thirteen a side ... you watch some of the games, some kids touch it once or twice in half an hour so. I think smaller sided games ... also giving them enough space, but just trying to get young players as many chances to get their hands on the ball, make decisions and make as many passes as they possibly can and not stereotype at a young age who plays where.

With higher involvement for all players during games, the coaches felt that it would also ensure a greater opportunity for all individuals to develop a core set of FMS, such as passing, catching, running, and dodging, alongside improving game understanding.

I think ideally it would be sort of multi dimensional people who are comfortable handling the ball. It's not just about handling, but have the core skills all of an exceptionally high standard so running, passing, tackling, rucking are really important; and understanding the techniques and the tactics required in those areas without worrying too much about the positional specifics, because those will come. (Eric)

As well as having a positive benefit on the skill and tactical development of players it was also suggested that having unstructured games with high involvement would have psychosocial benefits. One of the coaches believed that it was crucial for higher participation levels and to get children of all shape and sizes involved in the game:

For me, it's really important that we give the kids a really positive experience. That they contribute. That they are allowed to handle the ball. That they are encouraged to run and pass from a young age. They are encouraged to support one another. They are encouraged to defend in a way that the attack is put under pressure. And I think the more we can create a sport where kids of all ages and both sexes want to play for as long as they can, we're just going to produce a far bigger number of kids who love the game and are competent to a level, because they are involved (Richard).

#### **4.4.3 Scaffolding skills – introducing contact**

The third theme that emerged saw the coaches identify the importance of introducing contact skills in competitive small-sided matches at the right developmental stage during childhood. Henry explained:

I just think it's vital they get it right because the current system is so heavily weighted to big kids, powerful physically developed kids at a young age; that we are probably losing a lot of kids that are skilful players just because of that element of the game that they're not particularly good at.

All coaches identified contact skills as the main strength of the players produced by the current development pathway, due in large part to their physical capabilities. As Richard said, “the strengths of the players at the moment are their strength, they are very strong,” and Eric added, “I think an obvious area of standout would be their physical ability.” For some coaches this physical aspect was to the detriment of game understanding and decision-making skills, where according to Hugh, current players at the elite level, “are tending to lack a bit of decision-making and tactical nous, game sense or whatever you want to call it.” While Henry felt that, “the one area that they tend to be lacking is in decision-making and self-reliance on the pitch and being able to make decisions for themselves.”

Although all participants believed that contact skills should be introduced through tackling at the appropriate age in small-sided games, it was essential that it was not to the detriment of developing the core technical and tactical skills.

I think they should be spending time on game space, space awareness, passing, catching, running, you know, two v ones, three v twos. I think once they develop a little more physically they gain a little bit more confidence and so I think that should come into it a little bit later. (Hugh)

If you're developing them at the expense of that awareness, and fun and speed of movement then it's probably a negative. (Bob)

For the majority of coaches, introducing children to basic contact skills (i.e. tackling) at around the U9 level was essential, with Seth explaining that, "the first part of the contact process really is the tackle in open play so go to that first and let them get proficient at that." Eric believed that, "the earlier you can teach them to tackle the easier it is and the more likely they are to tackle." For Lee introducing the tackle correctly was crucial to the overall development of players' contact skills.

I think it is the foundation level of confidence a child needs to have to enjoy rugby. I think that if you can give them the confidence to master the art of tackling then I think as a consequence the rest of the physicality of the game will become less threatening.

Although the coaches were supportive of introducing contact skills through tackling they were critical of the current rules of games where all specialized set-piece skills (scrum and lineout) and contact breakdown skills (rucking and mauling) are introduced from U9 level. As Lee explained, "At the moment the game jumps up in too big a step and we never get the foundations in place: tackle, pass, catch, run, before we are onto the next thing." Frank added:

It's too big a step, too big a jump and it's not concentrating and what we should be concentrating on at U9s which is a continuation of catch, pass, offload and just introducing the tackle in sympathetic safe way.

Competitive scrums and lineouts were acknowledged as important aspects of rugby union from adolescence onwards, however they were seen as late specialization skills and an unnecessary part of competitive games played at mini rugby level. Henry felt that scrums and lineouts "just slow the game down - I think it happens enough in the senior game", and Richard explained, "I would do my utmost to get rid of scrums and lineouts because they (i.e. coaches) take too long coaching them." Eric added:

I don't think at a young age under-9s, under-10s, under-11s that they are going to learn anything technically, because there's no lifting in any way [in the lineouts] and the scrums basically are a chance to put players together [no competition].

Although some coaches explained that they could see the benefits of uncompetitive scrums as a way of restarting play, overall it was felt that scrums

and lineouts were not needed during the sampling years. Frank said that, “I wouldn’t have a lineout until they are post twelve,” while Henry explained that, “I don’t think they need to start doing scrums or lineouts until they are 14.” Seth summed up the general feeling explaining that the game at mini rugby level needed to have high involvement, be faster moving with the ball in play for longer. He added that it would:

Also develop them into more intelligent rugby players because it’s the same with any learning, any skill or revising for exams at school the more they do it the better they get at it. If you’ve got scrums, lineouts, rucks, mauls it takes significant chunks out of the game where they could be learning how to pass before contact, and avoid contact to make decisions.

#### **4.4.4 Early diversification**

There were two aspects that emerged from the third theme identified – early diversification - and these related to both the micro situation (within rugby) and the macro situation (within sport in general). The first was to maintain early diversification in rugby by encouraging players to play in a variety of playing positions, and the second was early diversification through playing a variety of sports during childhood. It was suggested by some of the coaches that the current competitive games structure can lead to early position specialization of young players, which can have a negative impact on development. Richard explained:

What happens then when they get scrums and lineouts is [at U9], and again excuse the politically incorrectness, they go you’re a fat kid you’re a prop, you’re tall kid you’re second row. You’re going to practice scrums and lineouts while the backs practice moves which involves running and handling. So all of a sudden you’ve separated the team in half, you continue to do some sort of skill development with these and with these they are doing something they can’t really compete at until they are 18.

Eric felt that from a young age, “I certainly wouldn’t pigeon hole them,” and that it was essential to give, “people opportunities to gain experience and develop in lots of different positions.” Seth added that, “I think you have to get position specific eventually because it is a very much a position specific sport but not until maturation’s been fully reached.” It was highlighted that many of the elite players were playing in a different position today from when they started playing the game and that it was best to have a game that allows players to develop core skills applicable to all positions. As Frank explained:

Very few players especially going at the top level stay in the same position. So we went through last week. Out of the ten best hookers coming through, nine of them didn't start at hooker, turned there very, very late [15 years old or older]. So we don't need to be pigeon holing them, so if tight heads have played a little bit at inside backs, inside backs have played it'll give them an understanding and appreciation of different positions very early. And to come back to my other point players that are being produced positionally they are quite strong but their core skills are poor especially the forwards.

Alongside early player position diversification, it was emphasized by coaches that a key element during childhood should be sampling or taking part in a variety of sports. Although they were supportive of players participating in competitive rugby matches at mini-rugby level, it was believed that playing different sports during childhood would have positive results for the technical, physical, and psychological development of rugby players. It was suggested by Mike that sticking solely to rugby from a young age was detrimental for player development.

I think my biggest concern, obviously when the game went professional is that there is a huge amount of players just to stick with one sport or just to stick with rugby. And I firmly believe that you know up to the age of 16 you know they should be playing football, cricket, basketball, athletics... The danger is that you know you get players thinking only one way and I think a multisport, multiskilled approach for me is still very important and particularly for decision making.

This multisport approach was also highlighted by Bob who identified a number of advantages of sampling a variety of sports from childhood. He explained that any opportunity to, "run around looking for space, movement, is going to improve you as a rugby player."

Football is a classic one isn't it, you know playing football, your best twelve, thirteen year old backs tend to be guys who've played football since the day dot and are quite good and competitive at it and they have that ability to kick the ball, see a bit of space, general movement, can control things that are happening around them. So I'm all for that. I almost think, almost think rugby's probably a bad sport for you at a young age because everything is right in your face, and it's shutdown time all the time, shutdown time, shutdown time. You're always being closed down and its helter skelter, things are flying at you all the time.

Frank also believed that, "all sports have different skill sets which in the bigger picture, they just make the player a better all round player," while Hugh encouraged his children to play as many sports as possible.

If they play cricket, they learn a bit of etiquette and they learn a little of individual and team stuff ethics. Football, it's about passing and moving into space, it's about setting up a goal for somebody else. You know, I reward my boys for setting up somebody, assisting somebody to score rather than scoring.

#### **4.4.5 Adult involvement**

The final theme to emerge highlighted the importance of the role of adults in providing positive psychological and social experiences during competitive mini rugby matches. The importance of creating an enjoyable and fun game environment for children was identified as crucial by all coaches. Henry expressed that it was the “basis on what they build their participation in the game. I think it's got to be especially for kids, they've got to enjoy it otherwise they shouldn't be playing.” At mini rugby level Seth believed it was crucial, “because it increases retention and, it keeps kids in the game for longer, which in turn gives them more hours practice, and develops them into better players.”

The role of the mini-rugby coach during matches was seen as a crucial element in creating this positive environment for player development. The behaviour and philosophy of the coach was seen as key by Eric who said that, “Unfortunately it is the coach's behaviour that moulds and reflects the team as opposed to the other way around.” Hugh described negative behaviour he had experienced, “Coaches thinking they're Graham Henry or Warren Gatland on the sideline when you are dealing with eight, nine, ten year olds when really they should be promoting fun, enjoyment, camaraderie, team ethics.” Communication during matches between coach and player was seen as crucial and many of the elite coaches identified the constant shouting during matches as a negative element. As Eric explained, a touchline coach needs to give, “some verbal encouragement about the positive things they are seeing rather than ‘tackle him’ which is obviously a regular Sunday morning shout and one I'm sure I've done myself but it's not that productive.” According to Frank the constant communication from coaches telling children what to do during matches was having a negative impact on performance.

The big drama I have with kids coming through is their ability to communicate is significantly poor year on year it's getting worse, and worse, and worse. But part of the problem is we're having someone communicate for the kids especially in our sport - pass, pass, tackle – shut up man they'll work it out, they're not stupid.

It was identified by the elite coaches that the key to positive touchline behaviour was to provide positive encouragement, support performance by giving feedback at appropriate times, and allow the players to work out things for themselves during games. As Richard explained:

Their roles are to support and to observe and then feedback in no more than either one or two things at a time. I would say words of support and encouragement rather than shouting and direction...Let them discover it, because if coaches can control themselves get them on the sideline just let the kids play.

As well as encouraging fun and enjoyment, the role of adults as match official was identified as a key factor in promoting a positive environment and developing players during small-sided games. Instead of having a referee strictly applying the laws of the game it was suggested by the elite coaches that the person officiating the game should use it as an opportunity to coach the players. Richard felt that, "even at the World Cup now referees are coaching" and Eric believed that the best referees applied this approach.

What I see at any level of the game is the best referees' constantly talk to the players. So even at international level it's more get onside, hands away or roll away or leave it; they are coaching the game to allow it to flow rather than penalizing.

Having the coach/referee on the field during games at mini-rugby level was seen as an ideal situation to assist the development of players. Richard explained:

There is a great opportunity with those games to actually to start to educate, and to talk to kids and at the break get a perspective from both sides. Then get the referees perspective; or we're going to 5 minutes now to discover what the back foot is and what you can and can't do.

It was identified that some players struggle to connect the sessions done in practice with the game and that the match environment provides an ideal learning opportunity. As Lee suggested:

Their best learning is often in the game and the ability to stop the game then to explain to the players what was good about a certain passage of play or what wasn't as good and what they might need to think about both sides from a referee's point of view would be excellent.

However, coaches expressed caution if a referee/coach approach was used to assist with the players' learning. According to Richard it was, "essential that there is somebody in the middle has an empathy with their development



and can actually talk them through and also question them.” An individual telling a player what to do was seen as negative to a player’s development, as Bob explained; “If you’ve got a guy running around going pass it, pass it, pass it, it defeats the object a little bit.” It was stressed that it was essential that the person officiating had to have the correct coaching philosophy and know how and when to apply the best learning techniques in practice.

I think intervention’s key to good coaching but it’s knowing instinctively when to intervene and actually when to let them get on with it. Sometimes I think you can intervene when they would have worked out for themselves anyway, so it depends what the intervention is. If it’s to stop the game and tell them he should have passed to this lad because there was a two v one I would probably say don’t worry about it (Seth).

#### 4.5 Discussion

The current study sought to initiate enquiry into the effective introduction of children to participation in organized rugby union, by asking elite coaches to discuss pertinent issues with the current system and suggest potential improvements. The themes that emerged from these discussions generally supported the principles of the DMSP model (Côté et al., 2007), with an emphasis on early diversification and deliberate play through unstructured small-sided games being lauded. However, the coaches also discussed the importance of *appropriate* adult involvement and competitive experience, which are generally considered to be anathema to the principles of the DMSP (Côté et al., 2007). The five high order themes that emerged from the data were Introducing Competition, High Involvement, Scaffolding Skills (Introducing Contact), Adult Involvement and Early Diversification (sampling).

The elite coaches reported that competitive matches could play a key part in an effective pathway for player development during childhood. DMSP purists might argue that playing competitive organized sport is linked to early specialisation (Baker et al., 2009); and should not play a significant part in the development process until adolescence (the specializing years; 13+). However, the coaches’ opinions indicate that player development through competition is a complex process and that a strict application of a dichotomy between ‘pure’ sampling via backyard games, and early specialisation via organized sport, may be too simplistic. This view is supported by recent research examining the developmental activities of elite child soccer players, which also did not fit the

DMSP definition of early diversification (Ford et al., 2012; Ford et al., 2009; Ford & Williams, 2012). Rather, Ford and colleagues proposed an early *engagement* model, which recognizes that, while elite soccer players may specialise early during childhood, the focus is still on high amounts of deliberate play activities during the sampling years. While the coaches in the current study supported the benefits of early engagement through playing organized rugby games, they also supported the early diversification principles of the DMSP on both a micro (the structure of rugby games) and macro (sporting involvement in general) level.

At the micro level, the coaches felt that the organized games should be modified, less structured versions of adult rugby (in tune with principles of deliberate play), where children were not pigeon-holed into set positions. Furthermore, the emphasis on winning matches and trophies should be minimized, with the emphasis placed on enjoyment and inherent competition. At the macro level, the coaches were also supportive of the potential for developing players' physical and psychological skills through the sampling of a variety of sports, and not specialising in rugby alone. Previous research has indeed identified that a multi-sport, sampling approach during childhood is associated with both improved fundamental motor skill development (e.g., Baker *et al.* 2003) and decision-making expertise (Berry et al., 2008). Research has also suggested that children who participate in a variety of sports are more likely to have enjoyable experiences and have increased motivation to continue to participate in sport (Côté et al., 2007; Côté & Fraser-Thomas, 2008; Wall & Côté, 2007).

Contrary to the early diversification pathway of the DMSP, which proposes that there should be limited if any adult involvement in children's deliberate play activities (Côté et al., 2007), coaches in the current study were supportive of appropriate adult involvement during the sampling years. Specifically, the coaches felt that, as both coaches and referees, adults had a potentially powerful role in the development of their players' technical, tactical and psychosocial skills (Fraser-Thomas & Côté, 2009; McCarthy & Jones, 2007; McCarthy, Jones, & Clark-Carter, 2008). Positive and encouraging touchline behaviour was viewed as important, and research suggests that the modelling of appropriate behaviour during competition does play a crucial role in influencing the behaviours and attitudes of children (Fredricks & Eccles, 2004).

It has been suggested that the key outcomes for coaches working in the sampling years, should be the promotion of perceived competence and confidence in players through effective communication (Côté, Bruner, Erickson, Strachan, & Fraser-Thomas, 2010). However, the elite coaches in the current study were able to highlight occasions when adult involvement was less than ideal, and other research evidence supports such comments. Indeed, there is a tendency for childhood team sports coaches to use more negative comments than positive comments in competitive environments (Walters et al., 2012). Additionally, over-coaching during games - having constant instruction shouted, such as “spread out” and “run straight” – can have a detrimental effect on children’s game experience (Coakley & Pike, 2009). It is therefore important that coaches develop an appropriate environment that allows players to develop their own playing and communication skills on the field (Adler & Adler, 1998).

With regards the structure of the game itself, the elite coaches were supportive of a focus on simplified, less structured games, with increased structure and complexity being gradually introduced over the sampling period. There was concern that the current system specialised too quickly, moving from a very simple, unstructured game with no contact at U8, to a highly structured and technically demanding game at U9. With this pathway, the fundamental skills of evasion, ball handling and tackling have little opportunity to be reinforced and instead, children are introduced to new specialised skills relevant to their position (as determined by their size, speed, early aptitude etc.). This can also lead to a greater emphasis being placed on complex contact skills that can further magnify the physical differences that exists between players due to maturation and the relative age effect. The coaches discussed the importance of ‘scaffolding’ skill learning, by gradually introducing technical skills at a developmentally appropriate age level (Wood, Bruner, & Ross, 1976). While scaffolding skills via manipulation of age-appropriate rules is not explicitly consistent with the principles of deliberate play and early diversification, the coaches’ support for small-sided games, with high player involvement, limited structure, and no playing positions, is (Côté et al., 2007).

It was suggested that encouraging less structure and promoting skill development during matches would increase the opportunities for *all* players to embed fundamental movement and tactical skills during this critical childhood

period for skill development (Gallahue & Ozmun, 2006). The coaches agreed that small-sided games are crucial to encourage high involvement for players' skill development. This is consistent with previous research that has shown that small-sided versions of invasion games can encourage high player involvement, with increased opportunities for scoring, basic skill development, and decision-making (Berry et al., 2008; Burton et al., 2011; Fenoglio, 2004). Sampling different playing positions was also thought to be important, and this is congruent with an early diversification strategy at the micro level. Coaches therefore expressed an interest in seeing children experience as much diversity in their sport participation as possible; both inside and outside of rugby, and discussed the performance and psychosocial benefits of this approach.

It is evident that the coach-generated themes discussed in this article do not fully align with the DMSP's strict interpretation of sampling and deliberate play (i.e. no adult involvement and no organized competition). This variance from the framework can be interpreted in two ways. First, the DMSP may represent a philosophical ideal to be strived for, but one that is difficult to achieve within the current sport participation landscape where school and local sports clubs seek to thrive. If children are going to play organized sport, then it is important that their experience is as developmentally appropriate as possible. As the elite coaches suggest, some of the elements of a sampling pathway for young children can be promoted within organized games, with careful consideration of the rules governing competition. Within an environment where fewer children are playing backyard games (Coakley & Pike, 2009; Weissensteiner et al., 2009) it becomes even more important to focus on appropriate organized sport participation. Second, there is an argument that backyard games are not a panacea for skill and psychosocial development (Coakley & Pike, 2009). As with organized sport, there is the potential for a few players to dominate involvement; something that can be mediated with the intervention of a skilled coach in organized practice and competitive settings.

While the results are likely to provide useful guidance to the RFU as they seek to re-develop the rules governing the current developmental pathway in rugby union in England, the themes do need to be interpreted with caution. First, as the interviewer and participants are all rugby coaches, there may be a bias towards coaching-related themes and the value of organised rugby

participation. In combination with a focus on critiquing the current player development structure, this bias may explain why themes were incremental to a degree. For example, while the DMSP suggests that the negative influence of inappropriate adult involvement and adult-driven competitive structures can be negated by allowing children to just play non-supervised backyard games, the coaches preferred to consider this issue in terms of more supportive adult involvement. As some of the issues raised (e.g., competing in more than one organized sport) need to be considered within a more general framework of children's sport participation, future research might seek to explore the opinions of parents and children.

Second, while a theme of incremental skill introduction emerged, it was not the aim of the study to explore explicitly *when* during development specific skills should be introduced. The interviews tended to focus on concerns with the introduction of multiple specialised skills in U9rugby, at the expense of consolidating the key skills developed during Tag rugby at U7and under-8, as this emerged as a perceived concern with the RFU's current development pathway. However, the coaches expressed opinions on whether some skills should be introduced during or after the sampling years, and this is clearly an interesting area for further exploration. At present there is limited enquiry in the skill acquisition literature that attempts to examine optimal periods for motor skill acquisition during late childhood, adolescence.

#### **4.6 Conclusion**

The current study initiated enquiry into the question of how children should be introduced to competitive rugby union during the sampling years. By using qualitative semi-structured interviews, rich, detailed and complex accounts were gathered from elite coaches on the key components of a developmental pathway for competitive games during childhood. The strength of such an inductive approach is that themes emerged from the data that did not explicitly match the framework (Côté 's DMSP) on which the research questions were developed. Indeed, while the participants did discuss the importance of limited structure for mini-rugby games; high involvement for all players and the sampling of other sports, they also highlighted the role of appropriate adult involvement and organized competition, and the gradual introduction of specialized technical skills throughout the sampling period (and beyond). As

such these comments contradict the dominant view within the DMSP that early specialisation (as assessed by engagement in formal, organized competition) and adult involvement during childhood lead to negative outcomes.

The elite coaches reported that competitive rugby games can have a positive impact on development as long as the rules at each age level are developmentally appropriate and not based on the adult version of rugby. Playing positions, scrums and lineouts were identified as late specialization skills to be introduced during adolescence, while the introduction of tackling at around the U9 age level was seen as crucial to developing contact skills. Alongside developing these playing skills, having fun was identified as an important factor. Coaches believed that adults should play a crucial role in creating this developmental environment by being supportive as coaches on the touchline, and providing positive guidance for players when refereeing and coaching games. Overall, it was indicated that children should play competitive rugby games from U7 onwards (i.e. early specialisation) and also participate in a variety of other sports as well. It was suggested that this approach would have positive benefits for motivation, skill development and decision making, that might benefit children whether they stayed involved in rugby or not.

#### **4.7 Summary**

In the current study qualitative data was collected and analysed separately to the other studies in two stages as part of the mixed methods convergent parallel design (see figure 3.1). A qualitative approach was used to initiate enquiry into the question of how children should be introduced to competitive rugby union during childhood. Data from semi-structured interviews provided, rich, detailed and complex accounts from elite coaches on key components of a developmental pathway for competitive games during childhood.

One of the main findings showed that expert coaches believed that competitive rugby games could have a positive impact on player development as long as the rules at each age level are developmentally appropriate and not based on the adult version of rugby. It was suggested that the current pathway specialised too quickly, moving from a very simple, unstructured game with no contact at U8, to a highly structured and technically demanding game at U9. The findings showed that elite coaches' supported games during childhood

based on the concepts of deliberate play, with high player involvement, more skill learning opportunities, limited structure, and no playing positions (Côté et al., 2007).

This first study provides generic support for the efficacy a deliberate play approach; with expert coaches suggesting that a less structured game would be more appropriate for young players. The next chapter focuses on competitive U9 rugby matches and investigates whether the principles of deliberate play from the DMSP can be applied to *competitive* U9 rugby union games, by manipulating the rules of play.

## Chapter 5

### **Playing by the rules: A developmentally appropriate introduction to rugby union.**

#### **5.1 Abstract**

The current study examined the effect of rules changes on the game behaviours of under-nine rugby union players. Eighty-nine games were filmed at end of season festivals over two seasons (2010-11, 2011-12) in five counties in England. Two counties were playing matches governed by the current (traditional) rules, whereas three counties had been playing pilot rules for those seasons. The pilot rules were designed to create a more open and less structured game, by reducing numbers on the pitch and limiting set pieces and specialised skills. Compared to games played under the traditional rules, games played under the pilot rules had 25% more ball-in-play time; 55% more runs with the ball; more than twice as many successful passes; and nearly twice as many tries scored. The results suggest that the principles underlying Côté's DMSP can be applied to the rules governing competitive matches in youth sport.

**Keywords:** *Developmental Model of Sports Participation; sampling; deliberate play; youth sport*



## 5.2 Introduction

Rugby Union is a complex game with specialised playing positions, complex rules for infringements, a variety of different methods to restart play (e.g., kickoffs, lineouts and scrums), and a high degree of physical contact (Greenwood, 2003). The complexity of the senior game presents a real challenge when designing competitive games that introduce children to rugby. There are key issues to be resolved around what behaviours (e.g., scrummaging, rucking, mauling) should be emphasised at the various age group levels and how the rules and structure of the game could be designed to help encourage these behaviours (Wilson et al., 2009). Competitive games have been identified as one of the main developmental activities during childhood (Côté et al., 2013; Ford et al., 2012), however, there is a lack of empirical evidence to support the design of developmentally appropriate competitive games for children (e.g., see youth development proposals by the Football Association, 2012b).

Although there is little research examining the development of *competitive* games for children, there is a large body of research that has examined the structure of children's *practice* (Côté et al., 2007; Williams & Hodges, 2005). One of the most contentious issues when designing age-appropriate rules for complex sports is the extent to which the development of specialised skills (e.g., scrummaging, mauling, kicking, etc. in rugby) might be hindered if not trained from an early age. Indeed, Ericsson's 'deliberate practice' proposal would suggest that as there is a monotonic relationship between expertise and time spent practising, children should specialise as early as possible (Ericsson et al., 1993). In support of this contention, Ford and Williams (2010) have reported that adolescent footballers (soccer players) who were offered a professional contract on graduating from an elite training programme (Academy) could be differentiated from those who were not offered contracts by the amount of deliberate practice they undertook during their childhood (200 hours per year versus 130 hours per year; (see also Ford & Williams, 2012).

An alternative perspective to the design of practice is offered by Côté's DMSP (Côté, 1999), which suggests that developmentally inappropriate early specialization can result in impaired physical (e.g., overtraining, fewer transferable skills); psychological (e.g., decreased enjoyment); and social (e.g.,

limited social opportunities to mix) development (Côté & Abernethy, 2012; Wiersma, 2000 for discussions). Instead, children in the so-called sampling years (6-12) should be free to sample a range of sports as such early diversification can have a number of benefits. These outcomes have been measured both in terms of the likelihood of attaining elite status in team sports (Berry et al., 2008; Weissensteiner et al., 2009), and in terms of continued participation within the sport (Strachan, Côté, & Deakin, 2009; Wall & Côté, 2007).

Another key message from the DMSP is that children in the sampling years benefit more from deliberate play (game-like activities) than structured (deliberate) practice and competition (Côté & Abernethy, 2012). Deliberate play activities are theorized to be essential during early sport experiences because they provide an opportunity for young athletes to develop fundamental motor skills in an enjoyable environment (Côté et al., 2003). A key area where involvement in deliberate play and structured practice or competition are different, is in the amount of time that an individual is actively involved in the activity (Côté et al., 2007). In deliberate play situations there are fewer periods of waiting or off-task time than in structured practice and competitive settings (e.g., waiting around to perform the next drill; waiting for a phase of play to be relevant to your position, etc.)

It has recently been suggested that the structure of practice and organized competitive matches should become more play orientated (Ford & Williams, 2012). To date however, there has been limited research that has attempted to experimentally assess the benefits of a deliberate play approach; indeed the research supporting the DMSP has been retrospective in nature (Côté & Abernethy 2012). By changing the rules governing organized games, it should be possible to elicit changes in players' behaviours that might be more representative of the outcomes of deliberate play (more skill learning opportunities, less structure, less waiting around, etc.). Non-linear pedagogy (Chow, Davids, Renshaw, & Button, 2013; Chow et al., 2006) provides a useful framework for developing an effective learning environment for children, where desired player behaviour can emerge as a consequence of a constraints led approach to "bending the rules" (Davids, Button, & Bennett, 2008; Renshaw 2010). The effectiveness of a constraints led approach to skill development in

rugby union has been supported in experimental practice scenarios (Passos, Araújo, Davids, & Shuttleworth, 2010; Passos et al. 2008). In youth sport, Fenoglio (2004) found that U9 footballers exhibited more frequent skill attempts (e.g., scoring attempts, goals, passes, dribbling skills etc.) when competing in a series of four constrained games compared to when playing the traditional game.

The aim of the current study was therefore to investigate if the principles for *practice* from the DMSP could be applied to *competitive* U9 rugby union games, by manipulating the rules of play. As such, this is the first study to explore the impact of rules changes on player behaviours in a national trial in any youth sport. We compared matches in end-of-season festivals (county tournaments) at three counties who had been playing the traditional rules for that season and three counties who had agreed to play 'pilot' rules (designed to more closely resemble the principles of deliberate play) for that season. Specifically, we hypothesised that the rules governing the pilot game would prioritise play activity (i.e. more ball in play time) and provide more skill learning opportunities (more passes, runs, tackles) than those governing the traditional game (as Fenoglio, 2004).

## **5.3 Methods**

### **5.3.1 Background**

The rules of age-group rugby union played in England are overseen by the governing body, the RFU. At U8, children currently play a modified game (six a-side) involving no contact, where 'tackles' are made by removing a velcro tag from an opponent's belt (Tag rugby). In the (current) traditional rules at U9 (U9), not only is tackling introduced, but also the set pieces (scrummaging and lineouts) and the breakdown (contact) skills of rucking and mauling. In the pilot rules at U9, only tackling is added to the evasion game played at U8, and there are fewer numbers playing compared to the traditional rules (7 a-side vs 9 a-side). As the pilot game has no competition for the ball in a standing tackle (a maul), a 'tackle' is called by the referee after 3 seconds if the attacker is not brought to ground. The game is intended to be less structured (more like 'backyard rugby') allowing the other skills to be incrementally added in following years, while these fundamental skills (evasion, running, passing, catching,

tackling) have time to be embedded. In effect, the game was designed to be more in tune with the principles espoused in the sampling pathway of the DMSP (Wilson et al., 2009).

### **5.3.2 Participants**

Three English counties were nominated to play the pilot rules for the entire 2010-2011 and 2011-2012 seasons and were selected to represent the north, midlands and south of the country. Three counties from the other 26 constituent bodies still playing the traditional rules were selected to represent a similar geographical spread. In total, 89 games were filmed (57 in pilot counties and 32 in traditional counties) involving 84 teams. Local institutional ethics committee approval was obtained prior to the start of testing. Parental consent was given on two different occasions. In line with RFU guidelines the parents at clubs in all participating counties gave their consent during player registration for their child to be filmed in matches during the season. The RFU does not allow filming in any mini rugby matches without this consent. Prior to filming, participating clubs in all counties were provided with study information and consent sheets, and asked to confirm parental consent for filming. Following consultations with parents, the coaches or team managers provided final informed consent on behalf of the whole club on the day. Final confirmation was given by participating counties that parents at each club had given their consent to film matches for the study. Players involved in the U9 age group at the beginning of the season were eight years old at midnight on the 31st August (Rugby Football Union, 2011).

### **5.3.3 Procedure**

Matches were filmed at end-of-season festivals in each of the six Counties in March and April 2011 and again in 2012. This timing was designed to allow players to get used to playing these rules in training and competitive matches throughout the season. The study ran over two seasons to enable sufficient data to be collected (between 14 and 25 games per county). Unfortunately, the 2012 festival in one of the traditional counties was cancelled due to flooding, so full data were only available for the other five counties. The camera was set up on a tripod on the halfway line on the pitch and tracked the ball as the games progressed.

### **5.3.4 Measures**

A notational analysis system was developed based on a clear identification of critical behaviours for comparing the Traditional and Pilot games (Hughes & Franks, 2004). Categories for analysis were identified following a study of the International Rugby Board (International Rugby Board, 2012b) game analysis categories and discussions with coaches at the RFU about the fundamental behaviours desired in U9 matches (see Appendix D). Behaviours of interest were tagged using Dartfish (Fribourg, Switzerland) Connect Plus video analysis software (see Data Analysis).

#### **5.3.4.1 Percentage ball in play (PBIP)**

In any organized competitive sport there will be times when the ball is not in 'play' – i.e. waiting for restarts or for set pieces to form. For the traditional game, PBIP was defined as:  $(\text{total game time} - \text{time for restarts and set pieces to set}) / \text{total game time}$ . For the pilot game, where there were no set pieces, PBIP was defined as:  $(\text{total game time} - \text{time for restarts}) / \text{total game time}$ .

#### **5.3.4.2 Tries.**

The primary aim in rugby is to score tries (touching the ball down over the opposition's try line).

#### **5.3.4.3 Runs**

A run was defined as a movement of at least 3 steps in any direction that led to a pass, a try, going into touch, or being tackled.

#### **5.3.4.4 Open play passes**

In rugby, the ball can only be passed backward. We analyzed the number of successful passes made in open play - i.e., made before, or during a tackle.

#### **5.3.4.5 Tackles**

A tackle is considered to have occurred when an opponent brings an attacker to the ground.

#### **5.3.4.6 Breakdown: Rucks and mauls.**

A ruck begins when one or more players from each team close around the ball on the ground. A maul begins when a ball carrier is held by one or more opponents, and is joined by one or more of the ball carrier's team-mates.

#### **5.3.4.7 Set-pieces: Scrums and lineouts.**

A scrum is formed in the field of play, following an infringement, when players from each team (three in the U9 game) bound together and interlock with the opposition team. A lineout restarts play after the ball has gone into touch, with a throw-in between two lines of players.

### **5.4 Data analysis**

As game durations varied due to different interpretations by referees / counties, the number of behaviours occurring in each game were standardised to a nominal, 10 minutes duration to allow meaningful comparisons. An experienced mini-rugby coach / performance analyst blindly re-coded all measures from five pilot and five traditional games (11.2% of the data). Inter-rater reliability analyses (as O'Donoghue, 2010) revealed satisfactory percentage error scores, ranging from 1.75% to 7.02%.

Differences in the dependent variables (fundamental behaviours) were compared between each of the five counties using one-way MANOVA, with follow up ANOVAs. Effect sizes were calculated using partial eta squared ( $\eta_p^2$ ) for omnibus comparisons. Tukey homogeneous subsets were used to determine if the counties grouped together as would be expected by our hypotheses: with pilot rule counties having more play time and more skill opportunities than traditional rules counties. This approach was adopted to protect against assumptions relating to the homogeneity of counties within their groupings. If the Tukey subsets supported group differences, we ran independent *t*-test analyses (pilot vs traditional).

### **5.5 Results**

MANOVA revealed a significant difference in behaviours between the 5 counties analysed.  $F(20,332) = 14.48$ ,  $p < .001$ , Wilks'  $\lambda = 0.087$ ,  $\eta_p^2 = .46$ .

### 5.5.1 Percentage Ball in Play

There was a significant difference in the ball in play time (PBIP),  $F(4,84) = 27.77$ ,  $p < .001$ ,  $\eta_p^2 = .57$ . Tukey post hoc comparisons revealed two homogeneous subsets that perfectly matched the pilot / traditional rules groupings (Table 5.1). The pilot rules allowed the ball to be in play for significantly longer (mean 81.84% of game time;  $SD = 8.29$ ) than the traditional rules (mean 64.47%;  $SD = 7.20$ ) in a standardised ten-minute period ( $p < .001$ ).

The traditional rules include four specialised elements not included in the pilot rules; the set pieces of scrums and lineouts and the breakdown skills of rucks and mauls. On average across the 32 traditional games analysed there were 10.18 ( $SD = 4.89$ ) rucks; 6.95 ( $SD = 3.14$ ) mauls; 3.45 ( $SD = 1.85$ ) scrums; and 2.82 ( $SD = 1.61$ ) lineouts in a ten minute game. On average each ruck lasted 54s ( $SD = 34s$ ); each maul lasted 67s ( $SD = 47s$ ); each lineout lasted 92s ( $SD = 61s$ ); and each scrum lasted 115s ( $SD = 59s$ ). As the ball in play time for the traditional game (6.45 minutes) includes the time spent in rucks and mauls, only 4.45 minutes is available for open play activities (running, passing, tackling).

*Table 5.1. Tukey homogeneous subsets table for the mean (SD) percentage of ball in play (PBIP) time for games played in each county. Subsets are significantly distinct at  $\alpha < .05$ . Counties are presented in ascending order of score.*

County	Subset	
	1	2
Trad A	64.20 (8.82)	
Trad B	64.71 (5.69)	
Pilot A		78.72 (8.28)
Pilot B		83.89 (8.12)
Pilot C		84.79 (7.03)
Sig.	1.00	.157

### 5.5.2 Runs

There was a significant difference in the number of runs made,  $F(4,84) = 34.71$ ,  $p < .001$ ,  $\eta_p^2 = .62$ . The Tukey post hoc comparisons revealed two homogeneous subsets that perfectly matched the pilot / traditional rules groupings (Table 5.2). Teams playing the pilot rules made significantly ( $p < .001$ ) more runs per ten minutes (mean 41.54;  $SD = 6.15$ ) than teams playing the traditional rules (mean 26.86;  $SD = 5.51$ ).

*Table 5.2. Tukey homogeneous subsets table for the mean (SD) number of runs made with the ball in hand by teams playing in each county. Subsets are significantly distinct at alpha < .05. Counties are presented in ascending order of score.*

County	Subset	
	1	2
Trad B	26.70 (6.10)	
Trad A	27.04 (4.50)	
Pilot C		38.92 (4.36)
Pilot A		41.02 (6.40)
Pilot B		44.32 (6.17)
Sig.	1.00	.059



### 5.5.3 Passes

There was a significant difference in the number of successful passes made in open play,  $F(4,84) = 35.66$ ,  $p < .001$ ,  $\eta_p^2 = .63$ . Tukey post hoc comparisons revealed three homogeneous subsets that generally supported the pilot / traditional rules groupings (Table 5.3). The two traditional rules counties grouped together (subset 1) and the three pilot counties grouped together in two homogeneous subsets (subsets 2 and 3). Again, teams playing the pilot rules completed significantly more passes (mean 26.63;  $SD = 8.74$ ) than teams playing the traditional rules (mean 9.78;  $SD = 4.40$ ) in a standardised ten-minute period ( $p < .001$ ).

*Table 5.3. Tukey homogeneous subsets table for the mean (SD) number of successful passes made by teams playing in each county. Subsets are significantly distinct at  $\alpha < .05$ . Counties are presented in ascending order of score.*

County	Subset		
	1	2	3
Trad B	8.98 (4.38)		
Trad A	10.68 (4.40)		
Pilot C		20.48 (6.51)	
Pilot A		26.87 (6.49)	26.87 (6.49)
Pilot B			31.08 (10.16)
Sig.	.950	.059	.384

### 5.5.4 Tackles

There was no significant difference in the number of successful tackles made,  $F(4,84) = 2.14$ ,  $p = .083$ ,  $\eta_p^2 = .09$  (Table 5.4). As the ANOVA approached significance, we ran the follow up t-tests for the County grouping: Teams playing the pilot rules (mean, 23.45;  $SD = 8.51$ ), completed significantly more tackles than teams playing the traditional rules (mean 19.17;  $SD = 5.30$ ) in a standardised ten-minute period ( $p < .012$ ). When standing tackles are added to the number of tackles to the ground in the pilot game, the total tackle count increases to 35.83 ( $SD = 8.94$ ).

*Table 5.4. Tukey homogeneous subsets table for the mean (SD) number of tackles made by teams playing in each county. Subsets are significantly distinct at  $\alpha < .05$ . Counties are presented in ascending order of score.*

	Subset
County	1
Trad B	18.95 (5.99)
Trad A	19.42 (4.59)
Pilot A	22.14 (8.73)
Pilot C	23.25 (5.27)
Pilot B	25.46 (10.16)
Sig.	1.00

### 5.5.5 Tries

There was a significant difference in the number of tries scored,  $F(4,84) = 10.74$ ,  $p < .001$ ,  $\eta_p^2 = .34$ . Tukey post hoc comparisons revealed three homogeneous subsets as presented in (Table 5.5), that again partially supported our à priori groupings based on the rules being played. Significantly ( $p < .001$ ) more tries were scored in a ten-minute period in counties playing the pilot rules (mean 5.16;  $SD = 2.47$ ) than in counties playing the traditional rules (mean 2.81;  $SD = 1.42$ ).

*Table 5.5. Tukey homogeneous subsets table for the mean (SD) number of tries scored by teams playing in each county. Subsets are significantly distinct at  $\alpha < .05$ . Counties are presented in ascending order of score.*

County	Subset		
	1	2	3
Trad B	2.52 (1.26)		
Trad A	3.15 (1.56)	3.15 (1.56)	
Pilot C	3.78 (1.66)	3.78 (1.66)	
Pilot A		4.74 (2.64)	4.74 (2.64)
Pilot B			6.23 (2.31)
Sig.	.360	.154	.203

### 5.6 Discussion

The development of players from novice to expert levels, and the continued participation of players in a sport are key objectives for any sport governing body (Ford et al., 2012). An important question therefore is the extent to which age-group rules are appropriate for the physical and cognitive development levels of these young participants (Fenoglio, 2004; Wilson et al., 2009). How and when should critical skills be developed and to what extent should the structure and rules of adult versions of the game be modified for children? The current study is the first to test the possibility of increasing skill learning

opportunities in competitive games, using the DMSP (Côté, 1999) as a framework for modifying rules. The sampling pathway of the DMSP provides a useful structure for a governing body like the RFU as it strives to meet its objectives (Sport England, 2013). A program based on these principles has potential benefits for both mass participation (increased involvement, enjoyment etc.) and elite athlete development (e.g., improved decision-making), and therefore represents both an efficient and effective structure for athlete development (Côté, Murphy-Mills, & Abernethy, 2012).

Differences in the behaviours that emerged were evident between counties, supporting our predictions for the efficacy of the pilot rules. Specifically, the pilot rules appear to produce a game that provides more opportunities for developing attacking skills. Indeed over a standardised ten-minute period the pilot game produced 55% more occasions when children ran with the ball (Table 5.2); and more than twice as many successful passes (Table 5.3); resulting in almost twice as many tries being scored (Table 5.5) compared to the traditional game. Interestingly, there was only a marginal difference in the number of tackles made between counties (Table 5.4), which suggests that tackling performance may lag the development of attacking skills in the pilot game at U9. However, this marginal difference is likely due to differences in the rules concerning a standing tackle. When these standing tackles are added to the traditional tackles to ground, the gap between defensive and attacking skills in the pilot game is reduced.

A key reason for this increased opportunity for skill development in the pilot is the additional time afforded to the creation of these behaviours by having a significantly higher percentage ball in play time (Table 5.1). In comparison, over half a traditional game on average (five and a quarter minutes) was spent in the specialised skills of scrums, lineouts, rucks and mauls, providing less time to further develop the basic attacking and defensive skills learned at U8. The results therefore support our hypotheses that a game that emphasises play elements (evasion, passing and tackling skills) at the expense of structured elements (scrums, lineouts, rucks, mauls), will provide more opportunities to develop these core skills that are crucial for all rugby players.

There are some limitations with the current research. First, there is a potential philosophical issue in attempting to apply the DMSP to the design of competitive rules for sampling years' sport. The DMSP suggests that the sampling years should consist of backyard, unsupervised games (deliberate play) without the need for structured, competitive sport (Côté et al., 2007). However, in recent years the growth of organized sporting activities has coincided with a decline in the number of children playing informal sporting activities (Coakley & Pike, 2009). With over 700 clubs playing mini-rugby in England alone, it may be productive to guide NGB to make the rules governing these games as developmentally appropriate as possible - in line with the principles espoused in the DMSP (Thomas & Wilson, 2013). As a controlled 'trial' of the principles of the DMSP, the current study is also able to make a novel contribution to the DMSP literature, extending support beyond those from retrospective accounts (Côté & Abernethy, 2012). Such experimental research can act as a launch pad for future longitudinal examinations of the benefits of sampling and deliberate play and may serve to inform further development of the model. Indeed there may be the potential for the sampling pathway to be modified to include developmentally appropriate competition in the sampling years. In soccer, an early engagement pathway – including an emphasis on play activities and structured competition - has been identified as a key component of elite player development (Ford et al., 2012; Ford & Williams, 2012).

Limitations were also apparent in the methods adopted. First, we did not manipulate the Pilot rules (task constraints) in a systematic way, as would be important when formally testing the predictions of a constraints-led approach (Passos et al., 2008; Passos et al., 2010). However, the aim of the rules changes was to create a game aligned with deliberate play principles, rather than assess the relative importance of each constraint (e.g., reduced numbers, removal of set pieces, etc.). As the current rules at U9 are so far removed from the principles of deliberate play, a practical decision was taken to manipulate a number of elements concurrently. Practical considerations were important in this trial, as the pilot rules were not simply enforced for the data collection period. Rather, the RFU had to formally agree for teams in the pilot counties to be coached in, and play competitive games under the pilot rules all season. We

therefore had to sacrifice a degree of internal control (experimentally manipulating variables independently) for the sake of ecological validity.

The second limitation is that we only measured basic skill behaviours, albeit fundamental development skills. Future research in small-sided games may wish to examine differences in individual player involvements, and particularly, specific interactions between attackers and defenders (Passos et al., 2008). Finally, it would be interesting to examine the views of the players and coaches involved in both variants of the U9 game, as this would provide additional insights into perceived strengths and weaknesses of the traditional and pilot rules. This is especially important, as the rules of the game do not only influence player behaviours during the games themselves, but also the coaching and practice activities carried out between games (Thomas & Wilson, 2013).

To conclude, the current study initiates enquiry into the impact of rules changes on player behaviours in youth sport. The results revealed that changes to the rules governing age-group rugby could influence the game-related behaviours of children playing. The pilot rules were designed to encourage more opportunities for children to perform fundamental attacking and defensive skills, at the expense of structured, specialized behaviours, and this aim was met. As the pilot rules puts less emphasis on more specialised contact skills; negates the need for formalised positions; and reduces the involvement of the referee (there are fewer structured rules to enforce); the ensuing game is more closely aligned to the principles of deliberate play (Côté, 1999). In games governed by the pilot rules, there were significantly more examples of attacking behaviours, less waiting around and more involvement in 'play', when compared to the traditional games. The results provide initial support for the utility of applying the principles of the DMSP to competitive (organised) games, and provide a useful starting point for the design of child-centred and developmentally appropriate competitive rules for rugby union.

## 5.7 Summary

The current chapter presented the data collection and analysis from the first quantitative study included in this mixed methods convergent parallel thesis. Performance analysis was conducted on competitive U9 matches using quantitative methods to investigate whether manipulating the rules based on the principles of deliberate play produced a more open and less structured game.

The results revealed that changes to the rules governing U9 rugby could influence the game-related behaviours of children playing. The findings provide additional objective data supporting the elite coaches' views that a less structured game would be more appropriate for young players. The results showed that the pilot rules encouraged more opportunities for children to perform fundamental attacking and defensive skills, with less waiting around and more involvement in 'play' at the expense of structured, specialized behaviours.

Both studies from previous chapters provide support for childhood rugby games with high involvement and a high number of skill learning opportunities. However, it is not known what impact the rules had on those involved, and what their opinions overall are about the key components of U9 rugby. The following chapter aims to address these issues by exploring the opinions and attitudes of those closely involved in U9 rugby through an analysis of surveys completed by both a sample of coaches (experiment 1) and players (experiment 2).

## Chapter 6

### **Shaping the Game: Exploring coaches and players perceptions of competitive mini rugby union**

#### **6.1 Introduction**

Since the latter part of the twentieth century, there has been an increase in the number of organized team sports played by children in the UK, with a corresponding decrease in informal child driven activities, such as street soccer (Coakley & Pike, 2009). In adult-led organised sport, early specialization in one or two sports is common; and serious competition often replaces fun and enjoyment (DeKnop et al., 1996). Indeed, the emphasis of organized sport is arguably the development of highly skilled and specialized individuals (Coakley & Pike, 2009). For the RFU in England, these are significant issues when considering the development of competitive matches during childhood (7 to 11 years old). For example, there are over 700 teams competing in the U9 age group alone.

The RFU has a responsibility to continuously retain and attract children to rugby union (Sport England, 2013); and is interested in optimising both mass participation and elite player development. Due to the complexity, physicality and structure of the adult game, this provides the RFU with unique challenges. At each age group level, there are key issues to be resolved around the rules and structure of the game. One of the most contentious issues is whether the development of specialised skills (e.g., scrummaging, mauling, kicking, etc. in rugby) and contact skills could be hindered if not trained from an early age. These issues are especially important as the rules and structure used in games will have a considerable influence on the hundreds of volunteer coaches and players participating at this age level throughout England (Coakley & Pike, 2009; Côté et al., 2013). Therefore, when considering the structure and rules of games, a key issue is to examine and understand the opinions and attitudes of coaches and players.

Although organized competitive activities are one of the key childhood developmental activities in sport (e.g., Ford et al., 2012) empirical research examining the development of this type of activity is sparse. However, there is a



large body of research that has principally examined the focus and structure of children's *practice* (Côté et al., 2003; Williams & Hodges, 2005). The DMSP (Côté, 1999; Côté et al., 2007; Williams & Hodges, 2005) proposes that there are two main developmental activities; *deliberate practice* and *deliberate play*, which differ in the amount of influence adults and children have on the practice environment (Cote et al., 2013). The main goal of *deliberate practice* is to improve performance through formal adult direction and instruction (Ericsson et al., 1993). These types of practices have high input from coaches and are highly structured, effortful, low in inherent enjoyment, and are not designed to produce immediate rewards. From a deliberate practice standpoint, children should follow an early specialisation pathway and participate in competitive sport as early as possible (Baker et al., 2009). The introduction of intensive practice activities from an early age enables the accumulation of the vast hours of practice required to reach elite status (see, Ericsson, 2007). In contrast, *deliberate play* activities are informal and child-led, with limited if any adult input and a high emphasis on enjoyment and late specialisation (Côté et al., 2007). Deliberate play activities, such as street soccer, where participants continually modify the game they play are intrinsically motivating, with a primary emphasis on having fun. The deliberate play activities are part of a late specialisation pathway where the emphasis is on experiencing (i.e. sampling) all different types of sports during childhood (Côté et al., 2012).

Observations of informal player-controlled (i.e. deliberate play) and formal adult-controlled games during childhood (i.e. deliberate practice/formal competition) suggest that child-led games have different aims to adult-led games (Coakley & Pike, 2009). When children design their own games and play on their own they are interested in four things: being involved in the action; having action situations that lead to scoring; an exciting experience; and playing with friends (Coakley & Pike, 2009). Although these informal games shared similarities with organized games, they were modified to keep the score close, and to produce the highest possible levels of action, scoring and personal involvement (e.g., by applying handicapping systems). In contrast to these *action-centred* observations of informal games, formal organized adult-controlled games can be described as *rule-centred* (Coakley & Pike, 2009). A key element of these games is the strict application of the rules by adults (i.e.

referees or coaches), with the importance of structure highlighted, for example, through playing positions. The skill level of players determines the amount of playing time, with the less skilled individuals playing least often.

NGB have recently been urged to design activities that are more play oriented and more closely aligned with the informal games children play (Ford & Williams, 2013; Renshaw, 2010). In support of this approach, elite rugby union coaches have emphasised the importance of limiting structure in mini-rugby games (under 12 years of age) and to resist the temptation of getting children to play the same game that adults do (Thomas & Wilson, 2013). The RFU recently trialled new rules of play (pilot) at U9 level, where contact is first introduced to children (RFU, 2010). These rules were based on the overarching principles behind the DMSP (early diversification and reduced structure). During the entire 2010/11 season three English counties were nominated to play the pilot rules and were selected to represent the north, midlands and south of the country. Three counties from the other 26 constituent bodies still playing the traditional rules were selected to represent a similar geographical spread. The previous season (2009/10) at U8, these coaches worked on a modified non-contact game, where removing a velcro tag from an opponent's belt counted as a 'tackle' (Tag rugby). For the 2010/11 season, the traditional rules, would have introduced tackling alongside the set pieces (scrummaging and lineouts), and the breakdown (contact) skills of rucking and mauling. In contrast the new pilot rules at U9 added only tackling to the evasion game played at U8, with fewer playing numbers compared to the traditional rules (7 a-side compared to 9 a-side). As there was no competition for the ball in a tackle that does not go to ground (a maul), a 3-seconds 'grab/standing tackle' was officiated by the referee. Conceptually the traditional laws take on the form early specialisation and deliberate practice, and the pilot laws late specialisation and deliberate play.

The first study of this thesis (Chapter 4; Thomas & Wilson, 2013) provided generic support for the efficacy of such an approach; with expert coaches suggesting that a less structured game would be more appropriate for young players. The second study (Chapter 5) provided additional objective data to support this contention, in that the pilot rules provided significantly greater ball-in-play time and more completions of relevant skilled behaviours than the

current (traditional) rules. However, it is not known what impact the rules had on those actually involved at U9 rugby, and what their opinions overall are about the key components of U9 rugby. There is a possibility that critics may argue that the pilot game is missing certain perceived essentials of rugby union; which may exist alongside the persistence of traditionalism within the game. This could suggest to some that the new rules, superficially at least, are reminiscent of rugby league; which has historical connotations due to the split between the two games in 1895. To the researcher's knowledge, there is no research in any sport examining the opinions of volunteer coaches and their players with regards the games they coach and play.

The current chapter therefore aimed to explore the opinions and attitudes of those intimately involved in U9 rugby through an analysis of surveys completed by both a sample of coaches (experiment 1) and players (experiment 2). In chapter 4, the elite rugby union coaches highlighted the critical influence of adult involvement (i.e. coaches and referees) in player development during childhood. It is therefore important to understand more about their general opinions about what rugby should 'look like' at U9 as well as any specific opinions about the pilot and traditional games. Given that adults and children may have different opinions about the structure of team games (Coakley & Pike, 2009), it is also crucial to understand the players' experiences and opinions of sport (MacPhail, 2011).

## **6.2 Experiment 1: U9 Coaches**

### **6.2.1 Introduction**

Three main aims guided the U9 coaches' study. The first, was to examine reactions to the introduction of the new pilot rules across a cross-section of junior rugby coaches. The second was to explore whether there are distinct groups of U9 coaches differentiated on the basis of their perceptions of competitive U9 games on principles related to early (i.e. traditional rules) or late (i.e. pilot rules) specialisation. A third aim was to discuss the implications of these findings related to these two prior research questions. As the study was exploratory it was difficult to make specific predictions. However, it was expected that the majority of coaches would favour late specialisation given the findings from the qualitative study with elite coaches (Thomas & Wilson, 2013).

## **6.2.2 Methods**

### **6.2.2.1 Participants**

Participants were U9 coaches who had coached U9 mini rugby union during the 2010/11 season. The database from the RFU RugbyFirst website (an internet-based tool to help administer rugby at all levels) provided e-mail details for a sampling frame of 856 U9 coaches from all 29 constituent bodies, who were contacted (sampled) and invited to take part in the survey. There were 202 usable responses from U9 coaches, giving an effective response rate of 23.6%. The RFU did not have an exact figure of the number of coaches involved at U9 level during the 2010/11. Therefore, following discussions with the RFU, an estimate on the number of coaches was based on clubs having at least two coaches. This gave a total 1314 coaches, as there were 657 teams playing U9 mini rugby during the 2010/11 season (RFU 2011, October internal document for Player Development Sub-Committee). Therefore, it is estimated that this research captured the views of around 15.4 per cent of the population.

### **6.2.2.2 The Surveying process**

An internet-based survey explored U9 mini rugby union coaches' opinions of competitive rugby union game played at this age (Appendix E). The survey consisted of 31 questions and took around 10 minutes to complete. This cross-sectional internet survey study was created to produce a snapshot of the opinions of the coaching population at that particular point in time (Cohen, Manion, & Morrison, 2011). A survey allowed for the collection of standardized information, to enable generalizations of the results. The analysis of the survey data was exploratory using cluster analysis to investigate whether there were distinctive groupings of U9 coaches based on their beliefs and attitudes towards the game at this age.

The web based company SurveyMonkey (SurveyMonkey Inc., Palo Alto, California, USA) was used to administer the survey as the RFU had an existing licence. Following background reading and conversations with RFU coaches and mini rugby coaches at U9 rugby festivals, several survey drafts were written and modified. Pilot versions of the survey and individual questions were developed following discussions with a sample of RFU coaches and experienced adult rugby players. For example, a group of 28 rugby coaches

and rugby playing adults piloted two open-ended questions that were, 'Please give two reasons why children are attracted to playing mini rugby?' and 'Please give two reasons why you think children wouldn't want to play mini rugby?' The most popular answers generated categories that were in multiple-choice questions (question 5 and question 7) in the final questionnaire.

Implementation of the final version of the survey onto SurveyMonkey proved to be problematic. Although the researcher requested sole responsibility for implementing, administering, and distributing the survey, this was not possible as the RFU insisted on using their in-house IT department. This limitation caused a number of problems throughout the research process, but especially during the survey building phase in relation to the management of the survey (including; layout, the introduction of skip patterns, the correction of errors (e.g. two ticks when only one allowed), and the completion of missed items). At no stage did the researcher have access to SurveyMonkey and having to depend on the Digital Content Coordinator at the RFU to build the survey was frustrating for both parties; any changes made had to be communicated via e-mail. This meant that the building of the survey that should have taken a few days ended up taking nearly a month. Once the survey had been built on to SurveyMonkey the RFU was in sole control of the distribution and administration until the completion of the survey.

### **6.2.2.3 Survey design and measures**

The survey contained four sections, focusing initially in Section A on gathering the opinions of all participating U9 coaches on key components mini rugby, irrespective of the game they had coached during the season. The aim overall in Section A was to explore the behaviours coaches identified as important for player development and were essential for U9 rugby matches. All the questions in the survey were closed, with the first a multiple-choice question on how many players should be on a team, followed by two rank ordering questions to gather opinions on what attracts and is off-putting for children off playing rugby. The initial warm-up questions in each of the four sections were easy to answer in order to generate interest and to encourage participants to continue with the survey (Burns & Bush, 2006). The remaining questions were Likert scales with question 6 rating features such as scrums and lineouts using a four point scale (Very Important, Important, Insignificant, Negligible). In question 8 coaches had

to respond to Likert scale statements on common behaviours associated with pilot and traditional matches (Disagree Strongly, Disagree, Agree, Agree Strongly). The selection of the number of categories of responses was based on those commonly used in rating scales, as there is little agreement among researchers about the best number of points on a scale (Brace, 2008; Burns & Bush, 2006; Johns, 2010). A four-point scale was used to ensure that the respondents made a definite choice on these subjects and did not 'hedge' by choosing the middle option (Garland, 1991). Although it has been suggested that respondents are reluctant to use non-response options, it was felt that having no such category would lead to a more accurate gauge of the coaches' opinions (Johns, 2010). In the scale questions, the same numbers of positive and negative attitudes were included in order to avoid bias (Brace, 2008). It was crucial that the scale were balanced as respondents were likely to oppose a succession of statements asserting a contrary position to their own viewpoint. Scales were mixed so that positive responses were sometimes skewed to the right and at other times to the left.

Section B focused on the coaches who had only experience of coaching the traditional rules; while Section C focused specifically coaches' who had only coached the pilot rules. Dichotomous questions were used to discover if coaches believed that the traditional game should be changed (question 9) and whether pilot coaches felt that the new rules should be played in all matches in England (question 13). As changing the laws of the game has been such a contentious issue (based on comments from coaching development officers in pilot and traditional counties), it was felt that giving two option answers ensured that the respondent gave a clear response to these issues. In the next section the focus shifted to the beliefs of coaches who had coached both the pilot and traditional game (Section D). The aim was to clearly identify if coaches had preference for either the pilot or traditional game, and in question 17, coaches compared the on-field behaviours of both games by responding to statements with a four-point rating scales (Disagree Strongly, Disagree, Agree, Agree Strongly). The final Section (Some Questions About You; Section E) focused on demographics in order to provide background information on coaches with regards to age, gender and coaching experience.

Ethical approval for the study was granted by the University Ethics Committee to ensure that the research was undertaken in a way that minimised the risk to participants. Coaches received e-mails from the RFU inviting them to participate, explaining the background to the research, and the purpose of conducting the questionnaire. All coaches volunteered to take part in the survey by clicking on a link in the e-mail and their anonymity was preserved. As the survey was a self-administered internet based questionnaire, the participants were free to withdraw at any time and to refuse to answer any questions. There were 25 unusable replies, due to early withdrawal; failure to complete all questions; and ineligibility. The coaches had the opportunity to ask questions about any aspect of the research via e-mail, however, the researcher did not receive any questions.

#### **6.2.2.4 Procedures**

The survey was distributed by e-mail to U9 coaches at the start of June 2011 with the final closing date the first week in July 2011. The only input from the researcher was to agree on an extension of the deadline for replies from mid June, and to confirm the second distribution of the survey in order to increase response rates. The full survey period from start to finish was a total of five weeks.

#### **6.2.2.5 Data analysis**

Alongside a series of univariate measures, the survey questionnaire was subject to cluster analysis. The main aim of cluster analysis is to group objects based on individual characteristics, which are determined according to natural relationships within the data (Hair, Anderson, Tatham, & Black, 2010). The clustering process produces groups that on the one hand have high internal homogeneity; whilst at the same time have high external heterogeneity. Input variables are chosen by the researcher based on a series of correlations and not empirically calculated; a unique process among multivariate techniques (Hair et al., 2010). These decisions therefore require good researcher judgment as they ultimately determine the characteristics of each cluster. However, these selections are also recognised as a weakness of the approach, as there's no statistical foundation upon to draw inferences from a population sample (Hair et al., 2010).

Cluster analysis was identified as a suitable exploratory method of analysis for achieving the research objective of identifying different groups of U9 coaches based on their beliefs and attitudes towards the proposed new laws and traditional laws. By identifying possible natural underlying relationships within the data, the method otherwise had the potential to identify unknown groups of coaches that would not have been revealed using other research methods (O'Donoghue, 2012). This allowed for the identification of groups of coaches with variations in beliefs based on the key behaviours in U9 rugby and whether these beliefs were supportive or in opposition to the pilot competitive game experiences proposed by the RFU. There were two stages in the Cluster Analysis process. The first stage was to identify the clusters through determining which variables to include and the final number of clusters. Second, the final cluster solution was examined for differences.

#### *6.2.2.5.1 Clustering variables selection*

The first step was to select clustering variables based on the research objectives and in relation to theoretical, conceptual and practical considerations (Hair et al., 2010). The principles of the DMSP that underpin the RFU's U9 competitive game proposals formed the basis for input variable selection, alongside the views expressed by mini rugby coaches during the filming of U9 matches at festivals. These included focusing on the importance of actual game elements such as passing and scrums, and also the game experience itself. These are, after all, the crux of the differences between the two games. It was also crucial to select input variables that could effectively differentiate between the U9 coaches within the dataset. The five sections in the dataset were for all U9 coaches (Section A), coached the traditional game only (Section B), coached pilot game only (Section C), coached both games (Section D), and personal demographic questions (Section E). The selection was based on identifying clustering variables that were applicable to all U9 coaches regardless of what type of game they had coached during the season. Therefore, input variables were selected from Section A as this section was applicable to all U9 coaches. As the focus was on coaches' attitudes and beliefs, these unobservable specific clustering variables were identified as suitable for clustering. It is generally accepted for market segmentation purposes that unobservable preferences such as perceptions and attitudes produce clusters



that are more homogenous (Mooi & Sarstedt, 2011). This is crucial to the cluster analysis process as clusters of objects should exhibit high internal (within-cluster) homogeneity and high external (between cluster) heterogeneity (Hair et al., 2010). Therefore, from the six questions in Section A, two attitudinal questions 6 and 8, that each included 10 variables (total of 20 variables) and a four-point rating scale were considered for selection.

On initial examination it was identified that 10 variables from each question dealt with similar subject matters and it was decided to remove one of the five pairs (Table 6.1). In Question 6, therefore, the rucking, scrums, mauls, lineouts and high number of passes variables were removed. The equivalent variables in question 8 were retained as it was felt they gave a stronger indication of the coaches' attitudes towards that aspect of play. For example, when comparing 'rucking' from question 6 with 'rucking isn't needed' in question 8 an insignificant selection for the latter would not necessarily result in an agreement with rucking isn't needed in the former. To reduce the impact of multicollinearity between the clustering variables the remaining 15 variables were assessed using SPSS and were found to be suitable (correlation coefficients  $< 0.90$ ). This was a crucial step as it is generally accepted that using a large number of clustering variable increases the likelihood that the variables are no longer dissimilar (Mooi & Sarstedt, 2011).

Following exploratory cluster analysis testing with the original 15 variables, the resultant 2-and-3 cluster solutions produced using SPSS were consistent and unsatisfactorily unstable (Hair et al., 2010). Following further exploratory cluster analysis using a combination of different number of input variables, it was decided that the final streamlined set of variables should reflect the areas of contention in the pilot rules debate issue. From the exploratory cluster analysis and examination of descriptive statistics, eight of the fifteen variables were ultimately identified as being non-contentious with high levels of agreement among the U9 coaches, and hence were removed from the list of clustering variables.

*Table 6.1. Selection of similar input variables*

---

**Q6. Please rate the following features for U9 rugby matches.**

***(4 point scale where = 1 Very important, 4= Negligible)***

---

- Rucking
  - Scrums
  - High number of passes
  - Mauls
  - Line-outs
- 

**Q8. Please respond to the following statements about U9 rugby matches:**

***(4 point scale where = 1 Disagree Strongly, 4= Agree Strongly)***

---

- Mauling is important
  - Playing positions are needed
  - A grab below the arm pits should be allowed as a tackle
  - Children need to scrummage at this age
  - Rucking isn't needed
  - Line-outs aren't needed
- 

There were high levels of common agreement in relation to both 'involvement where all players having lots of touches of the ball', and 'children's enjoyment' being identified as important. Passing skills and tackling were also identified as key elements, while having kicking as part of the U9 game experience produced negative responses. Therefore seven input variables were selected for subsequent analyses (see Table 6.2 below).

*Table 6.2. Selected input variables for cluster analysis*

---

**Q6. Please rate the following features for U9 rugby matches.**

**(4 point scale where = 1 Very important, 4= Negligible)**

---

- Coaching on the pitch during games
- 

**Q8. Please respond to the following statements about U9 rugby matches:**

**(4 point scale where = 1 Disagree Strongly, 4= Agree Strongly)**

---

- Mauling is important.
  - Playing positions are needed.
  - A grab below the arm pits should be allowed as a tackle.
  - Children need to scrummage at this age.
  - Rucking isn't needed.
  - Line-outs aren't needed.
- 

#### *6.2.2.5.2 Similarity measures*

Squared Euclidean Distance was used as a measure of similarity/dissimilarity with the decision based on the type of data to be analysed (Hair et al., 2010). This approach is commonly used when analysing ratio or interval-scaled data; moreover, although the input variables in the study were ordinal, for the purpose of calculating distance metrics this was nevertheless, treated as metric data. This is a standard operating procedure in Cluster Analysis (Mooi & Sarstedt, 2011). By using the data in this way, Squared Euclidean Distance could be used to measure similarity/dissimilarity alongside a hierarchical clustering procedure. Even though the variables were measured on the same scale (4-point) they were transformed into Z-scores to ensure that variables with larger variances did not overly influence the final cluster solution (Pastor, 2010).

#### *6.2.2.5.3 Clustering algorithm*

A Hierarchical Clustering procedure was selected based on; the choice of variable used to form the cluster groups; the size of the sample; and the unknown number of clusters (Mooi & Sarstedt, 2011). A hierarchical method is considered most suitable for use with smaller samples (Hair et al., 2010). Ward's method was identified as the most suitable clustering algorithm as it

creates similar sized clusters, minimizes within-cluster differences and avoids the chaining effect associated with single linkage methods (Hair et al., 2010). The Ward agglomerative method at each step combines objects to ensure that the overall within-cluster variance increases to the smallest possible degree until the final solution is formed (Mooi & Sarstedt, 2011).

#### 6.2.2.5.4 Determining an initial clustering solution

There is no standard, objective selection for determining the final number of clusters to be formed and there is limited guidance available (Hair et al., 2010; Mooi & Sarstedt, 2011). The decision on the appropriate number of clusters, also known as the 'stopping rule' was based on à priori criteria, practical judgement, common sense and theoretical foundations (Hair et al., 2010). This combination mutually reinforces the selection of the final number of clusters. With 202 U9 coaches participating, it was decided initially to focus on a range of two to six clusters to ensure that the number of clusters was manageable for interpretation (O'Donoghue, 2010). One approach used to identify cluster solutions, is to examine the average within cluster distance (Hair et al., 2010) as seen in Table 6.3.

*Table 6.3. Analysis of Agglomeration Coefficient*

<b>No of Clusters</b>	<b>Agglomeration last step</b>	<b>Change</b>
<b>1</b>	1407.0	
<b>2</b>	1059.9	347.1
<b>3</b>	934.4	125.5
<b>4</b>	856.7	77.7
<b>5</b>	808.4	48.3
<b>6</b>	761.9	46.5

Table 6.3 shows large increase from four to three cluster ( $934.4 - 856.7 = 77.7$ ), three to two cluster ( $1059.9 - 934.4 = 125.5$ ), and two to one cluster ( $1407 - 1059.9 = 347.1$ ). Identifying large increases between clusters allows the selection of the prior cluster solution; as the combination causes a substantial decrease in similarity (Hair et al., 2010). Therefore, it was decided to further concentrate the range of clusters by focusing on two, three and four cluster solutions. A further way of identifying how the clusters relate to one another is

within a form of a dendrogram, which has been reproduced below in tabular form to identify the precise sizes of each of these clusters (see Table 6.4).

*Table 6.4. Number of participants in each cluster of each solution*

<b>No. Of Clusters</b>	<b>Cluster sizes</b>			
1	202			
2	156			46
3	89		67	46
4	53	36	67	46

At this stage the profile of each cluster solution was examined, to ensure that they were statistically meaningful (Hair et al., 2010). Following initial analysis, careful consideration of the descriptive statistics, and evaluation of the values and frequencies in each cluster, it was decided that the three cluster solution provided distinctive segments that warranted further examination. The creation of a third cluster from the initial two cluster solution of 156 provided distinctive groups based on the clustering variables. In a four cluster solution the creation of another two clusters of 53 and 36 from the group of 89 did not provide any clear variations on the cluster variables that warranted choosing this solution.

### **6.2.3 Results**

#### **6.2.3.1 Characteristics of U9 coaches**

A total of 195 male and 7 female coaches participated in the survey, and highest frequencies of coaches (57%) within the combined gender groups were in the 35 – 54 age group (Table 6.5). Over two-thirds (67.3%) of coaches had only coached the U9 traditional game, and over three quarters (77.2%) were inexperienced at coaching at U9 level, having coached for only one season. A majority of coaches (88%) indicated that the following season they would move to the next age group with the same team and not stay at U9 level. This movement is probably explained by the high number of coaches (90.1%) who were the parent/guardian of a child in their team.

The highest coaching qualification of 93% of coaches was Level 1 and there were no coaches with the highest coaching qualifications (level 3 or level

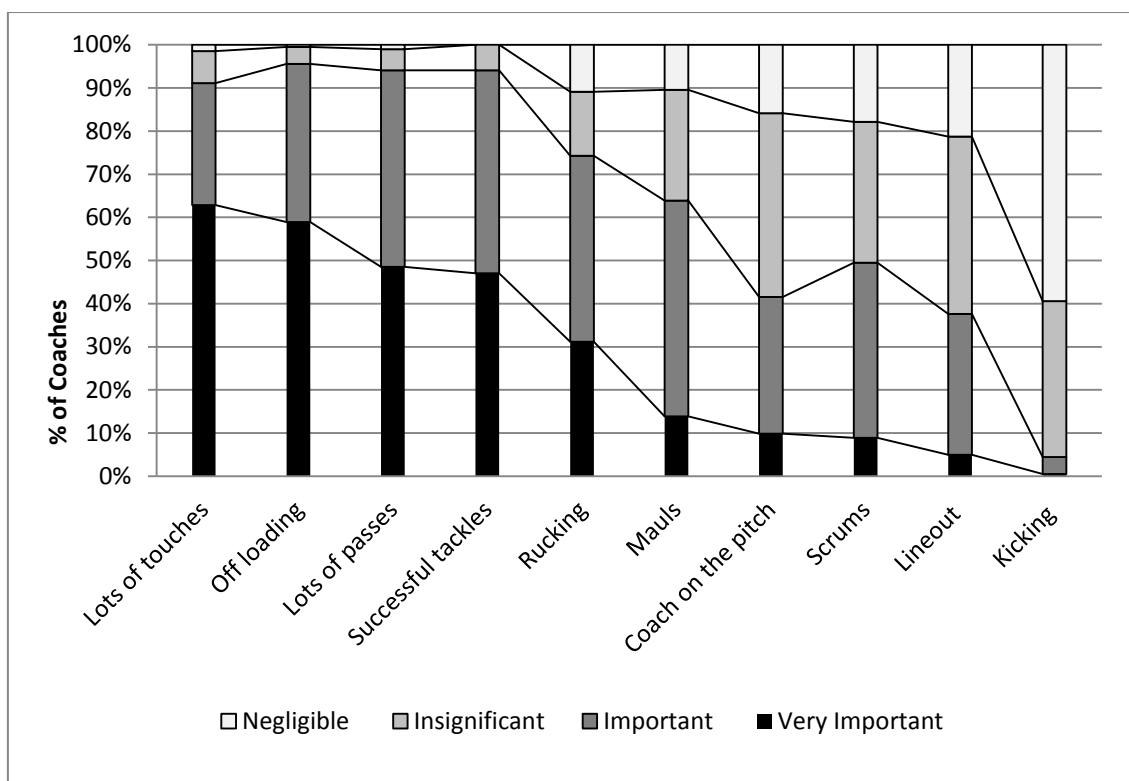
4). On the other hand, the highest playing level achieved for over three quarter of the coaches was adult club level (51%) or junior levels (29%); while only five (2%) had played semi-professionally and one professionally.

*Table 6.5. Selected characteristics of U9 coaches in survey*

<b>Coach characteristics</b>	<b>%</b>
<b>U9 female coaches</b>	3.5
<b>Coached traditional game only</b>	67.3
<b>Coached pilot game only</b>	11.9
<b>Coached both games</b>	20.8
<b>Coaches aged 35-44</b>	57.4
<b>Coaches aged 45-54</b>	38.1
<b>Coached mini rugby for 2 seasons or less</b>	13.9
<b>Coached mini rugby for 3 or 4 seasons</b>	62.6
<b>Coached for 2 seasons or more at U9</b>	22.8
<b>Related to child in the team (parent/guardian)</b>	90.1
<b>Level 2 highest coaching qualification</b>	6.9
<b>Level 1 or lower highest coaching qualification</b>	93.1
<b>Highest level of rugby played youth or lower</b>	6
<b>Highest level of rugby played adult club</b>	44
<b>Highest level of rugby played semi-professional or professional</b>	3

### **6.2.3.2 All coaches at U9 level**

There was overall agreement among coaches on the importance of key fundamental skills and breakdown skills in matches (from questions 6 and 8; see Figure 6.1 and Figure 6.2). Over 90% indicated the importance of passing and successful tackling; while having lots of touches of the ball (91%) and children enjoying themselves (100%) were seen as being important or very important. There was strong opposition to kicking (95.5%); while over three quarters (77.2%) agreed that rucking was needed, and over two third's (68.8%) agreed that mauling was important. All coaches were supportive of games with smaller numbers on each team with the three most popular answers being: 7 v 7 (36.1%), 9 v 9 (34.7%) and 10 v 10 (26.2%).



*Figure 6.1. Coaches ratings of the importance of key features for U9 rugby matches.*

The main division in opinions was on the inclusion of set pieces, with half (50.5%) of the coaches indicating that scrums were insignificant or negligible, and 57.9% agreeing that it should not be part of the game. Lineouts followed a similar pattern with 49.5% agreeing that they shouldn't be part of the game, while under two thirds (62.4%) felt that they weren't important. There was also split opinion over playing positions with over half (50.5%) agreeing that they were necessary; and similarly with grab tackles with 50.5% believing that it should be allowed in a game.

Playing with friends (30.2%) was the identified as the most important reason children played rugby, followed closely by rugby is an exciting game (27.7%). On the other hand, fear of getting hurt (24%) and football (19.8%) were seen as the main reasons children did not want to play rugby.

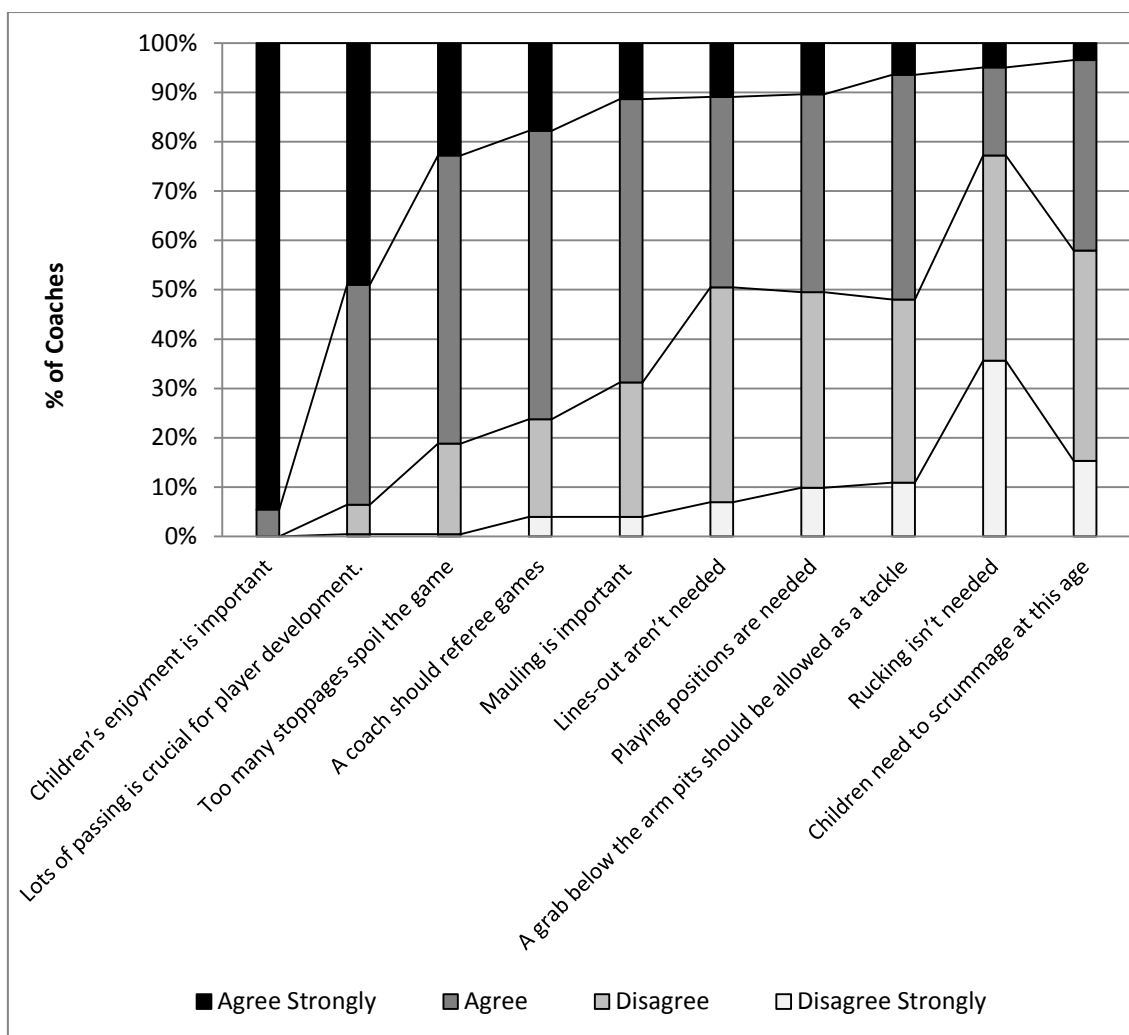


Figure 6.2. Coaches attitudes towards key behaviours in U9 rugby matches

### 6.2.3.3 Coached traditional rules only

Over three quarters of coaches (78.3%) described the traditional U9 game as excellent or good . 59.8% indicated that they wouldn't change the traditional U9 rules.

### 6.2.3.4 Coached pilot rules only

76.3% described the U9 pilot games as excellent or good, and two-third's (66.2%) believed the pilot rules should be played by everyone in England.

### 6.2.3.5 Coaches who coached both pilot and traditional games

When comparing both games Table 6.6 shows over two thirds (66.7%) of the coaches agreed or agreed strongly that players enjoyed the traditional game more than the pilot game; and 58.4% agreed that tackling was better under traditional rules. When focusing on passing more than half (54.2%) disagreed



that there was less in the traditional game, while 56.3% agreed that players had more touches of the ball in the pilot. There was strong agreement that games flowed better without scrums (70.9%) and that mauls slowed down the game down (60.5%).

*Table 6.6. Coaches attitudes when comparing the pilot and traditional game*

coaches who <b>agree</b> (or <b>agree strongly</b> ) that	%
Rucking gives the defence a chance to win possession.	95.8
The pilot game is similar to rugby league.	77.1
There's more flow to a game without scrums.	70.9
Players enjoy the traditional game more.	66.7
Mauling slows down the game.	60.5
Kids tackle better in the traditional.	58.4
All players have more touches of the ball in the pilot.	56.3
Nine in a team is too many.	45.9
There's less passing in the traditional.	45.8
Line-outs give structure to the game.	37.5
<b>4 point scale where 1 = Disagree Strongly, 4 = Agree Strongly</b>	

There was disagreement among coaches when asked whether the pilot game should replace the traditional game with slightly more than half (52.1%) agreeing. This split was reflected in opinions on which games was the best game (both 35.4% for pilot and traditional) with the remaining coaches (29.2%) believing that they were both equal games.

## **6.2.4 Clusters Profiling Descriptions**

### **6.2.4.1 Introduction**

The final stage of analysis involved examining for differences through profiling and validating the cluster solution. Discriminant analysis profiled the clusters by describing the characteristics and differentiating variables that were not used as part of the clustering process (Hair et al., 2010). Post hoc, non-parametric testing using the Kruskal-Wallis one way analysis of variance verified the cluster solution and indentified statistically significant differences between the three clusters. Reported within tables Table **6.7** to Table **6.11** are the significant

differences between the clusters at either the 95% or 99% significance level, standard confidence levels used in sports science (O'Donoghue, 2012). In the following section, all clusters will be evaluated against five profiling themes.

The results in the overall demographic profile of each cluster were very similar. There were two statistically significant differences in terms of the age of coaches and highest level of rugby played variables between the clusters. Significant differences between clusters were found in key elements and structure of games from answers given by the whole sample. All the results in both the 'Coached Traditional only' and 'Coached Pilot only' were significant. In the final theme interrogating whether they had 'Coached both games', significant differences were found in all three questions, with only three of ten attitude variables being of no significance. The following Sections set out the essential features of each cluster groups' identity by focusing on the internal homogeneity of characteristics' within the three groups and by highlighting the heterogeneity between them (Hair et al., 2010). The clusters were given names the Moderates, Radicals, and Traditionalists to reflect their opinions towards the recommended changes to the U9 game.

Table 6.7. Variations among clusters to key features of U9 matches (all coaches)

Cluster	Moderates	Radicals	Traditionalists	Sample	$\chi^2$
<b>Cluster Size</b>	89 cases (44%)	46 cases (22.8%)	67 cases (33.2%)		
<b>Ideally, how many players should be on each team in an U9 game? (n = 202)</b>					
4 v 4	0 (0%)	2 (4.3%)	0 (0%)	2 (1%)	44.16**
6 v 6	0 (0%)	1 (2.2%)	0 (0%)	1 (0.5%)	
7 v 7	31 (34.8%)	31 (67.4%)	11 (16.4%)	73 (36.1%)	
9 v 9	38 (42.7%)	9 (19.6%)	23 (34.3%)	70 (34.7%)	
10 v 10	18 (20.2%)	3 (6.5%)	32 (47.8%)	53 (26.2%)	
13 v 13	2 (2.2%)	0 (0%)	1(1.5%)	3 (1.5%)	
<b>% of the following are important or very important in U9 games</b>					
Rucking	86.5	23.9	92.5	74.3	64.10**
Coach on the pitch	26.9	32.6	67.1	41.6	24.84**
Scrum	48.3	8.7	79.1	49.5	63.75**
Lots of touches	91	97.8	86.5	91.1	9.46*
Kicking	1.1	2.2	10.5	4.5	4.67
Successful tackles	95.2	93.5	92.5	94	4.67
Lots of passes	91	97.9	95.5	94	4.98
Mauls	76.4	8.7	85.1	63.9	76.58**
Off loading	93.2	100	95.5	95.5	8.5*
Lineout	33.7	4.3	65.6	37.7	62.56**
<b>4 point scale where 1 = Very Important, 4 = Negligible</b>					
<b>Kruskall-Wallis Test, <math>\chi^2</math>, 2df, *-Significant at p≤.05, **-Significant at p≤.001</b>					

Table 6.8. Variations among clusters to behaviours in U9 matches (all coaches)

Cluster	Moderates	Radicals	Traditionalists	All	$\chi^2$
<b>Cluster Size</b>	<b>89 cases (44%)</b>	<b>46 cases (22.8%)</b>	<b>67 cases (33.2%)</b>	<b>202 (100%)</b>	
<b>% of coaches that agree or strongly agree</b>					
A coach should referee games	73	82.6	76.1	76.2	6.32*
Children's enjoyment is important	100	100	100	100	4.24
Lines-out aren't needed	57.3	93.5	9	49.5	91.01**
Too many stoppages spoil the game	84.3	89.1	71.6	81.2	7.82*
Lots of passing is crucial for player development	88.8	97.8	97	93.6	7.57*
Mauling is important	83.1	4.3	94	68.8	104.87**
Playing positions are needed	49.4	15.2	76.1	50.5	51.52**
A grab below the arm pits should be allowed as a tackle	29.2	69.5	70.1	51.9	36.52**
Children need to scrummage at this age	32.6	6.5	79.1	42.1	75.54**
Rucking isn't needed	10.1	78.2	1.5	22.8	88.57**
<b>Kruskall-Wallis Test, <math>\chi^2</math> 2df, *-Significant at p&lt;.05, **-Significant at p&lt;.001. 4 point scale where 1 = Disagree Strongly, 4 = Agree Strongly</b>					

Table 6.9. Variation among clusters in opinions to rules of game coached

Cluster	1 Moderates	2 Radicals	3 Traditionalists	All	$\chi^2$
<b>Coaches who coached traditional rules only</b>	80 cases (46%)	33 cases (19%)	61 cases (35%)	174	11.06*
% who described the game as good or excellent	93.7	69.7	98.4	92.1	
% who described the game as poor	6.3	30.3	1.6	7.9	
% who felt that the traditional game needs to be changed	41.3	72.7	21.3	40.2	23.61**
<b>Coaches who coached pilot rules only</b>	27 cases (38%)	31 cases (43.7%)	13 cases (18.3%)		
% who described the game as good or excellent	70.4	90.3	53.9	76	16.82**
% who described the game as poor or very poor	29.6	9.7	46.1	24	
% who agreed that the pilot game should be played by all team in England	51.9	87.1	46.2	66.2	10.87*
<b>Kruskall-Wallis Test, <math>\chi^2</math>, 2df, *-Significant at p≤.05, **-Significant at p≤.001</b>					

Table 6.10. Variations among clusters when comparing pilot rules and traditional rules

Cluster	Moderates	Radicals	Traditionalists	All	
Cluster Size	20 cases (41.6%)	17 cases (35.4%)	11 cases (23%)		
% pilot game should replace the traditional game at U9 in England	40	82.4	27.3	52.1	14.28*
% pilot game should continue alongside the traditional game	15	0	9.1	8.3	
% traditional game should continue and the pilot game should not replace it	45	17.6	63.6	39.6	
%The U9 pilot game is a better game than the U9 traditional game	15	70.6	18.2	35.4	10.68*
% Both the U9 pilot and U9 traditional are equal games of rugby	40	17.6	27.3	29.2	
% U9 traditional game is a better game than the U9 pilot game	45	11.8	54.5	35.4	
<b>% of coaches that agree or strongly agree</b>					
There's more flow to a game without scrums.	55	94.1	63.6	70.9	10.44*
Players enjoy the traditional game more	70	58.9	72.7	66.7	4.99
9 in a team is too many	45	52.9	36.4	45.9	2.58
Kids tackle better in the traditional	70	35.3	72.8	58.4	9.02*
Lines-out give structure to the game	40	17.6	63.6	37.5	8.50*
All players have more touches of the ball in the pilot	60	64.7	36.4	56.3	2.43
There's less passing in the traditional.	35	70.6	27.3	45.8	6.02*
Mauling slows down the game.	60	88.2	18.2	60.5	12.94*
The pilot game is similar to rugby league	95	70.6	54.6	77.1	9.85*
Rucking gives the defence a chance to win possession	100	88.2	100	95.8	9.12*
<b>4 point scale where 1 = Disagree Strongly, 4 = Agree Strongly</b>					
<b>Kruskall-Wallis Test, <math>\chi^2</math>, 2df, *-Significant at p≤.05, **-Significant at p≤.001</b>					

Table 6.11. Selected coach characteristics among the clusters

Cluster	Moderates	Radicals	Traditionalists	All	$\chi^2$
<b>Cluster Size</b>	89 cases (44%)	46 cases (22.8%)	67 cases (33.2%)	202	
% coaches aged 25-34	3 (3.4%)	0 (0%)	1 (1.5%)	4 (2%)	7.175*
% coaches aged 35-44	54 (60.7%)	31 (67.4%)	31 (46.3%)	116 (57.4%)	
% coaches aged 45-54	32 (36%)	15 (32.6%)	30 (44.8%)	77 (38.1%)	
% coaches aged 55-64	0 (0%)	0 (0%)	5 (7.5%)	5 (2.5%)	
% experience of coaching U9 traditional rules only	64 (71.9%)	17 (37%)	55 (82.1%)	136 (67.3)	29.18**
% experience of coaching U9 Pilot rules only	7 (7.9%)	13 (28.3%)	4 (6%)	24 (11.9)	
% experience of coaching both U9 rules	18 (20.2%)	16 (34.8%)	8 (11.9%)	42 (20.8)	
% Mini rugby highest playing level	6 (6.7%)	0 (0%)	2 (3%)	8 (4%)	13.46**
% School rugby highest playing level	22 (24.7%)	4 (8.7%)	11 (16.4%)	37 (18.3%)	
% Youth rugby highest playing level	6 (6.7%)	4 (8.7%)	5 (7.5%)	15 (7.4%)	
% Adult club rugby highest playing level	44 (49.5%)	21 (45.7%)	38 (56.7%)	103 (51%)	
% County rugby highest playing level	5 (5.6%)	12 (26.1%)	7 (10.4%)	24 (11.9%)	
% Divisional rugby highest playing level	3 (3.4%)	3 (6.5%)	3 (4.5%)	9 (4.5%)	
% Semi-professional rugby highest playing level	3 (3.4%)	2 (4.3%)	0 (0%)	5 (2.5%)	
% Professional rugby highest playing level	0 (0%)	0 (0%)	1 (1.5%)	1 (0.5%)	
<b>Kruskal-Wallis Test, <math>\chi^2</math>, 2df, *-Significant at p≤.05, **-Significant at p≤.001</b>					

## 6.2.4.2 The Radicals cluster

### 6.2.4.2.1 Characteristics of coaches

The smallest of the three clusters and the youngest along with the moderates (Table 6.11) the age of the majority in this group was 44 or younger (67.4%). The radicals had the highest number who had coached the pilot game with 63.1%, and coaches who had played to a higher level than both moderates and traditionalists (37%).

### 6.2.4.2.2 Structure of U9 rugby games

The radicals favoured a game with the structure of the pilot laws (Table 6.7 and Table 6.8), with 7v7 receiving the highest frequency for player numbers (67.4%). There was little support for the structure of the adult game, with scrums (93.5%) lineouts (93.5%), rucks (78.2%) and playing positions (84.8%) deemed to be unnecessary. Only 4% of the group thought that mauling was important and a third (32.6%) that the coach needed to be on the pitch during games. The radicals agreed with the traditionalists, who surprisingly thought that grab tackles should also be allowed during games.

### 6.2.4.2.3 Coached traditional rules only

Over two-thirds (69.6%) of coaches described the traditional game as good or excellent (Table 6.9), however, the radical traditional coaches were the only cluster who indicated (72.7%) that the traditional game needed to be changed.

### 6.2.4.2.4 Coached pilot rules only

Around 90% described the game as being good or excellent (Table 6.9), the highest among the three clusters; with a similar amount (87.1%) agreeing that in England the pilot game should be played by everyone.

### 6.2.4.2.5 Coached both rules

In contrast to the other clusters nearly two thirds (64.7%) disagreed that tackling was better in the traditional game (Table 6.10). There was a strong belief that scrums disrupt the flow of games (94.1%) and 88.2% felt that mauls slowed down the game. The radicals were the only group who agreed that there was less passing in the traditional game (70.6%) agreed, while there was strong opposition (89.2%) to the idea that the pilot game was similar to rugby league. Over 80% of this group believed that the pilot game should replace the



traditional game; while close to three quarters (70.6%) felt that the pilot was a better game.

### **6.2.4.3 The Traditionalists cluster**

#### *6.2.4.3.1 Characteristics of coaches*

Comprising a third of all respondents this was the oldest cluster of coaches with over half (52.3%) aged 45 years old or older (Table **6.11**). The traditionalists had the highest number of traditional rules only coaches with 82.1%, and while the highest playing level for nearly three quarters (71.9%) was adult club or lower (similar to moderates).

#### *6.2.4.3.2 Structure of U9 rugby games*

The traditionalists favoured U9 games based on the on the structure and skills included in the current U9 traditional game (Table **6.7** and Table **6.8**). There was strong support for the inclusion of set pieces, with over three quarters (79.1%) agreeing with scrummaging and 91% with lineouts. Breakdown skills were identified as important, with 98.5% advocating rucking in matches and 94% expressing that mauling was important. Over three quarters of group agreed that playing positions were necessary and over two-thirds that the coach should be on the field during matches. The most frequent response of nearly half (47.8%) of the cluster was for 10-a-side game; while it was a surprising to see 70.1% agreeing with allowing the grab tackle during U9 matches.

#### *6.2.4.3.3 Coached traditional rules only*

There was strong support for the traditional game, similar to the moderates (Table **6.9**), with good being the most frequent response (77%). Over three quarters of the traditionalist coaches (78.7%) wanted to keep the game as it was without any changes.

#### *6.2.4.3.4 Coached pilot rules only*

There was division among the pilot only coaches when describing the pilot, with just over half of the cluster indicating that it was good game (53.9%). A similar pattern emerged with opinions split (53.8% in agreement) on whether in England the pilot game should be played by everyone (Table **6.9**).

#### 6.2.4.3.5 *Coached both rules*

Close to three quarters of traditionalists who had coached both rules agreed that tackling was better in the traditional game (72.8%); while a similar figure (72.7%) disagreeing that there was less passing using the same laws (Table 6.10). In contrast to the other groups, over three-quarters (81.8%) disagreed that mauling slowed down the game; however 63.6% agreed that the scrum disrupted the flow of matches. There was strong agreement (81.9%) among the traditionalists that the pilot laws were similar to rugby league.

Nearly two thirds of traditionalists who had coached both games (63.6%) indicated that pilot should not replace the traditional game. Over half (54.5%) believed that that the traditional game was better, with just over quarter (27.3%) selecting that they were equal games.

#### 6.2.4.4 **The Moderates cluster**

##### 6.2.4.4.1 *Characteristics of coaches*

The largest of the three clusters comprising 44% of respondents (Table 6.11). Nearly two-thirds (64.1%) of coaches in this cluster were aged 44 or younger; while over 70% had only experience of coaching the traditional rules. The highest playing level for half of the group was adult club, with 38.1% having played at colts, school and mini rugby level

##### 6.2.4.4.2 *Structure of U9 rugby games*

The Moderates had mixed opinions on including all complex breakdown and set piece skills in U9 rugby matches (Table 6.7 and Table 6.8). There was a strong agreement that games should include rucks (89.9%) and mauls (91%), which was similar to the traditionalist cluster. On the other hand, opinions with the traditionalists differed on set pieces, with over two thirds (67.4%) indicating that they did not agree with scrummaging, and lineouts (57.3%) at U9. The cluster itself was split on the inclusion of playing positions (50.6% not needed), while there was strong opposition for allowing grab tackles (70.8%). There was agreement with the radicals with the involvement of coaches, with only just over a quarter (27%) feeling that it was important that the coach should be on the playing field during the game. The most frequent response for playing numbers

was 9v9 (42.7%), the same as the traditional game; while the moderates were the only group who opposed allowing 'grab tackling' in games (70.8%).

#### *6.2.4.4.3 Coached traditional rules only*

Coaches in this cluster agreed with the traditionalists on their description of the traditional game with 93.7% describing it as good or excellent (Table 6.9). Over half of these coaches (58.8%) thought that the traditional game did not need to be changed.

#### *6.2.4.4.4 Coached pilot rules only*

Over two thirds (70%) of the coaches agreed with the radicals and described the pilot game as good or excellent (Table 6.9). There was an even split among the group when asked whether the pilot game should be played by everyone in England.

#### *6.2.4.4.5 Coached both rules*

When comparing specific aspects of traditional and pilot games (Table 6.10) around two thirds of the coaches who had coached both rules in this cluster agreed that the tackling skills (70%) were better in the traditional game; while 65% disagreed that there was less passing playing the current laws. Just over half (55%) felt that scrums slowed down games and 60% agreed that mauls did the same. There was an even split in opinion to whether the pilot laws were similar to rugby league.

Overall, when comparing both games there was a split in opinion among the moderates with 45% indicating that the pilot should not replace the traditional rules; and 40% in favour of change. Only 15% felt that the pilot game was better than the traditional, with 45% siding with the traditional game, and 40% that both games were equal.

### **6.2.5 Discussion**

The findings from the current study identified three distinct groups of U9 coaches differentiated on their perceptions of competitive games, based on principles related to early or late specialisation (Côté et al., 2007); and the level of support for the RFU's pilot rules of play. The results suggest that over three quarters of coaches were in favour of a hybrid game, based on key components linked to both the highly structured activities of deliberate practice (Ericsson et

al., 1993) and the high engagement of deliberate play (Côté, 1999). Less than a quarter of coaches preferred the unstructured game connected to late specialisation (deliberate play).

With respect to the first objective, the results show three distinct groups based on their level of support for the pilot rules: a fifth of the coaches embraced the pilot rules (Radicals); just over a third steadfast opponents supporting the current laws (Traditionalists); and over 40% favouring a hybrid version (Moderates). Essentially the differences revolved around early specialisation and the inclusion of the key facets of play, the set pieces (scrummaging and lineouts) and breakdown contact skills (rucking and mauling). The results show that Traditionalists and Moderates favoured a relatively more structured game. Support for this type of game was strongest among the Traditionalists, who favoured a highly structured game with the early introduction of set pieces and breakdown skills, and giving players the opportunity to play in specialized positions. Moderates also favoured a degree of early specialisation, agreeing with the traditionalists that rucking and mauling should be part of competitive matches. However, Moderates differed in opinion with the Traditionalists, supporting a game without set pieces and playing positions. This type of early skill specialisation (i.e. deliberate practice) and the consequent additional amount of time spent practicing is linked to skill expertise (Ericsson et al., 1993). Research has shown that there is a positive relationship between the amount of time spent practicing skills and becoming and expert in applying those skills (Helsen et al., 1998; Kalinowski, 1985).

A high amount of adult involvement has also been considered an important element of early specialisation (Côté et al., 2013), and findings here suggest that the Traditionalists agree. For them, it was important that coaches should be allowed on the field during games. A coach on the field could provide the children with assessment and feedback on performance, while also providing immediate instruction. However, early specialisation has also been linked to negative outcomes such as dropout, overuse injuries, and decreased enjoyment (for review, see Baker et al., 2009). The Radicals, favoured the opposite to a highly structured games as a means of enthusing children about the game; instead, they preferred that set pieces, breakdowns (i.e. rucks and mauls) and playing positions should not be included in U9 rugby. This group's

view of the future of the game was consistent with the elite rugby union coaches (Chapter 4) and U9 players (Experiment 2, this Chapter), and principles of deliberate play where activities are modified, unstructured, enjoyable and motivating for participants (Côté & Abernethy, 2012).

In contrast, there was consensus among the cluster that a high amount of player engagement and increased opportunities to develop FMS were important for U9 games. Lots of touches, passes and successful tackles were considered very important elements of the game while there was universal agreement that too many stoppages spoiled the game. These findings support the motor learning theory that childhood presents the optimal window for developing FMS as following this period they become more difficult to master (Gallahue & Ozmun, 2006; Thomas & Thomas, 2008). There was also strong agreement among the clusters that children's enjoyment was important; and playing with friends was considered as one of the main reasons individuals play rugby. These results are consistent with the opinions of both elite coaches (Chapter 4; Thomas & Wilson, 2013) and U9 players (Experiment 2) who both suggested that enjoyment and playing with friends were important factors for participation in mini rugby. The findings also support the concept of deliberate play activities where there is active engagement, less time standing around, and a high emphasis on enjoyment (Côté et al., 2007). Games based on a high amount of action with an emphasis on enjoyment and playing with friends have also been identified as key features of informal (i.e. backyard sport) child-led activities (Coakley & Pike, 2009). However, enjoyment is a highly individual concept and further research is required to understand its role within deliberate play and deliberate practice activities (Bailey et al., 2010).

Among coaches who had coached both pilot and traditional games a similar pattern emerged. The Radicals indicated that they believed the pilot was a better game and should replace the traditional game while the Moderates and Traditionalists disagreed. These perceptions and beliefs among the clusters about both games were all the more interesting when compared with the objective game behaviours identified in the U9 match analysis (Chapter 5) and the opinions of U9 players themselves. The findings from the match analysis revealed that tackling is in fact similar in both games, and that there are significantly more passes in the pilot game (Chapter 5). However, both

Moderates and Traditionalists (mis)perceptions contradict these findings; both clustered agreed that the players tackling skills were better and there was the same amount of passing in both games. Surprisingly, all clusters of coaches agreed that they felt that U9 players enjoyed the traditional game more than the pilot. The findings of surveys with U9 players suggests otherwise; players tended to want more passing, running and tackling opportunities (see Experiment 2), and these were greatly increased in the pilot game. All groups agreed to a different degree that the pilot laws were similar to rugby league. These findings could provide a possible explanation for support for the traditional rules among the Moderates (95%) and Traditionalists (54.6%), especially in areas where there is competition for participants in both codes. For the purposes of presenting the RFU with the results of the U9 match analysis, elite coaches' opinions and U9 players' views are a more compelling way of convincing opponents of the benefits of modifying the laws for overall (long-term) player development.

There are possible explanations for the game structures supported by each cluster and these relate to significant differences in their age, playing and coaching experience. The majority of coaches in all clusters lacked higher coaching qualifications (93.1% level 1 or less) and over three quarters had little experience of coaching at U9 level (77.2% had only one season). Research has shown that coaches lacking in formal coaching qualifications develop their understanding of the profession through informal learning experiences, for example their own playing experiences (Erickson, Bruner, MacDonald, & Côté, 2008; Lemyre, Trudel, & Durand-Bush, 2007; Wright, Trudel, & Culver, 2007). Viewed from this perspective, it is possible that inexperienced coaches who had played at a lower level are more likely to identify with a game structure in which they are most familiar and hence confident in coaching. Findings showed that Traditionalists and Moderates all played to a lower level, and were more comfortable coaching a highly structured game format (i.e. rucks and mauls). In contrast, Radicals, who according to the results had played at a higher level, supported a more open game where the emphasis on coaching would be on tactical elements (e.g. decision making). As the elite coaches supported this approach too (Chapter 4), there would appear to be a link between rugby expertise and the nature of the U9 game favoured. These findings may have

implications for the RFU's approach to coach education at this age level. Providing age specific coaching material through informal methods, such as age specific practices online, could further support coaches understanding of coaching children in mini rugby. Finally, another simpler explanation may be the possibility that as the oldest group, the Traditionalists were less open to change, when compared to the younger Moderates and Radicals.

In the current study there are some limitations. First, as the survey was distributed to coaches with e-mail addresses on the Rugby First website and there's a chance that there could be a sample set bias. Those without online access and those not registered on the website would have not been able to participate. Second, the extent to which the findings generated with the U9 coaches' generalize with the wider coaching population is questionable. Third, the data driven nature of cluster analysis means that clusters will always be created whether or not a genuine group structure exists.

The second experiment in this chapter extends the examination of stakeholder attitudes by reflecting on the opinions of the young players themselves. Coakley and Pike (2009) have indicated that children might have different motivations to their adult coaches and it was hoped that this exploratory research might indicate if this is the case.

## **6.3 Experiment 2: U9 players**

### **6.3.1 Introduction**

This survey study explored U9 mini rugby union players' opinions of important behaviours and key experiences when playing organized U9 games. The main aim was to examine whether these opinions favoured game behaviours and experiences associated with early (i.e. traditional rules) or late (i.e. pilot rules) specialisation. It was decided to focus on game experiences, as observations of informal game activities have suggested that children value their experiences of playing sport (e.g. playing with friends) alongside the behaviours the game produces (Coakley & Pike, 2009). It was predicted that children would prefer a less structured and more open game, irrespective of their background and experience (Coakley & Pike, 2009). Therefore, in contrast to the U9 coaches who appeared biased by their coaching and playing experience, we predicted that there would be no differences between the players' perceptions of what is

important for U9 rugby, irrespective of the game that they currently played (the pilot or traditional game). We predicted that all players would indicate that the fundamental skills (e.g., passing, running, tackling, etc.) would be more important than the more specialised skills (scrums, rucks, mauls, etc.). We also predicted that children would not rate formalised structure (playing positions, winning, etc.) as important as less structured attributes of rugby competition (playing with friends, having fun, etc.)

### **6.3.2 Methods**

#### **6.3.2.1 Participants**

Participants in the interview surveys were 272 U9 rugby union players (Pilot, 47.8%; 52.2%). The players were from two pilot counties Hampshire (25.4%) and Durham (22.4%); and two traditional counties Yorkshire (21.3%) and Gloucestershire (30.9%). There were no official figures available from the RFU for the exact total player numbers during the 2011/12 season; however, there were 657 mini rugby teams playing the game (RFU 2011, October internal document for Player Development Sub-Committee). Based on a moderate estimate of a squad of ten players (population of 6,570) this research captured the views of around 4.1% of the background playing population. A less conservative estimate of 15 players would result in a playing population of 9,855 players around 2.8% of the background playing population. Players involved in the U9 age group at the beginning of the season were eight years old at midnight on the 31st August (Rugby Football Union, 2011).

#### **6.3.2.2 Survey Design**

A face-to-face interview survey explored U9 mini rugby union players' opinions of important behaviours during matches and key experiences when playing competitive games (Appendix F). The cross-sectional survey produced a snapshot of the U9 playing population at the end of the 2011/2012 season. Using a survey allowed the gathering of standardized information from a large population of U9 players, enabling the results to be generalized (Cohen et al., 2011). The decision to survey face-to-face was due to convenience and easy access to the U9 playing population at the end of season festivals where games were also filmed (Chapter 5). The schedule allowed sufficient time between



matches to conduct surveys with players and to clarify any queries from participants.

Pilot surveys were first developed and conducted with 84 U9 players at two festivals during the previous 2010/11 season. This pilot work was important in developing the final version of the survey and ensured that questions were clear, not too complex and identified the relevant issues to the research question (de Vaus, 1996). The simplicity of a survey is a crucial aspect in child-focused research (Cohen et al., 2011). The pilot survey (Appendix G) focused on obtaining rating scores for the game just played and open ended questions relating to the most and least enjoyable aspects of the game. The pilot survey proved to have some limitations, with many children simply using the anchor points of the visual-analogue scale (0 and 10). There were also issues with the open-ended questions, in that some players struggled to think of reasons why they enjoyed / did not enjoy some games ('don't know' was a common answer). However, these open-ended questions proved to be useful in generating categories for closed multiple-choice categories questions used in the final interview survey.

## **Measures**

In this study, the objective was to examine U9 mini rugby union players' opinions of important behaviours in matches and identify key experiences when playing competitive games. As such, the interview survey was organized into two sections covering these areas that each included two multiple-choice questions with nine and eight variables respectively. The decision to use multiple-choice questions was taken to simplify the process for participants; as during the pilot, some children had difficulty answering scalar or open-ended responses. In the first two questions the children were asked what were the two most important and two least important game behaviours if they were designing their own U9 game (e.g. lots of passing, lots of scrums). This was followed by the final two questions asking the players to identify their most important and least important game experiences (e.g. winning the game, playing with friends).

### **6.3.2.3 Procedures**

Local institutional ethics committee approval was given to conduct the survey. Parental consent was given on two different occasions. Participating clubs in all festivals received study information sheets and consent sheets prior to the

event, and asked to confirm parental consent for taking part in the survey. Officials from each club provided final informed consent on behalf of the whole club on the day of the festival. Officials at participating counties also confirmed that each club had given their consent to film matches for the study.

Data collection occurred at two different festivals in the south of England playing pilot and traditional rules, and two traditional rules festivals and one pilot festival in the north of England. Three of the festivals were cup tournaments and the other a series of 'friendly' games. Due to practical reasons (e.g. number of interviewers and filming commitments during festivals) there were no surveys conducted in the Midlands. The two surveys in the south, and the pilot survey in the north were conducted by the researcher and a student assistant between March and May 2012. The researcher collected the final data in the north of England at two festivals during a weekend in April 2013, as flooding caused a cancellation the previous year. On each occasion, participants were invited and then selected by a team official (usually their manager or coach) to take part in the survey. This sampling approach was not random, and was a form of convenience sampling as there was no control over who was selected. At the start of the surveys, the purpose of the study was explained to participants, and they were reminded that they could refuse to answer questions and withdraw at any stage. Anonymity was preserved with only the participant's initials and club name recorded during the survey.

#### **6.3.2.4 Data Analysis**

The chi square test of independence using Fisher's exact test was used to analyse the data, with phi ( $\phi$ ) used as a measure of effect size. As the players could give two choices for each question using the chi square test of independence for analysis was not possible (O'Donoghue, 2012). Therefore, in all questions each variable was treated as a yes/no question. This allowed the data to be analysed using the Fisher's exact test for nine 2 x 2 cross tabulations each in question 1 and 2, with eight 2 x 2 cross tabulations each for questions 3 and 4. Bonferroni correction was applied to the  $p$  value required for significance to avoid increasing the chances of making a Type 1 error (O'Donoghue, 2012). In all questions, only  $p$  values of 0.006 or less were considered significant.

### 6.3.3 Results

#### 6.3.3.1 Key Components of U9 Rugby (Questions 1 and 2)

##### 6.3.3.1.1 Most important.

Table **6.12** shows the results for what U9 mini rugby players thought were the most important behaviours if they were creating their own game. The Fisher's Exact Test showed no significant association between individual game behaviours and the rules played (all  $p$ 's > 0.02). The top two most important behaviours selected were the same for players playing both games; with lots of tackling the most popular (pilot 34.1%, traditional 34.9%), followed by lots of passing (pilot 20.9%, traditional 21%).

*Table 6.12. Most important behaviours if creating own U9 rugby game*

	Pilot	%	Traditional	%	Total	%	Fisher	phi	$\chi^2$
<b>Tackling</b>	88	34.1	98	34.9	186	34.5	0.896	0.014	0.055
<b>Passing</b>	54	20.9	59	21	113	21.0	1	0.001	0.001
<b>Tries</b>	46	17.8	36	12.8	82	15.2	0.086	0.109	3.244
<b>Running</b>	36	14	38	13.5	74	13.7	0.892	0.010	0.3
<b>Kicking</b>	11	4.3	15	5.3	26	4.8	0.681	0.036	0.347
<b>Rucking</b>	8	3.1	22	7.8	30	5.6	0.019	0.149	6.032
<b>Scrum</b>	9	3.5	5	1.8	14	2.6	0.274	0.077	1.609
<b>Mauling</b>	5	1.9	3	1.1	8	1.5	0.485	0.051	0.714
<b>Lineouts</b>	1	0.4	5	1.8	6	1.1	0.216	0.094	2.382
<b>Total</b>	258	100	281	100	539	100			

Fisher Exact Test, 1df, \*-Significant at  $p \leq .006$  phi ( $\phi$ ): 0.1 small, 0.3 medium. 0.5 large

##### 6.3.3.1.2 Least important.

The results in Table **6.13** show what U9 mini rugby players thought were the least important game behaviours if they were creating their own game. There was a significant association with a small to medium effect between lots of rucking and type of game played ( $p < 0.001$ , phi = 0.219), with more pilot players identifying lots of rucking as being less important than traditional players

(pilot 13.9%, traditional 5.3%). There was no significant association between all other individual game behaviours and the games rule played (all  $p$ 's > 0.087). The top two least important behaviours identified were the same for both games; with lots of lineouts receiving the most selections (pilot 27.4%, traditional 27.7%), and lots of kicking receiving the second highest number of selections (pilot 19.3%, traditional 24.6%).

*Table 6.13. Least important behaviours if creating own U9 rugby game*

	Pilot	%	Traditional	%	Total	%	Fisher	phi	$\chi^2$
<b>Lineouts</b>	71	27.4	79	27.7	150	27.6	0.903	0.01	0.028
<b>Kicking</b>	50	19.3	70	24.6	120	22.1	0.087	0.109	3.231
<b>Mauling</b>	37	14.3	45	15.8	82	15.1	0.598	0.035	0.336
<b>Scrums</b>	38	14.7	29	10.2	67	12.3	0.092	0.105	2.965
<b>Rucking</b>	36	13.9	15	5.3	51	9.3	0.001*	0.219	13.071
<b>Tries</b>	10	3.9	18	6.3	28	5.1	0.231	0.082	1.825
<b>Running</b>	9	3.5	16	5.6	25	4.6	0.294	0.075	1.535
<b>Passing</b>	4	1.5	8	2.8	12	2.2	0.383	0.062	1.052
<b>Tackling</b>	4	1.5	5	1.8	9	1.7	1	0.012	0.042
<b>Total</b>	259	100	285	100	544	100			

Fisher Exact Test, 1df, \*-Significant at  $p \leq 0.006$ . phi ( $\phi$ ): 0.1 small, 0.3 medium. 0.5 large

### 6.3.3.2 Key Experiences in U9 Rugby (Questions 3 & 4)

#### 6.3.3.2.1 Most important

Table **6.14** shows the results for what U9 mini rugby players thought were the most important game experiences when playing mini rugby. There was no significant association between any of the individual game experiences and the games rules played (all  $p$ 's > 0.089). The most important game experience selected by pilot participants was playing with friends (30%), followed closely by having fun (29.6%), and being involved in the action (22.3%). The same three experiences recorded the highest amount of selections among traditional participant, however the order was different with having fun having the highest

amount of selection (33%), followed by playing with friends (26.1%), and being involved in the action (18%).

*Table 6.14. Most important experiences when playing rugby.*

	Pilot	%	Traditional	%	Total	%	Fisher	phi	$\chi^2$
Playing with friends	78	30	74	26.1	152	27.9	0.222	0.079	1.713
Having fun	77	29.6	94	33.1	171	31.4	0.259	0.072	1.411
Being involved in the action	58	22.3	51	18.0	109	20	0.173	0.089	2.139
Playing well	16	6.2	27	9.5	43	7.9	0.137	0.094	2.371
Winning the game	17	6.5	16	5.6	33	6.1	0.712	0.028	0.208
Not being a substitute	7	2.7	7	2.5	14	2.6	1	0.01	0.029
A close game	4	1.5	5	1.8	9	1.7	1	0.012	0.042
Playing in a certain position	3	1.2	10	3.5	13	2.4	0.089	0.111	3.343
<b>Total</b>	<b>260</b>	<b>100</b>	<b>284</b>	<b>100</b>	<b>544</b>	<b>100</b>			

Fisher Exact Test, 1df, \*-Significant at  $p \leq 0.006$ . phi ( $\phi$ ): 0.1 small, 0.3 medium. 0.5 large

#### 6.3.3.2.2 Least important.

The results in Table 6.15 show what U9 mini rugby players thought were the least important game experiences when playing mini rugby. There was no significant association between any of the individual game experiences and the games rules played (all  $p$ 's > 0.038). Winning the game was the highest selection in the traditional game (31%) and second highest in the pilot (24.7%). This pattern was reversed for not being a substitute; with it being the highest selection by pilot participant (30.6%) and second highest by traditional players (27%). Playing in a certain position was the third least important selection in both games (pilot 21.2%, traditional 16.4%).

Table 6.15. Least important experiences when playing rugby

	Pilot	%	Traditional	%	Total	%	Fisher	phi	$\chi^2$
<b>Not being a substitute</b>	78	30.6	76	27	154	28.7	0.327	0.065	1.16
<b>Winning the game</b>	63	24.7	87	31	150	28	0.038	0.129	4.5
<b>Playing in a certain position</b>	54	21.2	46	16.4	100	18.7	0.132	0.095	2.441
<b>Close game</b>	29	11.4	45	16	74	13.8	0.102	0.105	3.017
<b>Playing well</b>	10	3.9	5	1.8	15	2.8	0.184	0.091	2.266
<b>Playing with friends</b>	9	3.5	10	3.6	19	3.5	1	0.002	0.001
<b>Being Involved in action</b>	9	3.5	9	3.2	18	3.4	1	0.012	0.038
<b>Having fun</b>	3	1.2	3	1.1	6	1.1	1	0.007	0.012
<b>Total</b>	255	100	281	100	536	100			

**Fisher Exact Test, 1df, \*-Significant at  $p \leq 0.006$ . phi ( $\phi$ ): 0.1 small, 0.3 medium. 0.5 large**

#### 6.3.4 Discussion

The current survey study examined U9 mini rugby union players' opinions of important behaviours and key experiences when playing organized U9 games. The results suggest that there is a consensus among U9 rugby players regarding key behaviours and experiences in matches, irrespective of whether they played the pilot or traditional rules. The findings indicate that U9 players agree with the elite coaches (Thomas & Wilson, 2013), and are supportive of behaviours linked to modified, less structured versions of adult rugby in line with the principles of deliberate play. Players identified that the four most important behaviours they wanted to see were lots of passing, running, tries and tackling; while lineouts, scrums, mauls and kicking were deemed the least important. This would suggest that the players are supportive of the pilot laws, where it has been shown that there are significantly more passes, runs and tackles during organized games (See Chapter 5).

The findings from the game experiences questions (3&4) imply that U9 players value experiences in organized games that are typically associated with deliberate play and child-led informal activities. The three most important selected experiences; having fun, playing with friends and being involved in the action are game experiences observed in informal games, such as backyard rugby or street basketball (Coakley & Pike, 2009). In contrast, the qualities associated with formal organized sports; structure, playing positions and winning the game, were rated as *least* important experiences.

There are some limitations to the current study. First, due to the nature of the data collection process players may have been influenced by peers when answering questions between matches. Following questions, players may have returned to other participants and discussed their answers with them before they participated. Although, attempts were made to ensure that the surveys were conducted individually it was also important to make all participants as comfortable as possible during the process, which meant staying within distance to coaches, parents and teammates. Second, the extent to which the findings generated with the U9 players' generalize with the wider playing population is questionable. Data collection was restricted to the four areas in the north and south of England, and was conducted on the same day as the filming data collection (Chapter 5).

### **6.3.5 Conclusion**

This chapter has presented two of the first experiments in the research literature exploring the views of coaches and children on competitive sport participation during childhood. The importance of the research is that it suggests that the players, irrespective of their playing background, support a version of U9 rugby that conceptually takes the form of deliberate play with high involvement and less structure during matches. In contrast, over three quarters of U9 coaches favoured a hybrid version of matches linked to the principles of deliberate play and deliberate practice. The findings showed that all clusters favoured high engagement, skill opportunities, less stoppages, and enjoyment for children. However, the Traditionalists and Moderates' favoured structured elements (early specialisation); while the Radicals, in contrast, favoured an unstructured game (late specialisation) with none of the complex specialised skills (i.e. set-pieces and breakdowns).

From a practical standpoint the research shows that the players and the majority of coaches favoured different types of U9 game. The Traditionalists, supported that traditional rules, the Moderates a hybrid version of both games, with fewer than a quarter of coaches favouring the pilot laws (Radicals). Further critical discussion of both experiments will occur alongside the both other studies in the final chapter.

### **6.3.6 Summary**

The current chapter explored the opinions and attitudes of those intimately involved in U9 rugby through an analysis of surveys completed by both a sample of coaches and players. These surveys were the final studies included in the first two stages of the mixed methods convergent parallel design where data was collected and analysed separately.

The findings suggest that all U9 players, irrespective of their playing background, support modified games with high involvement, more skill learning opportunities, and less structure during matches that conceptually take the form of deliberate play. On the other hand, overall the results suggested that over three quarters of U9 coaches preferred a hybrid version of matches linked to the principles of deliberate play and deliberate practice.

In the previous three chapters (Chapters 4, 5, and 6) all the data included in the studies were collected and analysed separately. In a convergent parallel mixed method design this initial analysis is followed by a second stage of analysis where the results from all four studies are merged to allow the triangulation of findings to corroborate meaning, and enhance research findings (Camerino et al., 2012; Creswell & Plano Clark, 2011). The final chapter will present this merged data analysis of all four studies using a side-by-side comparison to present similarities or differences between the data (Creswell & Plano Clark, 2011).



## Chapter 7

### Overall Discussion & Conclusion

#### 7.1 Background

In this final chapter, the results of the qualitative and quantitative studies will be merged and discussed using a side-by-side comparison (Creswell & Plano Clark, 2011). Data from the four studies making up the thesis have been analysed individually and the results presented in previous chapters (Chapters 4 to 6). Individual discussion sections were included for each study as they were written with the intention of being published as stand-alone articles in academic journals. The elite coach qualitative study (Chapter 4) has already been accepted for publication, while the U9 match analysis (Chapter 5) has been re-submitted for consideration. Following the completion of the thesis, the survey studies identifying the attitudes of U9 coaches and players (Chapter 6) will be submitted for publication. Consequently, a certain amount of replication will occur due to the inclusion of themes from discussion sections in the studies in previous chapters. However, it is the intention of this chapter to draw out themes that repeated across the different studies.

#### 7.2 Introduction

The design of age-appropriate organized activities has become a key issue for NGB when introducing children to competitive games during childhood (Football Association, 2012a). For the RFU, the complexity, physicality and structure of adult rugby union provides unique challenges when introducing children to organized mini rugby games during childhood. Although competitive games have been identified as one of the main developmental activities during childhood (Côté et al., 2013; Ford et al., 2012), there is a lack of empirical evidence to support the design of developmentally appropriate competitive games for children.

The objective of this thesis was to contribute to knowledge in this area by exploring how children are introduced to competitive rugby union during childhood. This was achieved by exploring the key components for rugby participation during childhood, and by examining whether the rules of adult rugby should be changed for U9 matches. The thesis had three aims:

- To explore children's introduction to organized competitive mini rugby union.
- To explore if the current U9 rugby union game should be modified.
- To discuss the practical implications of the findings for the RFU.

To meet these aims the research objectives were:

- To identify what elite coaches, U9 coaches, and U9 players believed were the key components for rugby participation during childhood.
- To investigate if the conceptual framework from the DMSP could be applied to competitive U9 rugby union games, by manipulating the rules of play.
- To explore whether there were distinct groups of U9 coaches differentiated on the basis of their perceptions of key components for competitive U9 games on principles related to early (i.e. traditional rules) or late (i.e. pilot rules) specialisation.
- To examine whether the opinions of U9 players favoured game behaviours and experiences associated with early (i.e. traditional rules) or late (i.e. pilot rules) specialisation.
- To examine reactions to the introduction of the new pilot rules across a cross-section of U9 rugby coaches.
- To discuss to what extent there is agreement in the opinions of elite coaches, U9 coaches, and U9 players in relation to key components of U9 rugby and the pilot laws.

A convergent parallel mixed methods design was used in an attempt to develop a more complete understanding of the issue by collecting qualitative and quantitative data during a single phase of the research study (Creswell & Plano Clark, 2011). Using the DMSP as a conceptual framework (Côté et al., 2007), elite coaches' views on mini rugby participation were explored. The rules of play at U9 level were modified to investigate whether the principles of practice from DMSP could be applied to rugby games; and relevant participants' (i.e. coaches and players) attitudes and opinions towards the key components and rules changes explored. The research was the first to examine the impact of rule changes on player behaviours in competitive games in a national trial in any youth sport, and to explore the coaches' and players' opinions of

competitive game activities during childhood. The thesis was also one of the first to gather empirical evidence on the DMSP to assess the benefits of a deliberate play approach (Côté & Abernethy, 2012). In the following sections, the main theoretical and practical findings will be summarised and discussed. Future research ideas will be presented, implications discussed and reflections made on the research process.

### **7.3 Summary of main findings**

#### **7.3.1 Sampling and organized competitive games**

One of the main findings of the first study (Chapter 4), was that the elite rugby union coaches identified playing organized competitive games, alongside sampling a variety of sports, as key components for rugby participation during childhood. Some will argue that early involvement in competitive sport is early specialisation, which is linked to negative outcomes for participants such as dropout, burnout, overuse injuries, and decreased enjoyment (Baker et al., 2009; Law et al., 2007). Furthermore, DMSP advocates could also contend that competitive organized games should not be part of the sampling pathway, and should be introduced in adolescence (the specializing years; 13+). However, the results suggest that a strict interpretation of the DMSP linking all competitive activities with the negative outcomes associated with early specialisation is too simplistic to describe a complex process. The findings show that elite coaches believe that organized games and inherent competition can have a positive influence on player development. For some coaches, there was support for the gradual introduction of a more formal competition structure towards the end of childhood (U11). Competitive activities, such as playing in leagues or tournaments, were encouraged, but these were to be the exception rather than the norm. The U9 players' results support the elite coaches opinions, as the findings suggest that the result of the game may not be important to participants at this age level. A quarter (24.7%) of pilot players, and around a third (31%) of traditional players, rated winning the game as the second least important experience. These findings were consistent, irrespective of the competitive format of the festivals, with three of the festivals cup tournaments and the other a series of 'friendly' games. The elite coaches suggest that children naturally compete, and it has been show that even in informal environments difficulties can occur (Coakley & Pike, 2009). For example, the older and bigger players

can make the most of their physical advantages against their younger and smaller opponents. Therefore, the findings suggest that competition can be appropriate if it is naturally occurring and not based on competitive adult values and structures (i.e. tournaments).

The complexity is emphasised in further findings, where elite coaches' indicated that sampling a variety of sports, and not specialising in rugby alone, was also key for player development. According to the DMSP sampling a variety of sports and early specialisation are part of different pathways during childhood. Elite coaches supported playing a variety of sports, as it was believed that this would have a positive impact on the technical, physical, and psychological development of rugby players. Although, psychological benefits were briefly mentioned, it was the transfer of technical and tactical skills between sports that was highlighted by coaches as the key benefit of sampling. Decision making and motor skills gained from playing sports such as football, were thought to contribute to the overall development of rugby players. Previous research supports these findings and has linked a multi-sport approach to increased motivation and enjoyable experiences; (Côté et al., 2007; Fraser-Thomas, Côté, & Deakin, 2008; Wall & Côté, 2007), improvements in fundamental skill movements (Baker et al., 2003) and decision-making expertise (Berry et al., 2008). Although, some studies have shown successful skill transfer across respective sports (e.g. football, field hockey, volleyball) research in this area to date has been contradictory and is inconclusive (Baker et al., 2009).

Recent research examining the developmental activities of elite child football players, has also suggested that definitions of early diversification within the DMSP may too narrow (Ford et al., 2012; Ford et al., 2009; Ford & Williams, 2012). Consequently, an early *engagement* model was proposed to describe the activities of elite soccer players, which also did not fit the definition of early diversification. This approach suggests that participation in high amounts of deliberate play can coexist with early specialisation in one sport during childhood. Sampling through competitive rugby does not fit into the early engagement model either, which suggests that applying general models to specific sports may be problematic (Ford et al., 2012).

However, there may be a much simpler explanation to these contradictions when applying sampling years' activities suggested by the DMSP to current childhood sports participation. As the model is based on retrospective accounts elite/expert athletes developmental activities during childhood, it may reflect a snapshot of a bygone era. Much of the research was conducted in the early 2000s with athletes in their twenties. For example, the mean age of the Australian athletes involved in Baker et al.'s (2003) (Baker et al., 2003) study was 27.6 and they had been participating in their primary sport for around, on average, twenty years. Therefore, the findings would have been based on the participation activities of athletes childhood activities from the late 1980's to the early 1990s.

As previously indicated, there has been a steady decrease in informal child driven activities, with a corresponding increase in the number of organized team sports played by children (Coakley & Pike, 2009). With the demise of informal 'backyard games' during the previous decades, retrospective research with elite rugby union players in 2023, may show a different pattern emerging of participation during childhood. It is suggested, that the findings may show that a high percentage of players developmental activities will have been in a variety of organized competitive activities, such as soccer, rugby union, and cricket.

### **7.3.2 Positive adult involvement**

A second key finding identified by elite coaches for competitive rugby development was appropriate adult involvement during childhood games. The results show that, as both coaches and referees, adults could potentially play a key role in supporting players learning during matches and provide positive psychological and social experiences. It was suggested that appropriate adult intervention through a coach/referee provided an ideal opportunity to assist with player skill and tactical development by intervening, questioning and explaining at a suitable time. Positive and encouraging touchline behaviour was also viewed as crucial to create an appropriate environment for player development. The findings suggest that elite coaches viewed this as important to create an enjoyable and fun environment for players during matches; as this could increase individual motivation and player retention. Findings from surveys with key stakeholders provide support for the opinions of elite coaches, with all U9 coaching clusters agreeing enjoyment during matches was very important;

whilst U9 players also rated having fun highly as an important experience when playing rugby. These results are also consistent with an early diversification pathway where intrinsic motivation resulting from fun and enjoyable experiences are said to lead to positive sports expertise and maintaining participation (Côté et al., 2003; Gilbert et al., 2002). It has been suggested that *participation* instead of *performance* should be the key element of coaching during the sampling years (Côté et al., 2010).

The findings also suggest, however, that although in theory the elite coaches supported adult involvement, there were doubts whether such an approach was currently possible in practice given the behaviour they had witnessed from coaches during mini rugby matches. DMSP advocates would agree, and would suggest that there should be limited if any adult involvement in deliberate play activities and it is contrary to the early diversification pathway of the DMSP (Côté et al., 2007). Previous research has linked adult involvement to early specialisation and deliberate practice through highly structured competitive activities, and the possible negative outcomes linked to using this approach, such as player dropout (Fraser-Thomas et al., 2008; Strachan et al., 2009).

The findings from the U9 coaches raise further the question of whether adult involvement can be appropriate in rugby union at this stage given the participants coaching qualifications and experience. It was shown that the majority of U9 coaches lacked higher coaching qualifications (93.1% level 1 or less) and over three quarters had little experience of coaching at U9 level (77.2% had only one season). Studies with coaches with limited formal coaching qualifications have shown that coaches develop their understanding of the profession through informal learning experiences, for example observing other coaches (Erickson et al., 2008; Lemyre et al., 2007; Wright et al., 2007). This suggests that mini rugby coaches, instead of using coaching practices based on an understanding of child development, may be applying methods they have experienced or observed from elite coaches with nine-year old children. Indeed, it was suggested by the elite coaches themselves that they had observed some mini rugby coaches behaving like elite coaches, Graham Henry or Warren Gatland, and consequently treated children as 'mini' adults. Negative comments and over-coaching during games - having constant

instruction shouted, such as “spread out” and “run straight” were believed to have a detrimental influence on players skill, psychological and social development. These findings are consistent with earlier research where in competitive environments there is a tendency for childhood team sports coaches to use more negative comments than positive comments (Walters et al., 2012). As well as the negative psychological impact this may have on individuals, it has also been suggested that the constant instruction from coaches can have a detrimental effect on the players decision making and creativity (Memmert, 2010).

These issues provide the RFU with some interesting practical dilemmas with regard to coaching education at this level. It raises the question, of whether coaches are necessary during childhood, especially with the current lack of qualified and experienced coaches. From observations made of current coaching practice at mini rugby level it may be argued that overall the likelihood of having a negative impact on player development and participation far outweighs the possibility of having a positive impact. Given the excellent contribution made by many coaches and parents to player development at this age, providing greater awareness of child development and providing opportunities to learn formally and informally may be the way forward (Cushion et al., 2010)

### **7.3.3 Deliberate play through competitive games**

#### **7.3.3.1 High involvement and unstructured play**

The performance analysis research suggests that rules modified and based on the principles of deliberate play, could be applied to competitive U9 rugby matches. As one of the first controlled ‘trials’ of the deliberate play principles, this makes an original contribution to the DMSP literature. One of the key findings from the research showed that in pilot rules matches the ball was in play for a significantly higher percentage of the time, when compared to the traditional rules (Table 5.1). Comparison of pilot and traditional rules matches showed that over half the traditional game on average was spent in the structured specialised skills; waiting for restarts in play at scrums and lineouts and participating in rucks and mauls. In contrast, the ball was in open play in pilot rules matches for over three quarters (81%) of match time. This finding

demonstrates the existence of some of the key aspects of a deliberate play activity which are high active engagement, and less time standing around in an unstructured playing environment, in U9 pilot matches (Côté et al., 2007). In contrast, it appears from the findings that the traditional rules had a greater number of occasions when participants were off task (i.e. standing around waiting for play to restart or for the ball to emerge from a ruck or maul). The findings from interviews with elite coaches and U9 players suggest that there is little support for having less time engaged in the game, and being involved in set pieces and scrums. One fifth of U9 players rated (Table **6.12**) being involved in the action as an important experience. This is consistent with previous research in childhood sport where there was preference for lots of action during games (Burton et al., 2011). Findings from observations of informal games played by children in settings such as parks and back gardens, have also suggested that maintaining action is a key characteristic for participants (Coakley & Pike, 2009). Being involved in the game and having a high number of scoring situations were identified key elements of these activities.

Given these findings on high engagement, it is not surprising that players also indicated that they favoured a less structured version of rugby in line with the principles of deliberate play. Over a quarter of players who had played both set of rules rated lineouts as the least important facet of the game (Table **6.13**). Although, there were subtle differences between the rankings, set pieces and breakdowns (alongside kicking), were the most selected by participants as least important skills to be included in U9 rugby matches. The results from elite coaches provide further support for higher involvement and a less structured game. Findings show that coaches wanted a faster moving game, high involvement, with the ball in play for longer, which the U9 match analysis show is provided by the pilot rules. The importance of 'scaffolding' skill learning, by adding the complex skills to games at the appropriate age level, was suggested as an effective approach to player development, compared to introducing all complex skills at once (Wood et al., 1976).

On the other hand, findings from U9 mini rugby coaches imply that over three quarters of the coaches favoured a structured and slower game linked with early specialisation. Traditionalists supported the early introduction of set



pieces, breakdown skills, and playing positions; while Moderates partially agreed, preferring the inclusion of rucking and mauling only. Less than a quarter of coaches (Radicals) agreed with the elite coaches and U9 players, favouring the unstructured game with no breakdown or lineout skills. However, despite a high percentage wanting these structured activities, there was unanimous agreement among coaches that stoppages spoil the game. This suggests, that the U9 coaches may favour a hybrid game that combines the high engagement but in a structured playing environment.

### **7.3.3.2 Fundamental skill learning opportunities and sampling**

The second key finding from the match analysis showed that in U9 pilot rules matches there were more skill learning opportunities for participants; while there was also overall support for within game *sampling*. These results are consistent with a deliberate play approach which suggest that a range of motor skills can lay a foundation during the sampling years for future sport participation (Côté et al., 2012). Compared to the traditional game there were significantly more opportunities to develop fundamental attacking skills and defensive skills.

During a standardised ten-minute period the pilot game had nearly three times as many successful passes (Table 5.3), generated 55% more occasions when children ran with the ball (Table 5.2); which led to almost twice as many tries being scored (Table 5.5) compared to the traditional game. There also appeared to be more defensive skill opportunities in the pilot with 18.3% more tackles to ground made in the pilot when compared to the traditional rules (Table 5.4). The findings are consistent with previous research that has shown that small-sided versions of invasion games can encourage high player involvement, with increased opportunities for scoring, basic skill development, and decision-making (Berry et al., 2008; Burton et al., 2011; Fenoglio, 2004).

Findings from all three other studies also support including increased opportunities to perform FMS in matches. Lots of tackling, passing, and running with the ball were rated in the top four most important among traditional and pilot players in U9 rugby matches (Table 6.12). The results from interviews with elite coaches agreed that greater opportunity for all individuals to develop a core set of fundamental movements skills, such as passing, catching, running and dodging, alongside game understanding was important. There was unanimous agreement between all three clusters of U9 coaches that successful

tackles, lots of touches and passes were very important behaviours in matches (Table 6.7). These findings are consistent with the motor learning theory that childhood presents the optimal window for developing FMS as following this period they become more difficult to master (Gallahue & Ozmun, 2006; Thomas & Thomas, 2008).

The findings also suggest that within game *sampling* could also provide enhanced opportunities for FMS and tactical skill development in U9 mini rugby. The majority of coaches and players believed that an unstructured format would contribute to overall player development by providing a greater opportunity to *sample* a variety of positions and develop a core set of skills. The elite coaches believed that having set-pieces and scrums in mini rugby union can lead to early position specialisation during childhood which can restrict the opportunities to develop overall skill and tactical understanding. The motor and cognitive development literature supports these views, and it has been suggested that FMS can be impaired if children specialise early at this age and focus on complex movement skills (Gallahue & Ozmun, 2006). At the transitional stage (starts around 7 to 8 years old) the focus should be on further enhancing key movement skills (e.g. dodging and passing simultaneously) and that complex skills should wait until the teenage years (Application stage: 11 to 13 years old) (Gallahue & Ozmun, 2006). It may not be beneficial for players to be exposed to early position specialization as they do not have the cognitive capabilities or social experience to understand a specific role within a team (Coakley & Pike, 2009).

The findings from the U9 players also indicates that position specialisation may not be an important issue with less than 3% rating playing in a certain position as an important experience (Table 6.12). Combined with their lack of support for structure, as already discussed, and their support for the importance of FMS this would suggest that players support *sampling* the skills associated with all positions during rugby games (e.g. passing, tackling etc). On the other hand, the findings from the U9 coaches survey show that position specialisation was a contentious issue with an even split among the whole sample of coaches Table 6.8. Close to a quarter (The Radicals) were against playing positions, with a third supporting inclusion (The Traditionalists), while

the Moderates were divided in their opinion. The match statistics provide support.

Taken together the findings from the interviews and surveys suggest that both elite coaches and U9 players favour a game based on the principles of deliberate play, which is unstructured, has high engagement and allows plenty of fundamental skill learning opportunities. In contrast, the opinions of over three quarters of U9 mini rugby coaches appear to show support for a hybrid game that is highly structured (early specialisation) but also has high engagement and provides fundamental skill learning opportunities.

The results from the studies provide the RFU with evidence to support their long-term pilot objectives (Table 1.1). Findings from the U9 match analysis show that the pilot rules encourage basic skill development (e.g. passing, catching), provides more continuity (i.e. ball in play) and is likely to increase involvement of all players. The results from the players' survey results indicate that the players themselves favour games that emphasise the skills that the pilot rules emphasise. Furthermore, the elite coaches are also in favour of the principles behind the pilot laws and the incremental nature of complex skill development.

It is arguable that the findings from the U9 coaches are of greater interest to the RFU, given that these individuals have a significant influence on player development. The findings show that around a fifth of the U9 coaches support the pilot laws, with 44% favouring a hybrid version, and a third being steadfast traditionalists. Level 1 was the highest coaching qualification for over 90% of coaches surveyed while less than 20% had played at a higher level than adult club. This lack of coaching expertise has implications for player development - not only during competitive matches - but also in practice sessions during the season. Research has shown that coaches lacking in formal coaching qualifications develop their understanding of the profession through their informal learning experiences, for example whilst playing the game (Erickson et al., 2008; Lemyre et al., 2007; Wright et al., 2007). Consequently, coaches may favour a high degree of prescriptive instruction during matches and practice sessions, which is the dominant coaching approach used among sports coaches (Partington & Cushion, 2011). Therefore, although the pilot game may

promote key skill development and high involvement, in practice coaches may still be using traditional approaches where skills are practiced in isolation and there is less focus on playing the game (Ford & Williams, 2013; Partington & Cushion, 2011). Further comments on coach education are in the Implications section of this chapter on page 130.

#### **7.4 Limitations**

One of the main limitations of the thesis is the lack of consideration given to the importance of psychological and social influences of the DMSP when designing developmentally appropriate rugby union games during childhood (Cote et al., 2011). Although, the results of the thesis suggest that deliberate play and sampling can lead to improved tactical and technical player performance, little consideration was given to the positive cognitive, social and emotional development linked with these activities (Cote et al., 2011; Wright & Cote, 2003).

Deliberate play activities have been shown to be intrinsically motivating, provide immediate gratification and are designed to maximize player enjoyment (Cote et al., 2010). Although high involvement and fundamental skill learning opportunities provided by deliberate play activities were highlighted, there was limited examination given to the feelings of competence and confidence this type of activity can provide for children (Cote et al., 2007). It is also suggested that deliberate play and sampling can motivate children to remain involved in sport and can promote continued participation into adulthood (Cote et al., 2009). On the other hand, deliberate practice activities have been associated with long term negative psychological outcomes such as dropout and burnout (Fraser-Thomas et al., 2008)

Despite an emphasis in the thesis being placed on the importance positive coach behaviour for player skill/physical development, the research was limited in exploring the positive influence coaches can have on the psychological and social development of players during the sampling years (Strachan et al., 2011). It has been suggested that during this period coaches should focus on participation instead of performance by promoting playing a variety of sports through deliberate play activities (Cote et al., 2010). The positive and supportive behaviour of coaches towards children has been linked

to higher perceived competence, confidence and enjoyment among participants (Smith & Smoll, 2007). These types of experiences provided by coaches are closely linked with continued participation and player retention in sport (Soberlak & Cote, 2003).

## **7.5 Future research**

### **7.5.1 Performance analysis in children's team games**

Three areas that may be considered for future research in performance analysis and children's sport. The first is to conduct a longitudinal study of the players who took part in the pilot study starting at U7. This could be achieved by comparing their skill development with those who played the traditional rules, and also to investigate whether playing the pilot has had an impact on participations levels. The second is to measure data for individual player performance during team sports in order to examine whether reducing player numbers will result in the extra behaviours spreading evenly among all team members. Individual analysis was attempted during the research period to measure individual player behaviours, but these were unsuccessful due to practical reasons. The main reason was the difficulty in identifying individual players on film due to teams playing without shirt numbers and also the field level position of the camera. Vests (bibs) with numbers on them offered a solution to identifying players, however, coaches refused to allow their players to wear the bibs as they were perceived to have a negative influence on performance and a health risk (i.e. on very rare occasion children were grabbing the bibs and swinging players). Having the camera placed at field level made it possible to follow the action, however, when viewing the film it was difficult to consistently identify players without shirt numbers and wearing similar playing kit.

The second area is to move beyond the simple measurement of actions during games and to focus instead on interpersonal interactions in team games (Correia, Araújo, Vilar, & Davids, 2013). The focus of this approach would be to examine how information in team game environments informs action. For example, in modified games does having less players on the field result in more tries being scored because there is more space between defenders? In the current match analysis study (Chapter 5) this would have proved challenging,

as it would not have been possible to manipulate individual variables (i.e. change the laws of the game) during the season. At the start of each rugby season the rules of the game at mini rugby level must be approved by different departments (e.g. playing and legal) within the RFU and cannot be changed by individual clubs. However, strict modifications of rules could be performed in training sessions, although this would limit the ecological validity when compared to the games analysed in Chapter 5.

### **7.5.2 Coaches, coaching and players**

There are interesting areas for further research with U9 coaches following on from the findings of the survey studies (Chapter 6). Individual or group interviews with members of the Radical, Moderate, and Traditionalist cluster would allow the opportunity to gain an in-depth perspective of their reasons for supporting the pilot or traditional rules, and give an in-depth explanation to why they favoured including or removing certain facets of the game (e.g. scrums) from U9 rugby. Another area of interest in the interviews, would be to find out whether the coaches support children playing organized competitive games during childhood; and whether sampling a variety of sports or specialising in one sport would be their preferred option. A final area of interest would be to collect views on whether adult involvement is necessary, and if it is, to identify what the coaches believe are the roles of the coach during childhood.

Another area for study where there is a limited amount of research is coach education and coaching practice at grassroots level (Cushion et al., 2010). This would be an interesting area for investigation especially in the light of the findings from the coaches' survey where it was shown that the U9 coaching population were generally inexperienced and had only the basic coaching qualifications. Surveying and interviewing approaches could add to the research in this area (Erickson et al., 2008; Lemyre et al., 2007; Wright et al., 2007) by identifying the informal and formal sources used by grassroots coaches in rugby union and/or other sports to guide their coaching practice in Great Britain. This type of research could also be a benefit in practice by assisting NGB in the development of coach education programmes.

An alternative area for investigation would be to focus specifically on coaching practice at grassroots level, through implementing a Teaching Games

for Understanding (TGfU; Bunker & Thorpe, 1986) approach. Although a less structured game at U9 may appear easier to coach, having to coach a free flowing game places more emphasis on tactical elements such as decision-making. With the TGfU method the coach plays a facilitative role and questioning becomes a key part of the learning process; which contrasts greatly with more traditional methods of coaching (Mitchell et al., 2006)

This would involve developing coaching practice through collaborative action research, where a group of mini rugby coaches would work alongside the researcher using him as a critical friend to reflect upon practice. The coaches could use a TGfU approach, such as play practice (Lauder, 2001), and the impact would be evaluated through player perceptions and the impact the method has on the coach. This type of research would extend inquiry into using TGfU approaches in a coaching context (Harvey & Jarrett, 2013).

## **7.6 Implications**

### **7.6.1 Theory**

The studies in this thesis were the first to explore the impact of rules changes on player behaviours in a national trial in any competitive youth sport games. As such, the findings present empirical evidence to support the design of developmentally appropriate competitive games for children. This may encourage national sports governing bodies worldwide in a variety of sports to conduct further research with university sports sciences departments.

### **7.6.2 Practice**

#### **7.6.2.1 Competitive games**

The findings of this thesis may have implications for Rugby Union NGB worldwide in their approach to introducing children to rugby through competitive games. This is especially the case when introducing contact for the first time, as the match analysis results showed, in the U9 pilot games there was a significant increase in overall passing, tackling, running with the ball, and try scoring in the modified pilot games (Chapter 5). The research has already had an impact in England, with the RFU deciding to apply the U9 pilot rules (also U7s and U8) nationwide from September 2013. The Swedish RFU have also expressed an interest in adopting the pilot laws, and have been working alongside the RFU to

implement pilot games as part of their player development pathway. As well as rugby union, other sports may consider applying a similar approach to competitive games. For example, rugby league in England are in the process of trialling new laws of play at childhood level, which can be linked to rules based on the principles of deliberate play.

#### **7.6.2.2 Coach education**

One of main findings from the U9 coaches survey identified that over 90% population had only the basic coaching qualifications and were generally inexperienced. Although, the figures were not totally unexpected, some coaches within the RFU found the low percentage of level 2 coaches surprising. These results may have possible implications for rugby NGB in their approach to coach education at grassroots levels, for example through access to online coaches resources and materials. During the three-year research and pilot period, there has been a gradual shift in rugby coach education towards supporting coaches with coaching children. Recently, the Level 1 coaching course for the RFU, Welsh and Scottish rugby unions has been changed specifically to coaching children with the focus on developing the 'whole child' (3 Unions Coaching, 2012). This may also lead the NGB's in rugby union to follow the lead of English football where there is now a specific pathway for youth coaching (Football Association, 2012a).

#### **7.7 Reflections on research process**

The PhD research process was an enjoyable, challenging, frustrating and ultimately rewarding experience. Much of the challenges revolved around the dual objectives of completing the research for the PhD, and fulfilling the objectives and producing reports for the external partner, the RFU (and ESRC). This had an impact on the objectives and overall design of the PhD during the first year, where there was a change in philosophical approach from using purely quantitative methods to using a mixed methods approach. There were also a number of practical challenges with data collection, where the limited time period to collect data for both the RFU and the PhD research caused most difficulties.

At the start of the PhD the overall focus of thesis was on the microstructure (i.e. the rules) of competitive mini rugby games for children. This



initial decision was influenced by the RFU's pilot objectives, as it was necessary to collect data from both U7 and U9 matches within the first six months of the research. This was to be followed in the second year and third year with filming matches at U8, U10 and U11. It became apparent towards the end of the first year of filming that at U9 level the introduction of the new laws were causing a considerable amount of disagreement among the pilot coaches. The decision to only introduce tackling and remove the complex breakdown and set-piece skills was proving to be a contentious issue among coaches. It was at this stage the decision was made to change the focus of the PhD specifically on the U9 age group and use mixed methods research. A couple of key factors drove this decision.

The first was that the RFU wanted to conduct an internet questionnaire survey at the end of the first season to gather the opinions and attitudes of the U9 coaches. It was also becoming apparent from conversations with the key stakeholders during data collection (i.e. filming) that not all coaches were going to be convinced with the results of the match analysis, even with the empirical data to support any key differences between games. Consequently, I made the decision to interview expert rugby union coaches to gather in-depth opinions on introducing children to rugby. For the thesis, collecting both qualitative and quantitative data meant that complete understanding of introducing children to rugby could be obtained compared to collecting either type of data separately. On a practical level, this decision also proved to be beneficial to the RFU as the results from the qualitative data were used alongside the analysis of matches as evidence supporting the pilot rules. Alongside collecting the U9 data for the thesis, for the remaining two years completed match analysis and surveys for the remaining age groups and presented the work at the end of each year in reports to the RFU (see appendix A & B for reports).

Ideally, during the first year of the PhD I would have had more time to explore different research methodologies, giving me the opportunity to evaluate and select the most appropriate methods to answer the research question. However, this change also gave me the opportunity to learn a wide-range of quantitative research methods, that included collecting and analysing surveys and mini rugby matches, and to consolidate my qualitative interview skills. This sudden change in emphasis meant that the focus of the U9 coaches' survey

questions was influenced predominantly by practical objectives of the RFU, and consequently the conceptual focus turned specifically to the microstructure of competitive U9 games and not the macrostructure of the game. With hindsight, this could have been an ideal opportunity to gather the U9 coaches' opinions by examining attitudes towards early specialisation and playing competitive rugby during childhood; and whether children should sample or specialise in one sport from a young age. This was also apparent to a lesser degree with the U9 players' survey, where the focus was on the microstructure of the game and key experiences when playing. However, as there was a limited amount of time to collect data from players during the festivals, the questions had to be prioritised to meet the objectives of the RFU and the thesis, while being easy for players to understand. Therefore, it was decided that the issues of competition, sampling a variety of sports, and adult involvement should not be included in the players' survey (see future research).

Data collection was also a significant challenge, due at times to the lack of resources, time, and the dual aims of having to collect for both the RFU and PhD. As previously explained, during the 3 years data collection took place within a short time period from March to the first week in May at festivals on successive Sundays. I managed to juggle the filming and complete the surveys despite having to deal with cancellations, clashes with festival dates, the weather, and having to organise everything on my own. Support with filming and player survey collection was completely dependent on the excellent support from undergraduate, masters' students'; and on a few occasions' parents and youth players at participating clubs. However, this was also proved to be problematic during this period due to exam and dissertation commitments; where on some Sundays I had four volunteers and none on other weekends. This meant at some festivals it was not possible to complete surveys with players or to film the required amount of matches.

## **7.8 Conclusion**

The studies in this thesis initiate inquiry into understanding children's introduction to organized competitive rugby union during childhood. By using a mixed methods approach findings from interviews, surveys, and match analysis were triangulated to develop a complete understanding of competitive rugby mini rugby union activities.

The findings show support for an alternative pathway for childhood rugby union where developmentally appropriate organized competitive games are a key developmental activity alongside sampling a variety of sports. The results suggest that a strict interpretation of the DMSP linking all competitive activities with the negative outcomes associated with early specialisation is too simplistic to describe a complex process. Elite coaches reported that organized games based on inherent competition and appropriate adult involvement could have a positive influence on player development. It was suggested that adult intervention, as coaches and referees provided an ideal opportunity to assist with player skill and tactical development. However, there were doubts whether such an approach was currently possible in practice; given the coaching behaviour witnessed during matches and the level of training and experience among coaches identified in the survey. For the RFU, these issues have clear practical implications for coach education and development that potentially resonate beyond the mini-rugby game and into senior community rugby.

At the U9 age group, the findings show initial support for modifying the rules of the competitive rugby union games during childhood and not basing the rules on the adult version of the game. The importance of these results are that they suggest that the concept of deliberate play can be applied to competitive sport activities to produce developmentally appropriate games for children. In U9 matches, the results revealed that modifying the rules of play could promote increased play activity and more fundamental skill learning opportunities. The findings also reveal, as predicted by research on deliberate play and informal games, that the players felt strongly that the game should have limited structure, no playing positions and focus on passing and tackling. Findings among coaches varied, with elite coaches in agreement with the U9 players, favouring a game with limited structure, and more opportunities to pass, run, tackle, and score tries. However, among U9 coaches the results suggested that the majority favoured a hybrid version of U9 rugby, with a combination of structure and specialisation, but also high amounts of engagement and skill learning opportunities.

The practical implications of the research findings are that they show support for the U9 pilot laws through the result of the match analysis and the opinions of elite coaches and U9 players. However, among the U9 coaches

over a third were steadfast traditionalists and 44% favoured a hybrid version of the game. For the RFU the overall findings present a more compelling way of convincing opponents of the benefits of modifying the laws for overall (long-term) player development.

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**Appendix A RFU Shaping the Game Report Year 1 – June 2011**

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## 1. Executive Summary

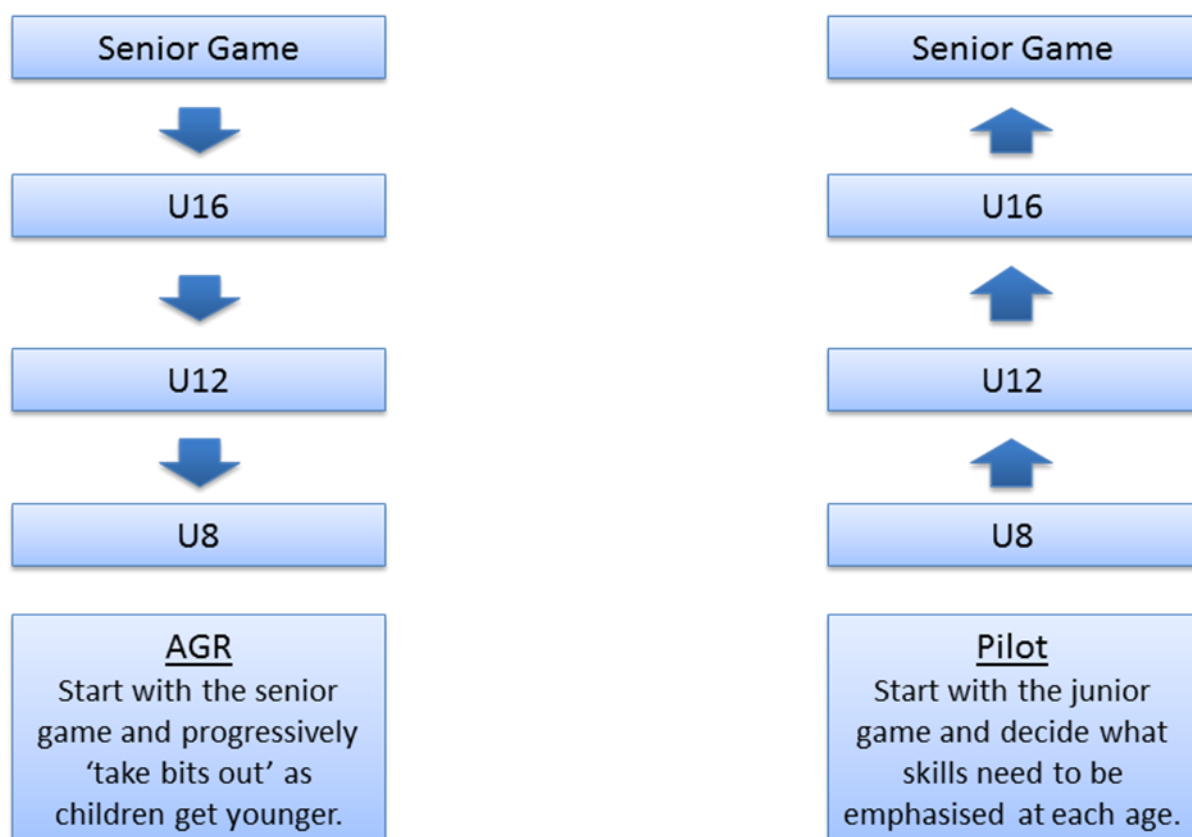
- A child-centred model is proposed for developing the game of rugby union for children based on the thorough understanding of:
  - The child: through biological, psychological and social development.
  - The game: focusing on 'on and off the ball' technical and tactical skills.
  - Coaching: highlighting the coaching process.
- Shaping the Game is a Rugby Football Union (RFU) pilot project agreed with and driven by three Constituent Bodies (CBs) and their clubs: Durham, Hampshire and Warwickshire. This research is part of a PhD funded by the ESRC and the RFU.
- During its first year (2010/11 season) the Shaping the Game pilot project has focused on the mini rugby game played at Under-7 and Under-9 level in England. The three participating CBs have played games under new pilot rules throughout the season. To evaluate and compare on-pitch performance of the pilot games with current Age Grade Regulations (AGR) games known for 20 years as the Continuum, data was collected in the pilot areas and also in three AGR other CBs - Cheshire, Devon and Gloucestershire- playing to the existing Continuum (AGR).
- Matches were filmed at festivals in both participating AGR (Continuum) and pilot areas during March, April and May 2011. At Under-7, there were 26 pilot matches and 15 AGR matches filmed; while at Under-9, there were 33 pilot matches and 21 AGR matches filmed. The total length of each game varied, but the number of behaviours occurring in each game were standardised to a nominal, 10 minutes duration for comparative purposes.
- Player feedback was collected at one festival from each age group and each version of the game. At the end of a match, players were asked to give a rating how much they enjoyed the game, and to suggest one thing they enjoyed the most and disliked the most about the match (see Appendix 1).
- At Under-7, the pilot game has 58% more tries ( $p < .001$ ) and the AGR has 24% more tags ( $p = .030$ ). There were no significant differences between the number of runs ( $p = .868$ ) or passes ( $p = .382$ ) in either game, however, these 'top-line' results need to be considered in terms of the number of players in each form of the game. For example, the forty passes per 10 minutes made in the AGR are spread between 14 players whereas the 37 passes in the pilot are spread between eight players.
- While the individual analyses for the Under-7 game are preliminary (and need to be considered with caution), it was found that 50% of the children in the AGR game could expect to receive less than 2 touches of the ball every ten minutes. Only 6% of players could expect this in the pilot game where 59% of the players received between 4 and 8 touches every ten minutes. This suggests that fewer numbers enable more children to get involved at this early age, where little passing prior to a tag occurs.

- There are many significant differences between the games at Under-9 level. There are 85% more tries ( $p = .001$ ), 37% more runs ( $p < .001$ ), 16% more tackles ( $p = .015$ ), and more than twice as many (126% more) passes ( $p < .001$ ) in the pilot compared to the AGR. The ball is also in play for 22% ( $p < .0001$ ) longer in the pilot.
- In the pilot game the players are provided with more opportunities to combine their fundamental movement skills such as passing, running and turning in more complex forms as specialized skills Gallahue and Ozmun (2006). With more touches of the ball, individuals need to make more tactical decisions in attack. The results show that players are making significantly more passes in open play in the pilot with nearly 16 being made per 10 minutes compared to 9 in the AGR.
- More ball in play time at Under-9 in the pilot provides for excellent physiological benefits for children as well as allowing for more tactical and motor skill opportunities. During the pilot game the ball is in play nearly 85% of the time, which is 22% higher than compared to the AGR game. This increase of ball-in-play-time, along with the reduced number of players on each side in the pilot game should result in a game of higher intensity with positive fitness benefits for players (Hill-Haas, 2008; Rampinini, 2007).
- Although structured contact skills are not emphasised in the pilot, contact is still a significant part of the Under-9 game with over 16% more tackles completed when compared to the AGR. On closer examination there are more tackles to ground and 'held' in the pilot, although the difference is only significant for standing tackles. This could be linked to rewarding the contribution in defence of physically smaller players by allowing a 'grab' tackle in the pilot.
- There was no difference in the reported level of enjoyment in either the AGR or pilot Under-9 and Under-7 games. According to Bailey et al., (2010) fun and enjoyment are complex areas and a highly individual concept, which is a possible explanation to the variety of answers given by players about game enjoyment.
- Taken together, the results provide support for the pilot games. The Under-7 age group game is characterised by lots of running, with little passing (in either version). However, the preliminary individual analysis does suggest that involvements are spread out more evenly when there are fewer players on the pitch (i.e. 7v7 in the AGR and 4v4 in the Pilot).
- The positive results at Under-9 provide exciting potential for the subsequent changes at Under-8 and especially, at Under-10 (year 2) and Under-11 (year 3).

## 2. Background

The Rugby Football Union (RFU) Shaping the Game pilot project is focuses on the competitive game played at mini rugby level from Under-7 through to Under-11 in England. The first year of the three-year pilot has focused on the rules played at Under-7 and Under-9. In the second year the emphasis will shift to Under-8 and Under-10 rugby and will conclude with the Under-11 game in the final year. Objective and subjective data will be gathered and analysed throughout this period and recommendations will be made for future developments.

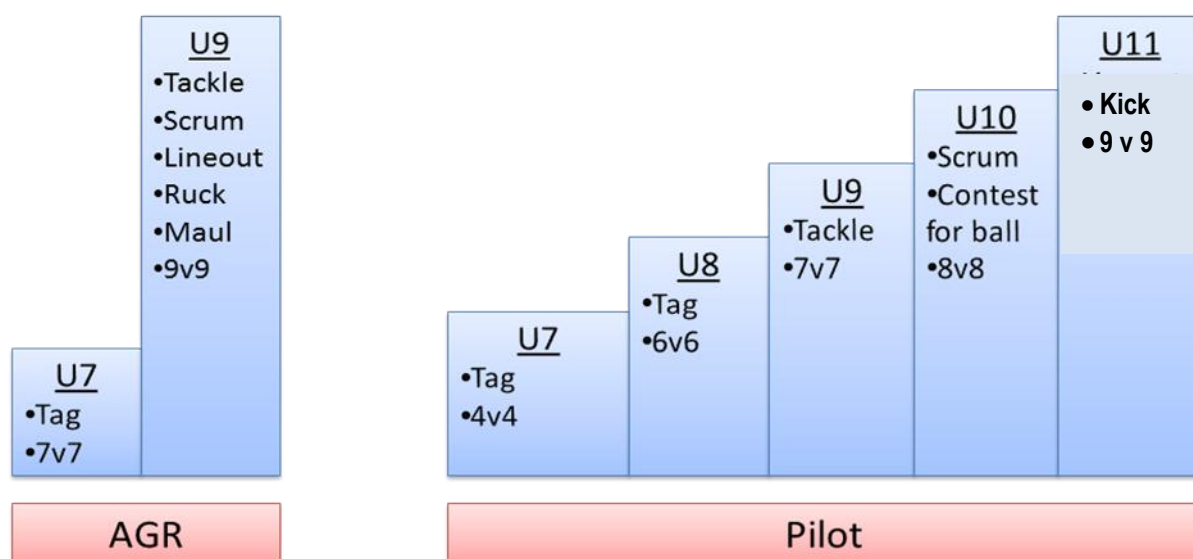
The rules developed for the pilot are based on the recommendations made by the University of Exeter from research commissioned by the RFU (Wilson, 2009b; Wilson, 2009a; Wilson, 2008b ; Wilson, 2008a). The primary proposal emerging from the reports was that junior versions of the game played under the AGR did not explicitly consider child development issues and were overly based on 'pruned-down' versions of the senior game.



By using a bottom up approach the child is placed at the centre of the learning process and the competitive game is structured to create a learning environment that will allow players of all abilities to develop at their own pace. Player development is placed within a zone of proximal development (ZPD) which is 'the distance between the actual developmental level as determined by independent problem solving, and the level of potential development' (Vygotsky, 1978). Children should play a game that allows them to gain confidence by exploring what they already know and what they are capable of learning (Doherty, 2009). Therefore, for children to be taught rugby union effectively at any stage of their development, the game needs to be developmentally appropriate (Bruner, 1973).

By ‘scaffolding’ the competitive game, children’s development is supported and skills and tactical elements introduced at an appropriate stage (Wood, 1976).

From Under-7 upwards the pilot rules emphasise key motor skills such as passing and tackling; and tactical elements such as decision-making and spatial awareness. Structured skills such as scrummaging and rucking are introduced at the appropriate developmental age (see previous detailed reports by Wilson et al.) In this way there is an emphasis on the key (developmentally appropriate) skills at the younger ages, with time provided to embed these skills (without the need to constantly introduce new technical skills). The figure below demonstrates the significant addition of skills that need to be coached and refereed between 7 and Under 9 in the current AGR. The question that arises from this is; “Is there really time to coach all these new skills?” It is evident that in the Pilot game similar levels of complexity will not occur until Under 11, with more time to embed key skills during the earlier years.



***A graded (scaffolding) approach to introducing rugby specific skills***

As Grehaigne et al., (2005) highlight, junior games should provide an outlet for children to achieve their own aspirations and not those craved by adults. At present this appears to be the dominant culture within children’s sport in England where adult coaching methods, such as blocked practices, are the accepted norm (Muir, 2011). Therefore, the aim of the pilot is to introduce competitive games, and influence coaching delivery, that reflect the different age and developmental levels of all players (Grehaigne, 2005).

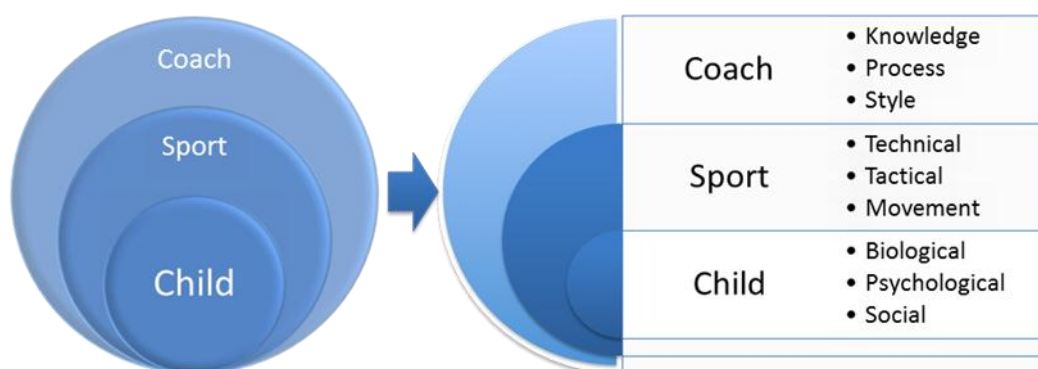
### 3. Developmentally Appropriate Rugby Union Games for Children

Player or child development cannot be adequately understood using a narrow, mono-disciplinary approach. An interdisciplinary approach is needed driven by an empirically/theoretically justified 'balance' between the bio-psycho-social domains (Bailey, 2010). In creating developmentally appropriate rugby union games for children there needs to be a thorough understanding of:

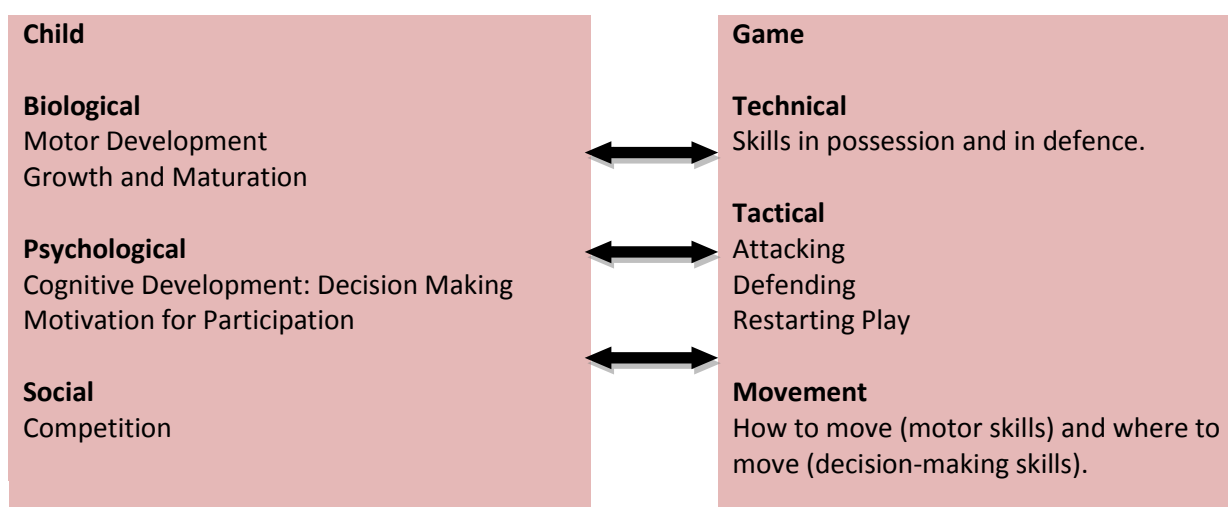
- **The child:** through biological, psychological and social development.
- **The game:** focusing on 'on and off the ball' skills and tactical skills.
- **Coaching:** highlighting the coaching process.

Adapted from Muir et al., (2011)

Indeed, a child-centred model for developing the game of rugby union for children is proposed as shown below.



While acknowledging the considerable impact of 'coaching' on development, the focus of the pilot study is on the competitive mini rugby games played between Under-7 and Under-11, and not the methods used by coaches in training sessions while preparing children for matches. Therefore, in the following section the focus is on the interaction between the child and the game they play, as outlined below.





### 3.1 Understanding the child

- **3.1.1 Biological**

#### Motor Development

At U7, children are approaching the end of the fundamental movement phase and the beginning of the specialized movement stage (Gallahue, 2006). Most children will have well developed stability skills such as turning, and dodging; and locomotion skills such as running and chasing. However, according to Gallahue and Ozmun (2006) manipulative movements such as catching may develop later due to sophisticated visual-motor requirements.

At U9 children are in the transitional stage of the specialized movement phase, where they seek challenging situations to test their fundamental skill capabilities (Gallahue, 2006). Fundamental movement patterns, such as dodging, passing and running, once mastered can be combined in more complex forms as specialized skills, such as in attack during a game. Typically, at Under-9 children are much more proficient in manipulative tasks, such as passing, and are beginning to demonstrate skills in sports and physical education settings (Doherty, 2009).

#### Growth and Maturation

From the age of six years onwards within single-year age groups, children advanced in maturity are, on average, taller and heavier than peers who are average or late in maturity status. This can result in children with significantly different levels of biological maturity despite being of the same chronological age (Malina RM, 2005a; Malina RM, 2005b). Within a team in any mini age group a one-year age difference can exist between the oldest and youngest players. Between these individuals, this *relative age effect* is linked to significant differences in cognitive, physical, emotional and skilled performance (Helsen, 2005; Malina RM, 2005a).

- **3.1.2 Psychological**

#### Cognitive Development: Decision Making

Based on Piagetian theory (Piaget, 1969) Under-7 players would be in the *pre-operational* cognitive stage (2- to 7-years). According to Piaget, thinking within this stage is egocentric – with children unable to think beyond their own perspective of a situation. This could explain why children at this age are looking to run with the ball and rarely want to pass. However, McMorris et al., (2006) state that at this stage a child *can* master simple decision-making 1 v 1 tasks; e.g. If I run straight at my opponent in a game I'm more likely to get tagged than if run to either side. With help from the coach, decision making skills can be developed in games involving more players, e.g. 2 v 2 (McMorris, 2006).

At Under-9, children are in the *concrete operations* phase (7- to 11-years) (Piaget, 1969). Here, players are beginning to make simple decisions based on what the present display affords (i.e. what's in front of them); e.g. to close down space and tackle a player in possession. McMorris et al., (2006) state that in the concrete operations stage, the child would be able to think through a series of events or actions and, as such, understand what happened and why.

## Playing Positions

At Under-7 and Under-9 nearly all players will have to be conditioned to stay in position on the field as children do not have the cognitive capabilities or social experience to understand a specific role within a team (Coakley, 2009). According to Coakley and Pike (2009) this is extremely difficult for a child during a game as they must do three things at once to understand his/her position:

- Have the ability to mentally visualize the continuously changing positions of teammates and opponents covering the whole pitch.
- In relation to the ball be able to consider the spatial relationship between all players.
- Combine the above information to decide their position on the field.

In rugby union there's also the added complexity of the ever-changing location of the offside line especially in relation to set-pieces, rucks, mauls and open play for children to process during a game.

## Motivation for Participation

Various studies highlight fun and enjoyment as key motivations why children taking part in sport (Coakley, 2009; UK, 2006; Siedentop, 2002a). However, within the participation motivation literature there is no comprehensive understanding of what comprises *fun* (Siedentop, 2002a), with Bailey et al., (2010) suggesting that it is a complex area and a highly individual concept.

According to Weiss and Williams (2003) children are looking for experiences that are challenging, fun and enjoyable, that lead to increased self-esteem and confidence. Game involvement has been linked to fun (Bengoechea, 2005) and experiencing fun and excitement through deliberate play is also seen as key for developing intrinsic motivation for sport (Côté, 2003).

- **3.1.3 Social**

## Competitive Games

For many children starting to play rugby at Under-7 or even at Under-9 it will be their first experience of playing competitive sport. Most of these individuals will not yet have the cognitive and social abilities they need to fully understand competitive relationships (Côté, 2007; Selman, 1971). According to Coakley and Pike (2009), being able to form and nurture competitive relationships is a requirement for understanding competition. Children who have experience of playing informal games use interpersonal and decision making skills and will learn such things as how to follow and enforce rules as well as co-operating with peers (Coakley, 2009). Therefore, by playing games based on deliberate play activities children should have the opportunity and experience of developing their interpersonal skills as well as movement, technical and tactical skills in an enjoyable environment (Côté, 2003; Baker, 2003).

As they progress towards Under-9 children should continue to learn to co-operate and express themselves on the field as well as learning about formal structures and rule-governed teamwork (Adler, 1998). Within an organized structure children also learn to manage relationships with adult authority figures, such as the coach (Coakley, 2009). However, to fully enjoy the playing experience the touchline behaviour of coaches and parents needs to be a positive influence on performance. For many individuals, having constant shouts of 'spread out' and 'run straight' has a detrimental effect on their game experience (Coakley, 2009).

### 3.2 Game Understanding

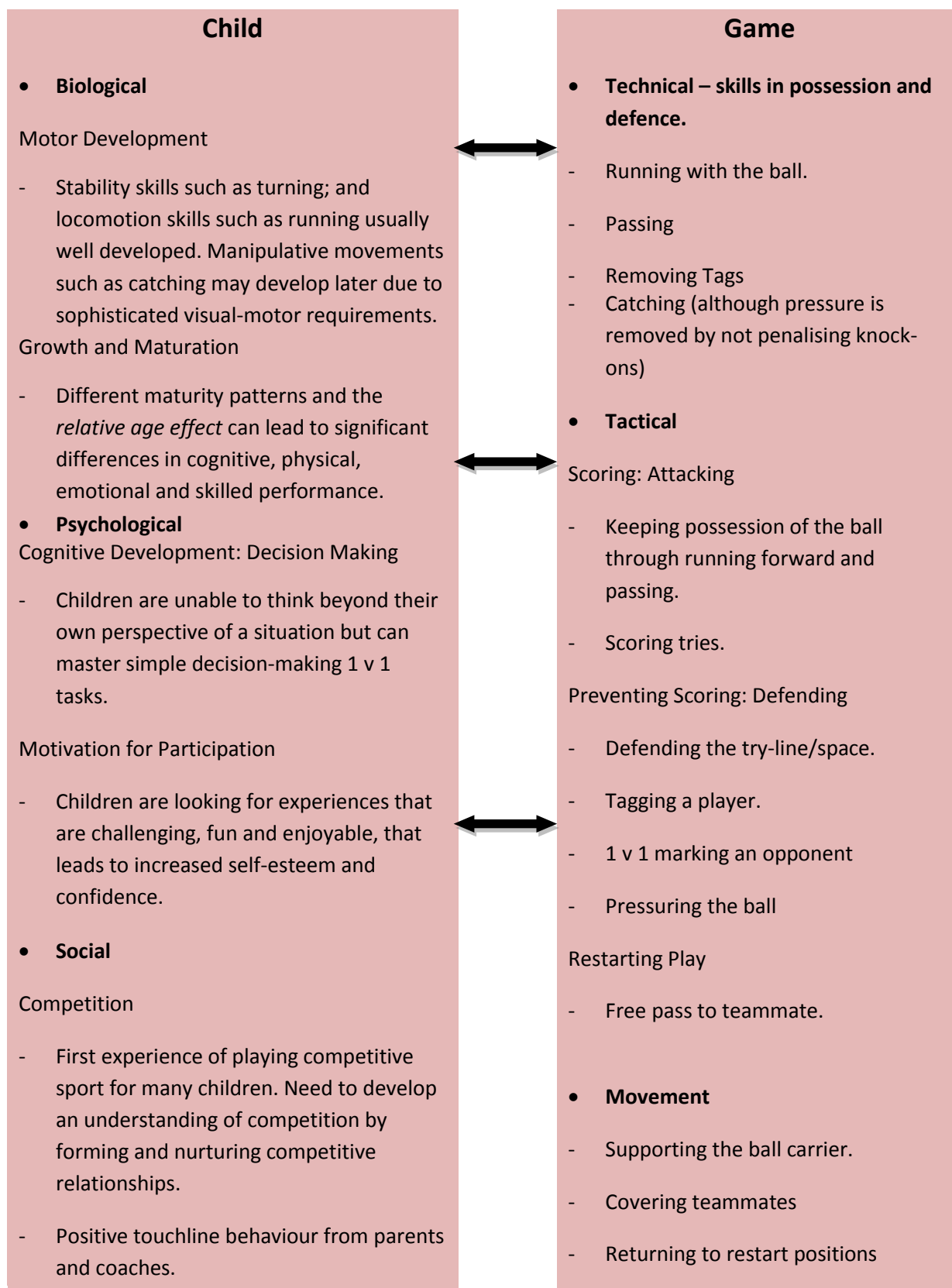
The second component of the model requires an examination of which skills are most important for the game and how these can best be introduced, reinforced and fine-tuned at each age level. As discussed earlier, the current mini rugby game appears to be based on a modified version of the adult game and founded on the application of the principles of an early specialisation sport, not a late specialisation sport (Wilson, 2008b). The pilot game focuses on fundamental motor skills and the development of decision-making skills in early age groups while specific skills such as line-out are introduced at older age groups. This graded approach (scaffolding) to the introduction of skills is more appropriate for learning, as skills that are considered important have more time to be embedded before new skills are added to the mix.

Mitchell et al., (2006) suggest developing a framework to assist in the process of creating games with different levels of tactical complexity. When creating a game it's essential to identify key tactical problems and associated skills and ensure that it matches the level of players' development (Mitchell, 2006). As a player's game understanding and skills develop they move to the next age group where the complexity of the game increases. For example, at Under-7 one solution to the tactical problem of scoring is to keep possession of the ball and effectively attack the try-line. The player in possession needs decision-making skills such as the tactical ability to identify space and the fundamental motor skills to run and evade opponents. Players in support need to be able to run and change direction and place themselves in the best position to support the ball carrier. When looking at game performance it's essential that we don't narrow our focus to the execution of motor skills only. What to do in game situations with or without the ball is equally as important as how a skill is performed (Mitchell, 2006; Williams, 2007).

	<b>Under-7</b>	<b>Under - 9</b>
<b>Skills in possession and defence.</b>	<ul style="list-style-type: none"> <li>- Running with the ball.</li> <li>- Passing</li> <li>- Removing Tags</li> </ul>	<ul style="list-style-type: none"> <li>- Running with the ball.</li> <li>- Passing.</li> <li>- Tackling.</li> </ul>
<b>Off the ball movement</b>	<ul style="list-style-type: none"> <li>- Supporting the ball carrier.</li> <li>- Covering teammates</li> <li>- Returning to restart positions</li> </ul>	<ul style="list-style-type: none"> <li>- Supporting the ball carrier.</li> <li>- Adapting field position as play develops.</li> <li>- Covering teammates</li> <li>- Returning to restart positions.</li> </ul>
<b>Tactical – Problems.</b>		
Scoring: Attacking	Keeping possession of the ball through running forward and passing. Scoring tries.	Keeping possession of the ball through running forward. Scoring tries. Drawing a defender to pass.
Preventing Scoring: Defending	Defending the try-line/space. <ul style="list-style-type: none"> <li>- Tagging a player.</li> <li>- 1 v 1 marking an opponent</li> <li>- Pressuring the ball</li> </ul>	Defending the try-line/space. <ul style="list-style-type: none"> <li>- Tackling a player.</li> <li>- 2 v 2 marking an opponent.</li> <li>- Pressuring the ball as a team.</li> </ul>
Restarting Play	Free pass to teammate.	Free pass to teammate.

## Developmentally Appropriate Rugby Union Games for Children

### Under-7 Summary



## Developmentally Appropriate Rugby Union Games for Children

### U9 Summary

Child	Game
<ul style="list-style-type: none"> <li>• <b>Biological</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Technical – skills in possession and defence.</b></li> </ul>
<p>Motor Development</p> <ul style="list-style-type: none"> <li>- Fundamental movement patterns, such as dodging, passing and running, once mastered can be combined in more complex forms as specialized skills, such as in attack during a game</li> </ul>	<ul style="list-style-type: none"> <li>- Running with the ball.</li> <li>- Passing</li> <li>- Tackling</li> </ul>
<p>Growth and Maturation</p> <ul style="list-style-type: none"> <li>- Different maturity patterns and the <i>relative age effect</i> can lead to significant differences in cognitive, physical, emotional and skilled performance.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Tactical</b></li> </ul>
<p>Cognitive Development: Decision Making</p> <ul style="list-style-type: none"> <li>- Players can simple decisions based on what the present display affords (i.e. what's in front of them); e.g. to close down space and tackle a player in possession.</li> </ul>	<p>Scoring: Attacking</p> <ul style="list-style-type: none"> <li>- Keeping possession of the ball through running forward and passing.</li> <li>- Scoring tries.</li> <li>- Drawing a defender to pass</li> </ul>
<p>Motivation for Participation</p> <ul style="list-style-type: none"> <li>- Children are looking for experiences that are challenging, fun and enjoyable, that leads to increased self-esteem and confidence.</li> </ul>	<p>Preventing Scoring: Defending</p> <ul style="list-style-type: none"> <li>- Defending the try-line/space.</li> <li>- Tackling a player.</li> <li>- 2 v 2 marking an opponent</li> <li>- Pressuring the ball as a team</li> </ul>
<ul style="list-style-type: none"> <li>• <b>Social</b></li> </ul>	<p>Restarting Play</p>
<p>Competition</p> <ul style="list-style-type: none"> <li>- Children continue to learn to co-operate and express themselves on the field as well as learning about formal structures and rule-governed teamwork.</li> </ul>	<ul style="list-style-type: none"> <li>- Free pass to teammate.</li> </ul>
<ul style="list-style-type: none"> <li>- Positive touchline behaviour from parents and coaches.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Movement</b></li> <li>- Supporting the ball carrier.</li> <li>- Adapting field position as play develops.</li> <li>- Covering teammates</li> <li>- Returning to restart positions</li> </ul>

## 4 Shaping the Game

Shaping the Game is a Rugby Football Union (RFU) pilot project agreed with and driven by three Constituent Bodies (CBs) and their clubs;: Durham, Hampshire and Warwickshire.

The long term objective of the pilot is to:

- Provide a progressive player pathway that will enhance the way in which players are developed in a more incremental manner.
- Provide a game which is in line with the principles of Child Development based on extensive research and expertise.
- Increase involvement of all players.
- Emphasise competitive performance not competitive outcome.
- Encourage less structure (encourage skills and discourage fear of failure).
- Make the game easier to understand and referee.
- Less emphasis on contact and more on continuity in early years.
- Rewarding intention to tackle in early years as much as ability to tackle.

**RFU (2010)**

### 4.1 The First Year

During its first year (2010/11 season) the Shaping the Game pilot project has focused on the mini rugby game played at Under-7 and Under-9 level in England. An age-group Under-7 and Under-9 player was one whose age at midnight on 31st August was less than 7 and 9 years, respectively. The three participating counties of Durham, Hampshire, and Warwickshire have played games under new pilot rules throughout the season. To evaluate and compare on-pitch performance of the pilot games with current AGR games played data was collected in the pilot areas and also in three AGR areas of Cheshire, Devon and Gloucestershire.

#### Under 7 – Key Rule Changes

	AGR Current	Pilot
<b>Pitch Size</b>	60m x 30m	20m x 12m
<b>Number of players</b>	7 v 7	4 v 4
<b>“Knock-On” by a player</b>	Offence – opposition ball.	No offence – play on.

- Smaller pitch size and less number of players on each team in the pilot.
- No offence for a “knock-on” in the pilot.

Rationale: Less players should mean that more children will get touches and opportunities to score tries and make tags (especially as at this age, children are unlikely to consider passing as a first option). At Under-7 children are in the process of developing manipulative movements such as catching and as they are in the *pre-operational* cognitive stage (Piaget, 1969) it makes sense to reduce the cognitive burden by not punishing catching mistakes.

## Under 9 – Key Rule Changes

	AGR Current	Pilot
Number of players	9 v 9	7 v 7
Scrum and Lines-out	Yes	None
Rucks and Mauls	Yes	None
Tackling	Yes	Yes 1 defender only. Grasp allowed.

- Less number of players on each team in the pilot.
- There are no scrums, lines-out, rucks or mauls in the pilot.
- Tackling remains a *key element in both games*, with a slight modification in the pilot rules to encourage physically smaller players to assist defensively.
- Rationale: Fewer players to simplify game and provide more opportunities for decision-making. By emphasising passing and evasion in the competitive game, these skills should be reinforced in the time which would have been spent learning new skills of rucking, mauling, scrums and lines-out.

### 4.2 Year One: Aims

The aims of the research for the 2010/11 season were:

- At Under-7 and Under-9, to evaluate and compare on-pitch behaviours between the AGR and pilot games.
- Examine the attitudes of key 'users' at Under-7 and Under-9 to the AGR game and pilot game.

## 5 Methods

Matches were filmed at festivals in both participating AGR and pilot areas during March, April and May 2011. At Under-7, there were 26 pilot matches and 15 AGR matches filmed; while at Under-9, there were 33 pilot matches and 21 AGR matches filmed. The total length of each game varied from 10 minutes to 20 minutes duration (in some AGR games). For subsequent comparative analyses, the number of behaviours occurring in each game were standardised to a nominal, 10 minutes duration (e.g. if there were 40 passes in a 20 minute game, this would be standardised to 20 passes per 10 minutes).

As with previous research involving rugby games at this age and with small-sided matches in football, the focus was on following the ball carrier rather than individual players (ARU, 2010; Rampinini, 2007; Fenoglio, 2005). A notational analysis system was developed based on a clear identification of critical behaviours for comparing the AGR and pilot game (Hughes, 2004). Categories for analysis were identified following discussions with coaches at the RFU about the key elements of Under-7 and Under-9 matches. These measures also included (but were not limited to) those used by the recent research into child behaviours during mini-rugby carried out by the (ARU, 2010).

The behaviours for comparison in the Under-7 games were: the number of tries, runs, passes (restart, before tag and after tag), and tags made. At Under-9, the number of tries, runs and tackles (to the ground and standing) were measured; while the amount of passes were examined in more detail (restart, breakdown, set piece, open play, passes when tackled to the ground and passes in a standing tackle). The number of lines-out, scrums, rucks and mauls were recorded for the AGR games only as there were none in the pilot game. The amount of time the ball was in play was compared between the pilot and AGR games.

Player feedback was collected at an Under-7 AGR festival in Devon during April, 2011 and in March, 2011 at a pilot Under-7 festival in Hampshire. The feedback from players at both Under-9 festivals was collected in March 2011 at an AGR festival in Gloucestershire and a pilot festival in Hampshire. At the end of matches at both Under-7 and Under-9 players were asked to give a rating how much they enjoyed the game, and to suggest one thing they enjoyed the most and disliked the most about the match (see Appendix 1). We also collected data from parents at these festivals but the analysis of these data is still incomplete (see Appendix 2).

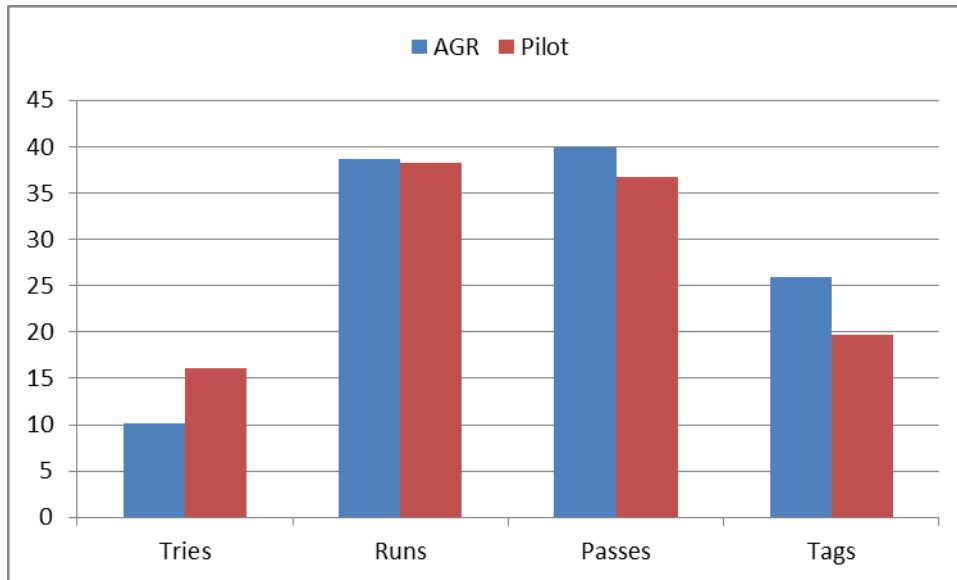
Finally, a more detailed questionnaire for coaches was developed to assess their views on the game of rugby they coach (whether Under-7 or Under-9, or AGR or pilot). There were some unavoidable delays in uploading this to the RFU's survey monkey website, but this is 'live' since from the first week in June 2011. It is expected that this data will be analysed over the summer (2011) to get an indication of where coaches feel the emphasis for rugby should be placed and whether the game they coached this season was best suited to these aims.



## 6 Results

### 6.1 Under 7 Game Behaviours

#### Basic Skills



On first sight, the basic results show few differences between both games. However the analysis must take into account that the number of incidents in the pilot are shared between 8 players (4 v 4) compared to the AGR where there are 14 players (7 v 7). This needs to be considered when interpreting these top line results, and for passing.

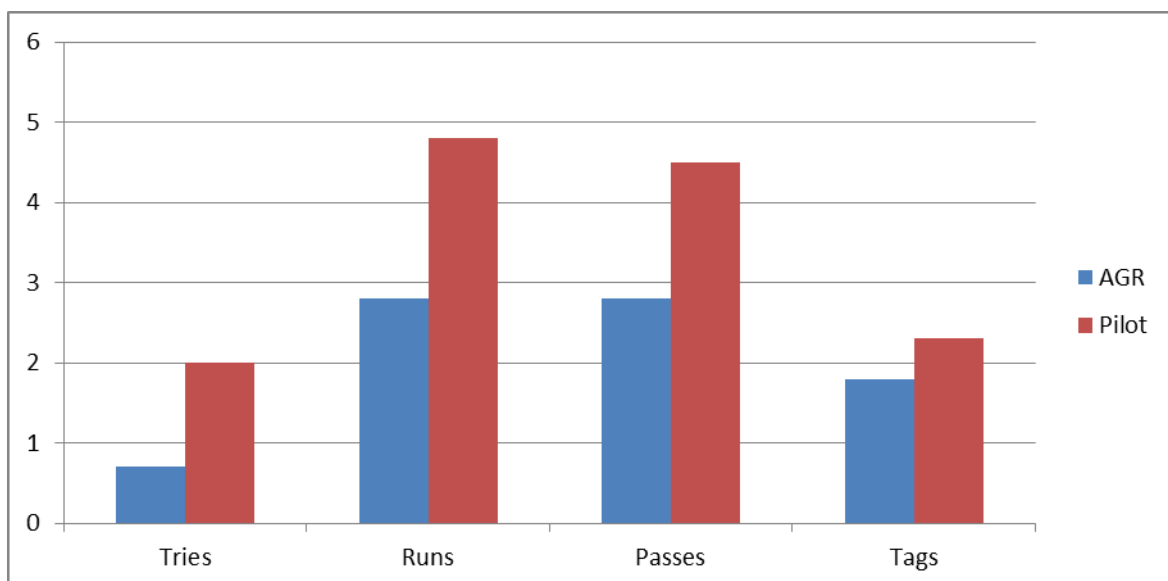
The pilot game has 58% more tries ( $t_{39} = 4.51, p < .001$ ) and the AGR has 24% more tags ( $t_{39} = 2.264, p = .030$ ). There were no significant differences between the number of runs ( $p = .868$ ) or passes ( $p = .382$ ) between either game.

## Passing



There were no significant differences in the types of pass made in either game (all  $p$ 's > .111). In all the games viewed, there were *NO* passes made prior to a tag. However when the average number of passes per player is analysed there is a marked difference between 4 v 4 and 7 v 7.

## Average number of involvements per player\*



*\*NB Given that the sample is limited, only tentative conclusions can be drawn and these will need further corroboration from a larger sample of data*

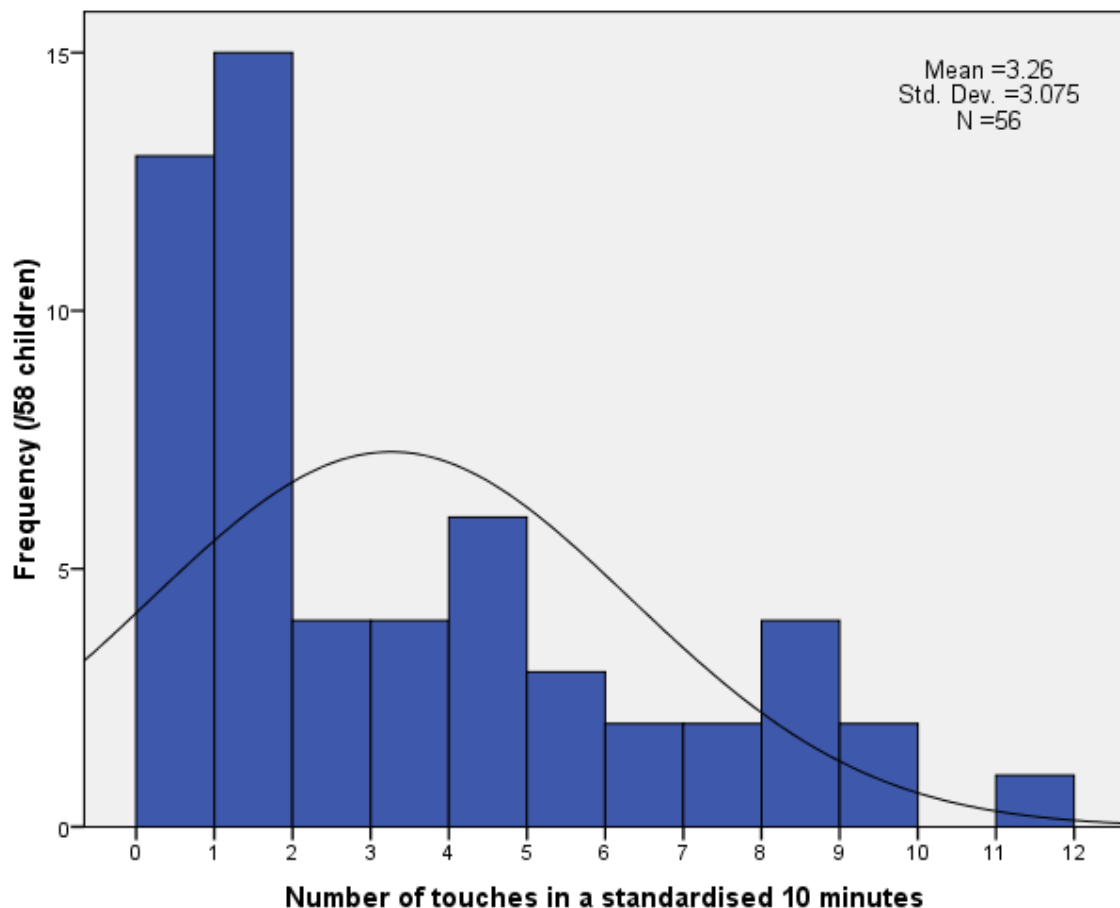
### Preliminary Under-7 Individual Analysis

It was not possible to carry out a detailed analysis of how many touches every player in every game had due to; (a) the difficulty in distinguishing children when not wearing numbered bibs and (b) the delay in receiving game analysis software. It was only possible to locate 2 games under each rule structure (divided into 4 separate halves) where both teams agreed to wear numbered bibs. These data are presented below for the number of touches of the ball each child got (again converted to a standardised 10 minutes of play). Given that the sample is limited, only tentative conclusions can be drawn and these will need further corroboration from a larger sample of data.

### AGR

Four halves of rugby with 14 children on the pitch equates to 56 data points to analyse. There was a mean of approximately 3 touches per ten minutes in this period, however, the data is significantly skewed by a modal score of zero touches (occurring 13 times; 23% of the players). Importantly, another 15 players only got between 1 and 2 touches, meaning that 50% of players can expect to receive two or less touches in 10 minutes in the AGR game.

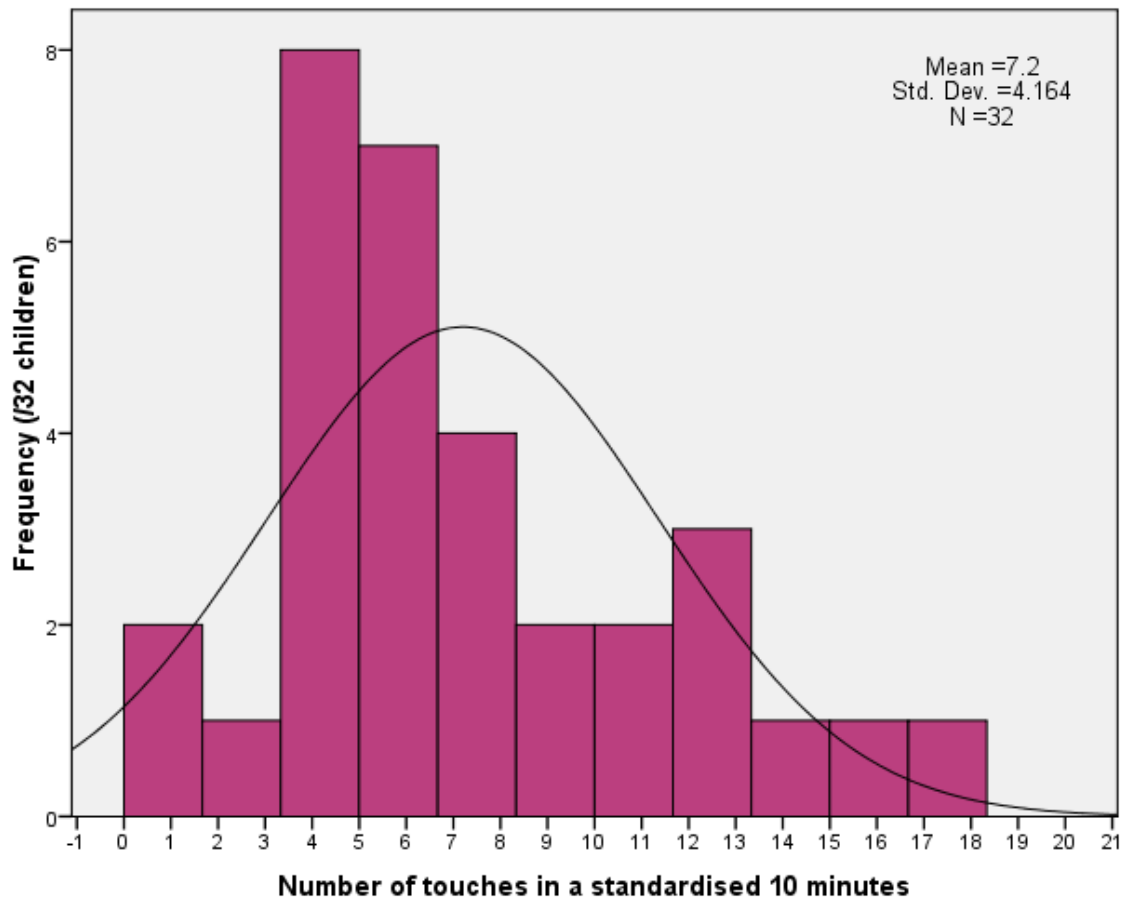
**Number of touches of the ball in AGR matches**



## Pilot

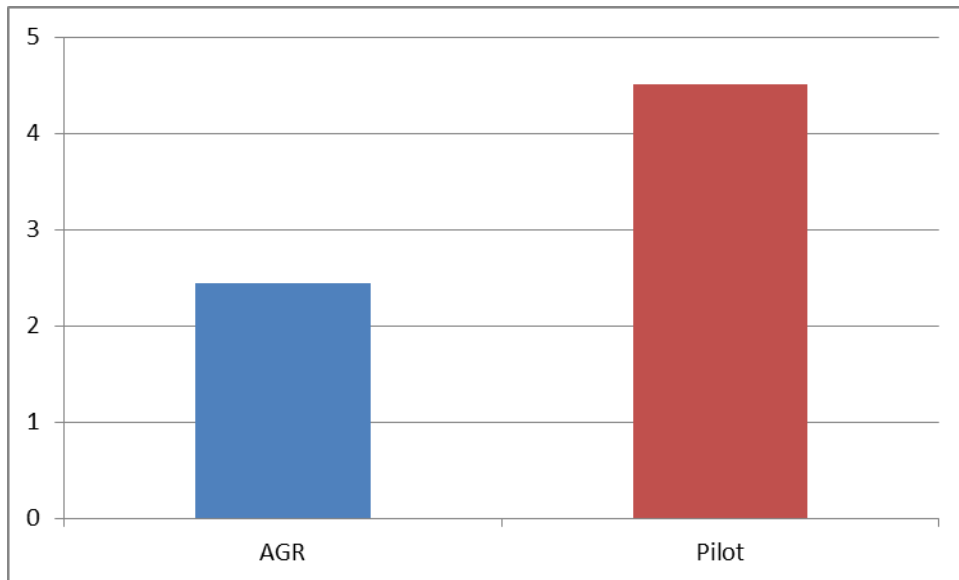
Four halves of rugby with four children on each time provides 32 data points for analysis. While the mean number of touches (of the ball) was higher than for the AGR (~7 as opposed to ~3), it is the distribution of touches that is most startling. The data is more normally distributed and the mode value is 4 touches per game. Also there is only one child who got no touches (and one more who got only one – a total of 6% of the data). In the pilot game 59% of the players got between 4 and 8 touches in each game.

**Number of touches of the ball in Pilot matches**



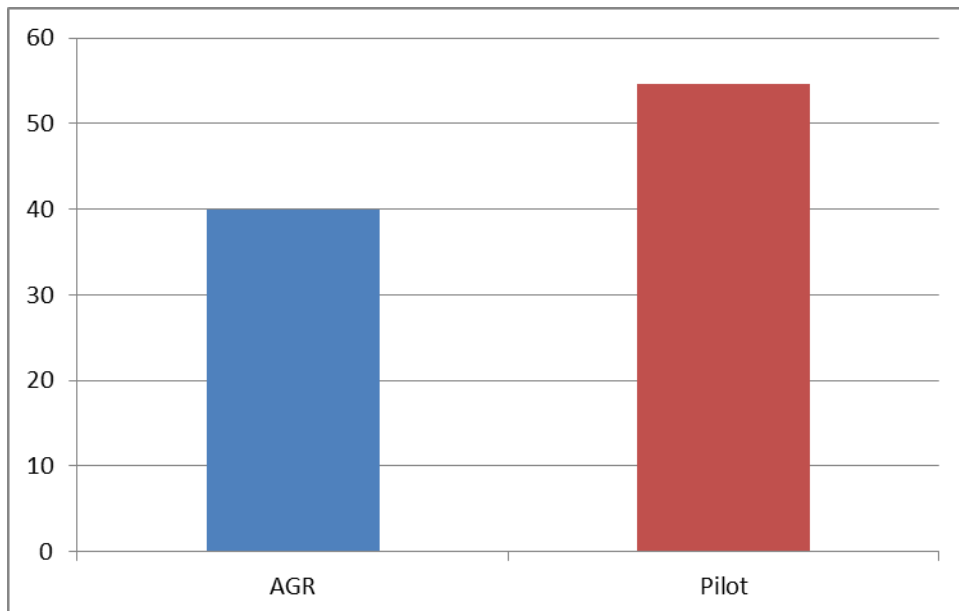
## 6.2 Under 9 Game Behaviours

### Number of Tries scored / 10 minutes



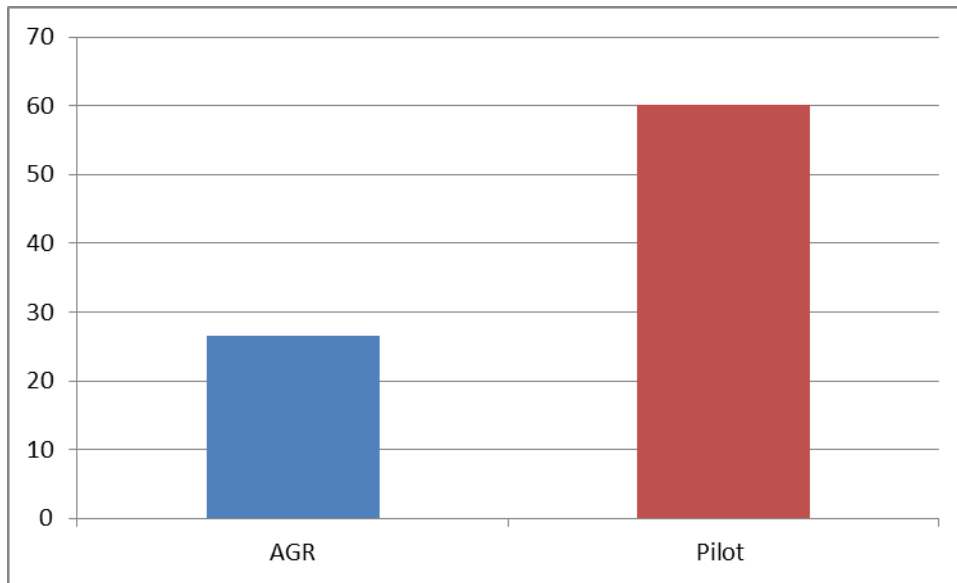
There were 85% more tries ( $t_{52} = 3.66, p = .001$ ) in the pilot compared to the AGR.

### Number of Runs / 10 minutes

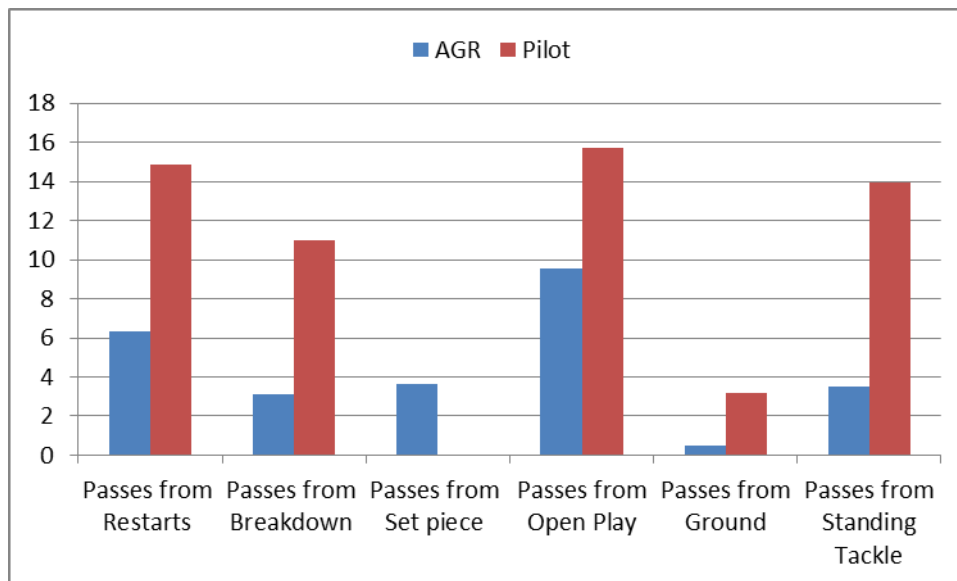


There were 37% more runs ( $t_{52} = 5.44, p < .001$ ) in the pilot compared to the AGR.

### Number of Passes / 10 minutes

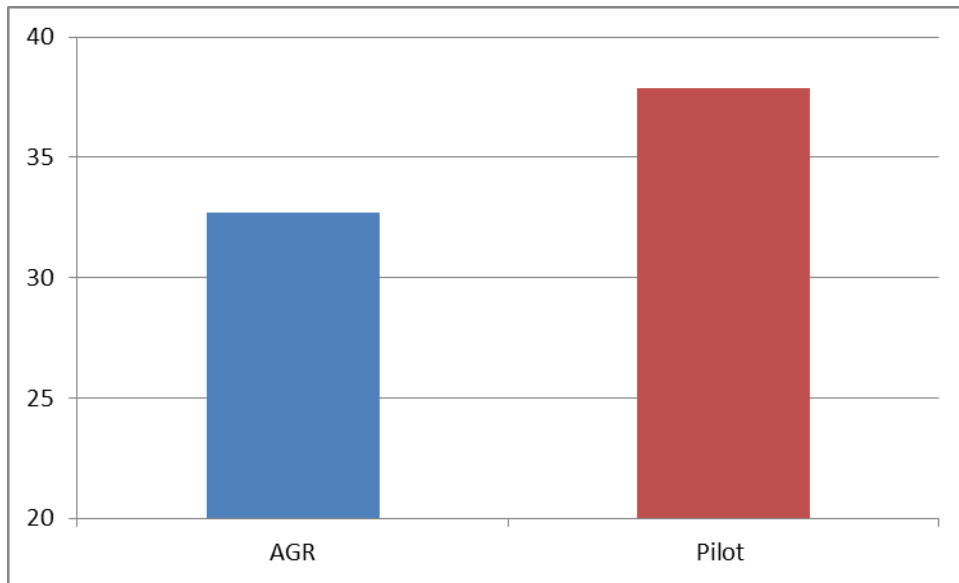


There were more than twice as many (126% more) total passes ( $t_{52} = 8.35, p < .001$ ) in the pilot compared to the AGR.

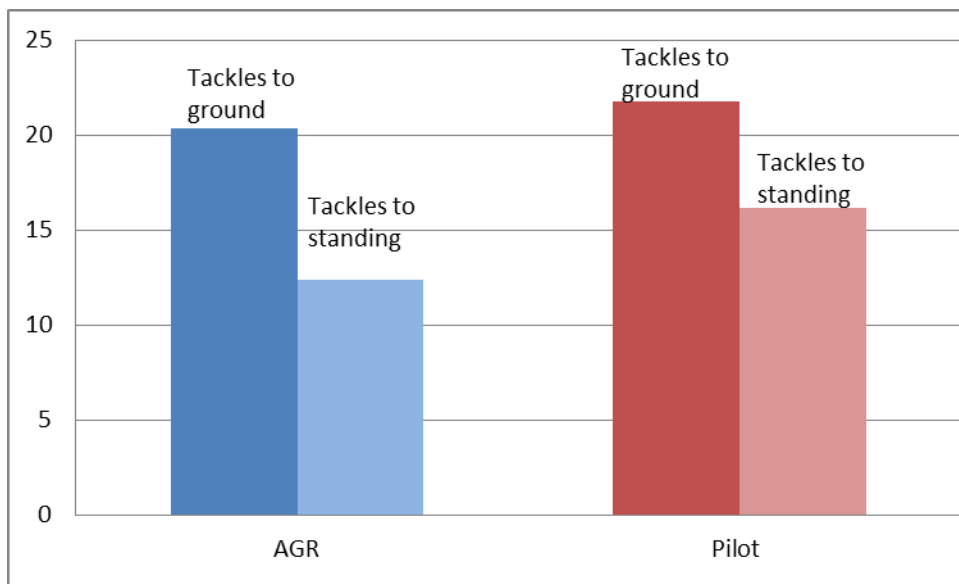


When we examine passes in more detail we see that the pilot has significantly more passes from differing starting positions ( $t$ 's vary from 3.52 to 14.59; all  $p$ 's < .01) with the exception of set pieces (there are none in the pilot). However passes from open play are significantly higher in the pilot

### Number of Tackles / 10 minutes

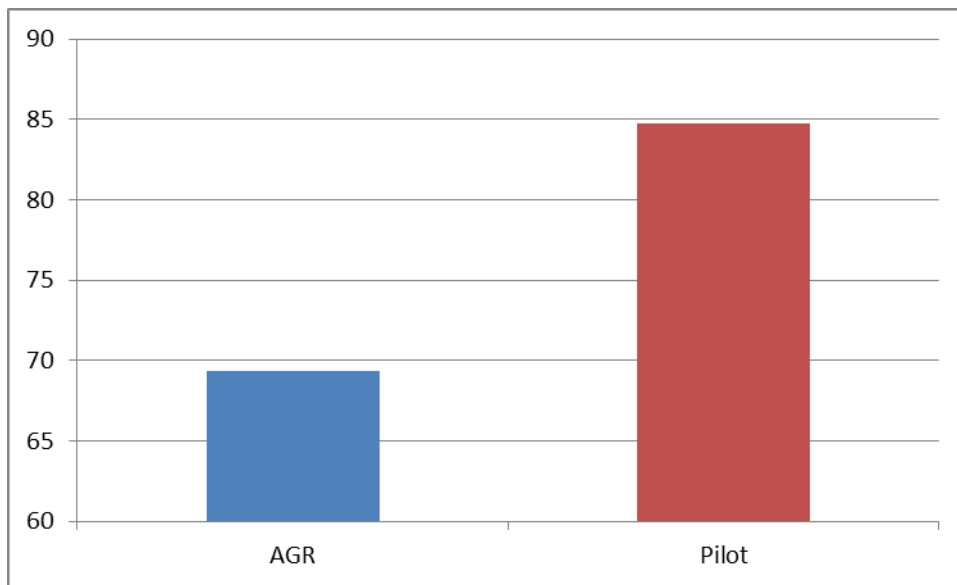


There were 16% more tackles ( $t_{52} = 2.52, p = .015$ ) in the pilot compared to the AGR.



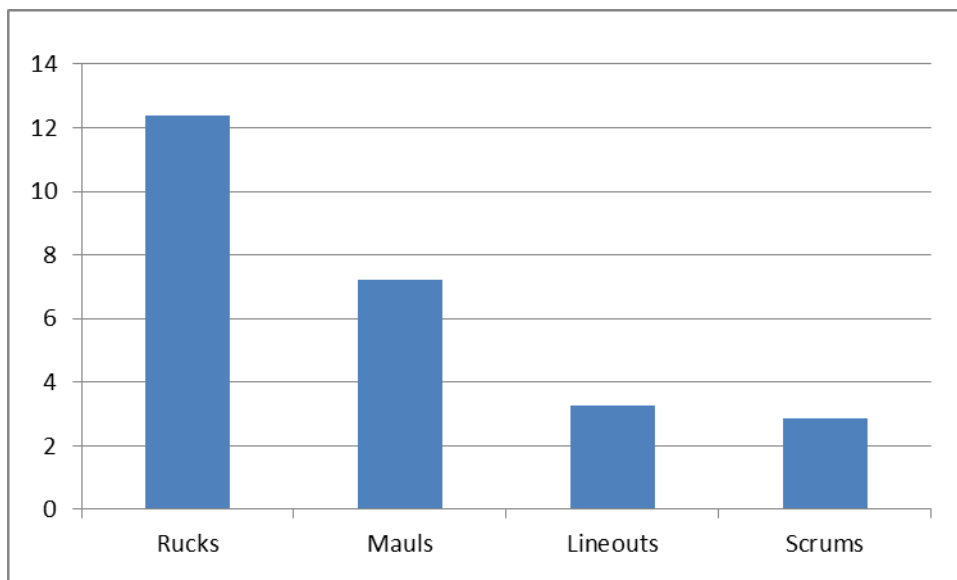
When we examine tackles in more detail we see that there are more tackles to ground and 'held' tackles in the pilot game than the AGR, although this difference is only significant for standing tackles ( $t_{52} = 2.16, p = .035$ ).

### Percentage Time Ball in Play / 10 minutes



There was 22% more ball in play ( $t_{52} = 8.81, p < .0001$ ) in the pilot compared to the AGR. (Note that this does not count time in which the ball is in a ruck or maul – which might take a further 2-3 minutes of time – see below).

### Number of AGR specific 'Skills / Activities' / 10 minutes



On average there are 12 rucks and 7 mauls every ten minutes in the AGR games.

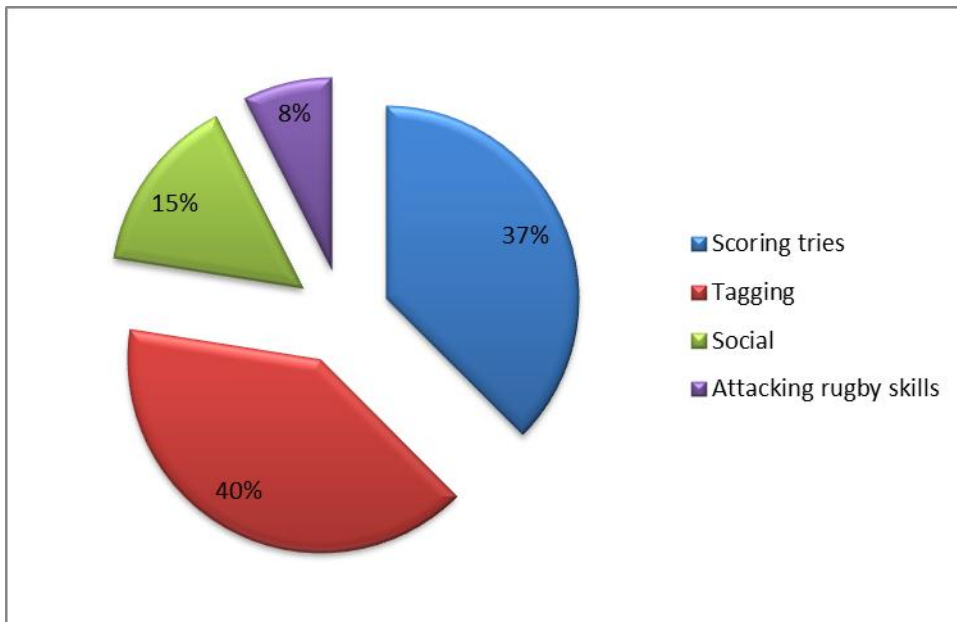


### 6.3 U7 Participant questionnaire data

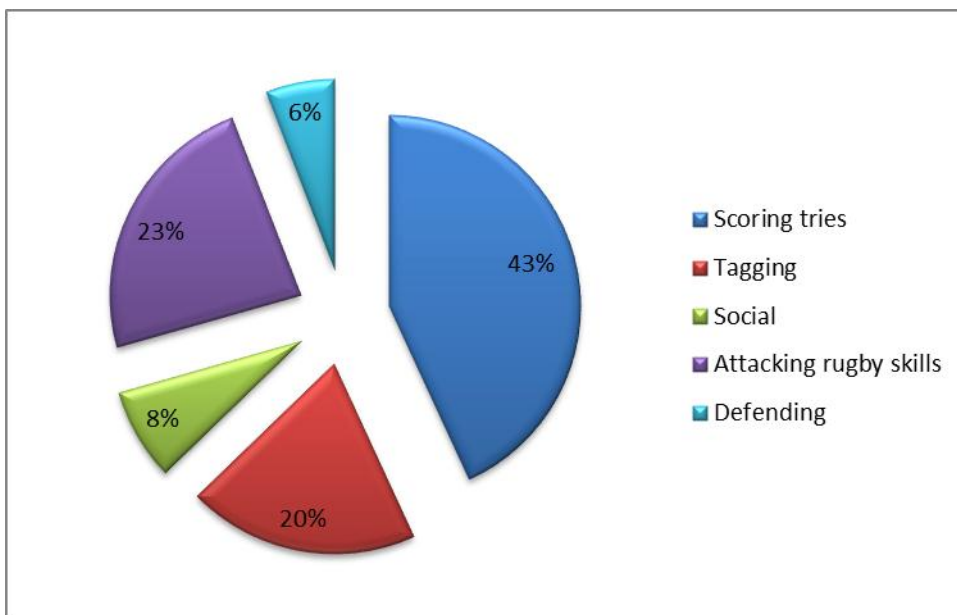
40 children from AGR games and 51 from Pilot games responded to the following questions after a game (see below).

#### 1. What did you like MOST about playing in that last game?

**AGR:**



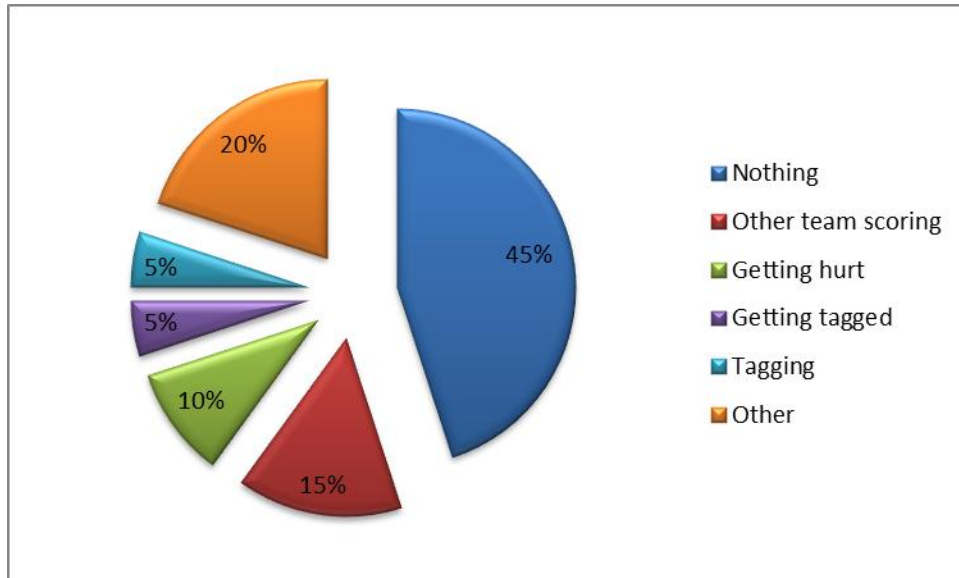
**Pilot:**



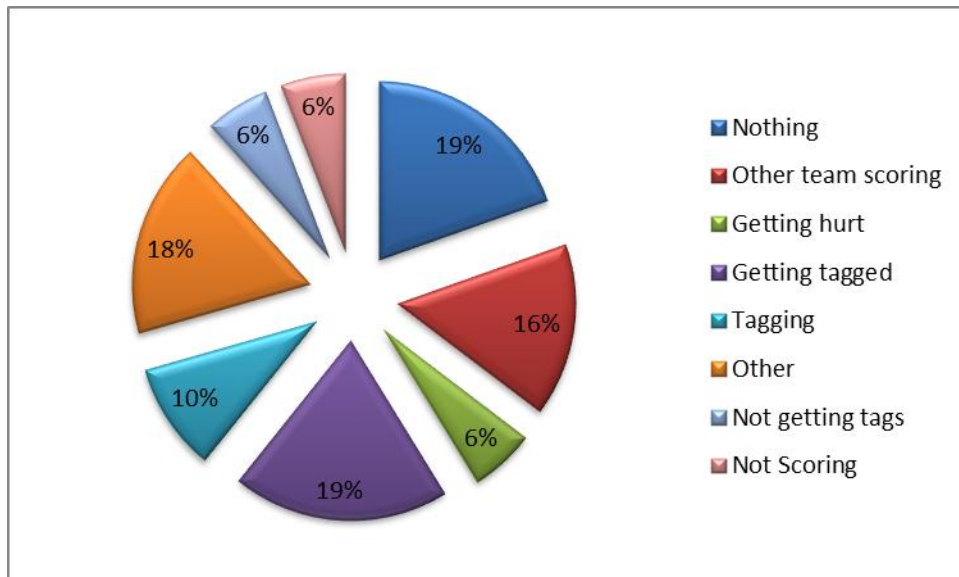
Scoring tries (37% AGR; 43% Pilot) comes out as the most fun aspect of rugby in general, closely followed by tagging (40% AGR; 19% Pilot).

## 2. What do you like LEAST about playing in that last game?

**AGR:**

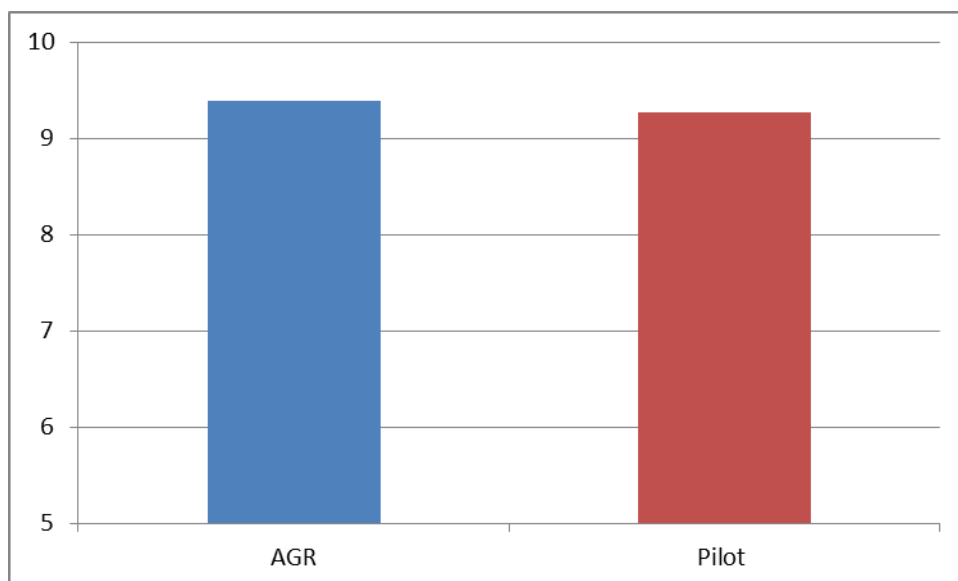


**Pilot:**



“Nothing” was the most common response to this question! (45% AGR; 19% Pilot). “Other team scoring” also ranked high (15% AGR; 16% Pilot).

### 3. “How much did you enjoy that game?” (Scale from 0 – 10)



There was no difference in the level of enjoyment reported by children playing each game, ( $t_{90} = 0.41, p = .685$ ).

**Limitations (U7)** It would have been desirable to have collected more data from children to be more confident in the implications, however, this was a time demanding procedure which had to take place while the next game was being filmed and therefore required multiple helpers.

There are always difficulties in getting young children to report feelings especially when they have to be collected in groups after a game. First, their responses will be biased by their particular experiences in the preceding game; which may not be typical. Second, it was sometimes found if the first child questioned provided a particular answer, subsequent children from the same team would simply copy this response.

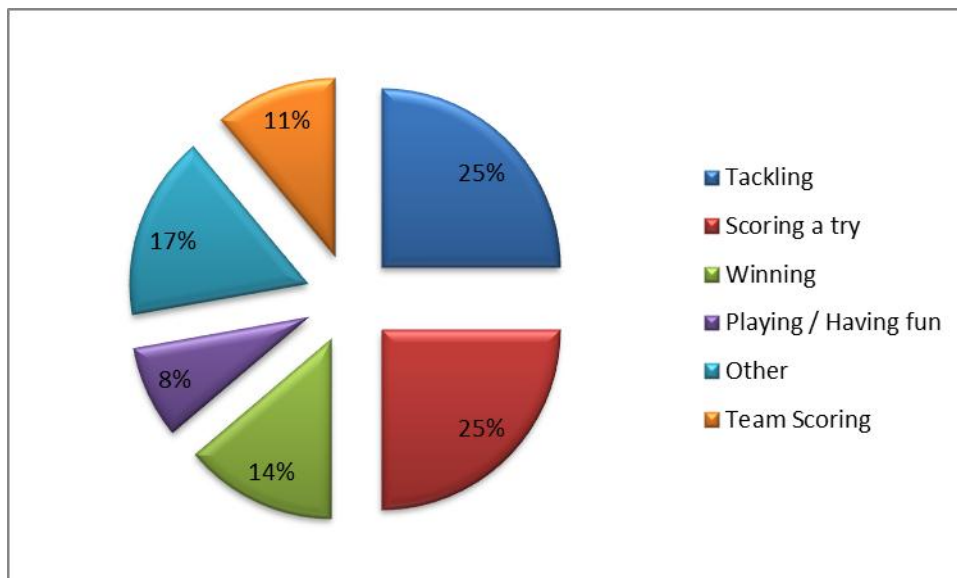
There was also a problem in making it clear that children could use the whole of the 0-10 scale. Most children simply circled the '10'. Whilst it is hoped that this is because they thought that the game was 'the most fun ever' (which was the label), it may have just been that they did not fully understand the task.

## 6.4 U9 Participant questionnaire data

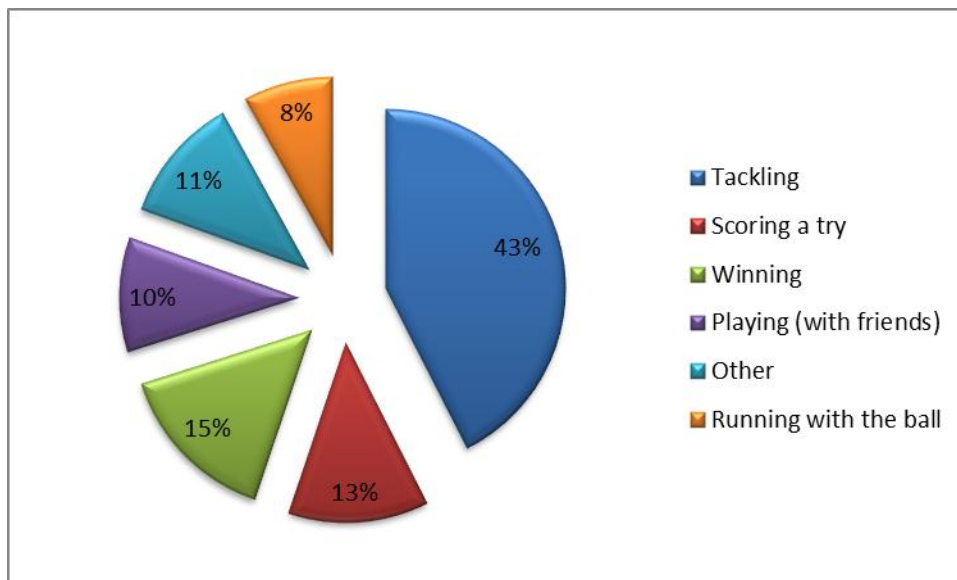
39 children from AGR games and 87 from Pilot games responded to the following questions after a game (see below).

### 1. What do you like MOST about playing rugby?

**AGR:**



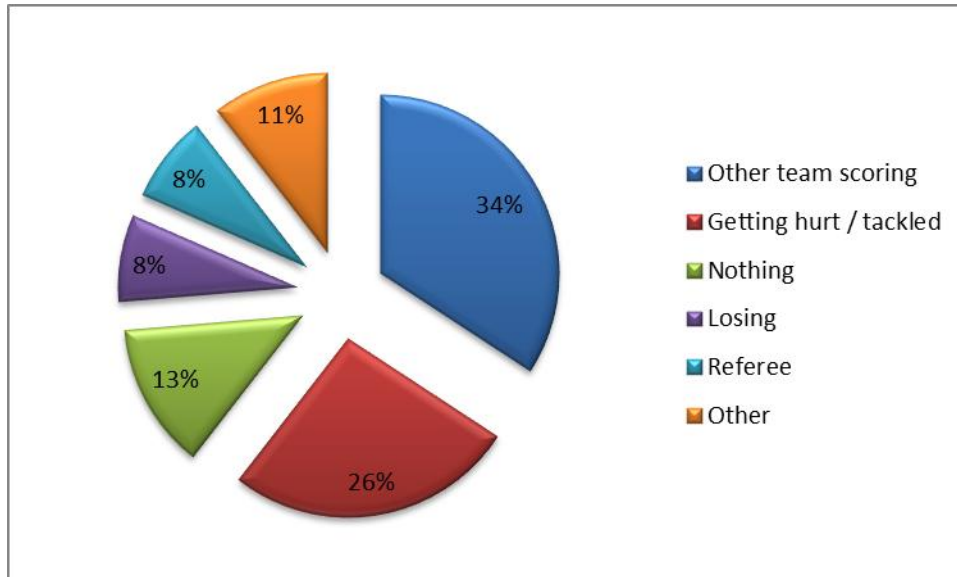
**Pilot:**



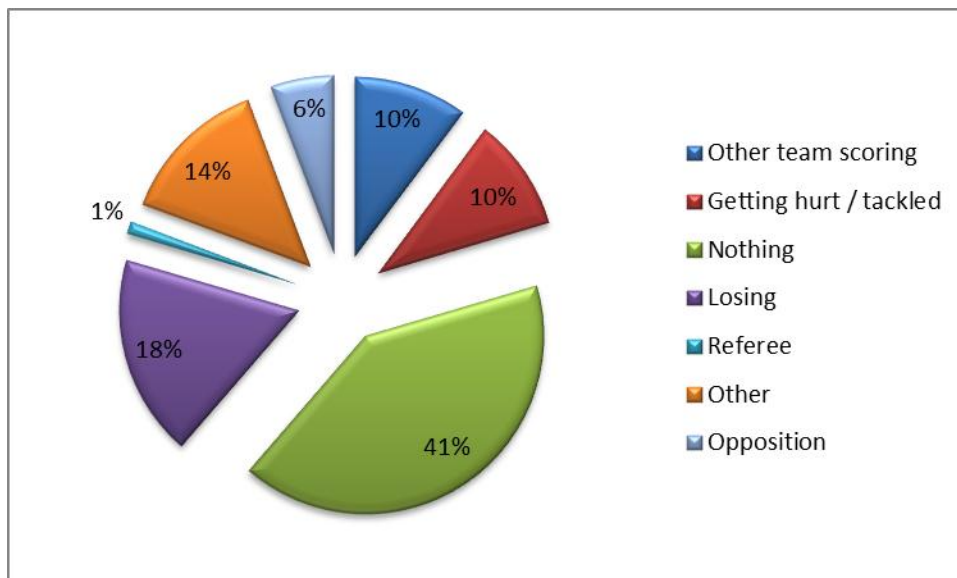
Tackling is the most enjoyed aspect of the U9 game according to these after-match reports (25% AGR; 43% Pilot). Scoring tries (whether as a team or individually) was the second most enjoyed aspect (36% AGR; 13% Pilot).

## 2. What do you like LEAST about playing rugby?

AGR:

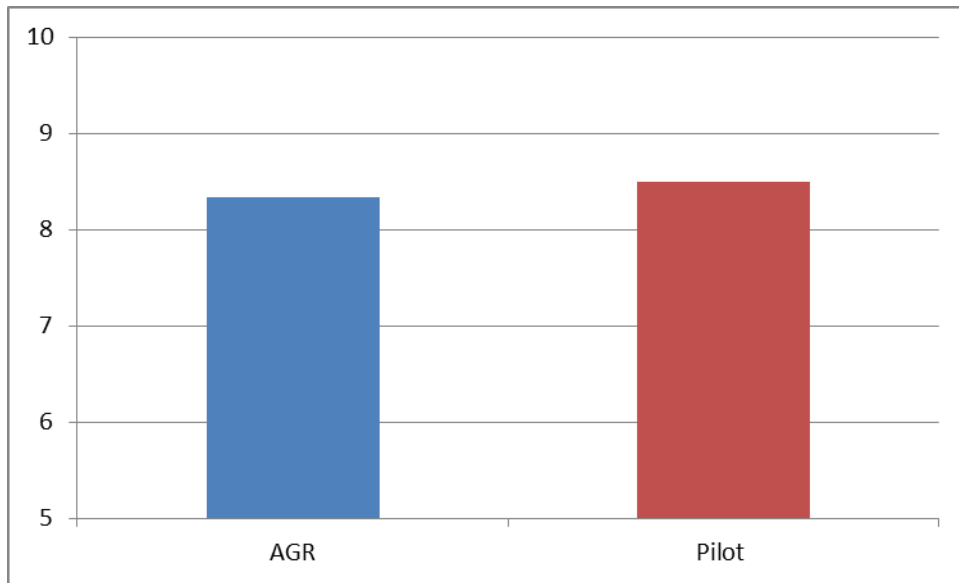


Pilot:



“Other team scoring” was the least enjoyable aspect of the game for players in the AGR games (34%; 10% Pilot) while 41% of the Pilot players said “nothing” (13% AGR). “Getting hurt / tackled” (26% AGR; 10% Pilot) were also less favoured.

### 3. "How much did you enjoy that game?" (Scale from 0 – 10)



As with the U7's, there were no significant differences in terms of how much the children enjoyed the game ( $t_{129} = 0.39, p = .695$ )

## 7 General Discussion

The rationale behind the *Shaping the Game* pilot is to provide developmentally appropriate games at mini rugby level, which are in line with the principles of child development. The results from the data-collected from both pilot and AGR games, especially at Under-9, highlight a shift in emphasis to a child-centred game from a game based on a watered down version and structure of the adult game.

### 7.1 Under-9

At Under-9, the removal of the structured skills of scrummaging, lines-out, mauling and rucking from the pilot game had a significant impact on the game in a number of key areas:

- **Increased opportunities to develop ‘specialised’ skills through increased involvement**

In the pilot game the players are provided with more opportunities to combine their fundamental movement patterns in more complex forms as specialized skills (Gallahue, 2006). The combination of the ball in play for longer periods and a reduced emphasis on structured contact skills results in a significant difference in the total amount of skills performed between each game. The players involved in the pilot games scored 85% more tries, had twice as many total passes (126%), 37% more runs and completed 16% more tackles. This should also lead to an increase in motivation as it's this action leading to scoring and personal involvement in that action that interests children the most when playing games (Coakley, 2009).

**Enhanced opportunities to develop decision-making skills.**

Players are making simple decisions to pass the ball based on what's in front of them (McMorris, 2006). With more touches of the ball, individuals need to make more tactical decisions in attack. The results show that players are making significantly more passes in open play in the pilot with nearly 16 being made per 10 minutes compared to 9 in the AGR. The pilot also has significantly more occurrences of all types of passes, which is probably an effect of shifting the focus on to continuity and reducing the emphasis on contact. Players are off-loading the ball in standing tackle four-times as much in the pilot and are completing three times as many passes from the ground.

- **Higher amount of ball-in-play**

A higher amount of ball-in-play-time in the pilot provides for excellent physiological benefits for children as well as allowing for more tactical and motor skill opportunities. During the pilot game the ball is in play nearly 85% of the time, which is 22% higher than compared to the AGR game. This increase of ball-in-play-time along with the reduced number of players on each side in the pilot game should result in a game of higher intensity with positive fitness benefits for players (Hill-Haas, 2008; Rampinini, 2007).

This figure doesn't include the amount of time the ball is held within rucks and mauls, which is likely to further reduce the amount of time ball is in 'play'. For example, during the AGR games filmed on average there were 12 rucks and 7 mauls per ten minutes. If the ball is held in both rucks and mauls for an average of 10 seconds then that would further reduce the ball-in-play time by over three minutes.

- **Re-emphasising the importance of contact.**

Although structured contact skills are not emphasised in the pilot, contact is still a significant part of the game with over 16% more tackles completed when compared to the AGR. On closer examination there are more tackles to ground and 'held' in the pilot, although the difference is only significant for standing tackles. One possible explanation for this difference may be the result of rewarding the contribution in defence of physically smaller players by allowing a 'grab' tackle in the pilot. Another factor that needs to be considered is that in the AGR many potential standing tackles end up as mauls.

## 7.2 Under-7

At Under-7 there is a radical reduction between the number of players' in each game from 7v7 in the AGR to 4v4 in the pilot which makes a straight comparison of results difficult. However, the basic results show little difference between both games, with only a significant difference being the 58% more tries scored in the pilot and the 24% more tags in the AGR. A possible explanation for these significant differences could be the size of the playing field. In the pilot the smaller playing field with less distance to the try-line may be the reason for more tries being scored, while the larger field with more players involved increases the amount of tagging. However it is also clear that passes, runs, tries, tags etc. are divided between 7 players per team in the AGR game whereas this reduces to 4 players per team for the Pilot. In this way each child should actually get more involvement in the U7 pilot game compared to the AGR game. Research has shown in invasion games that individual ball possession can increase three fold when there is reduction in the number of players from 7v7 to 3v3 (Rampinini et al., 2007). In order to examine this further we would have liked to have performed an individual analysis of each child's involvement, however it was extremely difficult to track individuals when you do not know them (NB All previous studies which have examined rules changes in age-related team sports have also simply 'followed the ball' for this reason). Our preliminary data does suggest that each player does get more involved in the game in the Pilot rules: 50% of players in the AGR got less than 2 touches every ten minutes compared to only 6% in the pilot. 59% of Pilot players got between 4 and 8 touches in a ten minute period.

We attempted to use bibs to aid the identification of players for individual analyses but found that coaches in most teams were reluctant to allow players to wear them due to the perceived effect on performance and threat of injury. In year 2 of the pilot, we would recommend that we find an effective method of indentifying individual players to assist with analysis. This would be groundbreaking work as individual player analysis has yet to be used in any published research examining variations in rules.

## Fun and Enjoyment

There was no difference in the level of enjoyment in either the Under-9 and Under-7 games. According to Bailey et al., (2010) fun and enjoyment are complex areas and a highly individual



concept, which is a possible explanation to the variety of answers given by players about game enjoyment.

## Appendix B RFU Shaping the Game Report Year 2 - July 2012

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\*References and Appendices have been removed.

## 4. Executive Summary

- The results of the first year (2010/11 season) of the Shaping the Game pilot project provided positive support for adopting the Pilot laws for both Under-9 and Under-7 age groups.
- In a qualitative study, nine expert rugby coaches were asked to provide their thoughts on what were essential early components for player development through mini rugby games. Replies pointed to playing modified small-sided rugby matches with unstructured and less specialised game play, and with an emphasis on fun and limited adult involvement. These recommendations are consistent with the aims of the Pilot laws and further support their adoption.
- 20 pilot matches and 10 Age Grade Regulations (AGR) Under-8 matches were filmed at festivals during 2012. The behaviours for comparison during games were identified using the Dartfish tagging system, and included: the number of tries, runs, passes (restart, before tag and after tag), and tags made. For comparative analyses, the number of behaviours occurring in each game were standardised to a nominal, 10 minutes duration.
- Face-to-face interviews were used to administer a six item survey to 79 Under-8 players. Importantly, the questions allowed players to reflect not only on what they thought was important for rugby as a game, but also on what they personally enjoyed about rugby.
- As both Pilot and AGR Under-8 games were very similar there were little differences between both games in terms of the behaviours they elicited. The only significant difference being that the Pilot game had 14% more passes from restarts ( $t_{28} = -3.15, p < .004$ ) than the AGR game. However, the number of behaviours are divided between 7 players per team in the AGR game compared to 6 players per team for the Pilot.
- The Under-8 player feedback suggests that players enjoy scoring tries (37%) and running with the ball (30%), and both game versions provide plenty of opportunities to apply these skills (Tries *mean*: 10 – AGR, 12 - Pilot; Runs *mean*: 44 – AGR, 45 – Pilot). Young players reported that having fun (35%) and playing with friends (20%) were the most important aspects of playing rugby.
- At Under-10, 20 Pilot matches and 20 AGR matches were filmed at festivals during 2012. Critical behaviours were identified using the Dartfish tagging system; including, the number of tries, runs, tackles, and passes. The number of, scrums, rucks and mauls were recorded for both games, while lines-outs only applied to AGR matches. The duration of each breakdown (i.e. rucks and mauls) were also timed, and the amount of time the ball was in play was compared between the Pilot and AGR games. As game duration varied across matches, all behaviours were standardised to a nominal 10 minute duration.

- Opinions about the game of rugby were sought via a similar 6 item, multiple-choice survey that was used with the Under-8 players. In total, 139 Under-10 players were individually interviewed.
- In the Under-10 Pilot game the ball was in open play for 20% more time when compared to the AGR. This likely provides both positive fitness benefits for players (e.g., Hill-Haas, 2008, Rampinini et al., 2007) and more opportunities to develop tactical decision-making in attack and defence.
- In contrast, over half the time in the AGR game (53%) was spent preparing for and competing in scrums and lineouts, and competing for the ball that was being held within rucks and mauls. While these are important elements of the senior game, it is dubious as to whether this emphasis offers an ideal learning environment for generic skill development (see section 3) or matches what children actually enjoy about playing rugby (section 6.5).
- The activities identified as being enjoyable by Under-10 players - tackling (27% Pilot, AGR 27%) and running with the ball (27% Pilot, AGR 26%) are both associated with the ball being in open play. These elements are consistent with the deliberate play principles of the Developmental Model of Sport Participation (Côté, 2007) on which the Pilot laws are based.
- The introduction of the competition for the ball at the breakdown in the Pilot resulted in possession being recycled at a significantly faster speed than in the AGR. The average time for one ruck in the AGR was 4.4 seconds and 2.5 seconds in the Pilot game; while a maul was nearly three times longer (11.9s) in the AGR compared to the Pilot (4.3s).
- The introduction of mini rucks and mini mauls resulted in a significant difference in the total amount of passes associated with these aspects of the game. At the breakdown, the players in the Pilot games completed 46% more passes from rucks and mauls and over half as many passes from standing tackles (58%) compared to the AGR.
- In the passes between phases there was also a significant difference ( $t_{38} = -2.83, p < .007$ ) with an average of 1.6 passes between phases in the AGR and 2 in the pilot. At first glance this doesn't appear much of a difference; however if there are 30 phases of play in a 10-minute period this could lead to up to 15 more passes being completed between phases in the Pilot.
- The mean for all types of other skills such as the other types of passes (restart, ground, set piece, open play), all types of tackles (standing, to ground) and runs were higher in the Pilot than the AGR, but these differences were not significant.

## 5. Background

This report presents the data of the second year of the Rugby Football Union (RFU) Shaping the Game project focusing on the Under-8 and Under-10 mini rugby game played in England. Previous reports by the University of Exeter have discussed the development of the pilot laws, introduced a child-centred model for designing games for children, and reported on the impact of the first year of the project (for copies of all reports see RFU/New rules of rugby website).

### 2.1 Year 1: Under-9 and Under-7

The results of the first year (2010/11 season) of the Shaping the Game pilot project provided positive support for adopting the Pilot laws for both Under-9 and Under-7 age groups (for full report see Thomas and Wilson, 2011).

At Under-9 level, there were many significant differences between both games: There were 85% more tries ( $p = .001$ ), 37% more runs ( $p < .001$ ), 16% more tackles ( $p = .015$ ), more than twice as many passes (126% more;  $p < .001$ ), and the ball was in play for 22% longer ( $p < .0001$ ) in the Pilot compared to the AGR game. It was concluded that the Pilot game provided more fundamental movement skill learning opportunities, as well as more experience of tactical decision making and option generation. It was also highlighted that a significantly higher amount of ball in play time and the reduced number of players on each side in the Pilot game should result in a game of higher intensity with positive fitness benefits for players (Hill-Haas, 2008; Rampinini, 2007). The significance of contact skills in the Under-9 game was also highlighted with over 16% more tackles completed when compared to the AGR.

The Under-7 age group game was characterised by lots of running, with little passing (in either version). While the Pilot game had 58% more tries ( $p < .001$ ), the AGR had 24% more tags ( $p = .030$ ). However, it was emphasised that these 'top-line' results needed to be considered in terms of the number of players on the pitch in each form of the game. For example, the forty passes per 10 minutes made in the AGR were spread between 14 players whereas the 37 passes in the Pilot were spread between eight players. Preliminary individual analysis also suggested that in the Pilot game, involvements were spread out more evenly when there were fewer players on the pitch (i.e. 7v7 in the AGR and 4v4 in the Pilot).

### 2.2 Year 2: Under-10 and Under-8

The rest of this report will outline the results from the second year of the project which predominantly focused on the Under-10 and Under-8 versions of the game. First however, we present some qualitative data that we collected from elite coaches, where we attempted to elicit their opinions about mini-rugby in general and where they felt the emphasis should be placed in these early years.

### 3. Expert Coaches opinions on introducing rugby union to children

The following study sought to initiate enquiry into the question of how children should be introduced to rugby union by identifying what expert rugby coaches thought were essential early components for player development through mini rugby games.

Semi-structured interviews were conducted with nine expert male rugby union coaches. An elite coach was classified as an individual who had experience of coaching at English Championship level or above. A six-phase inductive thematic analysis procedure (Braun, 2006) was used to analyse the interviews and at the end of this process five themes were identified that were consistent with current research literature: Modified Rugby Games, Adult Involvement, Introducing Specialist Skills, Promoting Positive Player Growth, and Early Sport Participation.

#### Results

##### 3.1 Modified Rugby Games

The expert coaches placed a high emphasis on modified small sided-games that allows for high involvement for all players when discussing the design of competitive mini rugby matches.

What you're looking is for high involvement. So why have 15 a side or 11 a side, you know, why not be running five, six, seven a side little games in small areas with the ball the right size that they can make sure they can control. And if you've got that high involvement then you get the natural, I think, skill development which you can then build on later' (Coach 7).

Examples used were informal games played in the park where children would spend most of the time playing and little time waiting to be involved. Most of the coaches expressed that they believed that small sided games would have positive benefits for player development.

It's not rocket science the more somebody can get a ball in their hands and make decisions the better they are going to get at it and if you are playing eleven a side thirteen a side you watch some of the games, some kids touch it once or twice in half an hour so (Coach 4).

It was suggested that this approach of modifying games would allow for positive skill development where children are allowed to improvise and be creative in an environment without direct adult instruction.

##### 3.2 Adult involvement

Adult involvement in mini rugby matches was discussed; focusing on the coaches' role during games and also in their roles as referees. The coaches were complimentary of mini rugby coaches and emphasised that without their involvement there wouldn't be any matches played at this level. However, it was highlighted by some, that the behaviour of some coaches was having a detrimental effect on the children playing the game.

The big drama I have with kids coming through is their ability to communicate is significantly poorer year on year it's getting worse, and worse and worse. But part of the problem is we're having someone communicate for the kids especially in our sport - pass, pass, tackle – shut up man they'll

work it out, they're not stupid. And when you have the breaks or whatever you can ask the questions and then you can video it. You'd be better off buying a video and video the game and then you can show the kids instead of shouting (Coach 1).

All elite coaches agreed that when refereeing mini rugby matches that the coach should give feedback to both teams and not to strictly apply the laws.

I think the referee should be referee come coach. I think if the referee's purely refereeing without explaining things and generally giving feedback then the players will not learn as quickly' (Coach 5).

Although a coach/referee was deemed to be the ideal in theory for developing players during games, some coaches questioned whether it could be applied in practice due to the competitive nature of some adults involved in the game and the difficulty in finding the appropriate time to intervene and ask relevant questions to players during matches.

### **3.3 Introducing specialised skills**

There was agreement among the coaches that set piece skills of the lineout and scrums were unnecessary for player development in mini rugby matches.

I don't think they need to do start doing scrums or line-outs until they are 14 because it's the one part of the game that slows the game down it involves a very small group of players (Coach 8).

It was felt that emphasis during games should be placed on developing fundamental movement skills and making simple tactical decisions.

At the moment the game jumps up in too big a step and we never get the foundations in place tackle, pass, catch, run, before we are onto the next thing. And I think if we can do it in a more incremental way then we'll end up with a better balanced player coming out of it (Coach 5).

The coaches also expressed that children should sample different playing positions at a young age.

So I think definitely there's a need to give people opportunities to gain experience and develop in lots of different positions. Naturally some players will lend themselves towards being certain positions as you would expect but it shouldn't prevent you from playing in other positions' (Coach 2).

By having children playing in a variety of positions it would allow them to develop an extensive range of skills and give them an understanding and appreciation of different positions from a very early age.

### **3.4 Promoting Positive Player Growth**

All of the elite coaches felt that fun and enjoyment was a key factor in attracting players to the game and developing players. For this to happen it was felt that it was important that children were playing, were highly involved in the game and this would lead to improved skill development and enhanced player motivation.

The purpose of any sports club is for the players to have fun it should be the top of the list. Clearly, if they're having fun they're going to progress further, they are going to stay involved longer, they are going to feel good about themselves (Coach 1).

Many coaches believed that having fun and enjoyment could enhance children's self-esteem and that it was key factor in keeping the players involved as they progressed through the age groups.

### **3.5 Early sports participation**

Coaches were supportive of children starting to play rugby from a young age however they emphasised the benefit of playing a variety of sports from an early age and that general sporting awareness makes you a better overall player.

'I think I would probably be correct in saying the guys who are good at football, good at cricket, good at basketball are probably the guys who'll come through as first team players here. .... they're aware of sport and space, of how you play and movement and I think that's the biggest challenge for young players coming up through..... The systems there to make them physically good but it's very difficult to cognitively improve them (Coach 3).

A multi sport approach was deemed to be very important for basic skill development and decision making in rugby players.

### **3.6 Conclusion**

Interpretation of the results suggest that the elite coaches interviewed support the design of developmentally appropriate rugby matches for children based on the late specialisation and deliberate play principles of the Developmental Model of Sports Participation (DMSP) (Côté, 1999; Côté, 2007) highlighted in previous reports (Wilson, 2009b; Wilson, 2009; Wilson, 2008). Essential elements identified by coaches consisted of playing modified small-sided rugby matches with unstructured and less specialised game play, and with an emphasis on fun and limited adult involvement. These recommendations are consistent with the aims of the Pilot laws and further support their adoption. Coaches also stressed the importance of playing a variety of sports at a young age.

## **4 Shaping the Game Year 2**

In the remaining sections of the report we will focus on the second year of the Shaping the Game project by looking at the Under-8 and Under-10 rules played in England during the 2011/12 season. An age-group Under-8 and Under-10 player was one whose age at midnight on 31st August was less than 8 and 10 years, respectively.

### **4.1 Research Aims**

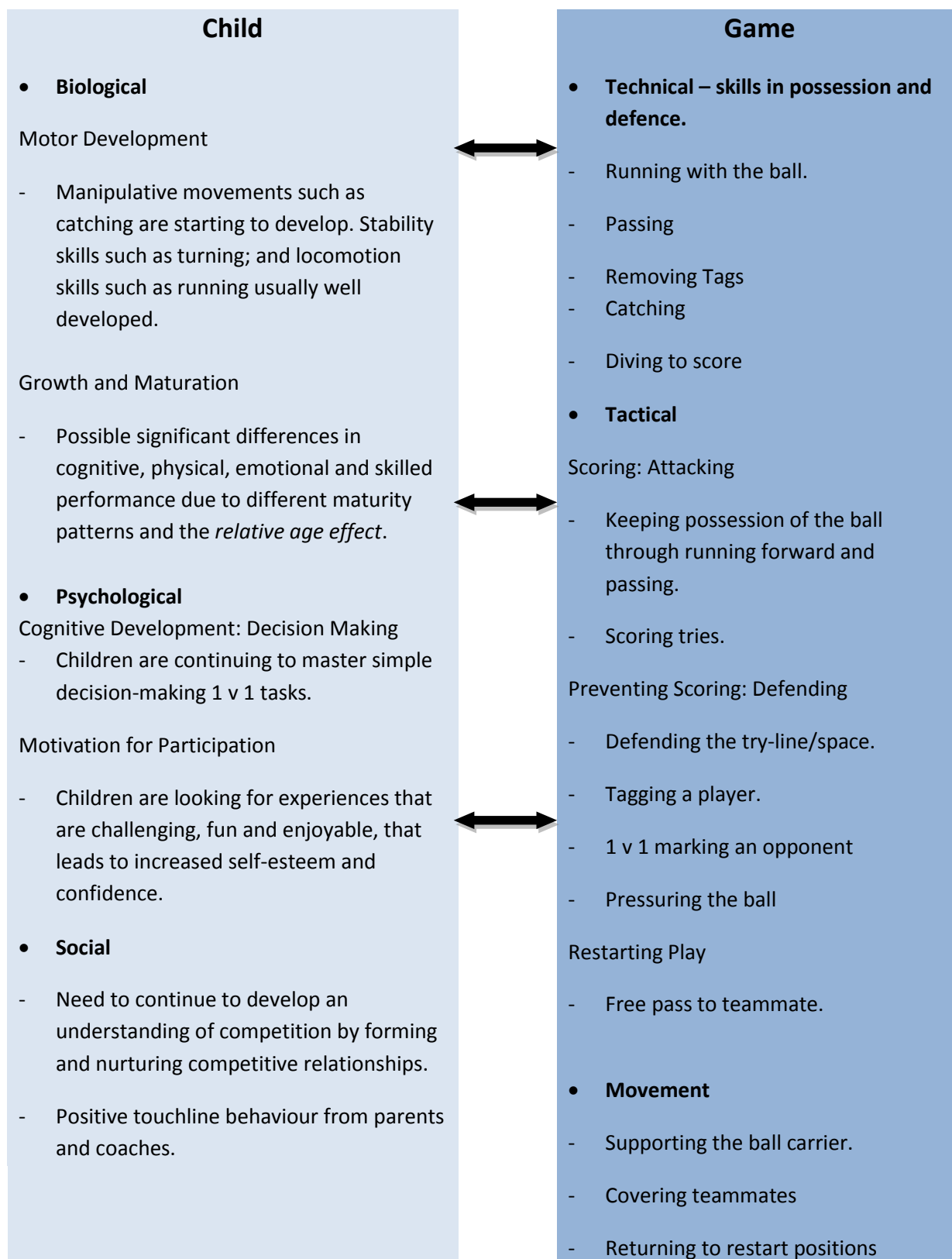
The aims of the research were:

- To evaluate and compare on-pitch behaviours between the AGR and Pilot games, at Under-8 and Under-10,
- Examine the attitudes of children who play Under-8 and Under-10 to the AGR and Pilot game.



## 5 Under-8 Rugby

### 5.1 Developmentally Appropriate Rugby Union: A Summary for Under-8



## 5.2 Under 8 – Key Rule Changes

	<b>AGR Current</b>	<b>Pilot</b>
<b>Pitch Size</b>	60m x 30m	45m x 25m
<b>Number of players</b>	7 v 7	6 v 6
<b>Coach</b>	Allowed on pitch	Not allowed on pitch
<b>Referee</b>	Referee only	Referee as coach
<b>Try scoring</b>	No going to ground	Can go to ground to score

- Smaller pitch size and one less players on each team in the pilot.
- Player can go to ground to score a try.

**Rationale:** An element of contact with the ground is introduced with players being able to go to ground to score tries. The principles of low numbers and increased involvement are maintained by increasing the number of player on each side by two.

## 5.3 Methods (U8)

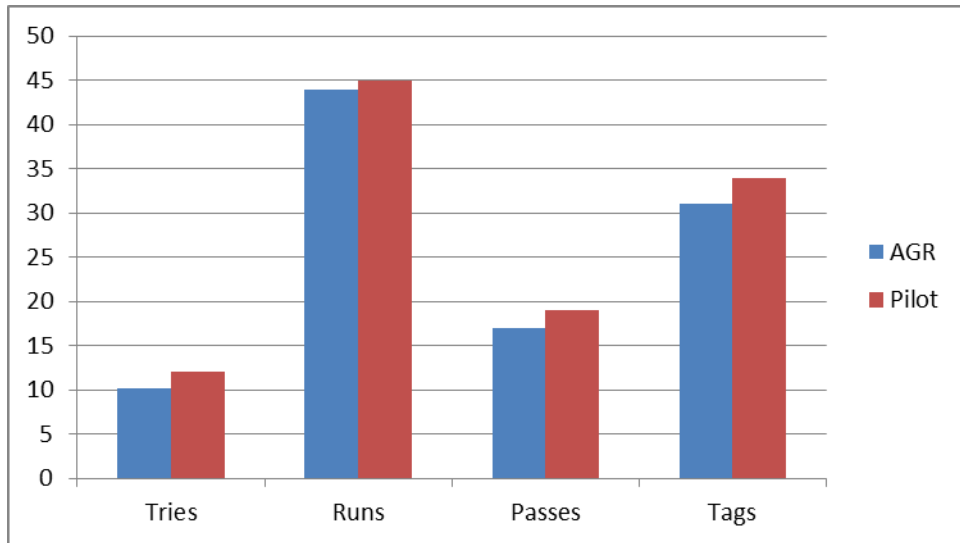
During January, March, April and May 2012, 20 pilot matches and 10 AGR matches were filmed at festivals. As total game time varied in length between matches the same procedures were used as during the first year for U7 and U9 analysis. For comparative analyses, the number of behaviours occurring in each game were standardised to a nominal, 10 minutes duration (e.g. if there were 30 passes in a 20 minute game, this would be standardised to 15 passes per 10 minutes).

The behaviours for comparison during games were identified using the Dartfish tagging system, following discussion with RFU coaches and included: the number of tries, runs, passes (restart, before tag and after tag), and tags made. Data were checked for normality and independent t-tests (Pilot vs AGR) were used to assess differences in the dependent variables of interest. Mann Whitney U comparisons were used if data failed to meet normality assumptions.

Face-to-face interviews were used to administer a six item survey (Appendix 1) to 79 players during the festival. The areas of interest were (1) the players' opinions of the game they were currently playing; (2) what they believed were the key rugby behaviours if they were designing their own games; and (3) what they interpreted as being important experiences when playing the game. These areas were identified from pilot open response surveys carried out in the first year of the study and from limited research available on how children define and interpret their personal experiences from playing informal and organised games (Coakley, 2009). Importantly, the questions allowed players to reflect not only on what they thought was important for rugby as a game, but also on what they personally enjoyed about rugby.

## 5.4 U8 Game Behaviours

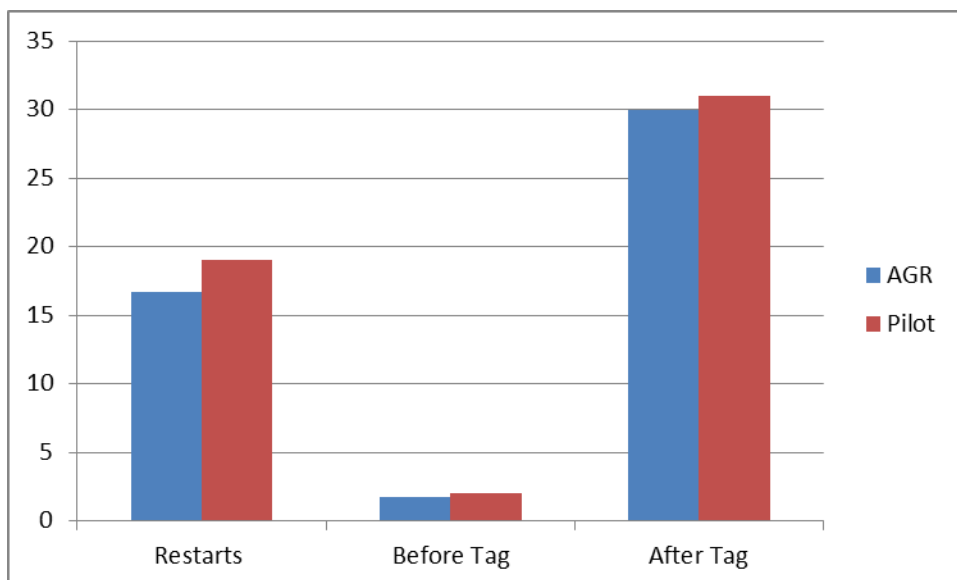
### 5.4.1 Basic Skills



There were no significant differences between the number of tries ( $p = .157$ ), runs ( $p = .621$ ), tags ( $p = .302$ ), or passes ( $p = .145$ ) in either game\*.

\*It is important to bear in mind that on every occasion there are marginally more behaviours in the pilot than the current AGR, and that these were shared between fewer players in the pilot.

### 5.4.2 Passing



There were no significant differences in the passes made after ( $p = .622$ ) or before a tag took place ( $p = .830$ ) in either game\*. However the Pilot game had 14% more passes from restart ( $t_{28} = -3.15$ ,  $p < .004$ ) than the AGR game.

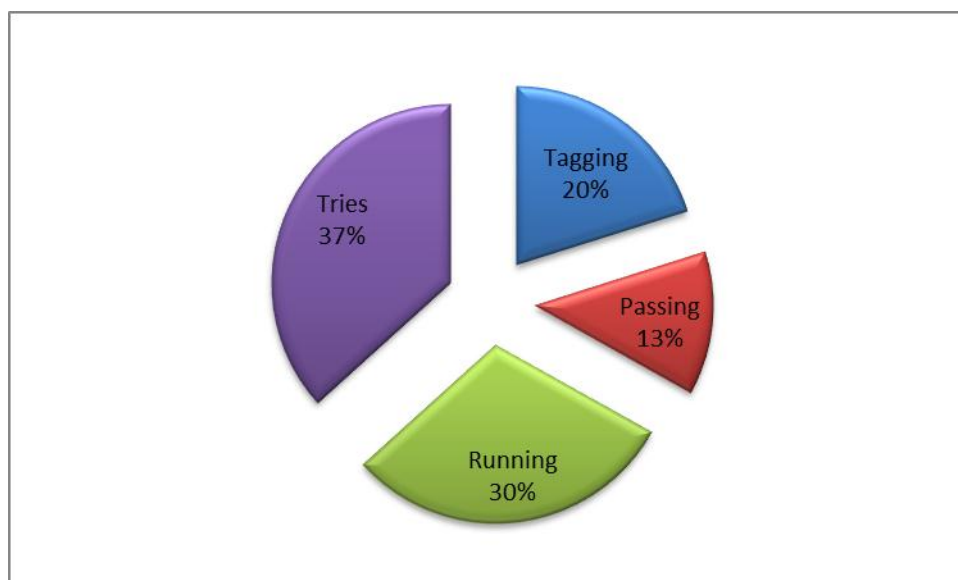
\* It is important to bear in mind that on every occasion there are marginally more passes in the pilot than the current AGR, and that these were shared between fewer players in the pilot.

## 5.5 U8 Participant questionnaire data

There were 79 U8 rugby players that took part in the survey during March and April 2012. 60 participants were from Hampshire (pilot) and 19 from Cornwall (AGR). We were unable to collect more data in Cornwall due to filming commitments on the day and the intention was to collect additional data in Cheshire but this plan fell through when the festival was cancelled due to bad weather. As a result of the limited numbers that took part in Cornwall and the similarity of the U8 pilot and AGR games we decided to combine the data for analysis. Questions 1, 3 and 5 are used in this analysis as they focus on positive aspects (e.g. Q2 is replaces enjoy with not enjoy).

### 5.5.1 Q1. What do you ENJOY the most about playing U8s rugby?

Options: tries, tagging, passing, running with the ball

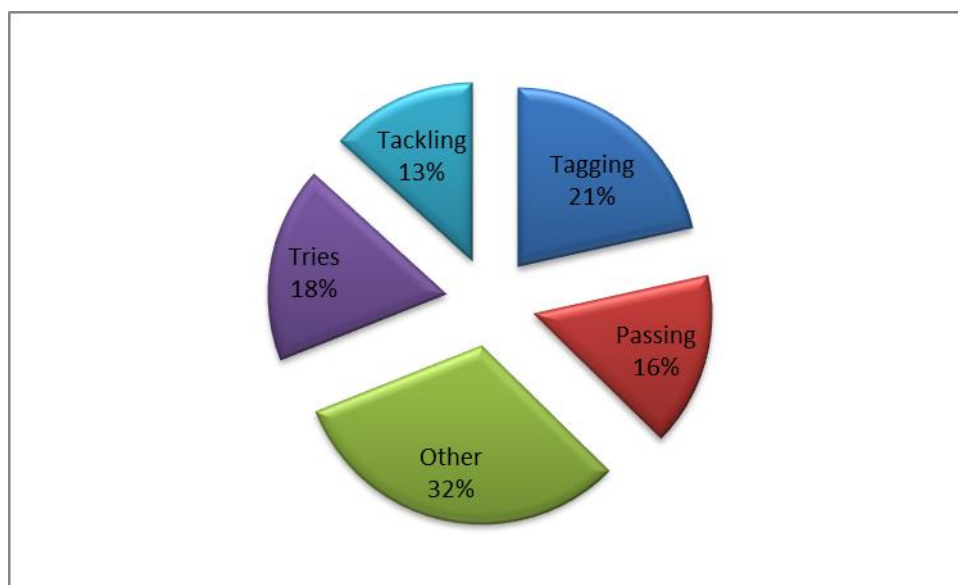


Scoring tries (37%) was ranked as being the most enjoyable element of playing U8 rugby, and along with running with the ball (30%) this represented what two thirds of players found most enjoyable about rugby.

### 5.5.2 Q3. Imagine you are creating your own U8 rugby game.

What do you think are the MOST IMPORTANT things to have in the game?

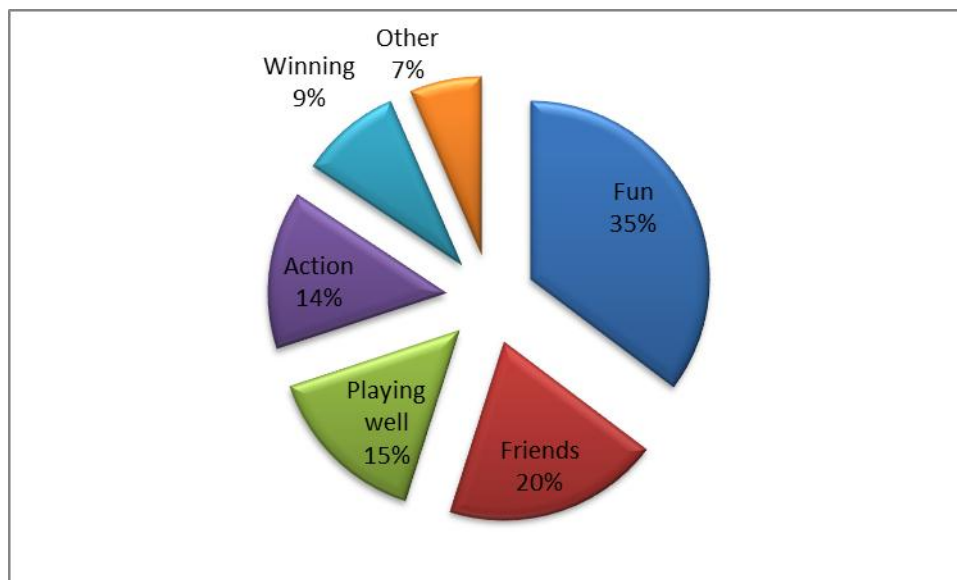
Options - Lots of: tackling, passing, running with the ball, lineouts, rucking, mauling, kicking, tries, scrums, tagging



There were a wide range of selections for the most important aspect of rugby; highlighted by the fact that one third of the selections were in the 'other' category (i.e. highest being running with the ball (12%) and line-outs next at 6%). Tagging (22%) was the most frequently reported activity, with passing second (16%). The lowest selected activities include rucking and kicking (both 4%) while mauling didn't receive a single selection.

### 5.5.3 Q5. Which of the following are the MOST IMPORTANT to you when you are playing a rugby game?

Options: Playing with friends, winning the game, being involved in the action, a close game, playing in a certain position, having fun, not being a substitute, playing well



Having fun (35%) and playing with friends (20%) rank highly in importance for U8s when playing rugby (more than half of respondents reported these aspects as being most important to *them*). The lowest selections include having a close game (3%) and not being a substitute (3%), and playing in a certain position (1%).

## 5.6 Discussion (U8)

As both Pilot and AGR games were very similar it wasn't a surprise to see that there were little differences between both games in terms of the behaviours they elicited. The only significant difference being that the Pilot game had 14% more passes from restarts ( $t_{28} = -3.15, p < .004$ ) than the AGR game.

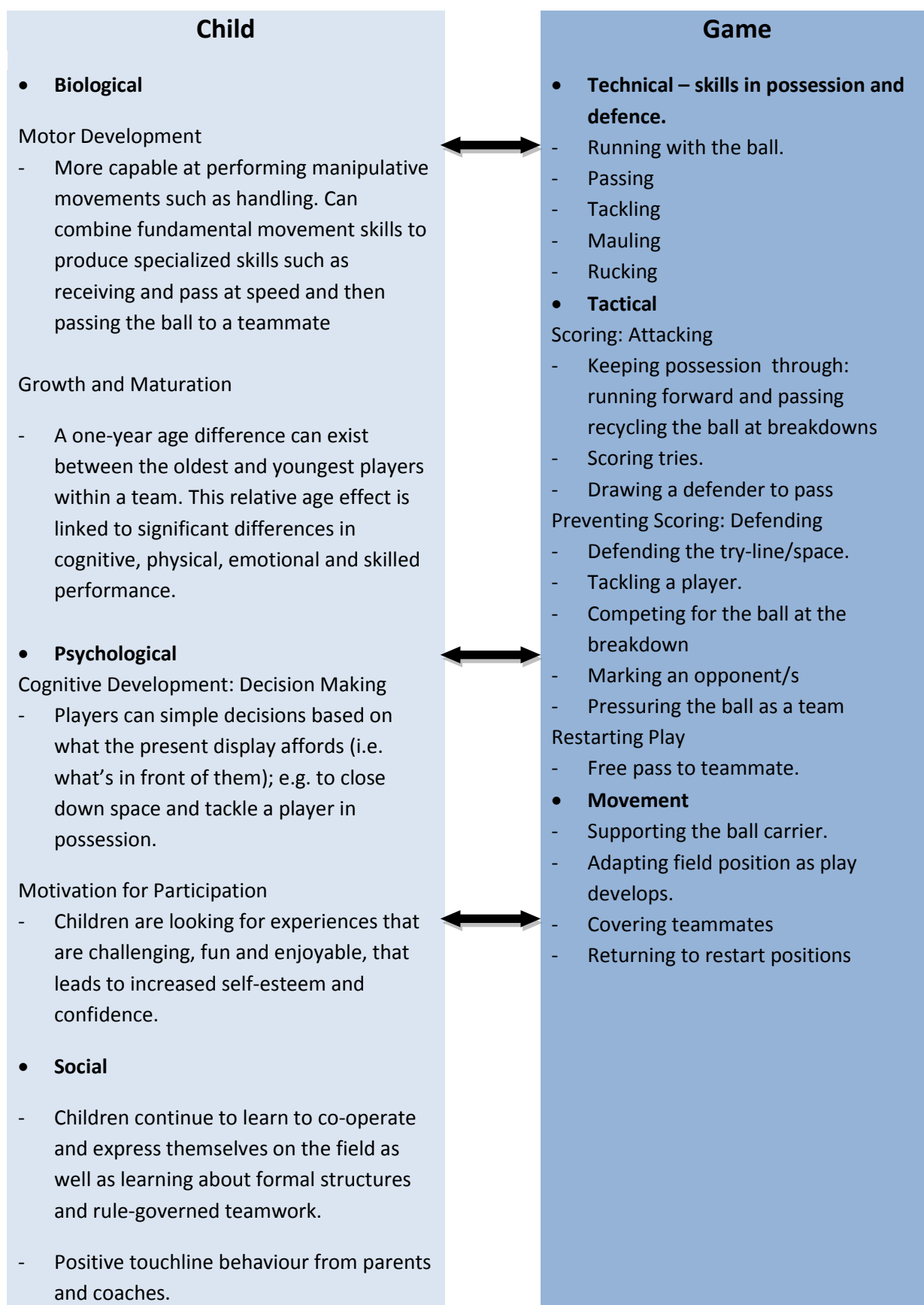
The main differences between the rules are the one less player in the Pilot game (6 v 6, instead of 7 v 7) and the coach not being allowed on the pitch during games. Simple calculations would suggest that if passes, runs, tries, tags etc. are shared between 6 players per team compared to 7 players per team, each child should actually get more opportunities for involvement in the Under-8 pilot game. However, caution should be applied when using this approach and as explained with the Under-7 analysis (last year's report), the only way to confirm the amount of individual involvement is to perform an individual analysis of each child's involvement during games. However, this is a lengthy (and hence expensive) process that has not been adopted in any of the research examining behaviours in child team sports. As explained in previous reports the reduction in the number of players on each team can increase the amount of individual possession in invasion games threefold (Rampinini et al., 2007). In order to increase inclusion and enhance skill development for all players we would suggest that a 5-a-side option would be suitable for Under-8 rugby matches (see section 7 for further details)

It is also difficult to measure the impact of not allowing the coaches on the pitch during games. From a pedagogical point of view the process shifts from the coach transmitting knowledge to receptive players (i.e. telling and showing them what to do) (Allison , 2000); to encouraging players to take an active learning role by constructing their own meaning from situations in which they are placed (Vygotsky, 1978). The expert coaches (section 3) identified that a key element in this process is for a coach to intervene at an appropriate time (e.g. half-time) and to ask effective questions. It is claimed that quality questioning can empower players to take more responsibility for problem solving and developing tactical awareness (Kidman, 2005; Launder, 2001; Mitchell, 2006).

The player feedback suggests that players enjoy scoring tries (37%) and running with the ball (30%) and both pilot versions provide plenty of opportunities to apply these skills (Tries *mean*: 10 – AGR, 12 - Pilot; Runs *mean*: 44 – AGR, 45 – Pilot). When playing a game, having fun (35%) and playing with friends (20%) ranked highest in importance. According to Bailey et al.,(2010) fun and enjoyment are complex areas and highly individualised concepts, so more detailed analysis would be required to define what constitutes fun.

## 6 Under-10 Rugby

### 6.1 Developmentally Appropriate Rugby Union: U10 Summary





## 6.2 Under 10 – Key Rule Changes

	AGR Current	Pilot
Number of players	9 v 9	8 v 8
Rucks and Mauls	Yes	Mini maul Mini ruck
Line-out	Competitive	No
Scrum	Competitive	Uncompetitive (nearest 3 players)

- In the pilot game there's one less player on each team.
- Uncompetitive scrums are introduced and there are not line-outs in the pilot.
- Competition for the ball is introduced in the pilot through the mini maul and mini ruck.

**Rationale:** A graded approach is maintained with the competition for the ball being introduced with the ball carrier, tackler and one from either side able to compete for the ball in the tackle area. The nearest three players take part in the scrum allowing individuals to gain experience of playing in different positions. The scrum also introduces a new tactical challenge for the players by creating an open side and blind side to attack and defend.

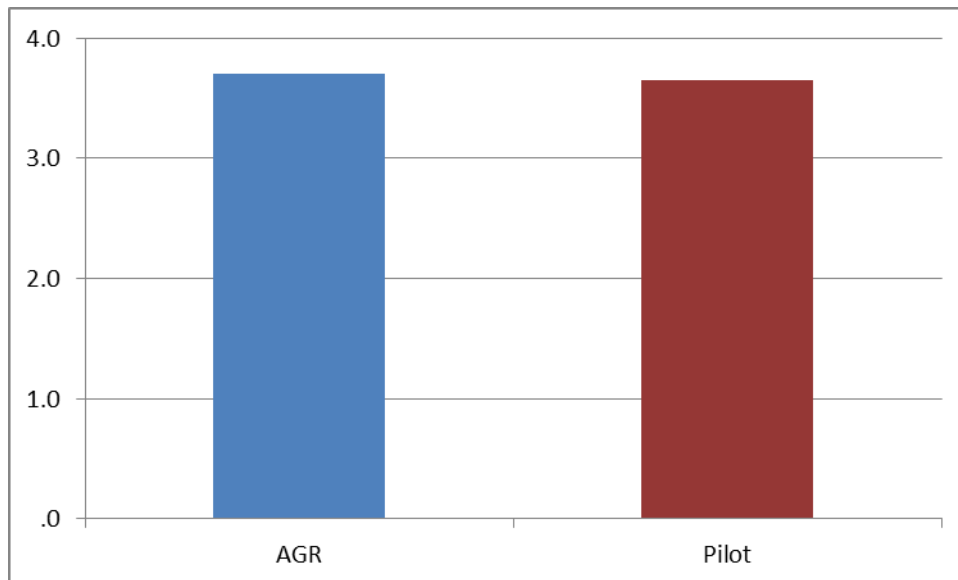
## 6.3 Methods

During January, March, April and May 2012, 20 Pilot matches and 20 AGR matches were filmed at festivals. Critical behaviours were identified using the Dartfish tagging system following discussions with RFU coaches (see Appendix 4 for definitions of behaviours). Behaviours included, the number of tries, runs and tackles (to the ground and standing); the number of passes (following restart, breakdown, set piece, open play, passes when tackled to the ground and passes in a standing tackle). The number of, scrums, rucks and mauls were recorded for both games, while lines-outs only applied to AGR matches as there were none in the Pilot game. The duration of the breakdown (i.e. rucks and mauls) were also timed, and the amount of time the ball was in play was compared between the Pilot and AGR games. As game duration varied across matches, all behaviours were standardised to a nominal 10 minute duration.

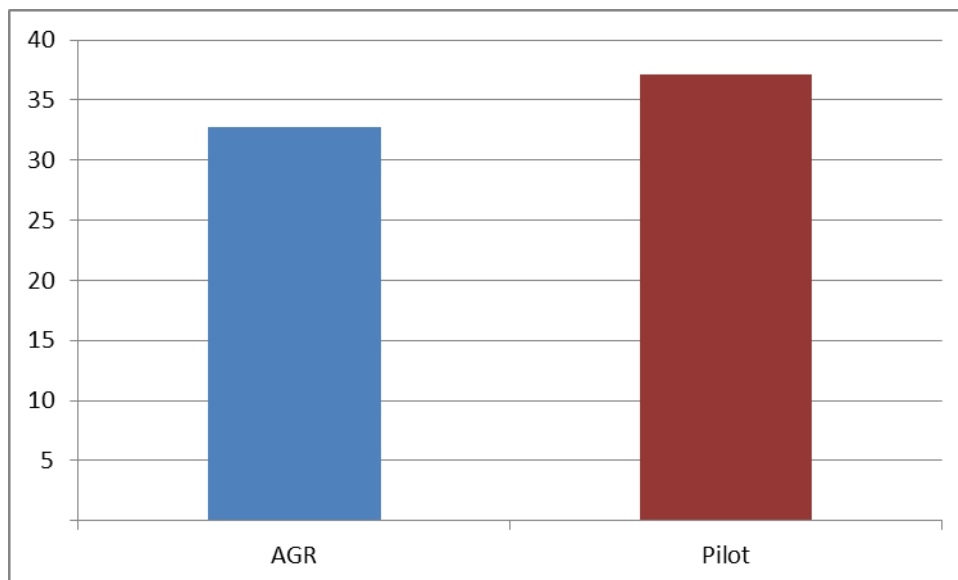
Opinions about the game of rugby were sought via a similar 6 item, multiple choice survey that was used with the Under-8 players (however for the opening pair of questions there was a Pilot and AGR version that included components relevant to the rules of that game – See Appendix 2 and 3). In total, 139 players were individually interviewed.

## 6.4 Under 10 Game Behaviours

### 6.4.1 Number of Tries scored / 10 minutes



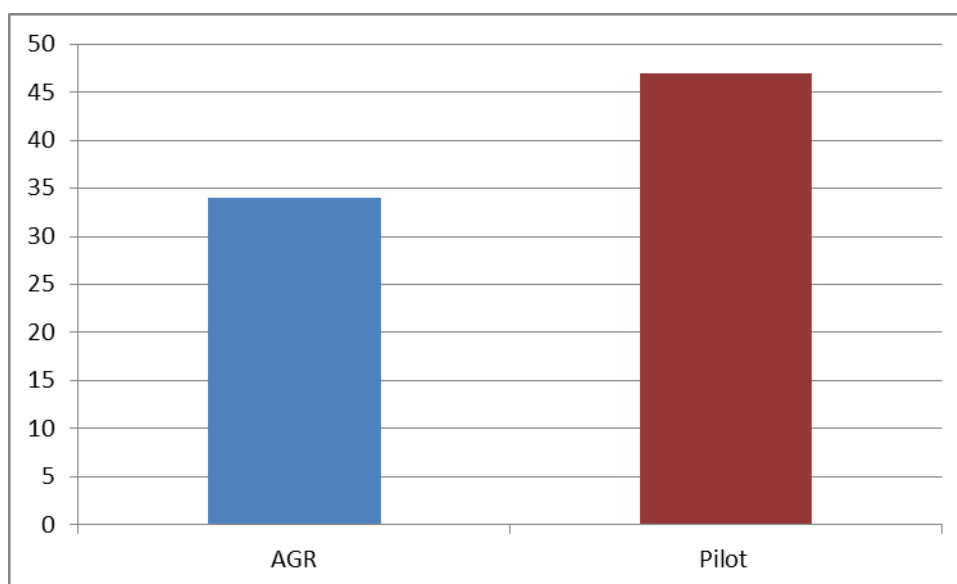
### 6.4.2 Number of Runs / 10 minutes



There were no significant differences between the number of tries ( $p = .935$ ) or runs ( $p = .085$ ) between either game (although the difference between runs in Pilot and AGR approached significance)\*.

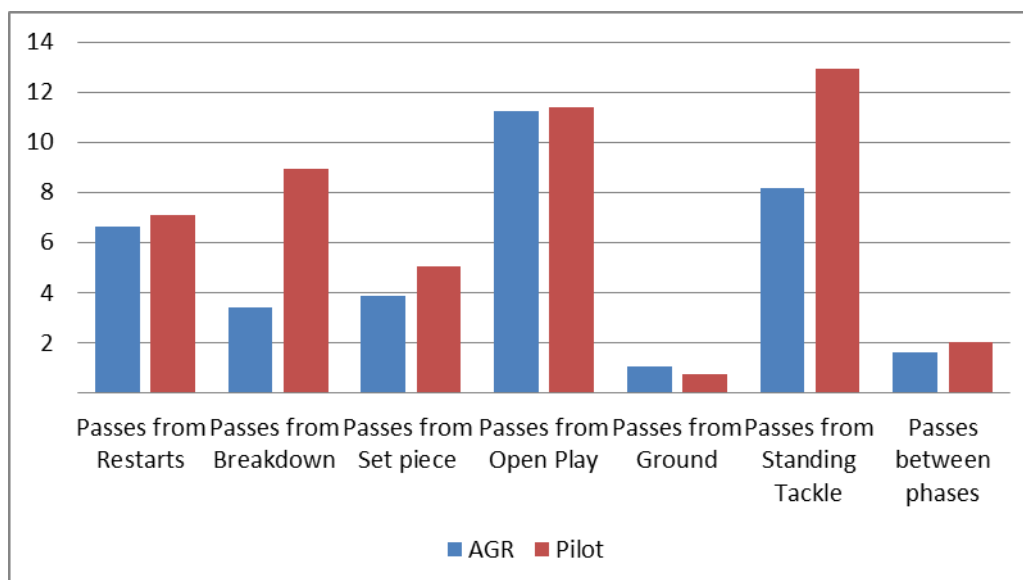
\*It is important to bear in mind that there are marginally more behaviours in the pilot than the current AGR, and that these were shared between fewer players in the pilot.

### 6.4.3 Number of Passes / 10 minutes



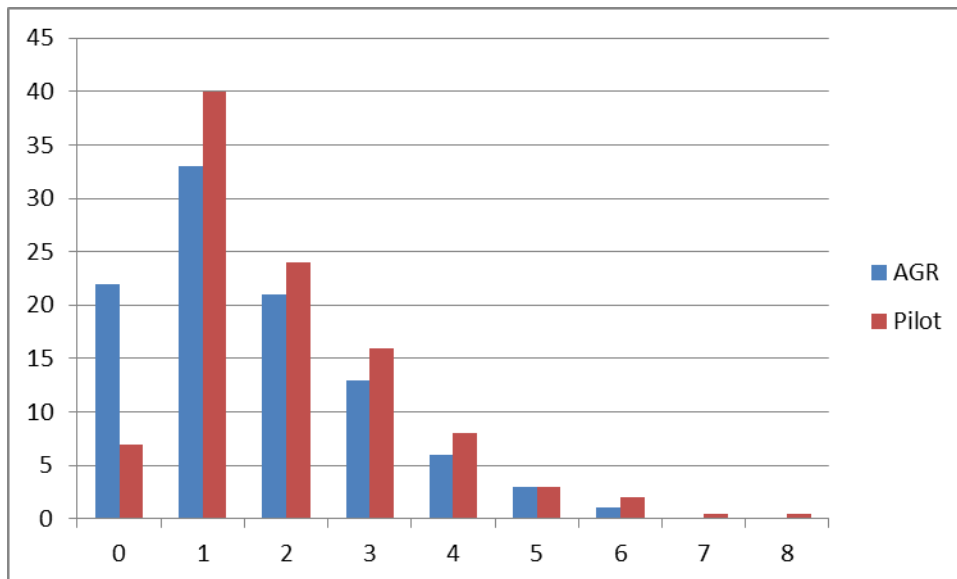
There were 13% more total passes ( $t_{38} = -3.85, p < .001$ ) in the Pilot compared to the AGR\*.

\* It is important to bear in mind that there are more passes in the pilot than the current AGR, and that these were shared between fewer players in the pilot.



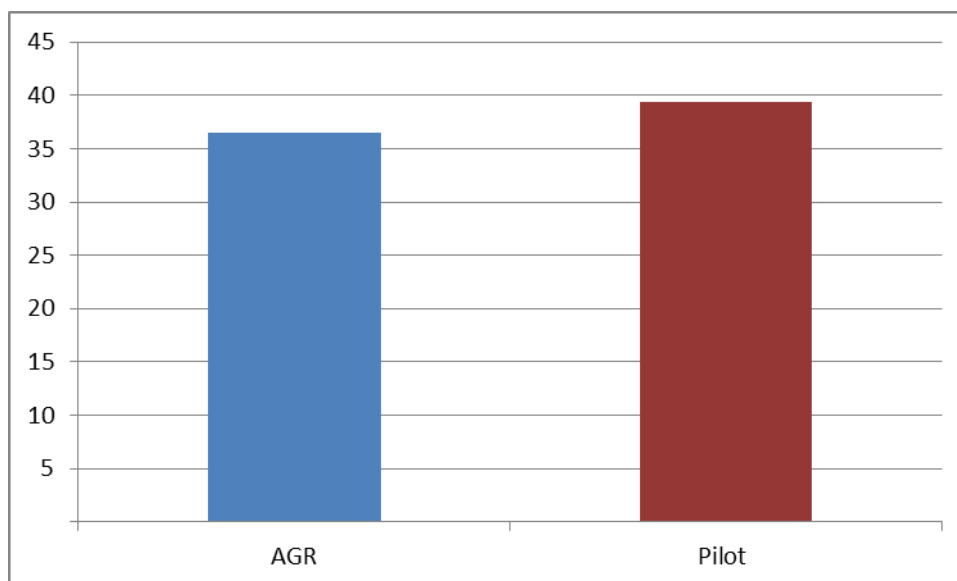
A closer examination of passes shows that the Pilot had significantly more passes from a standing tackle ( $t_{38} = -3.63, p < .001$ ), passes between phases ( $t_{38} = -2.83, p < .007$ ), and passes from breakdown ( $U = 66.0, z = -3.6, p < 0.001$ ). There were no significant differences in the other types of passes made in either game ( $t$ 's 1.40 and 0.94;  $p$ 's  $> .140$  and  $.938$ ;  $z$ 's  $= -0.72$  and  $-0.97, p$ 's  $> .341$  and  $.482$ ). [Note that Mann Whitney U test was used if the data failed to satisfy the assumption of normality].

### 6.4.3.1 Percentage of passes (total) between each phase in all matches

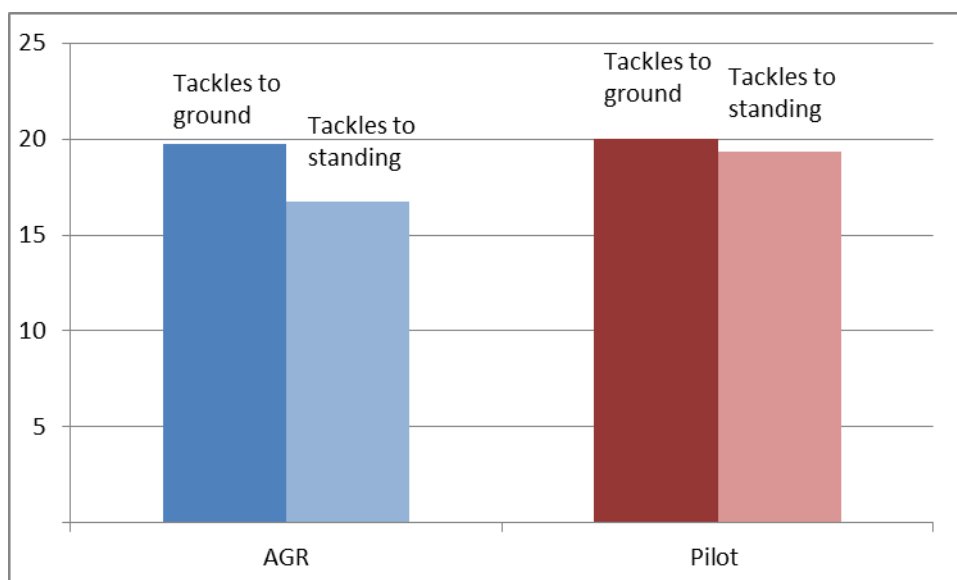


The descriptive data above provides an interesting picture of when players pass in both games. In the AGR more than half of all phases had one or fewer passes, with nearly a quarter of matches with no passes made between phases and over a third of phases with only one pass completed. It would appear that the pilot game encourages more passing between phases with a higher percentage of total passes from one per phase through to eight per phase when compared to the AGR (with the exception of 5 passes where the percentage is the same).

#### 6.4.4 Number of Tackles/10 minutes



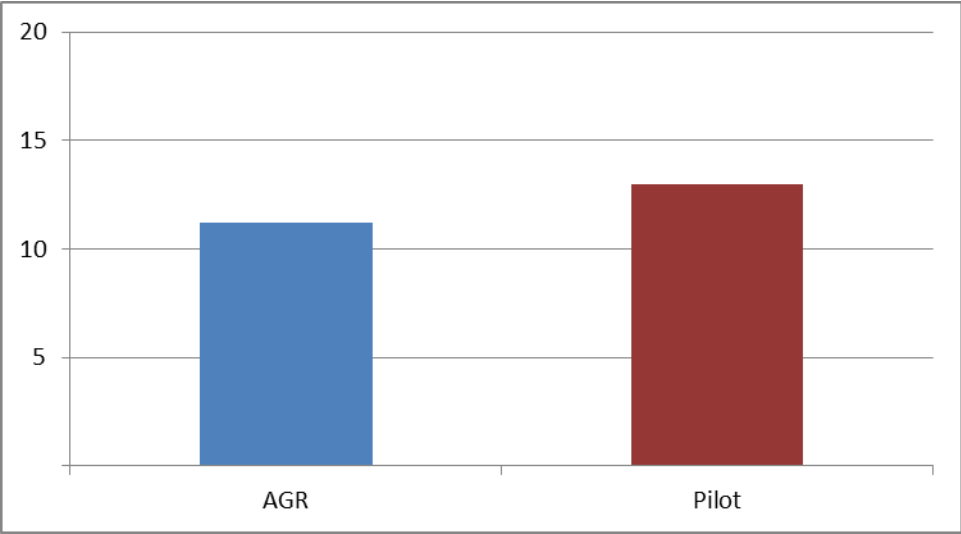
There was no significant difference in the mean total number of tackles in Pilot (median = 38.5) and AGR matches (median = 36.6) ( $U = 139.0$ ,  $z = -1.65$ ,  $p < 0.101$ ). A tackle to the ground occurs when the ball carrier is held by one or more opponents and is brought to ground (IRB, 2011). When the ball carrier is held on his feet by one or more opponents for three seconds or more a standing tackle occurs.



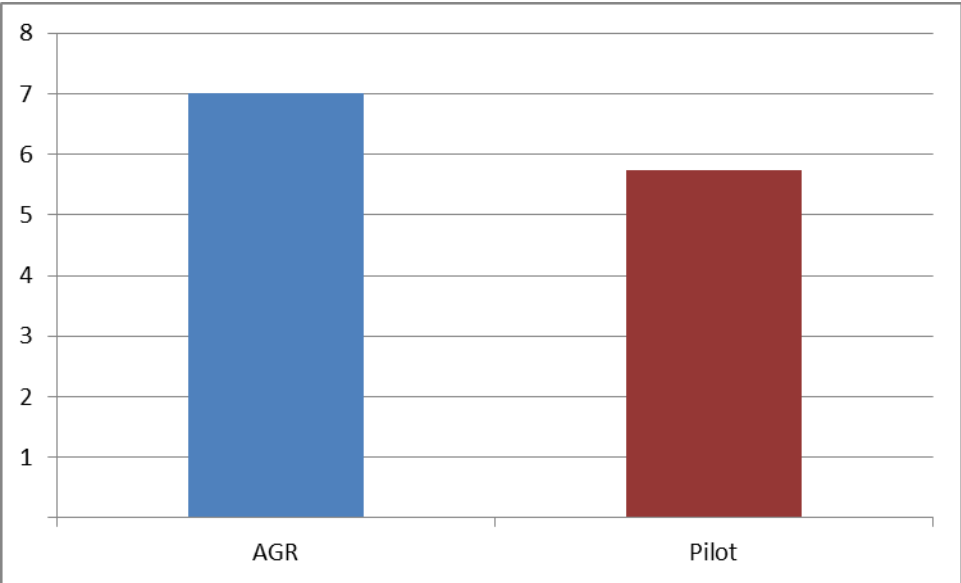
On closer inspection of the types of tackles, there were no significant differences between the tackles to the ground ( $p = .871$ ) or tackles to standing ( $p = .095$ ) between either game.

### 6.4.5 Number of breakdowns/10 minutes

#### Rucks



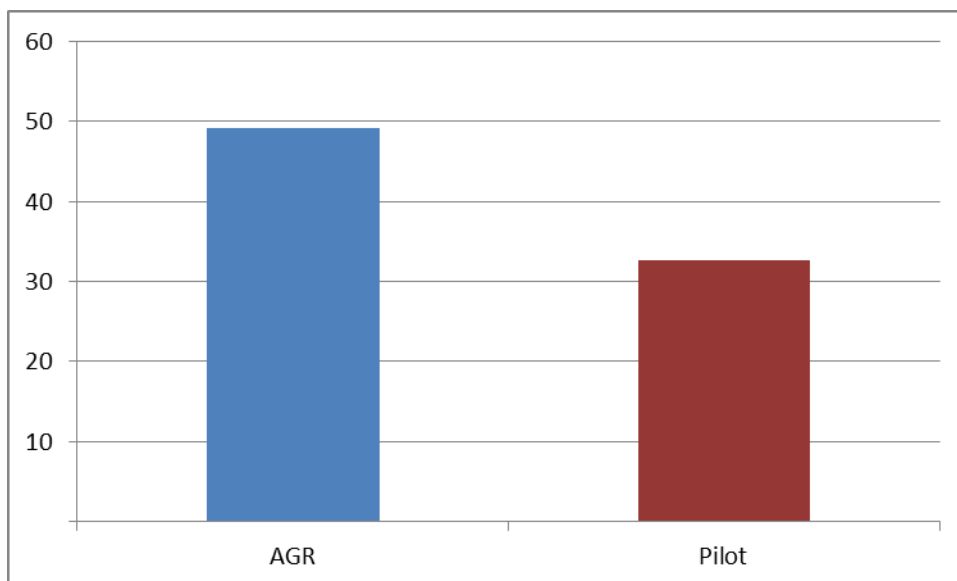
#### Mauls



There were no significant differences between the total number of rucks ( $p = .289$ ) or mauls ( $p = .130$ ) between both forms of the game.

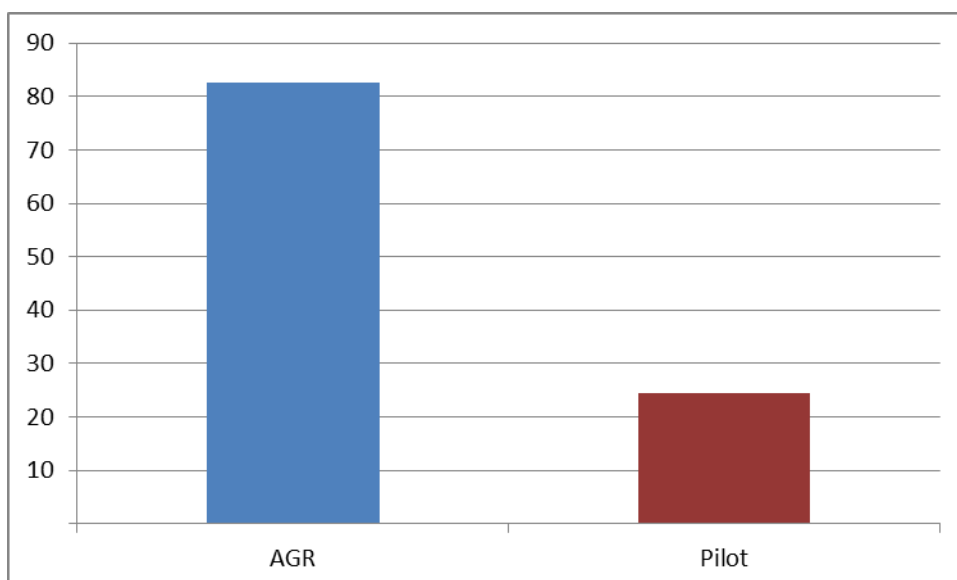
## 6.4.6 Duration of breakdowns

### 6.4.6.1 Rucks duration (seconds)



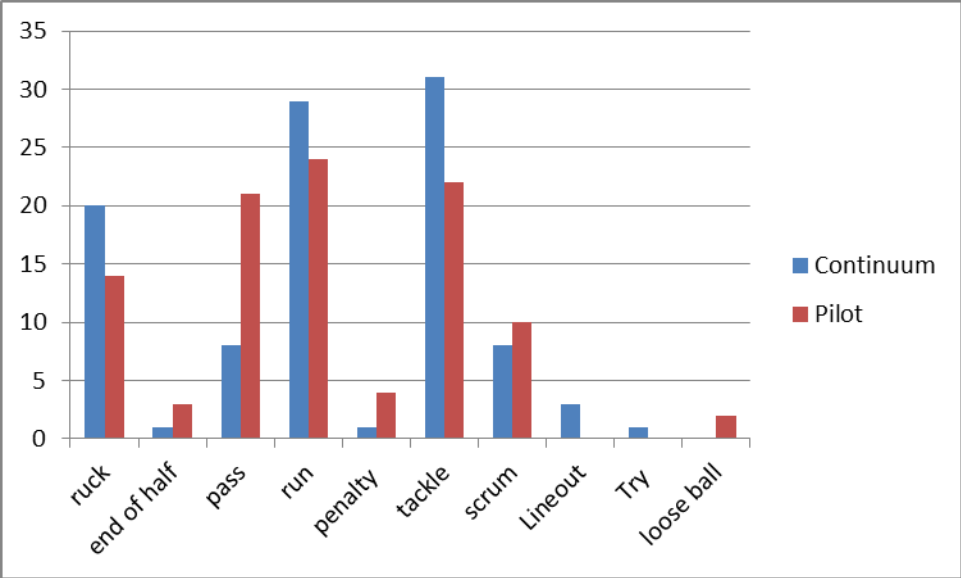
However, the total duration of all rucks ( $t_{38} = 3.14, p < .003$ ) were 33% higher in the AGR compared to the Pilot. The average time for one ruck in the AGR was 4.4 seconds and 2.5 seconds in the Pilot game.

### 6.4.6.2 Mauls duration (seconds)



The total duration of all mauls ( $U = 67.0, z = -3.6, p < 0.001$ ) were over three times higher (70%) in the AGR matches compared to the Pilot. On average one maul would last for 11.9 seconds in the AGR and 4.3 seconds in the Pilot.

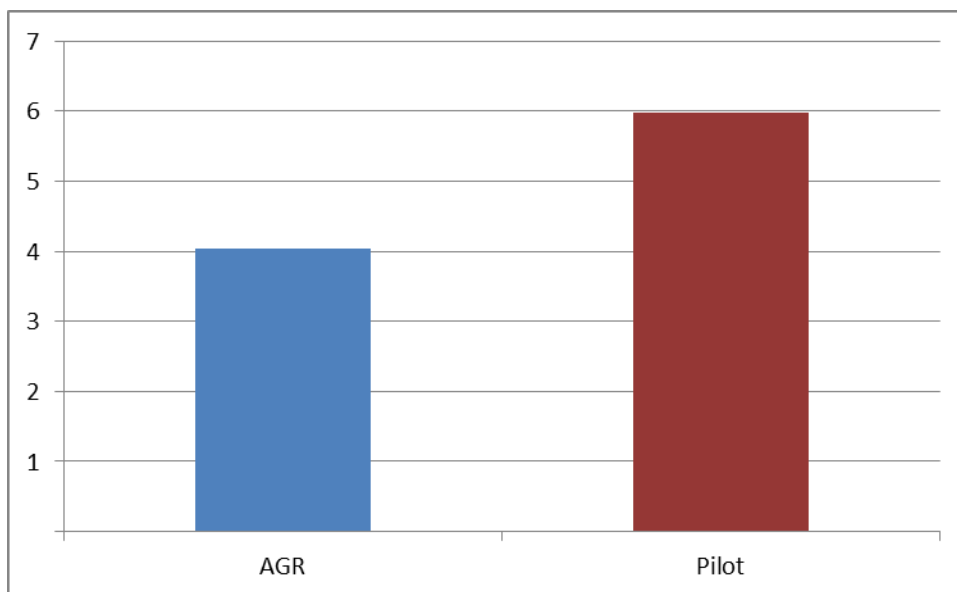
### 6.4.6.3 Subsequent actions following mauls (%)



Perhaps the most striking finding from the descriptive data of behaviours following mauls is that in over 20% occasions in the pilot a pass results, whereas this is only 8% in the AGR. This is probably due to the positive impact of implementing a law in the pilot where a pass must be made following a breakdown.

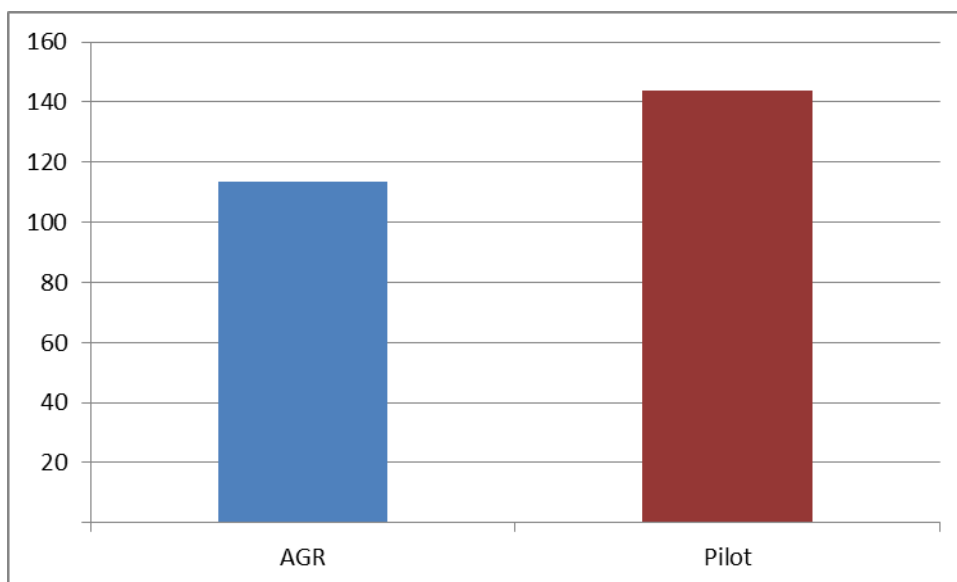


### 6.4.7 Scrums



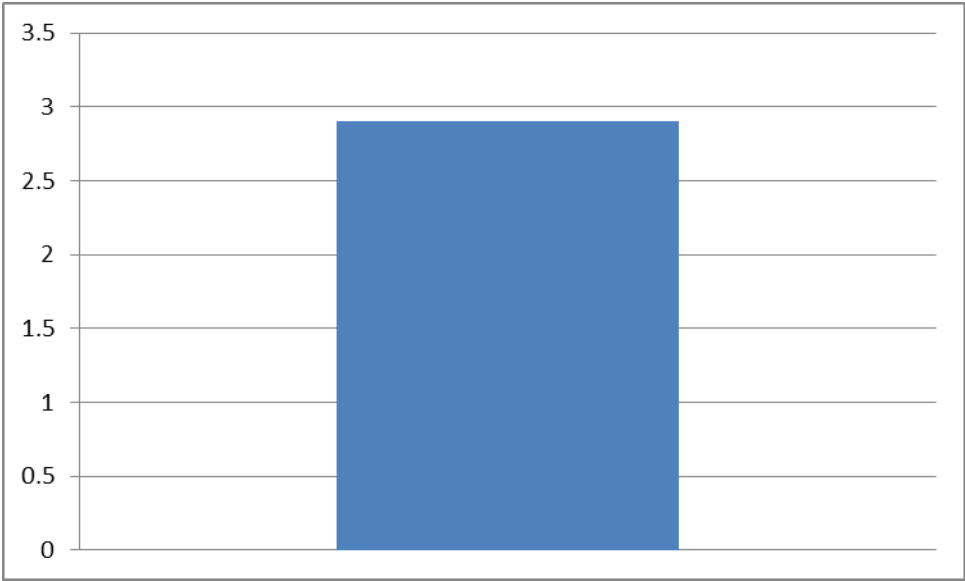
There were 32% more total scrums ( $t_{38} = -3.61, p < .001$ ) in the Pilot compared to the AGR (**Please note that the scrum replaces the line-out to restart play when the ball goes out of play in the pilot**).

#### 6.4.7.1 Scrum duration

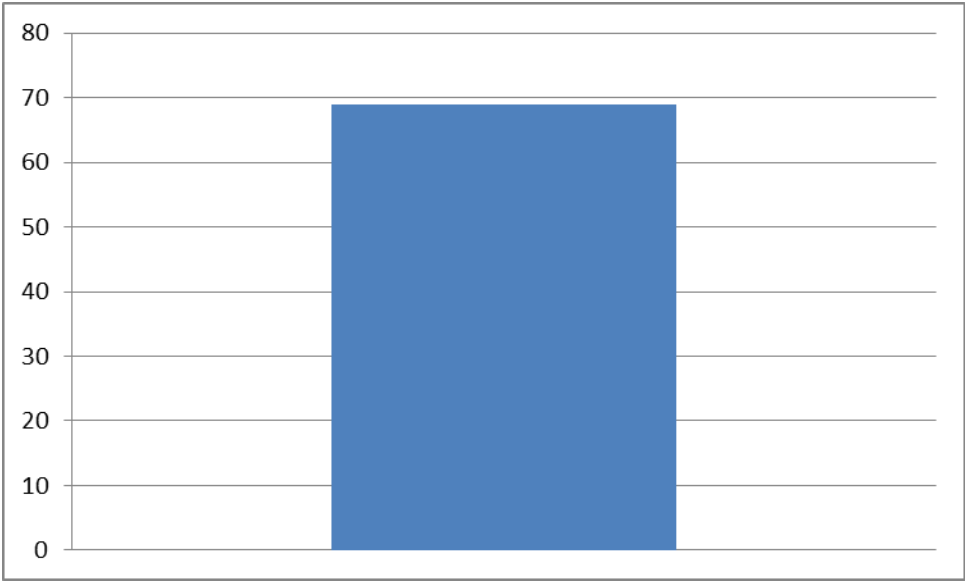


In the Pilot the total scrum duration was significantly higher ( $t_{38} = -2.05, p = .048$ ), however, as there were fewer scrums in the AGR (4), compared to the Pilot (6), the average time for a scrum was similar: AGR - 28 seconds; Pilot - 24 seconds.

**6.4.8 Number of Line-outs/10 minutes (AGR only)**

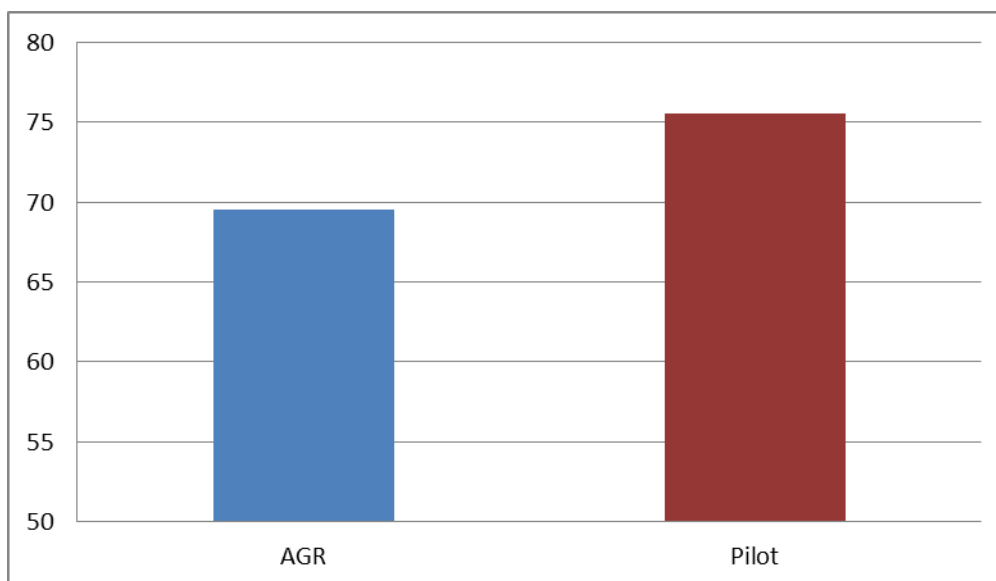


**6.4.8.1 Line-outs duration**



On average there are nearly three line-outs every ten minutes in the AGR game that take a total duration of one minute and nine seconds (69s) to complete.

#### 6.4.9 Percentage Time Ball in Play / 10 minutes

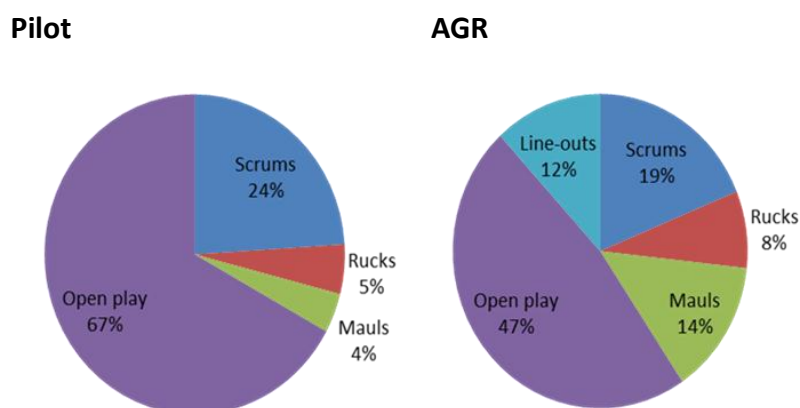


There was 9% more ball in play ( $t_{38} = -2.37, p = .023$ ) in the Pilot compared to the AGR. Ball in play time\* is the total match time\*\* minus the total duration for preparing for scrums and line-outs (i.e. from when the referee blows his whistle to award a set piece to when the ball is thrown back in to play)

\* Ball in play time does not count time in which the ball is in a ruck or maul – see below.

\*\* Total match time does not include the restart time following a try.

#### 6.4.9.1 Percentage Time Ball in Open Play / 10 minutes



The Pilot game had 20% more ball in open play when compared to the AGR (two thirds of game-time as opposed to less than half game time). The combined total duration of preparation for set-pieces and the duration of breakdowns (5 minutes 14 seconds) is more than half the nominal 10 minutes game duration in the AGR. See table 1 for more details.

**Table 1. Average number and total duration of set-pieces and breakdowns (converted to a nominal ten minute duration)**

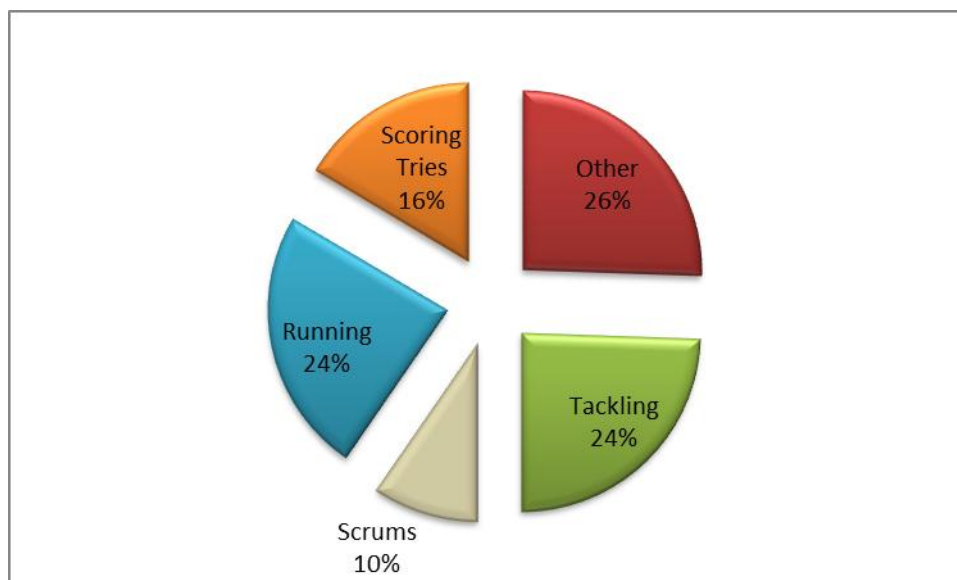
Activity	Pilot		AGR	
	Total	Total Duration	Total	Total Duration
Set-Piece	6	2m 24s	7	3m 03s
Breakdowns	19	56s	18	2m 11s
<b>Total</b>	<b>25</b>	<b>3m 20s</b>	<b>25</b>	<b>5m 14s</b>

## 6.5 U10 Participant questionnaire data

Participants consisted of 139 U10 rugby union players from pilot Constituent Body (53 Warwickshire) and one from AGR Constituent Body (86 Gloucestershire) during the 2011/12 season in England.

### 6.5.1 What do you ENJOY the most about playing U10s rugby?

#### AGR



#### Pilot

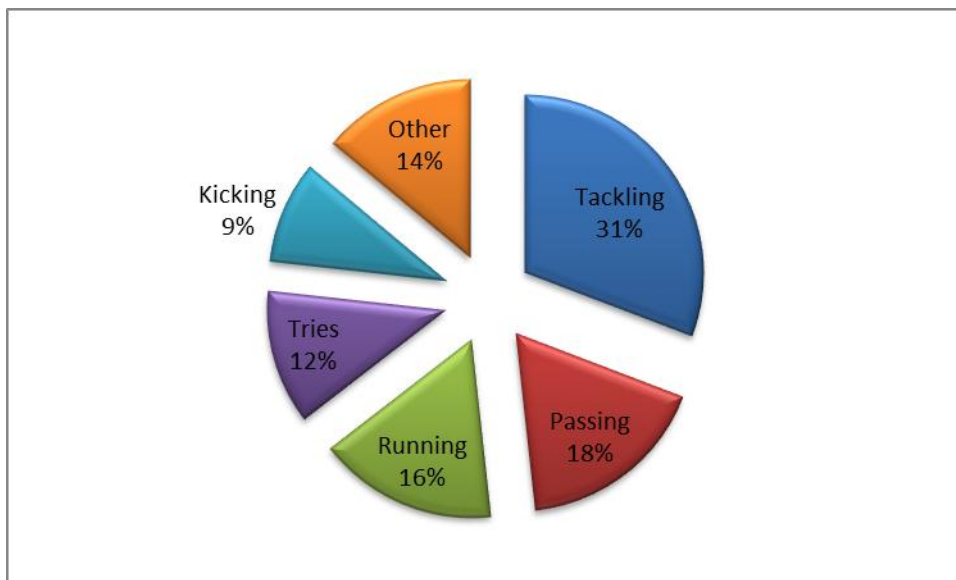


A similar pattern emerges for the highest and lowest selections in both games. Tackling (27% Pilot, AGR 24%) comes out highest and running with the ball (27% Pilot, AGR 26%) a close second. The lowest selections for the AGR players are line-outs and mauling (both 3%); with scrums (7%) and mauling (4%) receiving little support from Pilot players.

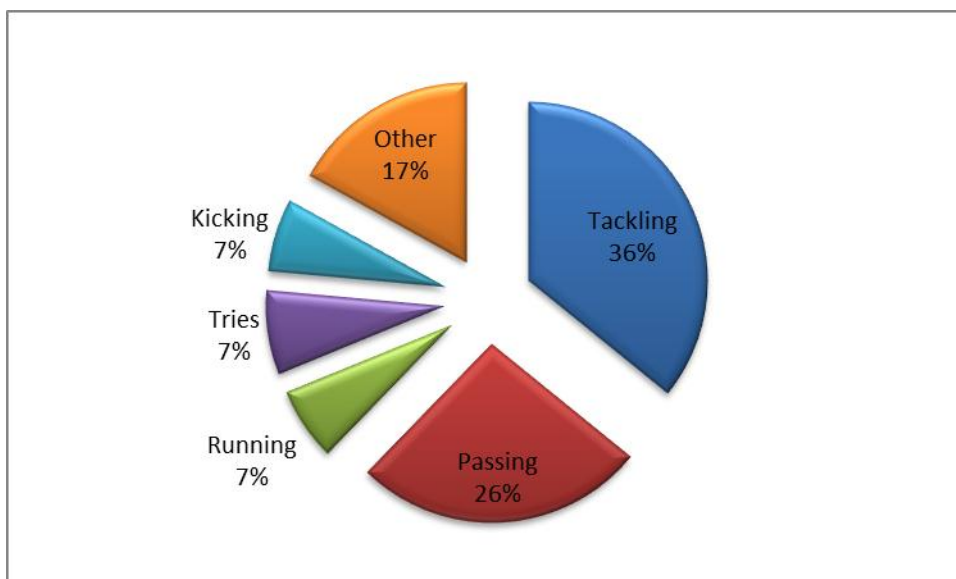
### 6.5.2 Question: Imagine you are creating your own U10 rugby game.

What do you think are the MOST IMPORTANT things to have in the game?

AGR



Pilot



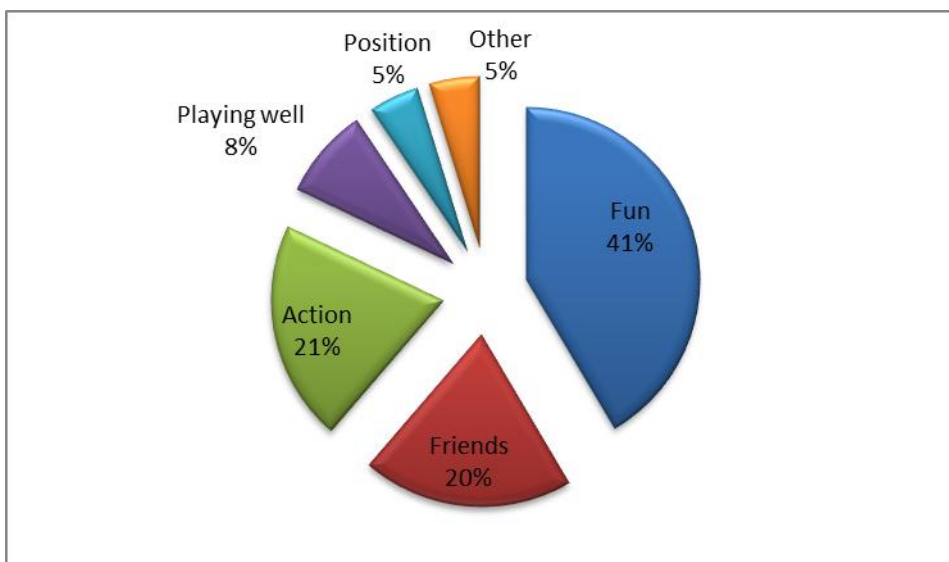
The players in both games identify tackling (27% Pilot, AGR 31%) as being the most important element to have if they were creating their own game. Set pieces have a low ranking with scrums (6% Pilot, AGR 5%) and line-outs (3% Pilot, AGR 1%) in both games having selections of less than 10%.

### 6.5.3 Which of the following are the MOST IMPORTANT to you when you are playing a rugby game?

#### AGR



#### Pilot



Having fun (Pilot 41%, AGR 32%), playing with friends (Pilot 20%, AGR 31%), and being involved in the action (Pilot 21%, AGR 16%), are selected as being the most important when playing a game of rugby for U10 players. The lowest ranked in the AGR is having a close game (1%) while not being a substitute has the same percentage in the Pilot.

## 6.6 Discussion U10

At Under-10, the introduction of competition for the ball at the tackle area and uncompetitive scrums had a significant impact on the game in a number of key areas.

In the Pilot game the ball was in open play for 20% more time when compared to the AGR. Alongside the reduced numbers on the pitch, this likely provides both positive fitness benefits for players (e.g., Hill-Haas, 2008, Rampinini et al., 2007) and more opportunities to develop tactical decision-making in attack and defence. In contrast, over half the time in the AGR game (53%) was spent preparing for scrums and lineouts, and competing for the ball that is being held within rucks and mauls. While these are important elements of the senior game, it is dubious as to whether this emphasis offers an ideal learning environment (see section 3) or is what children enjoy about rugby (section 6.5).

With the ball being more in open play in the Pilot, players should have more opportunities to develop their fundamental motor skills (e.g. see passing data [section 6.4.3]) and tactical attacking and defensive understanding (Gallahue, 2006). Furthermore, the activities identified as being enjoyable - tackling (27% Pilot, AGR 27%) and running with the ball (27% Pilot, AGR 26%) are both associated with the ball being in open play. The feedback from elite coaches also suggests that high involvement for all players and the development of fundamental skills are crucial during the mini rugby stage. These elements identified by players and expert coaches are also consistent with the deliberate play principles of the Developmental Model of Sport Participation on which the Pilot laws are based. The DMSP explains that children should be provided with an opportunity to develop fundamental motor skills, such as running, throwing and jumping, in an enjoyable environment (Baker, 2003; Côté, 2003).

The introduction of the competition for the ball at the breakdown resulted in possession being recycled at a significantly faster speed than in the AGR. The average time for one ruck in the AGR was 4.4 seconds and 2.5 seconds in the Pilot game; while a maul was nearly three times longer (11.9s) in the AGR compared to the Pilot (4.3s). The introduction of mini rucks and mini mauls resulted in a significant difference in the total amount of passes associated with these aspects of the game. At the breakdown, the players in the Pilot games completed 46% more passes from rucks and mauls and over half as many passes from standing tackles (58%) compared to the AGR. There's also a higher amount of passes between phases ( $t_{38} = -2.83$ ,  $p < .007$ ) with an average of 1.6 passes between phases in the AGR and 2 in the pilot. Although, at first glance this doesn't appear much of a difference; if there are 20 phases of play in a 10-minute period this could lead to up to ten more passes being completed between phases in the Pilot game when compared to the AGR.

Although, it is only in these types of passes that we see a significant difference, the mean for all types of other skills such as the other types of passes (restart, ground, set piece, open play), all types of tackles (standing, to ground) and runs were higher in the Pilot than the AGR. It is also interesting to note that the total amount of scrums and the total duration of all scrums in the Pilot were higher than in the AGR. There are two possible explanations for the higher amount of scrums. Firstly, a high total of scrums may be the result of a scrum replacing the line-out to restart play when the ball goes out in the pilot. On the other hand, a fast paced game with a higher amount of passes being attempted in a game could result in an increase in knock-ons. A simple solution to reduce the



amount and duration of scrums in the pilot would be to have a pass instead of a scrum when the ball goes out of play. This could be seen as an introductory step to taking a quick throw-in. We didn't analyse whether having the nearest three taking part in the scrum gave all players the opportunity to experience scrummaging during the game, however when observing some matches it was noted that some teams had decided prior to kick-off who would take part in the scrum and who would be scrum half.

## 7. Recommendations

### 7.1 Under 8: 5-a-side rugby

For Under-8, we recommend that matches should be 5-a-side in order to increase inclusion and enhance skill development for all players. This is based on the 'deliberate play' principles of DMSP, the data collected and the child development research at this age.

The reduction in the number of players on each team has been shown to increase the amount of individual possession in invasion games threefold (Rampinini, 2007). Children are often highly motivated to take part in physical activities and are more likely to enjoy smaller sided practices and games (McMorris, 2006). Therefore, it is crucial for all Under-8 players to be involved in the action during games as this period (*The specialised movement phase: 7-11 years*) has been identified as the 'skill hungry years' (Maude, 1996) where children can establish a foundation of motor skills as a basis for the future development of complex skills.

When we focus on the development of children at this age we would argue that it's not surprising to see that the current Under-8 game is characterised by lots of running, lots of tries and passes *after* being tagged, and defensive tagging. Children at this age generally are capable of twisting and dodging (stability skills); chasing, sliding and running (locomotion skills); and are only just beginning to display some skills in manipulative movements such as catching, passing and stopping (Gallahue, 2006). At Under-8 individuals have the ability to master simple decision-making 1 v 1 tasks and are starting to be able to think through a series of events or actions and, as such, understand what happened and why (McMorris, 2006).

It has been suggested that a pass limit should be introduced to encourage passing before tagging, however we believe this would be detrimental to the development of tactical understanding as it restricts the development of decision-making skills. By reducing the number of players in a team to five we believe that it would allow for increased opportunities for all players in the team to develop manipulative movements such as catching, passing and to master simple decision-making skills in an enjoyable environment.

### 7.2 Under-10: The Scrum

We believe that the **competitive scrum** is a late specialisation skill that should be introduced in junior and not mini rugby, a view that was also supported by the expert coaches. However, it is acknowledged that an **uncompetitive scrum** comprising of the nearest 3 players provides a new tactical challenge in defence and attack for players by introducing a blind side and open side.

At Under-10 it is suggested that the **uncompetitive scrum** should be retained, however we would introduce a pass instead of a scrum when the ball goes out of play. This would be an introductory

step to taking a quick throw-in, and also reduce the amount of playing time currently spent scrummaging in the pilot (see section 6). The specialised movement phase: 7-11 years is a crucial phase for laying the foundations of motor skills as a basis for the future development of complex skills, and also developing simple decision-making abilities. These changes should provide children with a playing environment where the ball is in play for a high percentage of the game that encourages experimentation and the development of key motor and decision-making skills.

We would also encourage that the 'nearest three' rule be retained for scrummaging and that the coach/ref should ensure that this rule is applied by both teams. We would strongly advise this to promote late position specialisation principles and would suggest that coaches do not advise or pre-select players to take part in the scrums. If any individual during game doesn't want to take part in the scrum we would encourage that the referee ensures that another player takes his/her place.

## **8. Acknowledgements**

The report authors would like to acknowledge the support and assistance of all members of the Shaping the Game Pilot Review Group, particularly Gary Townsend, Player Development Manager. We would also like to thank the counties of Gloucestershire, Cornwall, Warwickshire, Durham and Hampshire for their support and assistance in organizing the filming. A huge thanks to everyone at the following clubs Penryn RFC, Leamington RFC, Romsey RFC, Darlington Mowden Park, Dursley RFC, Andover RFC, Leamington RFC and Darlington RFC who allowed us to film and conduct questionnaires at their festivals. Thanks to all the rugby players who took part in the study and the following University of Exeter students who assisted with data collection: Josh Tipping, Alistair McQueen, Luke Pearson, Gina Reinge, Ian Reinge, Brendan Gilson, Joshua Gibson, Jonathan Finn, Daniel Wainwright, Mike Hislop and Brett Richmond. We would like to thank Prof Tim Coles for brokering the ESRC funding, in partnership with the RFU, which funds the CASE studentship and supports the research project, and Mike England, RFU Community Rugby Medical Director who was responsible for initiating the partnership between the RFU and Exeter University.

## Appendix C Guide for Interview with Elite Coaches

Subjects	Issues	Questions
<b>Introductory Questions</b>	Coaching Background/career Highlights/low points Coaching role Coaching philosophy	Tell me where you are currently coaching? Who else? What is your main coaching achievements? Have you coached at mini rugby level? Tell me about..? What's your coaching philosophy?
<b>Mini-rugby games</b>	<p><b>Current Player development</b></p> <p><b>Understanding of the game</b> Technical, Tactical &amp; Movement. Developmentally appropriate games for mini rugby. Key for player development</p> <p>- <i>Tactical.</i> <i>Decision making.</i> - <i>Skills/Technique.</i> Fundamental movement skills e.g. Passing, dodging etc. Complex movements: <i>Running and passing.</i></p> <p><b>Understanding of the child</b> - Child Development: Biological, Psychological &amp; Social. - The attractiveness of the game for children and what puts them off. - <i>Social.</i> Age start playing Competition. Enjoyment.</p> <p><b>Game structure (Top down or bottom up)</b> <i>Duration.</i> <i>Pitch size.</i> <i>No of players.</i> <i>Tackling.</i> <i>Rucks and mauls.</i> <i>Scrum &amp; line-outs.</i> <i>Offside-line.</i> <i>Kicking &amp; conversions.</i> <i>Playing positions.</i></p> <p><b>Rules of the games.</b> <i>Complex or simple?</i> <i>Refereeing.</i></p> <p><b>Role of Coaches</b> During matches.</p>	<p>- What type of player is the current system producing at senior level? Why? - What type of player do you think the system should be developing? - How important is mini rugby in this process?</p> <p>- In your opinion what are the key qualities we should be focusing on when introducing children to rugby?</p> <p>- Tell me what you believe is important for children to learn when playing rugby at a young age?</p> <p>- Skills/Technical - Tactical - Movement - Personal/social development</p> <p>- At what age would you start playing competitive games? Why? - Should these games be based on competition (i.e winner/loser, tournaments)? Why? - How important is enjoyment?</p> <p>- How would you structure the game at mini rugby level? (Relate this to answer to starting age – work up from there). Let's look specifically at the structure of the game for each age group.</p> <p>What would you include at...</p> <p>When would you introduce....? (e.g. contact)</p> <p>Are referees needed at this age? Tell me what you think of the idea of the referee coaching the children during games?</p> <p>What is the role of the coach during games?</p>

		<p>Should coaches be allowed on the field? Are coaches needed during games?</p> <p>What do you think attracts children to playing rugby union? What puts them off? How do we retain players?</p>
<b>Opinion of current mini rugby games</b>	<p><b>Current player development situation</b> Understanding of the current mini rugby structure. Opinions of the current structure. Effectiveness of the current structure.</p>	<p>How familiar are you with the current game at mini rugby level? (If not show the rules) Tell me what do you think of introducing tackle etc at U9?</p>
<b>Opinion of pilot games</b>		<p>Have you seen the pilot rules? (If not show the rules)</p>
<b>Concluding Questions</b>	<p>Future of rugby. Debriefing: Anything I've forgotten Mention main points learnt from the interview. Feedback on comments?</p>	<p>Do you have anything more to say before we finish the interview?</p>

## Appendix D Definitions of behaviours for U9 match analysis

<b>ATTACKING</b>	<b>DESCRIPTION</b>
Try	When an attacking player is first to ground the ball in the opponents' in-goal, a try is scored (IRB, 2011).
Runs	A run with the ball 3 steps in any direction: to pass, to score a try, into touch, or tackled
<b>PASSES</b>	
Restarts	Pass following a try, penalty. + In pilot game: Instead of scrum or lineout
Breakdown	Continuum: pass following rucks and mauls Pilot: Pass from the ground following a player being tackled to ground and placing the ball
Set piece	Pass following a lineout or scrum (continuum only)
Open Play	(pass before contact)
Player tackled to ground	Immediate pass by player on the ground following a tackle
Player in a standing tackle	(Off load – pass from a player tackled on his feet or falling to the ground during a tackle
<b>BREAKDOWN</b>	
Rucks	A ruck is a phase of play where one or more players from each team, who are on their feet, in physical contact, close around the ball on the ground. Open play has ended. (IRB, 2011: 98)
Mauls	A maul begins when a player carrying the ball is held by one or more opponents, and one or more of the ball carrier's team mates bind on the ball carrier. A maul therefore consists, when it begins, of at least three players, all on their feet; the ball carrier and one player from each team. (IRB, 2011: 103)
<b>SET PIECES</b>	
Lineouts	The purpose of the lineout is to restart play, quickly, safely and fairly, after the ball has gone into touch, with a throw-in between two lines of players (IRB, 2011: 122).
Scrum	A scrum is formed in the field of play when eight players from each team, bound together in three rows for each team, close up with their opponents so that the heads of the front rows are interlocked. This creates a tunnel into which a scrum half throws in the ball so that front row players can compete for possession by hooking the ball with either of their feet (IRB, 2011: 134).
<b>DEFENDING</b>	
Tackles to the ground	A tackle occurs when the ball carrier is held by one or more opponents and is brought to ground. A ball carrier who is not held is not a tackled player and a tackle has not taken place. (IRB, 2011)
Standing Tackle	A standing tackle occurs when the ball carrier is held on his feet by one or more opponents (3 seconds) Pilot held by one person: held for 3 sec.
<b>TIME</b>	
Duration of a match	Match time lasts as long as decided by the referee, minus time lost due to injuries or replacements (e.g. Total time of 11 minutes minus 2 minutes of injuries and replacement = 9 minutes match time)
Ball in Play	Match time minus the total of restart, scrum and lineout time.
<i>Time lost</i>	
Injuries	From when referee stop the play due to an injury to when the referee restarts play.
Replacement and substitution of players	From when referee stop the play to allow a substitution to when the referee restarts play.
Restart Time	Ball in play stops the moment the try is scored. It starts again at the restart.
Scrum	From when ref blows whistle to stop the game to award the lineout to when balls thrown in.
Lineout	From when ref blows whistle stop the game to award the scrum to when the balls is put in.

## Appendix E U9 Coaches Survey

### YOUR COACHING EXPERIENCE

1. Have you coached U7 or U9 mini rugby during the 2010/11 season?  
 Yes (go to Q2)       No (Please do not complete this questionnaire)
2. Have you coached U7 mini rugby during the 2010/11 season?  
 Yes (go to Q3)     No (go to Q21 – coached U9 only)

### SHAPING THE U9 GAME – WHAT DO YOU THINK?

3. Have you coached U9 mini rugby during the 2010/11 season?  
 Yes (go to Q22)     No (go to Q40 – coached U7 only)
4. Ideally, how many players should be on each team in an Under-9 game? (Tick one only)  
 3v3       4v4       5v5       6v6       7v7  
 8v8       10 v 10       13 v 13       15 v 15
5. What attracts children to playing U9 mini rugby? Please rank the two most important reasons. (Indicating the Most Important and the Next Most Important)

 Excellent exercise for children

 Playing with friends

 Rugby is an exciting game

 Family interested in rugby

 Opportunity to be a member of a team

 Emulate their idols

6. Please rate the following features for U9 rugby matches.

(Please tick one box on each line)

	Very Important	Important	Insignificant	Negligible
Rucking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coaching on the pitch during games.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scrum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All players having lots of touches of the ball.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kicking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Successful tackles made by everyone	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High number of passes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mauls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Off loading	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lines-out	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Why would children **NOT WANT TO** play U9 mini rugby? Please rank what you think are the **two** most important reasons from the following statements. (Indicating the Most Important and the Next Most Important)

<input type="checkbox"/> Fear of getting hurt	<input type="checkbox"/> Playing during the winter
<input type="checkbox"/> Friends not interested in rugby	<input type="checkbox"/> Never touching the ball during games
<input type="checkbox"/> Prefer football	<input type="checkbox"/> Parents not interested in rugby
<input type="checkbox"/> Afraid of looking foolish	<input type="checkbox"/> Interested in doing other activities

8. Please respond to the following statements about U9 rugby matches:  
(Tick one box for each row)

	<b>Disagree Strongly</b>	<b>Disagree</b>	<b>Agree</b>	<b>Agree Strongly</b>
A coach should referee games.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Children's enjoyment is important	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lines-out aren't needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Too many stoppages spoil the game.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lots of passing is crucial for player development.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mauling is important.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Playing positions are needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A grab below the arm pits should be allowed as a tackle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Children need to scrummage at this age.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rucking isn't needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





### COMPARING THE U9 PILOT WITH THE U9 CONTINUUM

*This section should only be completed by coaches who have coached using **both** sets of pilot rules and continuum rules in their 'career'.*

16. Please respond to **one** of these statements only:

- The U9 pilot game is a better game than the U9 continuum game.
- Both the U9 pilot and U9 continuum are equal games of rugby.
- The U9 continuum game is a better game than the U9 pilot game.

17. Please respond to the following statements: (Tick **one** box for each row)

	Disagree Strongly	Disagree	Agree	Agree Strongly
There's more flow to a game without scrums.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Players enjoy the <b>continuum</b> game more.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nine in a team is too many.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kids tackle better in the <b>continuum</b> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lines-out give structure to the game.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All players have more touches of the ball in the <b>pilot</b> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There's less passing in the <b>continuum</b> .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mauling slows down the game.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The <b>pilot</b> game is similar to rugby league.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Rucking gives the defence a chance to win possession.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Please respond to one of these statements only:

- The pilot game should replace the continuum game at U9 in England
- The pilot game should continue alongside the continuum game.
- The continuum game should continue and the pilot game should not replace it

### SOME QUESTIONS ABOUT YOU

19. What is your gender?

- Male
- Female

20. What is your age?

- 17 and under
- 18-24
- 25-34
- 35-44
- 45 - 54
- 55 - 64
- 65+

21. How many seasons in total have you coached Mini Rugby (U7 to U11)? \_\_\_\_\_

22. Which age range(s) did you coach during the 2010/11 season? (Please tick all that apply)

- U7 Pilot
- U7 Continuum
- U8
- U9 Pilot
- U9 Continuum
- U10
- U11

23. How many seasons in total have you coached at U9? \_\_\_\_\_

24. What's the highest level you've coached? (Tick one)

- Mini rugby (U7 - U11)
- Juniors rugby (U12- U16)
- Youth/Colts rugby
- Senior rugby
- Professional rugby
- International

25. Why did you start coaching at mini rugby level?

- Child playing in the team
- Something to do after I retired as a player.



## Appendix F U9 Players Survey

<b>Shaping the Game U9 Player Questionnaire</b>
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<b>IMAGINE YOU ARE CREATING YOUR OWN U9 RUGBY GAME</b>
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1. What do you think are the **MOST IMPORTANT** things to have in the game? (choose 2)

- |                          |                               |                          |                  |
|--------------------------|-------------------------------|--------------------------|------------------|
| <input type="checkbox"/> | Lots of tackling              | <input type="checkbox"/> | Lots of passing  |
| <input type="checkbox"/> | Lots of running with the ball | <input type="checkbox"/> | Lots of lineouts |
| <input type="checkbox"/> | Lots of rucking               | <input type="checkbox"/> | Lots of mauling  |
| <input type="checkbox"/> | Lots of kicking               | <input type="checkbox"/> | Lots of tries    |
| <input type="checkbox"/> | Lots of scrums                |                          |                  |

2. What do you think are the **LEAST IMPORTANT** things to have in the game? (choose 2)

- |                          |                  |                          |                               |
|--------------------------|------------------|--------------------------|-------------------------------|
| <input type="checkbox"/> | Lots of Passing  | <input type="checkbox"/> | Lots of tackling              |
| <input type="checkbox"/> | Lots of lineouts | <input type="checkbox"/> | Lots of running with the ball |
| <input type="checkbox"/> | Lots of mauling  | <input type="checkbox"/> | Lots of rucking               |
| <input type="checkbox"/> | Lots of tries    | <input type="checkbox"/> | Lots of kicking               |
|                          |                  | <input type="checkbox"/> | Lots of scrums                |

## PLAYING THE GAME

3. Which of the following are the **MOST IMPORTANT** to you when you are playing a rugby game? (choose 2)

<input type="checkbox"/> Playing with friends	<input type="checkbox"/> Winning the game
<input type="checkbox"/> Being involved in the action	<input type="checkbox"/> A close game
<input type="checkbox"/> Playing in a certain position	<input type="checkbox"/> Having fun
<input type="checkbox"/> Not being a substitute	<input type="checkbox"/> Playing well

4. Which of the following are the **LEAST IMPORTANT** to you when you are playing a rugby game? (choose 2)

<input type="checkbox"/> Winning the game	<input type="checkbox"/> Playing with friends
<input type="checkbox"/> A close game	<input type="checkbox"/> Being involved in the action
<input type="checkbox"/> Having fun	<input type="checkbox"/> Playing in a certain position
<input type="checkbox"/> Playing well	<input type="checkbox"/> Not being a substitute

## INFORMATION

Festival:

Date:        /        /12



<b>Festival:</b>	
<b>Age Group:</b>	<b>Date</b>

**How much did you enjoy the game?**

<b>0</b>	<b>10</b>
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**What one thing did you enjoy the most?**

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**What one thing did you dislike the most?**

---

<b>Team</b>	<b>vs.</b>	
<b>Game</b>		<input type="text"/>