Perceptions of players, coaches, and parents on a scaled tennis equipment program

Karl M. Davies

Submitted in partial fulfilment of the requirements for the degree

of

DOCTOR PHILOSOPHIAE

In

HUMAN MOVEMENT SCIENCE

in the

Faculty of Humanities

Department of Sport and Leisure Studies

University of Pretoria

South Africa

Promoter: Doctor J.G.U. van Wyk

March 2018

DEDICATION

This doctoral thesis is dedicated to my family, who have provided me with unconditional support in pursuit of my educational goals. The completion of this investigation is also dedicated to the many friends and colleagues that have helped me along the way without hesitation. Their assistance has kept me motivated, engaged, and focused on attaining this doctoral degree.

DECLARATIONS

I, Karl M. Davies, herewith declare that the language of this research report has been South African English edited in the APA style by Prof. Darlene A Kluka.

_____

Karl M. Davies

_____

Date

I, the undersigned, declare that this thesis is my original work and has not been previously used in full or in part at any other university for degree purposes.

_____

Karl M. Davies

_____

Date

ACKNOWLEDGEMENTS

Those in the Department of Sport and Leisure Studies at the University of Pretoria have provided me with excellent support and an opportunity to reach my doctoral goal: Professors Lourens Human, Anneliese Goslin, Ben Steyn, and Doctor Gerrie van Wyk. Prof Darlene Kluka provided welcomed support as well.

Much like what transpired in my Master thesis work, there have been tennis colleagues who I also consider to be good friends assisting me, in this arduous venture of completing a doctoral thesis. On every occasion that I have called upon them, they have been unwavering in their willingness to assist. Through the process of completing this thesis, there has been a few highs and lows as in anything of this significant undertaking. My friends have always been very supportive and made sure I kept the completion in sight.

Dr. Tim Buszard, an expert in the field of scaling equipment, proved to be very helpful. He provided advice in the initial stages of this thesis. Drs. Miguel Crespo and Machar Reid, without any doubt have been rocks of support. I felt that I could call upon them at any point. This assistance provided me with renewed confidence, they are two of the most significant minds in the tennis world.

I would be remiss without thanking my USTA colleagues. Drs. Paul Lubbers and Larry Lauer have provided support and numerous resources for me to reach my goal. Dr. Lauer has shown enormous passion for my research, as has the others mentioned above. Kent Kinnear and Geoff Russell, USTA Talent Identification and Development Department, provided me with the opportunity to use Early Development Camps as an excellent data collection opportunity.

This thesis has been a life-changing experience, and I am so glad that I challenged myself in this way. It has provided me with many different experiences and advanced me as a person. I cannot forget the amount of information that I have obtained from reading the hundreds of scientific articles, from trying to get the latest and most updated information

to share with the readers of my thesis. It seems that every December I have done the lion's share of the work to complete this thesis. I am looking forward to this year when I will be able to rest and enjoy the festive season. Because of the journey, while completing this thesis, I believe I am a better person for my family and friends.

Finally, I would like to relay my most profound gratitude to my supervisor, Dr. Gerrie van Wyk, while occasionally questioning my resolve as a Doctoral student, hung with me and pushed me over the line.

Karl M. Davies

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

SUMMARY

Candidate: Karl Martin Davies

Degree: D. Phil (Human Movement Science)

Title of Thesis: Perceptions of players, coaches, and parents on a scaled tennis equipment program

Promoter: Dr. J. G. U. van Wyk (University of Pretoria)

Scaling of equipment has been adopted by sporting codes to facilitate young children attaining early success in playing the sport and has recently been adopted by tennis. The underlying theory behind scaling of sporting equipment demonstrates that adult-sized equipment and rules should not be passed on to young players. The reason behind this is because from a growth, development, and maturation point of view they do not have that skill level to be able to manipulate those constraints to achieve success.

Tennis skill acquisition requires the ability of the player to observe conditions and compute answers in the environment, with the task, and dependent upon the opponent. If those conditions are too complicated, young players can become very frustrated due to lack of success. The scaling of tennis equipment has been under-investigated. Over the past decade, however, more interest has been shown. To date, researchers (Farrow & Reid, 2010; Guggenheimer & Larson, 2013; Buszard, Farrow, Reid & Masters, 2014; Kachel, Buszard & Reid, 2014) have found that the use of scaled tennis equipment improves skilled acquisition, increased implicit learning, improved forehand performance, increased enjoyment, and longer play at the net for elite junior players.

In 2007, the International Tennis Federation launched its *Play and Stay campaign*. The purpose of the campaign was to create more awareness worldwide of scaled tennis equipment programming. Under the campaign, a program termed *Tennis 10s* was promoted that provided increased understanding to tennis providers involving the development of a pathway for beginner players. A traffic light analogy was presented that had three stages of red, orange, and green. Each stage includes different constraints of court, racquet, and ball starting with smaller courts, lighter and shorter racquets, and

larger balls. As players improve their playing competence, the court becomes larger, racquets become longer, and the ball becomes smaller. Once players are competent in the last stage (green), they then move on to play with non-scaled tennis equipment. The overall goal of the campaign was to attract and retain more young children in the sport.

The campaign was not well received by all countries worldwide, particularly those where it was a new construct. Some countries (Belgium, Germany, and France) had already been using scaled tennis equipment in their programming, but with limited success. The resulting issue involved the successful education of the tennis providers and benefits of the use of scaled tennis equipment and its use in junior tennis programs. This has, to date, not been resolved.

The three primary stakeholders of a scaled tennis equipment program are players, players' parent(s), and coaches of the players. The reason for identifying these three groups as significant stakeholders is based on the perspective that they live and breathe scaled tennis equipment programs daily. The three groups of stakeholders have consistent production of rich data that provide additional validity to this investigation.

To better understand the perceptions of all three groups of stakeholders relative to scaled tennis equipment, a qualitative research design was employed. A set number of questions were designed for each group. Players were asked four questions; parents were asked seven, and coaches were asked nine.

To obtain and secure the best appropriate data to analyse, 22 red, 21 orange, and 20 green players (n = 63) were interviewed, and responses recorded. The parent sample included 10 red, 10 orange, and 10 green (n = 30). Ten coaches were interviewed (n = 10). By sampling feedback from each stage colour, the most updated and pertinent data were obtained to facilitate the best analysis. Once the interview was complete, the investigator replayed the interview to make sure it was (1) appropriately recorded, and (2) all comments were understood. Then each interview was transcribed and analysed. ATLAS.ti (Scientific Software Development, 2017) software was used to identify

common themes through a coding system. These common themes were identified for each stage colour for parents and players. An executive summary was then provided of each of the stakeholders giving an overall account of their perceptions of a scaled tennis equipment program.

Players' perceptions of scaled tennis equipment included the following: (1) they liked to play the game of tennis with their coach; (2) they wanted to play the game when playing with friends and family; and (3) they liked scaled racquets, balls, and courts as they made it easier to hit the ball. For parents, they: (1) perceived scaled tennis equipment to be designed for their children; (2) effective transition between the stages promoted success; and (3) using scaled tennis equipment developed confidence, fun, engagement, and success. Coaches' perceptions were (1) using coaching approaches of cooperative style, constraints based approach, changing activities and demonstration of activities. They liked to use a (2) use the same approaches as non-scaled tennis equipment; and (3) better connection of skill development with competition and more team play.

Through the questions asked to the parents and the coaches even though the exact question was not asked voluntarily, suggestions were given on how to improve a scaled tennis equipment program.

For the parents, they suggested making sure that they were using the right sized racquet. They also would like to make sure the player to coach ratio did not increase too high as that would affect the level of engagement. Lastly, the parents would like more education on the benefits and reasons behind scaled tennis equipment programming.

From the coaches' perspective, they thought it was best to use a teaching methodology of cooperative style. The coaches also suggested that for competition using scaled tennis equipment that they use team competition.

Considering research of this nature has not been done before, and through the course of doing this research, a few ideas on what future research could entail. Through the parent

and coaches sampling a consistent message was provided that when players move through the scaled tennis equipment stages that it be done from a skill development point of view and not according to age. More guidance from a technical, tactical, mental, and physical point of view is needed to guide stakeholders on when from a skill development point of view this transition in each stage is accomplished. Parents made mentioned collectively that the player to coach ratio was a big determining factor when it came the level of engagement of their child in the coaching session. More research could be done on according to the stage of a scaled tennis equipment program what is the appropriate player to coach ratio. Coaches mentioned in their feedback to their questions that more team competition was needed for players using scaled tennis equipment. Research that looks at the competitive formats, amount of play, duration of competition that is more appropriate to a player of each stage of a scaled tennis equipment program. Players starting to play and learn the game have a wide-ranging number of profiles both youth and adult. If the scaled tennis equipment is successful for 10-and-under players should it not also be successful for a player wanting to start the game of tennis 11-years-and older. Research could potentially look at how the racquets, balls, and the court could be best suited to an individual that would have more growth and development characteristics compared to a 10-and-under aged person.

National Tennis Federations around the world have created stages before the first red stage. They have done this to target younger children in the 3-5 years range. Should this not be an adoption worldwide and if so does this make scientific sense, more research in this area is needed. Lastly, a more in-depth engagement is required with the tennis equipment manufacturers in making sure the equipment being designed for young children are of the right specifications in achieving that success.

Key Words: scaled tennis equipment, Play and Stay campaign, benefits of using scaled tennis equipment, players, parents, coaches, scaled tennis equipment program, success, stages of scaled tennis equipment program.

CHAPTER 1:
ORIENTATION, PROBLEM STATEMENT, AIM AND OBJECTIVES, AND RESEARCH METHODOLOGY OF THE STUDY

1.1 ORIENTATION

Over the past several years, scaling of equipment in sports such as basketball and soccer has also made its way to tennis. Scaling of equipment looks at adapting the fully scaled adult sports versions, emulating the growth and development of children (Guggenheimer & Larson, 2013).

Scaling of equipment in tennis is an under-investigated area of research until recently. Researchers (Farrow & Reid, 2010; Guggenheimer & Larson, 2013; Kachel, Buszard, & Reid, 2014; Buszard, Farrow, Reid, & Masters, 2014) have begun to consider the importance of adapting tennis equipment to varying needs of children. The following areas have proven the benefits of scaled tennis equipment: Hammond and Smith (2006) investigated the transfer of learning of youth using scaled and standard tennis equipment. Farrow and Reid (2010) noticed that when children used scaled tennis equipment compared to adult-sized tennis equipment, their enjoyment and success rate increased. Guggenheimer and Larson (2013) proved that the use of scaled equipment was effective in the forehand tennis stroke. Buszard et al., (2014) explored specifications of balls, racquets, and court requirements for the three scaled tennis equipment stages. Kachel et al., (2014) found there was increased rally speed, lower strike height on groundstrokes, and more play at the net of elite junior tennis players.

No researchers to date, however, have not delved into the perceptions of tennis players of each stage of a scaled tennis equipment program. A young beginning tennis player who enters the first stage of a scaled tennis equipment program can, through improved play,

transition from the first stage to the second stage, and then on to the final stage. Once a player has reached the last stage of scaled tennis equipment program, the player can play with non-scaled tennis equipment. This investigation has used a different approach by exploring the perceptions of the players, coaches, and parents involving the three stages of a scaled tennis equipment program.

The use of scaled equipment has taken much of a roller coaster ride throughout the tennis world. Much criticism has come from coaches feeling that the method previously followed by using non-scaled tennis equipment was effective both from participation and performance points of view. Coaches who have adopted scaled equipment with their tennis players in training, due to their lack of experience or knowledge, seem to be unaware of what competencies are needed or what is involved for a player to be successful in each stage.

The International Tennis Federation (ITF) mandates the use of balls with 25% (red), 50% (orange), and 75% (green) compression among players aged 5-8, 8-10, and 9-10, respectively (Farrow & Reid, 2010). If further insight could be provided that may guide coaches, parents, and national tennis federations as to how tennis players can achieve success in each stage, more efficient player development programs can be modelled and be used by tennis stakeholder groups. This investigation explored and identified additional insight according to the perceptions of players, parents, and coaches on how a tennis player is successful within each stage of a scaled tennis equipment training program.

From the growing concerns of the physical capabilities and demands imposed on children by adults in sport, the need to scale equipment and modify games was first introduced in the 1970s (Winter, 1980). Combined with a focus upon competition and, especially upon winning, rather than skill acquisition and fun, sport organization leaders realized this accounted for the increasing proportion of children dropping out of a sport before reaching adolescence (Australian Sports Commission, 1991). Interestingly, modified games and scaled equipment were then encouraged in school sport programs (Winter,

1980). According to the constraints-led approach to skill learning, the environment, the task, and the performer act together to coordinated and appropriate motor performance (Davids, Button, & Bennett, 2008). Consequently, by scaling equipment, task constraints are changed. Equipment scaling can then confine a learner's movement pattern to advance skill acquisition.

The modifications that have been made through racquet technology over the past decade have increased the speed of the game of tennis dramatically, forcing beginning players to require individual skill sets from the onset to play the game. The use of scaled tennis equipment has resulted in a lower ball speed due to the short racquets limiting the leverage and lower compression balls that are absorbed more by the racquet on contact (Guggenheimer & Larson, 2013). Previous research conducted by Mehta and Pallis (2001) using adults revealed that using tennis balls of different sizes and types influenced the speed of play (Mehta & Pallis, 2001). When the ball received by tennis players is slower, it allows the player to identify the speed, movement, and spin of the ball more efficiently. The findings of adults using lower compression balls can also be applied to children. Children should not start playing tennis with fast-moving balls, as their impact zone on groundstrokes becomes too high and, therefore, detrimental to the biomechanics of each stroke (Barrell, 2008). It should also be noted that children's visual systems are not adult-like until around the ages of 10-11 (Kluka, 1999). Because of this gradual growth, ball speed recognition can be limited.

Modified equipment in tennis, including low compression balls, light racquets, smaller courts, and reduced net heights have been used for programming purposes for several decades (Winter, 1980). These forms of modifications have been used for rational decisions, and not from a scientific perspective. The ITF recently launched a *Play and Stay campaign* that endorsed children's play using three different-sized racquets, balls, and courts (International Tennis Federation, 2011). In conjunction with the launch of the *Play and Stay campaign,* the ITF executed only the fifth change to the game's rulebook in over a century (ITF, 2012a). This rule change mandated that ITF member associations use low-compression balls, for all sanctioned 10-and-under competitions. The ITF's *Play*

and Stay campaign was further defined by the launch of Tennis 10's, a program targeting players 10-and-under years of age. The Tennis 10's program is the ITF's scaled tennis equipment program that is defined as three progressive stages. Starting with red (Stage 3), then orange (Stage 2), and finally green (Stage 1). The reasoning behind having the first stage numbered three is to show the progression with red (Stage 3) and, with increased play and success, from stage three to two, and then on to stage one and, then with further success, onto non-scaled equipment. Progression from each stage in Tennis 10s is starting with red, then going from red to orange, orange to green, and then green to the yellow ball that is used for official play. The ITF (2011) recommends that 10-and-under players should only progress from stage to stage, based on their technical and tactical competencies, and success at the applicable stage competition. The ITF, however, has not developed any competencies for any of the stages and is left to coaches to establish their competencies. Considering the diverse knowledge base of coaches worldwide, the manner in which young tennis players move through the different progressive stages would differ dramatically. The United States Tennis Association (USTA) is the only tennis federation that has published competencies, but they are mostly technically focused and have no tactical fundamentals (United States Tennis Association, 2015). This investigation was centered on the identification of more reference tools that tennis stakeholders (federations, coaches, and parents) can use to guide young tennis players to become successful in each stage. The basis of the reference tools are the perceptions of players, parents, and coaches of a scaled tennis equipment program.

The impact of the ITF's decision to promote a scaled tennis equipment program has intensified, resulting in the lack of research or analysis of the scaling measures applied. The *Play and Stay campaign* encourages the use of balls with 25% (red), 50% (orange), and 75% (green) compression of ball standards among players aged 5-8, 8-10 and 9-10, respectively (ITF, 2011). Certain tennis federations have enthusiastically embraced not just ball scaling but also scaled court size, racquets, and net height, however, their recommendations lack empirical evidence (Farrow & Reid, 2010). Further confusion as to how a young player experiences each stage can be seen by how tennis-playing

countries have different specifications for the three distinct stages of red, orange, and green:

- Tennis Canada recommends red stage for ages 5-7, orange 7-9, and green 9-10 (Tennis Canada, 2015).
- Tennis Australia has similar age specifications for the red stage 5-8, orange 8-10, and green 9-10 years of age (ITF, 2012b).
- The USTA compared to Tennis Canada, ITF, and Tennis Australia are more conservative in their assessment of how children move between the stages. They have determined that the red stage is 6-8, the orange stage is 7-10, and the green stage is 9-11 years of age (USTA, 2015).
- Lastly, British Lawn Tennis Association is similar to ITF and Tennis Australia, with red being 5-8 years of age, orange is 8-9 years of age, and the green stage is 10 years of age (Lawn Tennis Association, 2015).

If countries are making their recommendations on how to experience each of the three stages, which currently are only using age as one factor, further insight is essential in guiding national tennis federations. Age cannot be the only criteria one can use to determine how players experience each stage, especially considering on how children develop at different rates. Considerations should be made with developmental reasons in mind. Buszard, Reid, Masters, and Farrow (2016) suggested that the use of scaled equipment should ideally conform to the development of each child, keeping in mind that children develop at different rates.

The role of parents in children's youth sport involvement is continually under scrutiny, and reports of over-involved parents are standardly in the news. There are also concerns that parents, for their children to attain expertise status in sport are pushing children to early specialization in a sport which involves high volume year-round training at a young age. Naturally, this is leading to an increase in overuse injuries in young athletes and, therefore, affecting their participation in sport (Gould, Lauer, Rolo, Jannes, & Pennisi, 2006). A study involving junior tennis players and their parents showed that winning

was deemed paramount by 33% of parents, and 29% of players. Investigators also showed that 20% of parents stated that inappropriate behaviours were demonstrated by other parents (Gould et al., 2006). Coaches realize that parents can be positive influences in children's tennis development, even though all that is heard is the negativity (Gould et al., 2006). Also, parental involvement has been associated with player enjoyment, performance, and self-esteem (Gould et al., 2006). Fredericks and Eccles (2004), have hypothesized that parents perform at least two significant roles: (1) to provide that sporting experience, and (2) to interpret those experiences. These influences of parents in young tennis players' development could be positive, or negative: children's abilities to progress or regress through the three scaled equipment stages of tennis training programs.

Adult response times to specific stimuli are superior to children's, it takes them much longer to respond (Kiselev, Espy, & Sheffield, 2009). This fact justifies slowing down the game for children to comply with their physical constraints. A child's first introduction to tennis could be very challenging if the speed of the ball and response time are not slowed down. The skills required to play tennis (e.g., serve, return of serve, rallying groundstroke back and forth over the net) are difficult for beginning tennis players, especially using non-scaled tennis equipment (Guggenheimer & Larson, 2013).

Scaling of equipment is professed to enhance skill acquisition, fun, motivation, and prospect of retention in tennis (Farrow & Reid, 2010). Davids et al., (2008) study further supported the use of scaled equipment when constraint of a learner's movement pattern to facilitate skill acquisition was considered. The lowering of compression in tennis balls can also manipulate one of the three constraints (task, environment, and performer) known to influence the production of motor skills. The appropriate tennis skill is achieved through a lower ball bounce as well as slowing the speed of the ball and, therefore, more comfortable height for anticipating and striking the ball, and more chance of developing proper movement patterns for a tennis groundstroke (Crespo & Reid, 2009).

Further support is seen in scaled equipment for junior sports coaching by catering more to the needs of children. There are two reasons behind this theory: (1) to enhance skill acquisition of the learner; and (2) to improve motivation and fun for the player, thereby increasing the chances of continuing participation in that sport (Farrow & Reid, 2010). Examples of sports using scaled equipment include soccer, American football, and ice hockey. Although common sense would dictate the use of scaled equipment in getting children involved in a sport, there is little scientific evidence to suggest this type of sport skill development approach. Scaled equipment to promote skill acquisition can be constrained to a learner's movement pattern (Farrow & Reid, 2010). For example, specific task constraints can be utilized to allow players to adapt to limiting demands and to allow learners to focus on the development of specific information-movement couplings (Farrow & Reid, 2010). The rules of tennis have now been changed to permit the use of scaled tennis equipment in tournament play for 10-and-under players.

Some investigations (Abbott & Collins, 2004; Russell, Martindale, Collins, & Daubney, 2005; Vaeyens, Güllich, Chelsea, & Philippaerts, 2009) have looked at identifying pathways of motor abilities from childhood to adult expert performance. They have identified two separate pathways in this developmental process: (1) a performance-based pathway with the amount of deliberate practice, leading the athlete to expert performance (Ward, Hodges, Starkes, & Williams, 2007); and (2) a pathway executing different stages of athletic development before reaching expert level (Cote, Baker, & Abernethy, 2007). The Developmental Model of Sports Participation (DMSP) (Cote & Fraser-Thomas, 2007) identified two pathways leading to an elite performance in sports: early diversification, and early specialization (Cote & Fraser-Thomas, 2007). Ericsson, Krampe, and Teschromer (1993) supported the early specialization pathway by showing that 10,000 hours of accumulated structured and organized practice termed “deliberate practice” were required to attain an expert level of performance in most sports involving motor skills. Consequently, early specialization represents the initiation of engagement at an early age and requirement of large amounts of deliberate practice in a specific sport with almost no deliberate play in any other sports (Ford, Ward, Hodges, & Williams, 2009).

In the early diversification approach, the DMSP identified three stages of athletic development: the sampling stage (6-12 years), the specializing stage (12-15 years), and the investment stage (+15 years). In the sampling stage, young athletes play in various sports, and deliberate play activities intend to maximize enjoyment through less controlled play, and age-adapted rules (Cote & Fraser-Thomas, 2007). The specialization stage is associated with increased specialization in sport, reducing the number of sports being played, and an increase in deliberate practice compared to the sampling stage. The investment stage is a progression from the specialization stage regarding the number of sports being played and is furthermore reduced while deliberate practice increases. The activities in the investment stage are highly structured, require effort, generate no immediate rewards, and are conducted with a goal of improving performance (Cote & Hay, 2002). In an investigation conducted by Baker, Cote, and Abernethy, (2003) elite athletes in field hockey, basketball, and netball showed that less sport-specific training to reach expertise had engaged in many sports activities before reaching expert level.

Researchers conducted studies involving the sampling stage, many of which are germane to this investigation of how young tennis players can be successful in the three-scaled tennis equipment stages. Cote and Hay (2002) and Baker et al., (2003) showed how athletes that had more exposure to other sports at a young age, (10U) had a higher trajectory into expertise status. Further justification can be seen in the Fransen et al., (2012) study of the effects of sampling various sports and spending varying amounts of hours in sports on fitness and gross motor coordination. Results showed that boys, aged 10-12, who spent many hours in various sports, performed better on standing long jump and gross motor coordination. The link between playing one sport to other sports could be a significant determining factor on how a tennis athlete progresses or regresses in each of the three scaled tennis equipment stages of tennis training programs.

A motor skill is a physical performance with a goal, accomplished by volitional body movement (Kluka, 1999). Tennis players use motor, cognitive, and technical skills in the game. Players obtain and develop these skills through practice and feedback. Motor skills need to become lasting to be useful (Pankhurst, 2013).

Coaches must know how to present skills that players need to develop and mature. Tennis is an open skill game. When coaches, therefore, teach tennis skills, they need to put these in game-like context. The demands of the game should elicit best coaching practices, and the methods they employ to develop a player's technique and movement (Pankhurst, 2013). The coaching practice used by a coach can be influential on how players perceive the three stages of a scaled tennis equipment training program.

The time and tempo of growth and maturation differ remarkably among individuals (Malina, 2008a). The time relates to when specific events or milestones in growth and maturation occur, while tempo refers to the rate at which the process of growth and maturation progresses (Malina, 2010a). Development is widely seen as the acquisition and refinement of behaviours expected by society. The concepts of social competence, intellectual or cognitive competence, emotional competence or well-being, and moral competence are usually used as an individual's behaviour develops within the environment of a specific culture that he or she is born and grows up in. As children mature at home, in neighbourhoods, at schools, churches, sport and recreational programs, and other community activities, they develop cognitive, social, affective, moral, and other behaviours anticipated by society (Malina, 2010a).

How children age involves three interacting processes: growth, maturation, and development. Growth and maturation are biological processes, while development is the behavioural process which is commonly associated with the culture of each individual (Malina, 2008a). The three methods involve the daily lives of children and adolescents for, on average the first 20 years of their life. These forms of life interactions between these three processes vary during childhood and adolescence, among individuals, and within and between cultural groups, which emphasizes the requirement to approach children and adolescents about their cultures (Malina, 2008a).

Growth, maturation, and development have pivotal roles in a child's sports development. Because children grow at different rates, sports have chosen to scale themselves to make

them more attractive and facilitate youth having success early on in sports participation. Tennis has achieved that goal recently through the ITF's launch of the *Play and Stay campaign.* Following the implementation and adoption of tennis scaled equipment programming, according to the direction stipulated by the ITF, the next step is to ensure that youth tennis players participate in a scaled tennis equipment program and progress at the appropriate rate. In order for the sport of tennis to adapt to scaling equipment programming to facilitate the growth, maturation, and development of young tennis players through appropriate programming measures, the concept of this development was an integral part in determining if this was a factor in young tennis players' participation in each of the three stages of scaled tennis equipment programs.

Researchers (Farrow & Reid, 2010; Guggenheimer & Larson, 2013; Buszard et al., 2014) have recently conducted a meaningful investigation, and each finding has led to more unanswered questions. Considering the infancy of an established scaled tennis equipment program started by the ITF (Tennis 10s), the leading topic for coaches who practice such programming is how players maximize their participation in each stage. Fear of making an inappropriate decision and potentially hampering player development, all stakeholders require more guidance. The findings in this investigation could shape programming worldwide. Coaches could have a more specific pathway to determine how players develop their tennis skills in each stage. The results from this study in tennis programming from a scaled equipment point of view, therefore, could be revolutionary. The perceptions of the different stakeholders in tennis can become an overarching foundation to clarify the questions on how young tennis players experience each stage of a scaled tennis equipment program.

1.2 PROBLEM STATEMENT

The scaling of equipment specific to tennis, as part of an overall tennis development program, is an evolving concept in tennis worldwide. Since the launch of the International Tennis Federation's (ITF) *Play and Stay campaign* in 2007, countries around the world have implemented a youth scaled tennis equipment program specific to

10-and-under children, to attract and retain more players in the game (ITF, 2012a). The essence of the campaign is to have playing performance successes as soon as possible. National Tennis Federations (NTF) have varied on how they have adopted this program, some are entirely on board, others have moved cautiously, and some have aspects already in place (Farrow & Reid, 2010). The whole purpose of scaling tennis equipment is to prevent adult rules of tennis play imposed on younger children (Guggenheimer & Larson, 2013). The scaling of equipment for tennis, as proposed by the ITF, has used the analogy of a traffic light. By reducing the size of the court, making the ball larger and lowering the compression and shortening the length of the tennis racquet, three stages have been conceived. Like a traffic light, red is the first stage, progressing to the orange stage, then green stage, and followed by a yellow stage, which is traditional tennis play. Each stage is defined by different conditions of court size, compression and size of the ball, and length of the racquet, starting with smaller conditions, and then progressing larger by emulating the size and growth of children. Each stage of the scaled tennis equipment program has been given a suggestive age range of play by the ITF, while some NTF's having adopted their own age ranges (Buszard et al., 2014).

Because young children both boys and girls grow and mature at different rates, by assigning age as the only criteria for experience each stages can be detrimental to their development. Buszard et al., (2016), have suggested that scaling of equipment requires more research for each sport, and suggest that scaling of equipment should conform more to physical characteristics and development of each child, and not age. It is with this uncertainty on how children perceive each stage, and various understandings of the NTF's regarding how players experience a scaled tennis program that this research was born.

By undertaking this study, more determining factors on how children progress have been investigated. Players, coaches, and parents were interviewed relative to experiences of a scaled tennis equipment program to provide insight and more information that can influence future scaling equipment programming. The scaling of tennis equipment concept could be lost under current conditions, because of the lack of information on the

transition through each stage. There is a concern that by holding children back too long in a stage could result in loss of interest due to the ease of play, or progression too quickly which could lead to difficulty in play. The purpose of a scaled equipment tennis program is to attract and retain more children in the game. If there are no clear guidelines on how to progress or stay at a specific stage; however, this could defeat the purpose of scaled tennis equipment programs.

The research question proposed for this study was: ***How do players, parents, and coaches perceive a scaled tennis equipment program through the different stages?***

1.3 AIM AND OBJECTIVES OF THE STUDY

1.3.1 Aim

The overall aim of this investigation was to explore the perceptions of players, coaches, and parents on a scaled tennis equipment program through the different stages.

1.3.2 Objectives

The following specific objectives are focused on the perceptions of selected stakeholders in tennis on scaled equipment: the objective of the study is to:

- Investigate the ***perceptions of players*** on their experiences with each stage, (red, orange, and green) of a scaled tennis equipment program;
- Explore the ***views of the parents*** on their children's relative success or lack of success in scaled tennis equipment programming;
- Examine **the knowledge and understanding of coaches** of how players successfully or unsuccessfully navigate the three stages of a scaled tennis equipment program;
- Determine the ***overall and interactive perceptions of all three stakeholders*** (players, coaches, and parents) share about a scaled tennis equipment program; and

- Provide ***recommendations*** for future scaled tennis equipment programming practices.

1.4 PROPOSITIONS

For qualitative research as compared to presenting hypothesis in quantitative research there is a need to state propositions (Creswell, 2009). It is for this reason that propositions will be presented that will be used as a foundational concept to be proven right or refuted by the findings of this research.

- Players like playing tennis with scaled tennis equipment because it is easier.
- Parents think that their child using scaled equipment when playing tennis provides a positive experience.
- Coaches find using scaled tennis equipment in their training is much easier for them to develop their student's tennis skills.

1.5 CLARIFICATION OF TERMINOLOGY

Through doing an overview of the document, relating to the topic of this research, and keeping in mind that not all people are versed in tennis terminology, the terms below have been defined to facilitate an appropriate understanding of this thesis and to set a foundation for interpretation.

1.5.1 Scaling of equipment

Scaling constraints in the environment (equipment and play area) facilitate participation in sport in a way that best resembles the adult game. Scaling of equipment looks at adapting the fully scaled adult sports versions, reflecting the growth and development of children. Scaling of equipment is professed to enhance skill acquisition, motivation/fun, and the prospect of retention in tennis (Farrow & Reid, 2010). Davids et al., (2008) further supported the use of scaled equipment in constraining a learner's movement pattern to facilitate skill acquisition. The lowering of compression in tennis balls can be

considered to manipulate one of the three constraints (task, environment, and performer) known to influence the production of motor skills.

1.5.2 Scaled Tennis Equipment Stages

The ITF, through their *Play and Stay campaign* and *Tennis 10's* program devised three stages that matched the growth and development of young tennis players. The three stages are detailed below according to the different racquet, court sizes, and ball compression.

1.5.2.1 Red stage

The red stage in a scaled tennis equipment program is the first and introductory stage, which uses a larger ball either foam or felt, racquets lengths ranging from 0.43 m (17 in.) – 0.58 m (23 in.), court size of 10.97-12.8 m x 4.27-6.1 m, and net height of 0.8-0.838 m. Recommendation age for young players to use equipment for the red stage is 5-8 years old.

1.5.2.2 Orange stage

The orange stage is the next in progression. The equipment involves racquets 0.58 m (23 in.)- 0.64 m (25 in.) in length, standard ball size with 50% compression, and court size of 17.68-18.29 m x 6.1-8.23 m, and net height of 0.8-0.914 m. Recommended age for young players to use equipment for the orange stage is 8-10 years old.

1.5.2.3 Green stage

Green stage is the last stage of a scaled tennis equipment program and is the last in the progression. The equipment used for the green stage includes racquets 0.66 m (26 in.)-0.69 m (27 in.) in length, standard size of the ball with 25% compression, court size of a regular tennis court (23.77 m x 8.23 m) and standard net height of 0.914 m. Recommended age for young players to use equipment for the green stage is 9-10 years old.

1.5.2.4 Transitioning through scaled tennis equipment stages

The way young tennis players perceive success for each stage of a scaled tennis equipment program is the premise of this investigation. To date, very little has been published to provide stakeholders with guidance. Currently, many NTF's are using age as the sole criteria to move children from one stage to the next. When considering that children develop at different rates, this study has provided more insight into the question that has been investigated.

1.5.3 Motor learning

The process of going through a series of internal phases, steps, or transitions leading to becoming proficient in motor skill. Motor learning involves physical practice and is directed by age, maturation, the amount of time devoted to practice, plus a host of other factors. More information on motor learning specific to tennis is covered in Chapter 3.

1.5.4 Stakeholders in tennis

The following stakeholders are included in this investigation:

1.5.4.1 Player

A young tennis player is a young athlete between the ages of 5-11, male or female, and playing tennis in one of the stages of a scaled tennis equipment program. The term player refers to young tennis players in the age bracket of 5-11 years old.

1.5.4.2 Coaches

Coaches refer to tennis coaches using scaled tennis equipment with their young tennis players in a tennis program.

1.5.4.3 Parents

Parents refer to parents or legal guardians of young tennis players using scaled tennis equipment in their tennis play.

1.5.5 The general nature of coaching

The coach forms an integral part of engaging youth in sport. Philosophy of coaching provides a foundation for their coaching practices. Coaches are very influential as they are the points of contact for skill development in the sport. Additionally, they can be a reason for sports participation or termination. In some capacity, coaches are responsible for delivering the principles of participation in a sport in an engaging manner.

1.6 RESEARCH METHODOLOGY SUMMARY

A detailed discussion of the research methodology will be delivered in Chapter 4, pp. 149-168.

To understand the perceptions of players, coaches, and parents of scaled tennis equipment, a qualitative research design was chosen. Additionally, a qualitative strategy of grounded theory has been applied. Grounded theory is an approach in which the researcher obtains a general, abstract theory for a process, action, or interaction derived from the views of participants (Creswell, 2009). The application of qualitative research methodology was to be conducive to obtaining more insightful data by asking questions of the three stakeholder groups: coaches, players, and parents.

As this investigation dealt with the identification of experiences of the stakeholders using a scaled tennis equipment program, the best way to achieve the aims and objectives of this study, questions were asked to each stakeholder using an interview method. The researcher asked questions to each stakeholder, with follow-up questions used if needed to gather more insightful data. Pre-determined questions were drawn up that matched the aims and objectives of this research. Because players had an age range of 5-11 years old, only four questions were asked, so as not to challenge players too much, and adhere to the limited attention span of participants. For the adults (parents and coaches), questions did not exceed 10. The objective of the question process was to get all three stakeholder groups to reflect on their scaled tennis equipment experiences, whether successful or unsuccessful.

A pilot study involved a small sample, usually five to 10 (Vincent, 2005), who have the same background as the participants of the study. To satisfy the pilot purpose three players, coaches, and parents were chosen, to sample the questions in making sure they were easily understood and would stand the test when the main interviews were staged, to obtain the appropriate data. As a result of this pilot, the researcher adjusted the questions slightly for parents, coaches, and players. Questions were reduced from nine to seven for parents, as some of the questions were redundant. Players' questions were reduced from five to four questions, and coaches' questions were adjusted from 11 to nine. To obtain the understanding of success or lack thereof relative to players, parents, and coaches involving a scaled tennis equipment program, players and parents of all stages of a scaled tennis equipment program were chosen.

- ***Fourteen girls and eight boys (n=22),*** red stage players, were interviewed using the same four questions.
- ***Eleven girls and ten boys (n=21),*** orange stage players, were interviewed using the same four questions.
- ***Nine girls and eleven boys (n=20),*** green stage players, were interviewed using the same four questions. In terms of sampling of players there was an emphasis in making sure that an even distribution of males and females were interviewed.

Ten parents of each stage were identified (n=30), meaning that their child was using the scaled tennis equipment of that specific stage (red, orange, or green). The parents in this sample were chosen from the players' sample. Players who were identified to be part of the players' sample were the ones asked to be part of the parent sample.

Ten coaches (n=10) who work with players of different levels and ages using scaled tennis equipment were identified and interviewed using the same questions. Of the 10 coaches, six were male, and four were female.

Players and parents were identified by using two sub-populations: (1) A tennis facility that offers programming for red, orange, and green stage players, USTA National Campus; and (2) participation in the United States Tennis Association (USTA) Early Development Camps (EDC). The newly created USTA National Campus (Appendix A) is 100 court-constructed facility that offers programming of all three ball colours. Another sub-population employed by the researcher was requesting and gaining permission EDC's are camps designed to provide training to players, provide coach education experience to the coaches, and provide parents more information on how they can best help their children enjoy the tennis experience. These EDC camps are hosted in all states of the United States of America (USA). Only orange and green stage camps are offered. They are staged locally to prevent travel for the parents and players and foster participation (Appendix B).

Data analysis according to Creswell (2009) is making sense of the text and image data collected. It is putting together data to analyse, using different methods of analyses, moving closer to understanding the data, representing the data, and making conclusions on the meaning of the data. Trustworthiness of the research was followed, that speaks to establishing the validity and reliability of the data obtained for this qualitative research design.

All interviews were audio recorded, and critical points jotted down by the investigator in the case of playback technology issues. From there, all interviews were transcribed, and analysis was conducted to make sure the appropriate data were being recorded for complete analysis. Once all the interviews were transcribed, qualitative analysis software, ATLAS.ti (Scientific Software Development, 2017), was purchased by the researcher to identify and present commonalities in the data. Epistemological philosophy approach of empiricism was established that speaks to the contribution of new knowledge through the experience and observations of the face to face interviews conducted by the researcher.

Four player interview questions, seven parent questions, and nine coach's questions have been listed in Chapter 4 on pp. 159-160 and Appendices F, G, H respectively.

1.7 LIMITATIONS OF THE STUDY

Cooper and Schindler (2001), indicated that all investigations have limitations. The following limitations have been identified for this study:

- Because of the ages of participants, maturity, and development may have hampered their ability to reflect and communicate actual thoughts. Often only one-word answers were obtainable from the players' interviews.

- Scaled tennis equipment programming in the USA is a relatively new concept. A majority of parents and coaches (adults), interviewed had not used scaled tennis equipment when they were young or first started to play tennis. They could inherently be biased towards the benefits of the program as they were unaware why scaled tennis equipment was used.

- The investigator was an advocate of the use of scaled tennis equipment, having been a tennis coach for 20 + years using scaled equipment with beginner tennis players, and having seen benefits first-hand.

- During interviews with the parents on occasion, they were distracted by having other siblings at the tennis facility. The investigator, at times, stopped the interview to allow the interviewee time to tend to the children's needs. Attention could have been taken away from the interview and have affected responses.

- Some player interviews occurred after their tennis training on school nights. They had attended school the entire day, came straight to their tennis training, and were then interviewed by the investigator. The fatigue resulting from school day routines could have affected their answers to the questions.

- There may be a need to analyse and interpret the results of the boys and the girls separately in order to determine to what extend they differ or agree in their perceptions based on gender.

1.8 OUTLINE OF THE STUDY

Chapter one began with an introduction to the research. Orientation was given to this study; the research problem was presented, the terminology was defined, an overview of the research methodology was explained, and limitations of the research were identified. ***Chapter two*** encompassed the essence and nature of youth sport. These involved perceptions of how schools, coaches, parents, and environment influence participation and/or termination in the sport. ***Chapter three*** conveyed the essence and nature of tennis, exploring all aspects of tennis play. ***Chapter four*** described the research methodology used for this study. ***Chapter five*** includes the analysis and interpretation of data related to this investigation. ***Chapter six*** completed the study by presenting conclusions, recommendations, and implications for further research.

1.9 CHAPTER CONCLUSION

This chapter explained the purpose of this study by giving an orientation to the subject, presenting the problem statement, the aim, objectives of this investigation, and describing terms used in this investigation. Additionally, it provided a summary of the research methodology and limitations to the research. The next chapter looks at the nature and essence of youth sports.

CHAPTER 2:
THE ESSENCE AND NATURE OF YOUTH SPORT

2.1 INTRODUCTION

Due to the nature of this research, investigation focusing on a sport such as tennis and, as part of an organized sports program offering targeting youth, it is appropriate to begin this chapter with a definition of *sport* and *youth sport*. These definitions provided valuable context and foundation to this chapter and shaped the importance of tennis as a sport in communities.

2.1.1 Sport

Defining a sport conforms to the following concepts of play, organized competition, skill, physicality, large following, and initialization (Jenny, Manning, Keiper, & Olrich, 2017). Play forms the foundation for all sports (Gutmann, 1978). Play refers to voluntary, intrinsically motivated activity which is executed for fun or enjoyment. Within this characteristic, play is considered make-believe. Sport involves goal-directed activities conforming to rules (Guttmann, 1978; Suits, 2007). All sport includes competition. It requires competitions that result in winning and losing (Guttmann, 1978). Sport includes skillful play where chance or luck is not the sole reason for winning (Suits, 2007). A distinguishing trait that separates sport from games is that sport refers to games of skill rather than chance, and skill must be physical to be a sport (Suits, 2007). It is evident that sport has physicality at its core. For an activity to be termed a sport "the employment of advanced physical skills and abilities within the context of gross physical activity must occur" (Loy, 1968, p.6).

Sport should be beyond a game that is merely a local attraction or fad and should have a broad following (Suits, 2007). Institutionalization of an activity must have a long history in which: a) rules have been developed and standardized b) learning the game becomes formalized c) expertise is developed, and d) coaches, trainers, officials, and governing bodies emerge (Suits, 2007).

All characteristics explained above are indicative of tennis. Tennis, then, can be termed a sport in the context of this investigation.

2.1.2 Youth sport

As early as the 1950s, sports participation and leisure activity involvement of young people have increased dramatically within the culture of an organized program supervised by adults (Adler & Adler, 1998). The increase in participation came as a result of a combination of the following cultural and structural factors specific to family, parenting, and childhood in many post-industrial societies (Coakley, 2006). These included:

- An increase in the number of single-parent families and families with both parents working outside the home;
- Parenting strategies shape an emerging neo-liberal view that parents are solely responsible for controlling and socializing their children;
- A longstanding cultural belief that sports participation automatically involves positive character-building experiences;
- A media-inspired belief among many parents that the world outside the home is a dangerous place for children;
- A general fear that children, especially boys, are bound to get into trouble if they are not controlled and adequately socialized by adults; and
- Increased visibility of high-performance sports represented as critical cultural events and athletes represented as cultural heroes (Coakley, 2006).

These six factors, as well as other factors combined, have created a context in which parents continually seek adult-supervised activities for their children. Youth sports have been viewed by many parents as high priority activities. They are perceived as necessary because they occur under the control and supervision of adult coaches. They offer critical cultural lessons related to competition and working with others to achieve goals in rule-governed scenarios.

Furthermore, youth sports are appealing to parents as they have predictable schedules, give measurable indicators of children's achievements, and allow children to obtain status among peers and in the broader community (Coakley, 2006). From a parent's perspective, organized youth sports keep their children off the street, out of trouble, and involve them in character-building activities that are fun and valued by society.

In summary, when children participate in sport, parents believe they are meeting their responsibilities as parents. For parents, organized sport is also stimulating a setting where parents can feel comfortable and competent. Their knowledge of the sport and their past experiences provide a basis for parenting and facilitating child rearing in ways that are consistent with community beliefs (Coakley, 2006).

Youth sport also has the potential to provide opportunities for children to have fun in a relaxed and social setting. For children to become passionate about the sport, it requires an ability to play the game and to achieve success. For this to happen, stakeholders involved with children need to harness and nurture this. Additionally, with the globalization of youth sport, numerous employment opportunities for players are available once they reach adulthood and/or no longer play the sport. Those sports experiences gained in youth can translate into more marketability as a potential employee.

For this investigation, tennis was chosen as the sporting code. The target age group focused upon was 5-11 years of age. It is, then, essential to provide a theoretical frame of reference for youth tennis players to better understand perceptions of stakeholders in the manifestation of scaled equipment.

The question for investigation was: Why is sports participation crucial to the development of youth athletes? The following focus is on the goals in sport and their importance as contributors to the holistic development of youth athletes. Martens (1986) identified participation, achievement, and motivation as foci.

2.2 THE IMPORTANCE OF GOALS IN SPORT

2.2.1 Participation as a goal in youth sport

Children who participate in a free play setting who have physical superiority is a significant advantage. Evans (1985) examined children, aged 8-12, and identified that team captain and group leaders, were physically gifted players and team selection followed strict hierarchical structures based on physical ability. For the boys that lacked physical skills, sports participation on the playground was usually met with social challenges. These boys were usually chosen last and given minor roles and were often prevented from entering games.

Lee (1999) identified six common goals for sport participation:

- **Demonstration of ability**

The purpose of participation in sport is to demonstrate high ability and avoid exposing low ability. Children who hold this goal tend to participate in events that they know they will do well in and stay away from events that they will not do well. They will also drop out of that sport if it goes wrong. They assess their ability by comparing themselves with other children but do not compete directly against them.

- **Mastery of tasks**

Children who embrace this goal do not think about other people. This goal involves the mastery of skills and performing for their benefit. They can get rather engrossed in what they are doing; they lose track of time. They are not concerned about tough competition because they are not concerned about comparing themselves to others.

- **Social approval**

When children exhibit this goal, they will try and do whatever they can to please other people. They demonstrate great effort because they think praise is earned merely by producing effort.

- **Experiences of success**

To physically perform better than others in competition provides some degree of success. This can be displayed through winning or defeating a major rival or skilled opponent. It is different from showing ability and is more pronounced in boys than girls.

- **Breakthrough**

Achieving success involves a feeling of having a breakthrough by doing something that seems impossible or is entirely new or finding additional inner qualities. It is a form of mastery where no one else is involved, but the experience is entirely different in quality.

- **Contributing to teamwork**

Children who have the ambition to work well in a team is very similar to an approval motive, but the focus is on helping others, not merely impressing them. The teamwork goal is more associated with sports achievement than school examination and is more important in team sport than an individual sport.

According to Martens (2012), physical activity contributes explicitly to different domains in the following ways:

- **Physically**: This term can have many contexts when referring to the definition. As a coach, one needs to look after oneself physically. A coach should not physically or mentally abuse and must be responsible for developing their players physically. Overall, coaches should help young people develop physically through learning sports skills, improve physical conditioning, develop good health habits, and avoid injuries (Martens, 2012).

- **Psychosocial**: Sport has been identified as having importance to the psychosocial development and in which peer status and acceptance are developed. Playing sport contributes to learning cooperation in a competitive context and appropriate standards of behaviour. Because sports experiences are highly valued by children, excelling at sport is, therefore, a robust social asset for children (Weiss & Duncan, 1992).

- **Emotionally**: Emotion can be an asset or a detriment to performance in sport. Young players mature at different rates. How children mature emotionally contributes with how coaches communicate with individuals. Additionally, young players could have matured physically but not emotionally. Abuse of children emotionally can also occur by coaches.

- **Morally**: Through sport, young players can develop morally, can develop an understanding of the code of ethics, that is transferable to a moral code for life. Play competition in sport, in which winning is a highly valued commodity, provides opportunities for high levels of moral development to occur (Martens, 2012).

- **Cognitively**: Mental engagement is required to play a sport. Cognitive skills are required in developing sporting skills and improve skills by making the appropriate adjustments. Through education and positive encouragement, a coach can help athletes reach that cognitive state.

The typical goal children have with sport largely depends upon *the length of time they participate in sport.* Ewing (1981) investigated high school-aged competitors in an American school. She found that those investing in sports participation were more aligned towards gaining social approval than dropouts, who were more oriented to showing ability. Duda (1992) found that ability-oriented motivation was primarily linked with drop out than continuation in sport but is dependent upon the situation and children's views of their abilities. If the only goal, then, is to show superiority and they are not able to achieve this, they may drop out. If that single goal is not meet in the eyes of the child, this could lead to that child dropping out. Prevention of this could be the potential goal of helping children develop multiple goals within their sports play.

Other factors could influence Ewing's (1981) deductions, as some sports can show approval easier and quicker than other sports. Support of dropping out of sport is partly influenced by perceived opportunities to satisfy different kinds of goals and, on occasions, there may be more chances in the sport to meet social approval or task mastery

goals than to show ability. Children enjoy being part of the action and would rather be part of a game and lose than sit on the bench and win.

Children have different goals which, in turn, can support withdrawal in different situations. Whitehead (1990), studied some youth sports club competitions for two years and noticed that the drop-outs from athletics had higher motivation to show superiority than the ones that stayed; however, the dropouts from rugby had low motivation for teamwork.

Coaches need to think about opportunities to establish different goals that need to be satisfied in specific sports. Wilson (1989) compared the achievement goals of international synchronized swimmers and squash players and noticed that the teamwork goal was higher in synchronized swimmers than in squash players. This example shows that motivational climates differ between sports.

- **How children change in judging their ability**

Nicholls (1989) reported that children go through four stages in learning to differentiate between effort and ability instead of their performance. In primary schools, children think success comes from trying hard but, in secondary schools, they associate trying hard with not being enough because their abilities could put limits on potential performances.

When children understand the importance of displaying ability, several possibilities occur. If they like to show their abilities but are thinking they are not sufficiently able to, they may drop out because they do not want others to see them fail. Conversely, if they require social approval and think that it is the only thing that the coach approves of, they may also drop out. Children think that coaches value quality performance. Lee (1999) concluded that coaches value the following aspects of sports participation, ranked in order: (1) winning or displaying ability, (2) effort or trying hard, and (3) having fun. The children, however, ranked these in the opposite order for themselves.

- **Goals have different time scales**

Children's approval goals are met when people around them approve, especially if the people approving are close to them. Such goals can keep youngsters in a sport for a lifetime because praise can be given to people for many different things, mainly when

skills are no longer improving or if the ability is low. Children who like to hear approval, however, may leave a sport if important people would like them to.

Mastery goals can potentially keep children in the sport for an extended period because skill development takes time, and there are always complex skills to learn. Mastery-oriented youngsters may lose interest if everything is too easy for them. Because they enjoy challenges, they may not be happy if they win too easily. A child who is oriented to show superior ability, however, may like an easy win.

Outcome goals may be useful if children obtain good results, and the same thing may apply to extrinsic rewards. Deci (1975) theorized that intrinsic motivation provides details on how rewards are used. When rewards are suddenly taken away, the activity is no longer attractive. Children who take part in the physical thrill of the activity itself, however, can be the most persistent participants because they cannot be turned off by the sport - only frustrated. Mastery goals, which are linked to performance, are associated with more prolonged participation in sport than competitive outcome goals (Duda, 1987).

In summary, children can choose to leave the sport because of having reached their original goal or coming to the conclusion that they cannot reach them, or because they are interested in other activities. They could also leave a sport because of injury, moved location, have challenges with money or transport, are dropped from a team, or a facility closes. Some of these reasons are beyond the coaches' control, but others are not. A more detailed understanding of children's motives can assist coaches to adopt practices to improve satisfaction that children acquire from their experience in the sport. Consideration should be taken that it may not be the fault of the child or the sports program if a child withdraws.

2.2.1.1 The Aspen Institute

The Aspen Institute Sports & Society Program created Project Play in 2013 to strategize ways to help all children in America become more active through sports. The reason for the creation of Project Play was a growing concern that the supply of quality sporting experiences were not meeting up with the demands of children or the needs of society (The Aspen Institute, 2015). Project Play had assembled more than 250 leaders in 10

roundtables and other events, including a televised town hall with President Clinton. From these discussions the Project Play team have identified a number of innovative strategies. The essence of the plan is to reimagine organized youth sports, highlighting health and inclusion, while recognizing the benefits of unstructured play (The Aspen Institute, 2015).

An all-encompassing document, it assembles in one place the most promising opportunities for stakeholders of youth sport, to work as a team to create universal access to early, positive sporting experiences. A primary focus of the playbook is to help and keep all children in the game by age 12, in all definitions of engagement. The playbook suggests that a systems change is required, starting with the groups that are in direct control of policies, practices, and partnerships in youth sports. However, it can be used by a plethora of community change makers from many backgrounds to break down the barriers. The playbook tackles the culture and structure of U.S. sports, while suggesting plays that youth stakeholders can use as strategies to revitalize youth sports and attract and retain more children in sports. The eight plays are (The Aspen Institute, 2015):

1. Ask kids what they want to do
2. Reintroduce free play
3. Encourage sport sampling
4. Revitalize in-town leagues
5. Think small
6. Design for development
7. Train all coaches
8. Emphasize prevention

2.2.2 Fun and enjoyment as a goal in youth sport

According to Scholder and McGuire's research (2007), the most essential and fundamental understanding regarding youth athletes and their participation is:

"Children participate in youth sport because they want to have fun."

Children think that it *will be fun* when participating and they will *experience fun,* they will *like it,* and they will *continue to do so (*Scholder & McGuire, 2007).

Ewing and Seefeldt (1996) found the following results regarding the 10 most important reasons why student-athletes (boys and girls, grades 7-12) participate in sport:

- *(1) to have fun*; (2) to improve skills; (3) to stay in shape; (4) do something the athlete is good at; (5) for the excitement of competition; (6) to get exercise; (7) to play as a part of a team**; (**8) for the challenge of competition; (9) to learn new skills; and (10) to win;

- Based on *gender:* both boys and girls regarded fun as the number one reason for sport participation;
- When asked the 11 most important reasons, athletes *stopped participating in sport*, the top two reasons were (1) loss of interest and (2) lack of fun;
- When asked to respond to questions on what changes could be made to get involved again in sport, both boys and girls placed the following reason as number 1: *"to make practices more fun."*

2.2.3 Achievement as a goal in youth sport

There is no reason more persuasive than the simple fact that children would instead participate in competitive sport than any other endeavour. Duda (1981), investigated the optimal achievement domain of high school (14-18 years of age) males and females in North America and concluded that males preferred to excel in sport rather than in classrooms. Female athletes also liked to succeed more in sport than classrooms. The only thing that females wished to avoid in the sport was head-to-head competition with other females. This fact is also confirmed by other research stating that females prefer not to compete against other females in an individual setting (Kleiber & Hemmer, 1981). It should be mentioned, however, that females consider sport contexts, specifically, team sports, a suitable context in which to succeed against others.

Ewing (1981) provided the first evidence that goal perspectives are essential and that motivation correlates to behaviour. Ewing (1981) also found that the younger children showed goal perspectives of mastery and competitiveness. Conclusions revealed that individuals who are high in competitiveness were the ones most likely to drop out of the sport; in other words, competitive goal-oriented children were most likely to exhibit the maladaptive behaviour of stopping play in sport.

Buchanan and Roberts (1991), studied the perceptions of the success of children at two different ages (9-10 and 13-14 years) and noticed that they had mixed goals of mastery and social approval elements at a younger age. It was apparent that competitive goal perspective was not fully developed. Older children showed more competitive goal orientation than younger children. Children were around 11-12 before a competitive goal perspective was observed. Additionally, boys were more competitively goal-oriented than girls.

The increase in competitive orientation can have significant negative implications for children around the age of twelve, especially for those children with doubts about their relative ability. Nicholls and Miller (1984) identified that children at the age of 12 were able to differentiate skill, luck, and effort from ability. After the age of 12, it is not uncommon that children expect to appear incompetent, more significant impairment of performance will emerge if aggressive goals are evident (Miller, 1985). As Roberts (1984) argues, the culmination of this developmental process of differentiation combined with increased emphasis on competitive goals, could be the reason why drop-out from competitive sport results in being such a massive problem with children aged 12.

It is not sure, however, that children will develop a competitive goal orientation in the sports context. The way significant adults set up the environment for children has a bearing on the achievement goal children will hold, especially for children under the age of 12 for whom social approval is significant (Buchanan & Roberts, 1991).

Although sport contributes many positive aspects, youth athletes are also confronted with the negative experience of failure. Males identified that failing in sport was the most

aversive context in which to experience failure. When given the choice males would instead perform poorly in the classroom than the sporting field. Females were different to the males when it came to failure as they would prefer to fail on the sporting field than in the classroom. This difference in the perceptions of males and females when it comes to failure establishes social expectations males and females have, and how males and females move toward different achievement goals (Duda, 1981).

Ames (1987) investigated how achievement situations influence the adoption of competitive or mastery goal orientations. He suggested that concept of achievement, whether on the sports field or in the classroom, can be identified as more or less competitive or mastery, depending upon the demands of the situation. In situations that are characterized by interpersonal competition, public evaluation, and normative feedback, a competition involving goals is more likely to be present. In scenarios which emphasize the learning process and participation, mastery goals are likely to emerge.

- **Creating a mastery-related climate**

Ames and Archer (1988), Ames and Maehr (1988), and Powell (1990) concluded that students who identify the motivational climate in the classroom to be mastery-oriented are more inclined to display adaptive behaviour than those who perceive the climate to be competitively oriented. Mastery-related cues are accepted by many aspects of the learning environment, from how tasks are defined to how children are grouped, as well as to how they are recognized and evaluated by others. The whole premise of Ames's (1987) study was that the nature of children's experiences determines the degree to which a mastery goal orientation is prevalent. Therefore, it is likely that children will develop adaptive patterns of behaviour in mastery climates.

- **Terminating participation in sport**

Children participate in sport to have fun, improve skills, belong to a group, be successful, gain recognition, improve fitness levels, and find excitement. Reasons for quitting sports participation include having other things to do, boredom, lack of success, too much pressure, loss of interest, friends leaving, expense, injury, work, and problems with facilities.

The above comments show that it is not a simple matter to understand children's motivation in sport. Children have different objectives for the things they do, and their reasons change from day to day. Ultimately, children do not think like adults. Sometimes children drop out of sport solely for the fact that they do not see themselves as successful, and there is no way to change that.

2.2.4 Development as a goal in youth sport

The concept of sports development is founded in a theoretical frame of reference that defines, explains, and applies the essence and nature thereof in the sport. The concepts that form the manifestation of sports development are;

- **Talent:** McPherson (1997) defines talent as outstanding performance in a specific activity that can be developed through learning and interactions with environmental influences, or even modified by the personality and motivation of the learner.

- **Talent identification**: Talent identification has long been a hot topic among coaches, administrators, communities, and governments. The talent identification process can be divided into three stages or components: detection, identification, and development. Talent identification speaks to the process of recognizing current participants who have potential to become elite players (Mohamed et al., 2009).

- **Talent detection**: Talent detection is the discovery of potential performers who are currently involved in the sport who has been identified (Mohamed et al., 2009).

- **Development**: Development is best explained by breaking it up into three areas: physical, psychological, and social. Physical development involves the learning of the sport, enhancing physical conditioning, developing good health habits, and avoiding injury. Psychological development refers to control one's emotions and

develop self-worth. Social means to learn cooperation in a competitive context with appropriate standards of behaviour (Martens, 2012).

2.3 THE STAKEHOLDER'S ROLES AND RESPONSIBILITIES IN SPORT COACHING

The sporting triangle forms a prevalent part of children's sport as per Figure 1. The interrelationships between the coach and the child, the coach and the parent, and the parent and the child are unavoidable. Most people would agree for the coach to succeed in youth programming they must have a positive relationship with their athletes. However, when speaking of parents in the sporting context, there is not much positivity with coaches, with them continually speaking of over-involved parents. Feedback from coaches in different sports seems to land on three distinct points of view when it comes to parents and their involvement in sport.

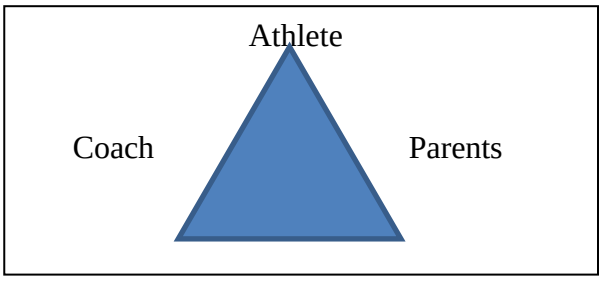

Figure 1: Sporting Triangle (Lee, 1999).

First, some coaches welcome and support parental involvement. Parents are deemed to be a vital element in the coaching process. They are interpreted as an essential human resource capable of reinforcing the views of the coach. Second, the presence of parental involvement is a common occurrence when working with children. Parents, at the most, are an inconvenience, something to be tolerated but indeed not encouraged. Last, some coaches believe that parents should be excluded from the sporting arena altogether. These coaches think parents are more trouble than they are worth.

Incredible stories of parental behaviour are retold by some coaches that lead to them justifying their opinions. The undue pressure some parents exert on their children, and the abuse they give to coaches, officials, and other parents allow one to share coaches' concerns. The potential solution given by coaches, however, is not an appropriate one. Trying to avoid parent involvement is not going to improve the situation.

It is quite clear that if there is tension or a lack of respect with two members of the sporting triangle, the third member will be affected. Careful consideration of the relationships between the coach, the child and the parent is crucial if the sports experience is to be enjoyable and successful. Parents need to understand their roles and responsibilities within the sport. This understanding can only be achieved if there is intercommunication.

Those coaches who wish to communicate with parents can avoid conflict within the boundaries of the sporting triangle. Listening and talking to parents will allow coaches to achieve greater understanding, establish respect, and facilitate the chances to meet goals. Coaches who decide to ignore parents can do so but at the determent of their future. They will be faced with numerous challenges. The problem is that the athlete is the one who will suffer because of mixed messages sent from their coaches and parents. This could quickly develop into an unfortunate sporting experience for all parties (Lee, 1999).

2.3.1 The athlete

"Kids are not miniature adults" is a guiding principle that developmental sports psychologists and coach educators have and will continue to relay to coaches, parents, and others working with youth in sport (Hainline, 2012, p.5). Instead, it is essential that tennis parents and field-based specialists know the primary stages of child development and the psychological characteristics associated with each stage. Considering both developmental psychology and sports psychology literature, some researchers have addressed this issue (Visek, Harris, & Blom, 2013), and many of the typical psychological characteristics and traits that are used to describe children and youth of varying stages are listed below.

It must be highlighted that there is considerable variability associated with each stage, as chronological age, at best is a rough indicator of physical, psychosocial, and cognitive maturation. Field-based specialists must be aware that each child develops differently, and children on the same age-based teams can differ significantly in their characteristics and attributes. Lastly, females mature more quickly than males so that females enter and exit each stage slightly earlier than their male counterparts.

Age category	**Psychosocial characteristics**
6-8	• Short attention span • Difficulty viewing the world from the perspective of others • Self-centred • Developing self-esteem and self-worth but fewer subdomains seen and less differentiation • Self-esteem and worth based on a limited number of sources • Self-esteem and worth seen as "good" or "bad." • Self-esteem often positive but unrealistic • Cannot handle criticism and failure well • At times can act out to gain attention • Cannot differentiate effort and ability • Limited ability to think abstractly so concrete examples needed to understand • Frequent mood swings • Strives to please parents and authority figures for adult approval • Dependent on significant others for feedback • Strict adherence to rules
9-12	• Begins to recognize others' perspective • Starts to differentiate effort and ability and task difficulty and luck • Can better focus and make decisions but still developing in this regard • Can better understand technical strategies

- Verbalizes thoughts and feelings
- Can talk through problems
- Wants to be with friends/trying to understand friendship with peers, especially same-sex peers
- Have best friends/want to be close
- Idolizes older boys and girls
- Looks to adult authority figures for direction but starts to want independence by period end
- Starts to understand emotional processes and multiple emotions
- Active and boundless energy
- More sophisticated and realistic self-representation
- More realistic view of self
- More differentiated self-esteem
- More self-comparison regarding physical status
- Friendship predominantly based on shared interests and common characteristics
- Uses peer comparisons, feedback from adults, and actual performance to judge competence
- Learns skills in parts
- Begins to see authority figures as fallible
- May defy authority
- Develops patience
- Strives to please parents but peers become more important
- Begins to be able to reflect
- Rules can be negotiated
- Behaves morally to avoid punishment

Table 1: Psychosocial characteristics (Martens, 2012)

2.3.2 The coach

2.3.2.1 Introduction to values

Coaching children is much different from coaching adults. The big difference is that younger athletes are more easily influenced and continuously faced with new situations and experiences. During the period that they are heavily involved in the sport, ages six to 16, they undergo rapid changes and are significantly affected by what happens to them. Coaches have the additional responsibility of taking on an educational function which affects the sport itself. This means that they must understand the impact their priorities and actions have on the children they coach.

Additionally, it is essential for coaches to establish those priorities and be clear about their philosophy of coaching. Philosophy of coaching is an aspect that is often neglected or ignored when coaches meet to continue their education or merely discuss coaching their sport. Without an established coaching philosophy coaches will adopt the most common philosophy which will usually be the professional or elite sports model which emphasizes winning (Martens, 1988).

It is, therefore, vital for coaches to clarify their values and motives to understand the part they play in the lives of the children they coach. It is without question that coaching children is an educational activity, not only concerned with facilitating competitive success, but also developing values in athletes.

2.3.2.2 The importance of values

The way we coach or do anything in life is a true reflection of our values. Values, as a definition are things that we believe are important to us, they show what we believe is important between competing goals and actions. Values can either be something in which we would like to attain (terminal values) or the way in which we behave (instrumental values). Both two types of values are based on a) personal, that does not involve other people or b) social, that involve interpersonal effects. Normally values are categorized into systems, meaning that different values take on order of priority of thinking which determines our choices and behaviour.

2.3.2.3 Nature of values

Values consist of certain characteristics. Firstly, value is a form of belief, something that is present in our minds rather than existing in the objective world. As it is with other beliefs it has three aspects: a) what we know or believe to be true, b) how we feel about it-good or bad, and c) how we behave is consequential (Lee, 1999).

Secondly, value seems to be rather enduring; when we feel that something is worth chasing or a specific way of behaving it is not easy for us to be persuaded otherwise. This is largely due to the fact when in our youth and growing up we learn values. Values are learned in isolation and an all or nothing attitude. As we mature, we face more complex situations and making a change from those earlier established values is hard to do.

Thirdly, values are thought to operate consistently through different situations. Logic would dictate that the same value structure that is present in life would transcend to sports (Lee, 1999). This is not always the case.

2.3.2.3.1 Attainment values

Attainment values are perceived to be those goals that we have established ourselves and are not concerned with the welfare of other people or society at large (Lee, 1999). Striving to win an important sporting event or a level of performance in sport represents the behavioural indicator of values associated with attainment.

2.3.2.3.2 Social values

Goals that we have for society are social values, or the small part we have in the sporting context of the club or team. These sporting environments will provide such value aspects as fair, freedom, and equality of opportunity. Social values can be shown in the club policies which facilitate access to minority groups or makes sure everyone has equal play opportunities on a tennis court.

2.3.2.3.3 Competency values

Competence values look at how we as coaches or athletes want to show how good we are at playing a sport. They are personal and concerned with the way we behave and the demonstration of our abilities. In a sporting context they could be represented by setting high goals, or being a hard worker and skilful (Lee, 1999). The inability to reach these standards results in a feeling of disappointment or even shame. Coaches who are supporters of competence values will encourage high levels of performance consistently.

2.3.2.3.4 Moral values

Moral values are interpersonal and instrumental. Within the realms of sports moral values are defined as sportsmanship. By not upholding them results in a feeling of guilt since we violate a set of rules for behaviour towards others which we feel is important. It is important to recognize that values guide our actions, they do not all refer to moral or social values, and that personal values with attainment and competence are perfectly valid and desirable. The reason to bring forth these values is to show that although they guide coaches, they also bring understanding on how that coaching is executed.

2.3.2.4 Coaching value

Values that coaches have adopted relate to their reasons for coaching. Further input is obtained from the children who frequently look upon their coaches in awe and think of them as role models. They sometimes end up thinking what the coaches think; their attitudes are the coaches' attitudes; their values are the coaches' values. It is imperative not to undervalue the impact coaches have on athletes they are coaching (Lee, 1999).

It is essential to put into context why coaches coach children. The reasons for coaching largely shapes what they do and what they do not do. It is also a determining factor when it comes to the amount of success they obtain (Lee, 1999).

- **Coaching elite athletes**

Most coaches are very keen to coach champion performers, elite athletes. They receive great satisfaction from helping their athletes attain both the pinnacle of their performance

and competitive public success. To achieve this goal involves working with children who have an unusual ability, focusing on skill and fitness, and training them in a limited range of activities, usually starting at an early age. This coaching technique may be positive, even necessary, for those children who match overall goals in sports participation. Others might be passed over, however, and potentially miss the opportunity to develop in the sport. The values promoted here are personal and competence. The aim is of accomplishment and on being ambitious and disciplined. Smoll and Smith (1979) have done some research in this area of the coach driven objective to win and noticed that sometimes winning is wanted more by the coach than the athlete. Smoll and Smith (1979) also point out that children can learn from winning as well as losing. They defined the personal definition of success and failure which has a significant influence on their child's interpretation of play in sports.

- **Interest in children**

Some coaches prefer to coach children more than adults because they are interested in the welfare of children. Many coaches are already teachers and are aware of the educational impact of what they do. This motif suggests a general concern for interpersonal values and sport for others.

Coaches' interests in children's welfare may view sport as a way leading to personal and/or social development. The latter will result in developing the ability of all levels for its sake. The ability to deal with success and failure is as important as the outcomes. This occurrence will result in putting a high emphasis on such things as cooperation with others, the development of fair play, accepting rules, and creating opportunities for leadership.

- **Enjoyment**

Some coaches enjoy engaging with children and instilling a love and appreciation of the sport. Coaches and parents have prominent roles to play in determining how much enjoyment children obtain from the sport (Lee, 1999). It is hard to describe precisely what people enjoy about the activity. Smoll and Smith (1979) found that athletes who

enjoyed playing the game felt a sense of happiness. The most important feature of what children liked in their coaches was a sense of humour so that they could relax and have fun (Lee & Austin, 1988).

An investigation conducted by Lee and Cockman (1991), identified ***values that children felt when playing the sport.*** First, young athletes expressed values which were aligned with the sport, or at least relative to sports settings. Second, through analysis of the frequency of occurrences, they identified differences between sexes and players in different sports. Value culture was associated with different sports which were transmitted by coaches. Based on the type of sport and the sex of an athlete values were developed that became apparent specific to those different sporting conditions. This is contrary to previous research that spoke of universal values for sports participation. Third, the most common mentioned values were winning, enjoyment, and sportsmanship. Young people appeared more concerned with enjoyment and satisfaction in their sport.

There is underlying importance of coaches in understanding what children's values, both about their goals and their modes of behaviour in sport and the influence they have on those values. Values and motives are closely related although not identical. Values may refer to a variety of outcomes which may or may not constitute primary motives. Motive, however, can be considered as reasons why people do things. A coach's motives may be understood and explicit, but coaches are not usually aware of the values which determine their behaviour and can be transmitted to the children. A more in-depth understanding of coaches' and players' values will allow coaches to meet needs of the children they work with.

2.3.2.5 Quality coaching

Quality coaching as a definition has three different components of coaching knowledge, athlete outcomes, and contextual fit (coaching environment). All three components are needed to deliver quality coaching in any particular situation (United States Olympic Committee, 2017).

2.3.2.5.1 Essential coaching knowledge

Coaches require knowledge in a multitude of areas because coaching is complex and coaches accept many roles. There are three broad types of coaching knowledge.

2.3.2.5.2 Professional knowledge: Know your sport and how to teach it

Coaches should have a good understanding of the sports culture, tradition, rules, and history; be aware of the skills, tactics, training, and safety requirements of the sport; perceive athletes' development and learning needs, and be able to apply their knowledge (USOC, 2017).

2.3.2.5.3 Interpersonal knowledge: Know how to relate to and lead others

Coaches should have the ability to engage and work effectively with all stakeholders in a sports setting, including officials, administrators, parents, and programmers. They should also be cognizant and control their emotions and show great leadership skills (USOC, 2017).

2.3.2.5.4 Intrapersonal knowledge: Know yourself and how to sustain improvement efforts

Coaches require a clear sense of purpose and core values and must continually be able to maintain perspective and balance. They need to be aware of their strengths and weaknesses and have the desire to reflect and strive for improvement.

2.3.2.6 Athlete-centred outcomes

The need to develop the whole athlete should be a consideration for all coaching objectives and actions. Coaching for the athletes' holistic development and well-being requires taking into account the emotional, personal, cultural and social identity of each athlete and how this identity influences sports development and performance. This applies to athlete development spectrum-from young children to masters' athletes. A common framework for setting comprehensive athlete outcomes is the Four C's model (USOC, 2017).

2.3.2.6.1 Competence

The wish to help athletes improve their skills is often given as the primary motive for becoming a coach. Also, athletes normally list the development of new skills as one of their main motives for sport participation. The capacity to perform the techniques involved in a sport demand a solid foundation of overall health, fitness, and physical well-being. Therefore, quality coaches pursue the holistic skill development of their athletes, going over and beyond teaching sport-specific techniques and tactics to include informing athletes about healthy training and lifestyle habits, which include areas such as nutrition, rest and recovery, and injury prevention. Allowing athletes to develop their potential and take ownership of the skills needed for achievement.

2.3.2.6.2 Confidence

Being able to reach an athlete's development or performance potential is not feasible without a strong self-belief in his or her ability to execute techniques when it matters. Athletes need to be able to perform under pressure in competitions and sustain repeated failures when learning complex sports skills. Teaching strategies are needed for beating self-doubt and frustration and building their confidence through techniques such as positive self-talk and imagery, supports holistic athlete development and the achievement of athlete-centred outcomes.

2.3.2.6.3 Connection

Many great athletes are independent and determined. These characteristics are essential for developing a competitive spirit; athlete development will be underdeveloped unless they learn how to train and compete. All sports, whether team or individual demand a level of cooperation with and support from others. Teams perform better when there is a high level of trust and commitment to common goals. Athletes, when training and competing alone, need to learn how to receive and use feedback from others and participate with other athletes.

2.3.2.6.4 Character

An entire sporting career can be unhinged with a single moment of unethical behaviour. Holistic development and athlete well-being depend on the coach's systematic and deliberate efforts to build athlete character. Just by participating in sport does not build character, it is the coach that determines whether sport experiences develop character. The first step in building athlete character is to build core values and standards that describe what is required and what behaviours are acceptable.

Athlete Outcome	**Description**
Competence	Sport-specific technical, tactical, and performance skills: overall health, fitness, and physical well-being.
Confidence	Self-belief, resilience, mental toughness, and sense of positive self-worth.
Connection	Interpersonal skills, ability to build and sustain meaningful, and positive relationships.
Character	Respect for the sport and others, integrity, self-discipline, and ethical and moral well-being.

Table 2: The Four C's Model of Comprehensive Athlete Outcomes (USOC, 2017)

2.3.2.7 Contextual fit

This day in age of the internet there are numerous coaching training activities available to search. These prescriptive coaching sources although very assessable should not be implemented without attention to context. Quality coaching entails the ability to adjust one's coaching knowledge to the specific requirements of the athlete, and suite the specific environment in which the coach is in (USOC, 2017).

2.3.2.8 Constraints-based approach

The ever-changing game conditions suggest that decision-making and action be defined in a moment-to-moment basis. The perception of key informational sources reveals the real adjustments between the properties of the task and the individual player's characteristics (Davids, Araujo, Hristovski, Passos, & Chow, 2012).

During a tennis rally, the opportunities to act offered by the situations that arise from the continuous relationship between the player and his/her opponent. A player must be perceptually in tune with the match characteristics that inform how and when to act to achieve a goal.

The player does not passively receive information but seeks it. Improving the ability to act successfully results primarily from increasing the perceptual atonement to relevant properties of the environment that guide action to achieve a goal.

2.3.2.8.1 Training: A process of manipulating relevant constraints.

Training is a method centred on the manipulation of the key constraints that magnifies information sources that assist players to achieve their goal (Carvalho, Araújo, García-González, & Iglesias, 2011). Constraints refer to the demands that are placed on the action that can be of a varied nature; instruction and augmented feedback given by the coach, movements of the players, type of ball or racquet that is used, or the movement amplitude of a certain joint (Carvalho, Correia, & Araujo, 2013).

These constraints, which concurrently interact to channel behaviour, are conceptually organized in three main categories: 1) the task, 2) the player, and 3) the environment. These three constraints influence training and performance.

Task constraints speak to the characteristics of the task such as goals, rules, and implements. The way players interpret that action depends on the context it is received. The ability to reach a given goal is constrained by the condition in which the task is executed. For example, the players' behaviour is influenced if the player is asked to keep five rally balls from the baseline before forcing an aggressive shot. If that aggressive shot is created with a forehand, they score a point. The coach can utilize different strategies to enforce task constraints, knowing that all the categories of constraints are always interacting (Carvalho et al., 2013).

The result of manipulating the different task constraints changes according to the playing level of the players. The constraints for the player are mainly concerned with:
1) Structural that is, those that are relatively constant over time: the morphology, the body composition or, even, the skill level in a given task.
2) Functional, referring to the thoughts, emotions, motivation, fatigue, speed, and concentration.

Constraints that are structural cannot be changed but can be present when choosing training opponents. When working with these constraints, practice situations can be designed to limit the fact of a player being taller, stronger, being more tired, or having a lower level of performance. For example, as a tall player with a good serve to engage in point play using only one serve as opposed to two serves that are allowed according to the rules of the game (Carvalho et al., 2013).

Environmental constraints are both social and physical. Players' development is dependent on the training climate built by the coach. The coach can set two different types of social environment: task or ego oriented (Roberts, Treasure, & Conroy, 2007).

Ego oriented looks at competition environment and how the player compares his/her performance with others performance. Task-oriented training environment calls to the intrinsic motivation of the player and incentives to improve his/her performance, having the reference of what he/she previously did.

Different sources of constraints work together at the same time to influence behaviour. The constraints-led approach supports that players should learn how to perform in the face of internal and external variability. The ability to manipulate constraints intervention is determent on the induction of functional variability in key constraints to performance. This method promotes the development of better perceptual atonement to the on-going match characteristics that the player receives, dependent on the characteristics and circumstances on how to achieve a specific goal (Carvalho et al., 2013). Within the realms of scaled tennis equipment programming the constraints of the ball, racquet, and

courts are available to the coach to manipulate and achieve success. Additionally, the task that the coach presents to his/her students is also available in the constraints-based approach to adapt and refine to achieve success. The non-scaled equipment has limited ability to achieve this degree of success for young beginner tennis players.

2.3.2.9 Coaching styles

Majority of coaches use one of three coaching styles: the command style, the submissive style, or the cooperative style.

2.3.2.9.1 Command style

For the command style of coaching, the coach makes all the decisions. The objective of the athlete is to respond to the coach's command. The theory dictating this approach is that because the coach has all the knowledge and experience, it is the coach's responsibility to tell the athlete what to do. The athlete is required to listen, absorb, and comply. This style of coaching is the most popular style used from the past (Martens, 2012).

2.3.2.9.2 Submissive Style

Coaches that use the submissive style make as few decisions as possible. This method is a throw-out-the-ball-and-have-a-good-time tactic. The coach delivers little instruction, gives minimal guidance in organizing activities, and resolves discipline problems only when required. The submissive style is often referred to as a babysitter (Martens, 2012).

2.3.2.9.3 Cooperative style

Coaches who decide to use the cooperative style share the decision making with their athletes. Cooperative style coaches do realize their responsibility to guide and provide leadership toward achieving the goals of the training session. However, they know that young people cannot become responsible adults without understanding how to make decisions. The only issue with cooperative style coaching is providing the right amount of directing athletes and engaging them directing. There is a sharing in the decision making between coach and athlete. Coaches that use cooperative style focus on teaching. This

type of teaching includes not only technical and tactical skills but also life skills (Martens, 2012).

2.3.3 The parents

Parents play a pivotal role in youth sports programs. Parents essentially provide three critical roles in youth sport: interpreters, role models, and providers (Fredricks & Eccles, 2004). They serve as interpreters of their child's sporting involvement, communicating beliefs and values relative to success, performance, and sports development. Parents can model their children's attitudes and behaviours by showing appropriate and inappropriate behaviours in sporting environments. Parents may also facilitate sports experiences by shuttling children to practices and matches, paying registration fees, supporting their children at competitions, and, in some situations coaching, organizing, or officiating junior team and leagues (Wiersma & Sherman, 2005). Overall positive parental involvement has been linked to athlete enjoyment, and sports adherence (McCarthy, Jones, & Clark-Carter, 2008).

When perusing previously published investigations about the influence of parents in youth sport in the USA, Gould et al., (2006) surveyed 250 junior tennis coaches to understand better the perceptions of coaches and how parents influenced their child positively or negatively. The study found that according to the tennis coaches that 59% of parents had a positive influence on their child's tennis, and 36% parents were perceived to hamper their child's tennis development. An additional survey was conducted in the USA (Shields, Bredemeier, LaVoi, & Power, 2005) with 189 youth sports parents, which showed 14% of parents yelled at or argued with referees, and 13% criticized their children's sports performance. In another study (DeFrancesco & Johnson, 1997), over 20% of parents of 101 tennis players showed negative behaviours regarding children's tennis performances. Another study identified instances of angry verbal, nonverbal, or physical interactions between children, parents, and athletes (Omli & LaVoi, 2009).

Youth sports athletes have stated that over-involved parents cause stress (Reeves, Nicholls, & McKenna, 2009). Over-involvement refers to a parental focus on winning, unrealistic performance beliefs, or over-excessive negative feedback after the competition

(Gould et al., 2006). Over-involved parents can impact children's enjoyment of sport negatively, lower their self-esteem, self-confidence, and increased anxiety (Knight, Boden, & Holt, 2010). Parent over-involvement can cause children to burnout or drop out of the sport altogether (Knight et al., 2010).

Hellstedt (1987), discovered a continuum of parental involvement from under- to over-involvement. Under-involved parents were defined as parents who do not invest financially, emotionally, or functionally in their children relative to sports involvement. Over-involved parents are parents who take an overbearing interest in their children's sport, and consistently make attempts to coach children. Moving parental involvement through a continuum from over-to-under involvement, however, shows how simple parental involvement is. Researchers are encouraged to look to distinguish these different dimensions of parental involvement to progress insight into this subject (Knight et al., 2010).

A study completed by Stein, Raedeke, and Glenn (1999) delved into the ongoings of parental involvement in children's competition experiences. The researchers primarily measured the amount and degree of parental involvement and linked it to children's perceptions of pressure and enjoyment in sport. Results revealed that quality of involvement was more important than quantity. Specifically, children who showed the better-perceived quality of parental involvement displayed less stress and more enjoyment. The authors, however, acknowledged that further research is required to identify specific factors that direct higher quality of parental involvement, which leads to less stressful and more enjoyable sports participation.

Parental behaviours during competition have been analysed by Kidman, McKenzie, and McKenzie (1999). They investigated behaviours of 250 parents of 6-12-year-old athletes at 147 team sports competitions. Parental feedback to questions was divided into positive and negative outcomes. Results showed that 47% of parents made positive comments during the competition, while 35% made negative comments. Goldstein and Iso-Ahola (2008) analysed determining factors of "side-line rage" shown by parents in their children's sport competition events. Findings revealed that parents who exhibited higher

levels of ego defensiveness felt more pressure and anger compared to less ego defensiveness.

Likewise, investigators (Holt, Tamminen, Black, Sehn, & Wall, 2008) of parental involvement at youth soccer competitions noticed a continuum of parents' verbal reactions from controlling to supportive comments. To be specific, Holt et al., (2008) observed that parents provided support and encouragement, performance-contingent feedback, instructions, a balance between positive and negative comments, negative comments, and offensive comments.

Another example that focused on parent's involvement in the competition was done by Bowker et al., (2009) during 69 youth hockey games. Similarly, a two-thirds of comments (66%) were deemed positive while one-third (33%) negative. Negative comments were more directed at referees and positive comments towards the players. The nature of parents' comments, however, seemed to vary depending upon competition level and gender. The more stressful and higher level of competition the comments made by the parents seemed to progress to being more negative. When comparing male and female comments, females were more positive than males. The above studies give more insight on how parents behave at their children's sports competitions. A few issues need to be clarified first. All studies involving parents' behaviours at competitions have come from researchers' perspectives. Insight is required in what children think are positive or negative parental behaviours. Bowker et al., (2009) and Holt et al., (2008) have shown that, in most cases, it is not clear whether children hear parental comments from the side-lines. It is quite likely that children have more understanding of parental nonverbal communication, as opposed to verbal communication. Again, it is not clear to children's interpretation of parental nonverbal communication.

Knight et al., (2010) looked at children's preferences for parental behaviours in the sport of tennis. Tennis, an individual sport, brings out children's successes or failures observed by parents, compared to team sports where team members could mask individual children's performance. In tennis matches, parents are usually present before, during, and after, and can have a considerable influence on young players (Harwood & Swain, 2002). There are numerous examples of over-involved parents in tennis. Headlines like *Tennis*

super-brats and their over-pushy parents (Pearson, 2009) and *Pushy parents poisoning junior tennis* (Gerard, 2008) add dramatization; however, they do provide an idea of the intensity that is present within junior tennis (Gould et al., 2006).

Researchers (Gould et al., 2006; Harwood & Knight, 2009a, 2009b; Knight et al., 2010) and sports organizations (USTA, LTA) understand the importance of analysing parental behaviours. In response to these concerns, tennis parents in the USTA and LTA have sanctioned studies (Gould et al., 2006). Gould and colleagues (2006) used a three-part research project to identify the role of parents in tennis players' lives, looking mainly at positive and negative influences. The study involved a survey of 250 junior tennis coaches, focus groups with 24 high-level junior coaches, and interviews with nine elite adult players, eight of their parents, and nine of their coaches. Overall, a majority of parents were identified as having positive influences in their children's tennis development. Some negative parental behaviours were also recognized: parents concentrating on match outcomes instead of player development; taking too much of coaches' time; too involved with training; and overly involved in their children's tennis. This feedback is advantageous to parents, coaches, and the governing tennis bodies. Although the information gained from coaches and junior athletes, the notion of how parents should be involved was not included.

Much like Gould and colleagues (2006), Harwood and Knight (2009a, 2009b) research was sanctioned by the LTA to understand the stressors parents give their children. Data were collected from 123 parents through open-ended surveys, and 22 interviews with tennis parents. Questions were geared towards parental behaviour around the competition. Parental feedback was quite impressive, as they mentioned they did not know how to act or what to say before, during, or after a match. The next step is to find out from children how they would like their parents to behave in competition.

Knight et al., (2010), examined the degree to which children in Western Canada would like their parents to act in the competition. An age range of 12-15 years old were included as this is when children in Canada can specialize in specific youth sport. The specialization stage is where athletes become more involved in their playing careers and

increased parental involvement in competitive events (Cote & Hay, 2002). Relative to the frequency of competition, athletes were required to compete at least once a month in

provincial level competitions as an indicator of their commitment to the sport. It is for the above criteria that the participants were chosen.

The sample consisted of 42 junior tennis players (n=26 male; n=16 female) aged 12 to 15 years. On average, participants had played tennis between one and 10 years and trained on average four to 18 hours a week and participated in two competitions a month. All participants had competed on a provincial level, 52% had progressed to the national level, and 12% to the international level.

The findings of this research can contribute tremendously towards the parent-child relationship when it comes to competition. Parents play an influential role in their child's sports development. Feedback from players consisted of parents not providing technical and tactical advice, commenting on effort and attitude, providing practical advice, respecting tennis etiquette, and matching nonverbal behaviours with supportive comments (Knight et al., 2010).

2.3.3.1 Parental role in young athlete development

Adolescence is a transitional period for children as well as parents. Parents noticed reduced companionship and level of authority from their children as they get older. Navigating this new role requires parents to allow their child to experiment with independence and let go of their old relationship. The parents of young athletes must work through this process to enable them to support their children without controlling their performance. Sport can be a productive opportunity for adolescent growth and development, but the essential benefit can come when young athletes participate independently and set their own goals. Parents play important roles in encouraging while helping their children negotiate the challenges of sports participation, in particular failures and stress.

- **Support without pressure**

It is difficult for parents to juggle on how to create an environment of support and an atmosphere of low pressure. Researchers show (Gould et al., 2006; Knight et al., 2010) how young athletes wish for their parents to be involved in their sports participation. Players who feel pressure from their parents, however, tend to have less motivation and enjoyment (Sanchez-Miguel, Leo, Sanchez-Oliva, Amado, & Garcia-Calvo, 2013). Researchers (Gould et al., 2006; Knight et al., 2010) found that tennis athletes wanted their parents to provide feedback on non-tactical aspects of performance, such as attitude and effort, rather than critiquing their performance and trying to coach. In lieu of young athletes drive for independence, they prefer their parents to perform observational roles in tennis. When parents become too controlling, it can have discouraging goals by way of extending the home as a tennis court instead of the home having structure and support outside the family confines.

- **Achievement by proxy**

One of the limitations of parental over-involvement is "achievement by proxy." This phrase defines a scenario where a parent lives vicariously through the accomplishment of his or her child. The issue here is that the underlying motivation for sports participation is in favour of the goals of the adult rather than those of the athlete. This outlook by parents leads not only to excess pressure on the athlete, but could also lead to neglect and abuse, as parental ambitions take priority over the needs, health, and desires of the child (Tofler, Knapp, & Larden, 2005). It is essential for parents to continuous reflect on their behaviours in making sure their child's sports participation is a positive one (Tofler, Knapp, & Drell, 1999). Support for young athletes requires realistic expectations based upon their stages in development, in addition to consistently re-evaluating their goals for sports participation for the child, the parent, the coach, and other stakeholders. Coaches and parents need to work together to facilitate positive sports experiences that link the desires and physical abilities of athletes.

- **Preventing Burnout**

Burnout, physical or emotional exhaustion leading to reduced sports enjoyment and accomplishment, is a common problem with young athletes (Gould et al., 2006). Burnout is regarded as a response to chronic physical and psychological stress. Factors that contribute to burnout can be both environmental factors, such as high time demands and high-performance expectations, and personality traits such as perfectionism, low self-esteem, and high anxiety. Stress-reducing techniques are the centre of both prevention and treatment of burnout. Deep breathing or reciting daily affirmations can help athletes relax and keep positive attitudes. Additionally, taking consistent breaks from sport can allow young athletes to rest their bodies and avoid overuse injuries. Young athletes are recommended to take off one to two days per week from organized sport and two to three months a year from training and competition (Thomason et al., 2009). It is imperative for parents and coaches to work together and keep realistic goals for their young athletes based on the physical, cognitive, and psychosocial stages of athletes.

2.4 SPORTS EDUCATION IN YOUTH SPORT

Within the confines of sports education (Harvey, Kirk, & Donovan, 2014), there are four pedagogical applications of Sports Education: (1) ethical contract, (2) sports panels, (3) practice and conditioned/modified games, and (4) awards.

2.4.1 Ethical contract

The ethical contract is well-versed in part by a notion from Francophone literature stating that there is a didactic contract that exists between the teacher and students about acceptable behaviour in physical education (Amade-Escot, 2006). Players' share an understanding of assumption about a range of suitable behaviours and conduct while they are active in the play. It can be thought of as a contract between the two stakeholders of youth sport (Kretchmar, 2005). Nonetheless, despite its usually inherent nature, the ethical contract should be apparent to allow a competitive game or sport possible. It can be stated that Sports Education has prescriptive features for constructing this ethical contract, in that it provides the student's opportunities to obtain rewards for things other

than winning, such as points for sportspersonship and fair play, punctuality, and wearing appropriate attire (Harvey et al., 2014).

2.4.2 Sport panels

Sports education provides a level of sophistication to deal with challenges to the ethical contract that can't be resolved by the young athletes themselves during the match or game. Disputes that are not able to be agreed upon on the playing field can be discussed by a sports panel that consists of a representative from each of the team participating in league competition. The panel decides on breaches of the contract. The members of the sports panel can be nominated from each of the teams. Sport panel meetings can offer student members of the panel opportunities to debate vital ethical issues over the season (Vidoni & Ward, 2009). The discussion that takes place within the sport panel meetings has a parallel with the notion of the debate of ideas where students are asked to engage in the verbalization of their decision-making between gameplay. In doing, they engage in critical rather than intuitive thinking (Hsu, 2004).

2.4.3 Practice and conditioned/modified games

The need to control the artificial challenges of a game to get the game perfect to provide an optimum level of challenge for the participants (Kretchmar, 2005). Games need to be modified to the developmental level of the children to get a good game going and develop a good sporting contest (Harvey et al., 2014).

Modifications to the game can be made by adapting the secondary, regulative rules of the game rather than the primary rules. Adjustments can be made to games by applying the idea of representation and exaggeration to these secondary rules (Harvey et al., 2014). Invasion gameplay is modified by using a smaller playing area, smaller goals, fewer players, shorter duration of play, and a smaller ball (Penney & Clarke, 2005). Additionally, the modification of games can provide teachable moments which can be re-enforced via teacher questioning and through a debate of ideas. Students can also be encouraged to put together their own games (Hastie, 2010) while doing so be asked to consider some dimensions of sports literacy (Harvey et al., 2014).

2.4.4 Awards

Giving awards for achievements in addition to winning is another pedagogical application that can promote and facilitate learning of ethical behaviour. In Sports Education, it is not only appropriate to recognize the best and most talented players but also nice to reward the success of other players, such as most improved or the best sportsperson. Awards can also be presented to players that show positive sporting behaviour. This award process also provides the coach opportunities to discuss and evaluate "teachable moments" and why they were of interest (Vidoni & Ward, 2009). This process of giving awards can involve higher order (Kretchmar, 2005) and critical thinking (Hsu, 2004), notably where ethical and moral thinking was present in acts of fair play.

2.4.5. The process of learning in sports education

2.4.5.1. Learning defined

Learning in the context of tennis where the coach is teaching the tennis skills to young tennis players has been defined by the below individuals:

> … *relatively permanent improvement in performance* as a *result of practice* (Martens, 2012).

> … any relatively durable *change in behaviour or knowledge* that is *due to experience* (Weiten, 2014).

> …*the lifelong process* of *transforming information and experience* into *knowledge, skills, behaviours, and attitudes* (Cobb & Houle, 2011).

> …*equipping people for the types of work* needed *now, and in the future* including *innovation and adaptation of learning* to *future work environments* (Watson, 2003).

2.4.5.2 The three ways of learning technical skills.

2.4.5.2.1 Mental blueprints

There is the development of blueprints through the repeated practice of a task (Martens, 2012).

2.4.5.2.2 Abstracting rules

Each time athletes practice technical skills, the brain seeks to abstract the following four types of information about the particular movement:

(1) The condition of the environment (e.g. the playing field or the position of the opposing players) and the position of the athlete at the time the technique is initiated.

(2) The demands of the movement being performed: speed, direction, and force.

(3) The consequences as perceived by the senses during and after the movement.

(4) A comparison of the actual outcome with the intended outcome based on available feedback (information that tells them how well they are performing the task) (Martens, 2012).

2.4.5.2.3 Motor Program

As athletes continue to practice, using feedback to adjust technique, they synthesize these abstracted pieces of information to mould the general rules into a motor program. A motor program is a complex set of rules that, when called into action, permits athletes to move. Once the movement is initiated, the basic pattern of action is carried out, even though the wrong movement may have been selected. Minor adjustments can be made in the primary movement pattern as it is being executed, but the pattern itself cannot be changed (Martens, 2012).

2.4.5.3. The three stages of learning

2.4.5.3.1 Mental stage

When learning a new skill, the overall objective is to understand how to perform the technique correctly which involves a significant amount of cognitive activity as an athlete identifies the mental plan of the correct technique. It is, for this reason, the first stage of learning is termed the mental stage. A part of this stage sees one's brain seek connections

with previous activities already learned, identifies with familiar movement patterns, and starts to build new neural connections.

Characteristics of the mental stage

- The first thing to acquire is the need for an overall picture of the task, which is delivered ideally through demonstration and explanation; and
- The goal in the mental stage is to acquire a good plan for what is needed (Martens, 2012).

2.4.5.3.2 Practice stage

The follow-up to the mental stage is the practice stage. It is not to say that practice was not done in the mental stage; there is now an emphasis on the quality of practice to improve and refine the technique. More time is spent at this stage than the mental stage (Martens, 2012).

Characteristics of the practice stage include:

- The mental energy needed for this stage will be less, and the mental activity will change from importance on learning the sequence of movements to refining the timing and coordination of each phase of the skill;
- As fundamentals are being acquired, errors decrease, and the performance becomes more consistent, this is a sign that learning is happening;
- As the practice occurs, athletes will benefit from sensory feedback information from visual and kinesthetic senses that inform how well the athlete is executing the task;
- In the beginning stages of learning, sensory feedback alone is not enough information to optimize learning. It is then up to coaches to provide that appropriate feedback to facilitate quicker learning;
- When errors occur, it is not appropriate to give feedback as the athlete's senses already confirm that;
- Providing positive reinforcement when senses confirm that occurrence; and

- As athletes continue to practice and learn, they can detect their errors, which is an essential way for them to make adjustments in practice (Martens, 2012).

2.4.5.3.3 Automatic Stage

As athletes practice a skill, the technique becomes increasingly more automatic. Thus, with practice, mental capacity is freed up, which can be used to focus on more critical elements to obtain superior performance or to facilitate style or flair. Athletes now have more room to hone and enhance skills (Martens, 2012).

Characteristics of the automatic stage involve:

- The performance of the athlete now becomes more reliable and when an error is made self-correction is evident;
- Overanalysis of one's skill is likely to hamper performance. The skill is now automatic, and when athletes begin analysis during execution, disruption of performance is evident. Often feedback from coaches during this stage is to stop thinking and just let the performance happen; and
- An advantage to have technical skill feel automatic. However, skills need substantive and meaningful repetition to keep it in the autonomous stage (Martens, 2012).

2.4.6 The process of teaching in sport education

2.4.6.1 Teaching defined

Teaching as in the above learning case in the tennis context is the ability of the coach to teach the young tennis player. It is defined by the below individuals as:

> … *presentation of data* in the form of examples to *help learners identify concepts* (Ur, 1999).

> … a process of *enlightening and enriching* those who *do not know by those who do know* (Sfard, 1998).

… the way *knowledge and experiences are sorted out* to form a *specific class* (Ramsden, 2003).

…the presentation of *visual and non-visual aid* and the *induction of learners* to help them *create and understand the concept* that the *teacher wants them to learn (*Stokes, 2002*).*

… the *act, process, or art of imparting knowledge and skill*: *education, instruction, pedagogy, training, and tuition* (Darling-Hammond, 2006).

… the *process that facilitates learning. The teacher acts as a catalyst that actively stimulates learning* (Wilson & Stacey, 2004).

2.4.6.2 Theoretical frame of reference: Teaching technical skills.

To teach technical skills, a coach needs a plan. This plan as implemented by Martens (2012) in different steps is structured in the following theoretical frame of reference:

A coach delivers a typical lesson and adopts a modified way to help the children achieve success. As the lesson progresses, there is the implementation of the technique in a context of a game situation. There comes the point where the play breaks down and the need to teach technique/fundamentals. The suggestive way is to follow the four steps of introducing the technical skill, demonstrate and explain the technical skill, have athletes practice skills, and correct errors (Martens, 2012).

The essence and nature of the process will now be discussed comprehensively to understand the deeper meaning of the process of teaching technical skills:

2.4.6.2.1 Step 1: Introduction of the skill

- Introduce the technical skill with *enthusiasm* expressed in *actions and words;*
- Speak *clearly* and use *language the athletes can understand*; the younger the athletes are, the simpler the words need to be;
- Be *brief* too. Say the essentials in less than three minutes; and

- Avoid sarcasm, annoying mannerisms, and abusive language; they create a negative learning environment (Martens, 2012).

A good introduction involves:

(a) Getting the team's attention:

- Start each teaching session with a general routine: location; begin the session by giving a signal (blowing a whistle); positioning for effective teaching [eye contact with all the members – also see (b)]; and

- Have a strategy for those athletes not paying attention: look directly at them, move closer to them, and politely but firmly address them by name and ask for their attention. If this fails, have them move to where they cannot disrupt the session. Speak with these athletes either at an opportune time later during the practice or afterward (Martens, 2012).

(b) The arrangement of the team:

- Athletes must be organized in a manner that they can see and hear the coach;

- Milling around or crowding together is a problem in the initial stages of the session and this will make keeping their attention difficult;

- The background of the coach should be free of visual distractions, and the athletes are not facing the sun; and

- Select a practice area with minimum noise (Martens, 2012).

(c) Identification and reasons for learning technique:

- Identify technical skill to reference. If a skill is widely known by a specific name, use that one. If not, select a short, descriptive title that is easy to remember;

- Why is knowledge of a scientific name for a skill so necessary? Example: In anatomy, biceps instead of upper arm muscle? and

- Sometimes the reason for learning technique is not so apparent, especially to athletes with little experience. The better athletes understand why they are learning a specific technique and how it fits into the total plan for playing the sport. Understanding why they are learning also increases their motivation to learn (Martens, 2012).

2.4.6.2.2 Step 2: Demonstration and explanation

- Demonstration and explanation are the prerequisites for developing a mental plan for a technique;
- The technique should be demonstrated by an athlete who can perform the technique proficiently and whom the athletes respect;
- If the coach cannot demonstrate a specific technique, there are several alternatives: Practice the technique until it can be demonstrated correctly and/or ask someone who is skilled in demonstrating perhaps a more able player on the team, an assistant coach, or a friend; and
- The use of multimedia (Martens, 2012).

Practical demonstration and explanation consist of three (3) steps:

(a) Demonstration

- Make sure the coach has the athletes' attention during the demonstration;
- Relate to the general execution of the skill;
- Demonstrate the whole technique just as it would be performed in a competitive situation. Demonstrate several times, showing how to perform the technique from different angles. If the technique is performed from a dominant side, demonstrate it for “lefties” and “righties.” ;
- If the technique is complex, demonstrate the major parts separately; and

- If the technique is performed rapidly, demonstrate it at a slower speed so athletes can see the sequence of movements (Martens, 2012).

(b) Explanation:

- Keep explanations simple and brief;
- Make certain that the explanation agrees with what is being demonstrated; and
- Relate the technique to previously learned techniques (Martens, 2012).

(c) Feedback on understanding

Check to see if athletes understand how to perform the technique by inviting or asking questions. If necessary, repeat a question so everyone can hear. Keep answers short and relevant.

2.4.6.2.3 Step 3: Practicing the skill

- Athletes should begin practicing the technique as soon as possible following the demonstration and explanation; and
- Critical decision: Should the players practice the whole technique, or should it be broken up into parts?

(a) Whole versus part practice

- It is best to practice the whole technique to avoid spending time combining the parts back into the whole and to help the athletes learn how to use the technique in the context of the game; and
- If the technique is so complex that athletes, however, cannot develop a good mental plan (the first stage of learning), then the coach should break the technique into parts.

(i) When to break techniques into parts

To decide whether to break a technical skill into parts, the coach needs to evaluate the task in two dimensions: first, its complexity and second, the interdependence of the parts (Martens, 2012).

Task Complexity

Two questions will help coaches determine task complexity: first, how many parts are there to the task and second, how mentally demanding is the task?

(Inter) Dependence of the parts

This concept reflects the relationship of one part of the technique to the next. Example: Tennis serve – no separation of the ball toss from the swing of the racquet.

When the task is low in complexity and high in interdependence, the athletes practice the whole technique. By contrast, part practice is better when the task is high in complexity and low in interdependence (Martens, 2012).

(ii) Where to break techniques into parts

- The more interdependent the movement, the more it should be left intact (as a unit);
- Analysing a technique: look for points in the movement at which there is less interdependence, or where there is a transition from one type of movement to another; and
- Most technical skills have a preparation, action, and a follow-through phase. The coach can break the actions between the preparation and action phases. It is difficult to do a break between the action and follow - through phases (Martens, 2012);

(iii) Integrating parts back into the whole

- Practice the first part of the technique;

- Move on to the next part by combining it with the first part; and
- Continue by progressing through each part of the technique until the athlete is finally practicing the entire technique (Martens, 2012).

(b) Seven principles of technical skill practice

Principle 1: Practice the right technique

One of the most common mistakes in designing practice experiences is having athletes perform drills that do not help the athletes learn the techniques required to play the sport.

Carefully analyse the drills the coach provides the athletes. Select only those drills that the coach is confident and will help the athletes learn the techniques needed to play the sport (Martens, 2012).

Principle 2: Practice the technique in game-like conditions

Athletes should also practice the speed to be performed in the competition so that it can be executed safely and with reasonable accuracy (Martens, 2012).

Principle 3: Practice principles: short and frequent

When first learning a technique, athletes are likely to make many mistakes and tire quickly. Therefore, they should practice the technique frequently, but not for too long. When athletes must use considerable mental and physical effort to perform a technique, the practice should be interspersed with either rest intervals or practice of another technique that uses different muscle groups and demands less effort (Martens, 2012).

Principle 4: Effectiveness: time

There are practice time-wasters in coaching technical skills. Suggestions for improving the use of time are provided to ensure effectiveness:

Time-waster 1: Athletes are waiting for a chance to perform an activity.

Time-saver: Reorganize drills, so athletes are more active.

Time-waster 2: The coach talks too much.

Time-saver: Keep demonstrations, explanations, and feedback concise.

Time-waster 3: Moving between activities.

Time-saver: Develop routines for athletes to follow when changing activities.

Time-waster 4: The selection of useless drills.

Time-saver: Work on techniques that need the most improvement.

Time-waster 5: Dealing with athletes' misbehaviour.

Time-saver: Separate the misbehaving athlete from the team, have the team continue practicing, and then speak with the misbehaving athlete.

Time-waster 6: Insufficient facilities or equipment or not having the facilities or equipment.

Time-saver: Be sufficiently organized to make the best use of the facilities and equipment available (Martens, 2012).

Principle 5: Effectiveness: facilities and equipment
Design practice activities to make efficient use of the facilities, equipment, and assistant coaches. Consider maximum and best use (Martens, 2012).

Principle 6: Outcome opportunities: success and failure
Select the right progressions for learning technical skills for the athlete to experience success. If the steps are too complicated, only a few athletes can experience success. If athletes are having difficulty in performing a technique correctly, give them a break or have them practice some other aspect of the sport. A coach could even terminate the process and approach it in another session. Forcing the learning process is likely to produce failure and frustration.

Failure in the learning of technical skill is a possibility, and the athlete should be confronted with such an outcome. The mastering of skill after numerous unsuccessful attempts is of educational value in the sense that it contributes to the athlete's self-

concept and general development. The role of the coach is guiding the athlete in dealing with errors but also at the same time rewarding task (Martens, 2012).

Principle 7: Outcome opportunity: fun
Changing the practice schedule occasionally, being enthusiastic, and letting the team help plan practices are useful ways to make practices more fun (Martens, 2012).

2.4.6.2.4 Step 4: Correct Errors
Coaches must provide athletes with information to correct errors. There are two ways of doing so (Martens, 2012):

- How the completed performance compared with the desired performance; and
- How to change an incorrect performance to more closely approximate the desired performance, is called feedback in didactical terms.

Guidelines for feedback in a successful manner:

- The sooner feedback is given, the more likely athletes will remember what feedback pertains to and practice correctly;
- The more often athletes get useful feedback, the more they will try to correct their performance, and thus, the faster their learning will be. As athletes' technical skills improve, they need to learn to rely more on their own feedback and less on feedback from the coach;
- Learning is more effective when an athlete attempts to correct only one error at a time, which means that the coach must decide which error to correct first. To do so, begin by determining whether one error is causing another. If it is, have the athlete try to correct that error first because this will eliminate the other error(s). However, if the errors seem to be unrelated, have the athlete correct the error that

the coach thinks will bring the most significant improvement when remedied. Improvement will likely motivate the athlete to correct the other errors;

- Athletes, especially those who are a little older, should give feedback to each other. A word of caution, though: If athletes are going to give feedback and suggestions for correcting errors, they must be able to offer accurate information;

- Feedback means to provide feedback precisely on what was done. When athletes perform incorrectly, the coach should share feedback on what they did wrong. Then explain how to do the technique correctly;

- Tell and show athletes what they must do to correct errors. Be careful not to go overboard; give just enough information so that they can concentrate on correcting one error at a time; and

- Positive feedback is good. Specific positive feedback, however, is much more valuable. Such feedback specifies what was correct and reinforces those aspects for all the athletes in a group. An example of specific positive feedback would be "Nice follow-through on that shot."

The same principle holds for negative feedback.

Example: tennis

By saying: "That was a terrible shot" is not helpful. The player already knows the shot was terrible. What is important is how to improve. A more effective approach would be to say, "Your shot was off the mark because you allowed your elbow to swing to the outside. Try keeping the elbow tucked into your side."

- Use sight and sound in providing feedback. People learn in different ways; some gain most from explanations of how to improve, whereas others need demonstrations. Both explanations and demonstrations should incorporate specific feedback (Martens, 2012).

2.4.6.3 Theoretical frame of reference: Teaching tactical skills

Tactics can be defined as an individual level of play or at a team level. A strategy is more of a plan of action of a team for a season or game. Coaches also make mention of a game plan, which is the execution of the team's strategy in specific situations.

To teach tactical skills, coaches need plans. A plan as implemented by Martens (2012) in different steps is structured in the following theoretical frame of reference:

The essence and nature of the process according to Martens (2012) will now be discussed comprehensively to understand the deeper meaning of the process of teaching tactical skills:

2.4.6.3.1 Triangle 1: Reading the play or situation

The role of coaches is to help athletes develop cognitive skills to recognize the problems they face in the contest. In sport, cognitive skills describe the ability to read the situation.

(a) Cognitive skills

Cognition involves the ability to read the situation using the following cognitive skills:

(i) Perception

Perception refers to a person's ability to recognize and interpret sensory stimuli. There are enormous amounts of sensory stimuli. Skilful players learn to direct their attention to the critical stimuli: to focus on what is relevant and to filter out the irrelevant. Relevant stimuli are the basis for making the appropriate decision.

(ii) Attention

Skilful players learn to direct attention to the important stimuli, or cues, in the flow of action to focus on what is relevant and to filter out the irrelevant to make the appropriate decision.

(iii) Concentration

Concentration is the ability to sustain one's attention on the relevant cues and not be distracted by all the other stimuli in that situation or by one's thoughts.

Highly skilled players learn to react extremely quickly to the situation and make the right response by anticipating what the opponent will do. Practical examples include:

- The position of the opponent's body;
- Past experiences in similar situations to anticipate an action by an opponent and thus make the right response; and
- Communication among opponents.

(b) Improving Attention and Concentration

Practical guidelines to improve attention and concentration are essential prerequisites for learning:

- Minimize distractions during practice when athletes are first learning skills, but once they have learned technical skills well, introduce game-like distractions so they can practice focusing their attention and maintain their concentration;
- Avoid distracting athletes with comments during play. Save those words of advice for timeouts and practices;
- Help athletes identify what to attend to and what to filter out-creating a "mindset" or expectation of what to look for in various situations;
- Develop and practice pre-event routines that prepare the athlete to concentrate;
- Instruct players to analyse their play only when there is a break in the action;
- Encourage players to analyse their play, help them to keep the focus on the situation or their performance rather than the outcome of the contest;

- Help athletes who lack confidence and are vulnerable to distraction. Athletes become more confident through positive coaching; and

- Help athletes develop physical and mental skills to meet the demands of the sport. Attention and concentration falter when athletes are physically and mentally fatigued.

2.4.6.3.2 Triangle 2: Acquiring the knowledge needed to make an appropriate tactical decision

Athletes make better tactical decisions when they know the following six elements:

(a) The nature and importance of rules:

Rules define the boundaries within which athletes are permitted to play so that the contest is equitable. The rules set limits on the tactics players can use. Most players learn most rules by watching and playing the sport. Athletes' knowledge of the rules may be incomplete because some situations occur only rarely. Sometimes players learn rules incorrectly.

Suggestions to ensure that players know the current rules of a specific sport are:

- Implement practice games and explain the rules as they pertain to the technical and tactical skills. In this way, athletes learn the rules in the context of the game rather than in abstraction;

- Review the rules that are infrequently applied in sport and that players may misunderstand. Simulate these situations, in practice games and describe the correct or preferred action players should take;

- Always have players play by the rules in practice unless the game has been modified. Be assured that the players understand that this modification only applies during this practice game. When violations of the rules occur in practice, point them out as a "freeze replay." Players will not avoid violations in games if

they do not know there are violations or never had those violations called in practice;

- Consider buying each player a copy of the appropriate rulebook. Help the athletes understand the criteria officials use to evaluate them; and
- Know any changes of the rules and teach these changes to the athletes.

(b) The strategic plan for the season and for specific games (game plan):

- Players need to know the strategy, or annual plan, to follow as they play;
- This strategy should be so thoroughly incorporated into the practice plans that it is self-evident and frequently discussed;
- The team strategy should not be a secret;
- In individual sports, the coach may still have a team strategy and then within that plan have specific annual goals for each athlete;
- It is useful to develop the team strategy with the team and individual goals with each player;
- Athletes are not at ease with team strategies and goals for individuals dictated by coaches; and
- The strengths and weaknesses of the team and opponents are the criteria in the formulation of game plans.

(c) The physical playing conditions:

The coach and his players want to know about any physical playing conditions that may affect the team's play. Part of preparing for a contest involves gathering any relevant information about playing conditions and sharing them with the athletes. Here are some factors to consider:

- The condition of the playing surface;
- Weather conditions: temperature, humidity, and wind;

- Altitude; and
- The type of ball and other equipment used to play the game.

(d) Strengths and weaknesses: opponents.

Most teams want to know as much as they can about their opponents by assessing their strengths and weaknesses to determine the types of and implementation of offenses and defences (tactics in specific situations).

Information can be obtained by:

- Personally observing the opponent's play;
- Watching videotapes of previous games; and
- Utilize systems (statistical data) that record information about opposing teams.

This information is then shared with the team as they prepare for the contest to help them develop the ability to read the situation and therefore have more time to respond to it with a right decision.

(e) Strengths and weaknesses: self-knowledge:

Players must also know themselves. They need to know their technical, physical, mental strengths, and weaknesses. The role as a coach is to help athletes know their capabilities and make tactical decisions resulting in them playing within themselves.

(f) The tactical options for the various situations within the game:

Athletes need to know the tactical options for the various situations they encounter in their sports. Players cannot make decisions about what tactics to use until they know the tactical options available to them. Coaches should be there to teach players tactical options in their sport. Examples of tactical principles are as follows:

- Move to the open space;
- Deny the opponent the open space;
- Hit behind the runner;

- Reduce the angle of the attack;
- Spread the defence;
- Get the opponent moving in one direction - then go the other way; and
- Increase the time to react to reading the play.

2.4.6.3.3 Triangle 3: Decision-Making skills

Athletes are ready to make tactical decisions to give them an advantage. In some situations, athletes may have lots of time to decide on the course of action, but in many situations, they must process the information and decide very quickly. The single best way to help athletes learn to make right, timely decisions is to have them play practice games designed for this purpose.

Vickers (2007) described six other methods for decision training.

Method 1: Teach the tactics in whole, then parts

There are many pros and cons of what is the best method to teach tactics: the whole method or the part method.

- In general: when using the whole approach, a negative aspect is that athletes initially perform more poorly than those who learn the parts only. On the positive side – as athletes continue to practice, they begin to sort out the complexities and go on to a higher level of performance;
- Those who learn parts and then are asked to put them into the whole game do not do as well. It may be that they do not see the big picture of how the parts fit in and, therefore, are unable to integrate the parts into a whole successfully. It may be that they underestimate the cognitive effort involved, become bored with the drills, and lose motivation to learn;
- The coach who wants to present the whole method requires experience and judgment and is based mostly on the ability levels of the players; and

- Develop practice games to work on the parts, so they are closely aligned with the whole game.

Method 2: Opponent observation

- Observe actual contests with players, directing their attention to the tactics being employed and the decisions being made;
- Help athletes develop their own analytical skills as they observe contests so that they become students of the game independently;
- Watch competitions on television or purchase recordings of the contests and share them with athletes;
- Observe highly skilled performers. This helps athletes learn the correct decisions to make and provides a positive image of what to aspire; and
- Observe opponents. This is also helpful because the play will be more relevant to them; it also provides a more significant opportunity to learn from the mistakes observed.

Method 3: Self-observation

Athletes can learn how to make tactical decisions by observing their play through visual feedback. Athletes should initially observe their performances under coaches' guidance. Coaches will want to help them identify the tactics being used by the opponent and the tactical opportunities they missed because they did not recognize the cues. As athletes develop an understanding of the sport, encouragement should be used to assist them in analysis so that they can later be on their own.

Method 4: Variable Practice

Consider the following two methods of practicing tennis strokes:

- Option A: players hit 15 forehand shots; then 15 backhands; and then 15 serves; this is called *blocked practice.*

- Option B they hit the same number of forehand, backhands, and serves, but the coach randomly selects these three types of shots the player to hit; this is called *variable practice.*

Option B is the ideal option: this type of practice is closer to what happens in the actual game, with the tennis player not knowing what type of delivery is coming. Part of learning to hit and distinguishing between different receiving shots and then deciding what type of shot to play is practicing decision making.

Method 5: Controlled feedback

- Occasional feedback: (1) with too much feedback, athletes may overanalyse their performances and thus disrupt concentration and flow. In its extreme form, it is "paralysis by analysis." (2) coaches who provide feedback continuously are doing the problem-solving, denying their athletes opportunities to learn to make their own decisions; and

- More feedback is better than less feedback when athletes are first learning a skill, and less feedback is better as athletes become more skilful. Part of the art of coaching is knowing when to begin to reduce the amount of feedback and how to encourage athletes to identify their problems as they perform and find solutions, in short, helping athletes become more independent decision makers. Reduced feedback from coaches introduced some problems. First, some athletes misinterpreted the reduction in communication as the coach being displeased with them or ignoring them. Others are observing the coach with the athletes-parents and administrators-judged the coach as being less efficient than a coach providing more feedback. Communicate to athletes when reducing the feedback so they can develop their decision-making skills. Also, players are encouraged to confront the coach with the problems they encounter when they are unable to find solutions. Implement questioning as a didactical method to help athletes identify the problems they face and find solutions.

Method 6: Questioning

Coaches must shift their styles from continually giving directions, instructions, and feedback to asking more questions to help athletes identify and solve problems that each sport presents. Asking questions is an essential tool in developing decision-making skills of all athletes once they have learned the rudiments of the sport.

2.4.6.4 Tactical Triangle

From a tactical perspective, think of a sport as a series of problems that need to be solved by coaches and players. Acquiring the ability to make right tactical decisions to solve these problems involves a complex set of tactical skills involving:

- Reading the play or situation;
- Acquiring the knowledge required to make the right tactical decision; and
- Applying one's decision-making skills to the problem.

Players who show good tactical knowledge have good "game sense." Game sense is the ability to apply an understanding of rules, tactics, strategy, and of oneself to provide a solution to the problems associated with the game or by one's opponent (Launder, 2001).

Tactical skills involve decisions athletes make to apply technical skills to specific situations in games to maximize chances of success. Tactical skills also relate to the decisions coaches, and athletes make about the offensive and defensive positions that take place before the start of play and during the game.

Tactical skills involve making decisions about specific scenarios in play. In tennis, this involves making observations in a multitude of inputs such as characteristics of the ball (height, depth, spin, and speed), where one's opponent is, score in the match, type of surface, and weather that day.

In endurance sports such as running, tactical skills involve the pace athletes use at different times in the race. In wrestling, it could be decisions to go aggressive in the first part of the match to get a quick pin or more defensive to fatigue the opponent.

As what was referenced above, decision-making skills in sport are significant components of acquiring and developing tactical skills. Within the realms of a game, there are many unknowns. Being able to understand and make decisions at short notice is a significant component of tactical skills.

2.5 CHAPTER CONCLUSION

Chapter two goes into the background of youth sport and how youth are motivated to play the sport. Mention is also made of the reasons why children terminate playing a sport. In line with the objectives of this research, context is given to coaches and parents. In-depth analysis was provided as to the motives of being a coach and how best to work with youth.

Insight was also provided in the process of learning, and the numerous ways youth learn. Focus then turned to coaches on how best to present technical and tactical skills required to play a sport.

With the background of youth sport laid out, looking at multiple angles and influencers, an in-depth analysis will be relayed from a tennis-specific point of view in chapter three, highlighting scaled equipment as a contributing factor in the development of skills in youth tennis players.

CHAPTER 3:
SCALED EQUIPMENT AS CONTRIBUTING FACTOR IN THE DEVELOPMENT OF SKILLS IN YOUTH TENNIS

3.1 INTRODUCTION

Multiple sports organizations are realizing through research that sport needs to conform more to growth and development of young children because they have different physical, mental, emotional, social, and competitive needs and abilities. Tennis is no different. In the 1970s, the Swedish were the pioneers in the development of a modified version of tennis called "short tennis." Short tennis used smaller courts, small plastic racquets, and foam balls. The United Kingdom quickly adapted this format (Pankhurst, 2016). This evolved into what it is called today as "mini-tennis," in which equipment was scaled to the size of children as they got older and increased in height. It comprised short courts, shorter and lighter racquets, and a range of low compression balls that increased in speed and bounce height in line with the increasing height and strength of 10-and-under children, as they grew stronger and taller.

From the mid-1990s, Mini-Tennis evolved into the way children aged 10-and-under learned the game of tennis across much of Europe. Some research projects have identified the benefits of using scaled tennis equipment which has shown to facilitate success rate of 10-and-under children and improved movement and stroke production of players (Pankhurst, 2016).

What has seemingly been common practice across Europe has only been realized by the United States of America (USA) in 2006 (Pankhurst, 2016). Much resistance was shown by tennis stakeholders, because the USA has produced many great champions, using non-scaled tennis equipment. The ITF, however, made a change in the sport, mandating that slower balls and smaller courts be required for 12-and-under tennis. The USTA developed some programs that enhanced good practices of using modified equipment and

courts when working with 10-and-under children. Even today, after the ITF rule change and the push by the governing body of tennis in the USA, the realization of using modified equipment is not holistically accepted. The evidence shows an improvement in this adoption of scaled tennis equipment through competition formats. Ultimately the objective of using scaled tennis equipment, like other tennis playing nations, is to promote increased participation and to develop the potential of every player (Pankhurst, 2016). A prerequisite for coaching athletes successfully is the principle of a coach's knowledge of a subject as well as of athlete's different levels of development. In this section, an overview of a youth tennis player's psychological status as a guideline in the coaching process is presented.

3.2 AN OVERVIEW OF A YOUTH TENNIS PLAYER'S PSYCHOLOGICAL DEVELOPMENT

The early years of a child's life, including school-age (6-13), offer a unique opportunity to develop healthy psychological development (MacNamara, Button, & Collins, 2010). Psychological development refers to cognitive, emotional, intellectual, social, and moral capabilities. Theorists understand that a child progresses through a series of discrete developmental stages that have a wide variation on what most people call "normal" (Hardoy, Serius, Floris, Sancassiani, & Carta, 2011). When understanding the proper mindset of tennis players, it is essential to understand all the intricacies of tennis relative to other sports (Hainline, 2012). These intricacies are as follows:

- There are no substitutions and no timeouts;
- When playing an official match in a ranked tournament, there is no clock; a match can last anywhere from 30 minutes to several hours;
- A player's opponent in the next round might have had a match that was brief while the other player's match might have lasted 3 hours;
- When playing individual tournaments, the player is alone with no coaching allowed;

- Both aerobic and anaerobic performance and physical fatigue can affect both cognitive and emotional processes;
- The scoring system applied to tennis facilitates mounting pressure. Leads can quickly be erased;
- Nervousness and anxiety play an important role in competition due to the wide range of fine motor skills required for success;
- Competitive categories are determined by age, not size or weight; short competes against tall and small competes against large;
- A player makes hundreds of thousands of split-second calculations for him or her to make contact in the centre of the strings in a way that will result in the ball traveling to the target on the opponent's side of the court. When hitting the ball, many factors need to be taken into consideration such as ball speed, spin, height, and wind conditions. It is not surprising that lapses in concentration or the presence of anger or nervousness can thoroughly challenge gross and fine motor skill execution and balance;
- Singles format is one-on-one competition (situation) and is similar to boxing, where competitor's trade blows. Players see their opponent's facial expressions;
- Rivalries between players can develop into larger than life experiences, fuelling considerable emotional and social pressures to win;
- Spectators are physically very close to competitors during competition. Players can see parental faces of disgust, joy, embarrassment, or fear;
- Opportunities for gamesmanship and cheating are ever present, with possible emotional pressure with players occurring;
- Fractions of inches determine if a ball is in or out;
- Unfortunate losses can be detrimental to a player's confidence; and
- In school-age years, girls frequently beat boys, which can lead to exaggerated feelings of embarrassment and perceived failure in boys.

These tennis-specific stressors can lead to the extraordinary field of demands that can be used to accelerate psychological development. Both increased and insufficient doses of stress prolong development whereas the appropriate dose amounts to positive

developmental adaptations (MacNamara et al., 2010). Temper tantrums, crying, quitting, and tanking are all optimal learning opportunities for increasing self-control and self-regulation. Not many sports offer a wide range of opportunities for psychological development. Instead, the reality of relatively low risk of injury is a great possibility for a player's lifetime, results in tennis being an attractive choice from a learning and development perspective (Hardoy et al., 2011).

For example, at age 6, the child begins to use language to relate displeasure and frustration rather than display aggression or throw tantrums. Being involved in tennis gives the child opportunities to talk through the bombardment of missed balls, mistakes, and unsuccessful execution of complex eye-hand motor skills. During this period, children experience frequent mood changes, need closeness and nurturing from parents, and consistent adult approval and praise. Tennis, when appropriately managed can help children to self-regulate mood swings and provide separation from parents, but still in a fun and supporting environment, one in which the needs for approval and reassurance can be easily met. Another manifestation is that most children are not able to view the world from different perspectives and not able to understand ethical or moral standards without specific and concrete rules. Tennis can be instrumental in the development of this behaviour. Numerous opportunities are provided through group lessons to learn the values such as respect for others, kindness, patience, self-regulation, and control of aggressive impulses (MacNamara et al., 2010).

Some activities contribute to the holistic development of a child. Educators (parents and coaches) have a significant obligation and responsibility to motivate children to get actively involved in physical activity and more specifically in organized sport. Educators are faced with the reality of athlete's withdrawal from sports participation. These concepts of motivation for tennis participation and the withdrawal from tennis are founded in the following frame of reference: being aware of the reason why children participate in sport as well as their reasons for withdrawal has been a relevant and widely discussed topic in sport and exercise psychology. While many of the investigations look at youth sports in general, some studies have focused on the young tennis player's

motives for participation (Kolt & Capaldi, 2001) and withdrawal (Alvarez & Marquez, 2006). Overall, the tennis-specific studies parallel the research conducted on other sports.

Reasons for participation in tennis are fun, physical fitness, improving skills, and making and being with friends (Crespo & Reid, 2007). Youth sports investigations also provide multiple motives for participation. Males and females are more similar than different, although males are often giving competitive reasons like competition, status, and earning rewards, while females give more affiliation-related motives (Weinberg & Gould, 2015).

Researchers (Molinero, Salquero, Alvarez, & Marquez, 2010) have also focused on reasons for withdrawal. Tennis, specifically, points toward the most common feedback for discontinuing participation relating to other things to do (Molinero et al., 2010). The fact that children have challenges with the availability of time it is not surprising as many young athletes participate in a multitude of different youth sports before focusing on those sports that they find more interesting, or unfortunately drop out of the sport altogether. Additionally, children make choices between, for example, tennis and scouts scheduled at the same time. The reason for withdrawal having other things to do is masking the real reason why they do not want to participate any longer which could be a low perceived competence or not being as good as one wants to be. Other reasons for wishing to withdraw include dislike of the coach, perceived failure, lack of team atmosphere/spirit, no teamwork, and minimal competence to desire (Molinero et al., 2010). The last reason for not being as good as they want is particularly important to parents and coaches as they can significantly influence their reason for participating. Other deeper lying motives for withdrawal are perceived competence, achievement goals and goal orientations, and self-determined motivation.

The most common reason in youth sports literature relates to perceived competence or how children view themselves physically, socially, and cognitively (Weiss & Ferrer-Caja, 2002). In other words, youth athletes who think they are physically competent are more likely to participate in sport compared to children who do not. Additionally, children are likely to discontinue sports participation if they lack physical competence. These

comments lead one to think that to enhance and maintain youth tennis participation is to identify ways to help children feel physically competent as better skills are correlated to improved competence. Therefore, trying to get youth to rally quicker from a tennis perspective has much value in attracting and retaining more players in their programs. Scaling equipment as per the *Play and Stay campaign* introduced by the ITF goes a long way to enhance perceived competence in young athletes, from a perspective of matching the task to the participant capabilities and helping players define success on self-improvement (Ebbeck, 1994).

Like tennis, ***achievement goal orientations*** look at how people view success in achievement-related activities (Duda, 2005). An ego orientation looks at establishing success by way of comparing oneself to others via social comparison, for example, winning a tennis match that contributes to one's ranking. Regarding task orientation, one is defining success by making a comparison to one's own or self-referenced standards like being able to improve on previous performances. Comprehensive research has been done, including tennis that supports the notion of a task versus ego orientation, sustain motivation, persist longer at activities, select more challenging tasks, exhibit less anxiety, and experience satisfaction from play (Van de Pol & Kavussanu, 2011).

On the same subject of achievement goal orientations is research on *motivational climates* or how training and competitive environments are stimulated by significant others and coaches (Ntoumanis & Biddle, 1999). A mastery-oriented or task climate focuses on self-improvement, cooperation, and positive group relations, whereas an ego or outcome emphasized climate focus on results and outcomes, a focus on competition between players, rivalry, and recognizing more talented individuals. Studies show that young players who participate in task-oriented motivational climates show higher perceived competence, better work ethics, greater persistence, enjoyment, and effort (Crespo & Reid, 2007).

Lastly, ***self-determination theory*** is one of the most popular and applied motivational theories in contemporary psychology (Deci & Ryan, 1985), and this theory has been

tested in the sports context (Cervello, Santos Rosa, Calvo, Jimenez, & Iglesias, 2007). According to this way of thinking, young athletes can be intrinsically or extrinsically motivated with intrinsic motivation looking at self-determined reasons for participation like self-satisfaction or individual improvement. Extrinsic motivation is looking at external reasons for participation such as receiving tangible rewards for participation or participating to please others. Young athletes and people, in general, are not purely intrinsically or extrinsically motivated, participating for intrinsic versus extrinsic reasons result in multiple motivational benefits. Sports psychologists (Cervello et al., 2007), have suggested that the use of external rewards should not be overused with young players, as this could be perceived as controlling one's behaviour which could result in a decline in intrinsic motivation when rewards are not present.

An integral part of sports coaching is the question of what methods and techniques apply to learning success. The implementation of scaled equipment is such a contributing factor. This research focuses specifically on the issue of scaled equipment in tennis. The perceptions of different stakeholder groups were investigated to clarify the viability of scaled tennis equipment. A discussion of the essence and nature of the scaled equipment, with particular reference to that used in tennis, is warranted.

3.3 A GENERAL INTRODUCTION TO THE SCALING OF EQUIPMENT IN A SPORT

From growing concerns and physical demands imposed on children by adult constraints in sport, the need to scale equipment and modify games to match the physical capabilities of children was first introduced in the 1970s (Winter, 1980). Combined with a focus on competition, and especially on winning rather than skill acquisition and fun, sports organizations realized that this accounted for the increasing proportion of children dropping out of the sport before reaching adolescence (Australian Sports Commission, 1991). Therefore, modified games and scaled equipment were encouraged in school sports programs (Winter, 1980).

The justification of scaling sports for children is beneficial. Consider seven year-olds playing basketball, on a full-scale court and ball, or six year-olds playing tennis on a full-size court, racquet, and ball that bounces over their heads. In both examples, children will experience difficulty in achieving successful play (Buszard et al., 2016). Figure 2 is an appropriate graph to include when speaking of scaled equipment in sports. The graph provides a comparison of how Australian Football, Soccer, Basketball, and Tennis use scaled equipment relative to age and ratio to full size.

The use of a constraints-led approach to facilitate skill acquisition uses a process of self-organization that is dependent on the constraints of that system which in the scaled tennis equipment program are: racquet, court, ball, and task (Davids et al., 2008). The constraints can either be internal or external, which dictate the boundaries within which the human neuromusculoskeletal system must operate. Newell (1986) identified three categories of constraints: organismic (individual's physical and psychological characteristics), environmental (external factors surrounding the performer), and task-related (the rules and goals of the task and the equipment used). Ideal movement patterns are considered to develop from the combination of organismic, task, and environmental constraints. For example, the scaling of equipment (task constraint) can facilitate young children, who lack the strength necessary to use the adult equipment efficiently (organismic constraint). The opportunity to execute the required skills and find the optimal movement patterns when playing a match, especially when external conditions, are less favourable (environmental constraint). As a result, facilitation of the coupling of perception-action processes, which are required for coordinated movement patterns (Davids et al., 2008).

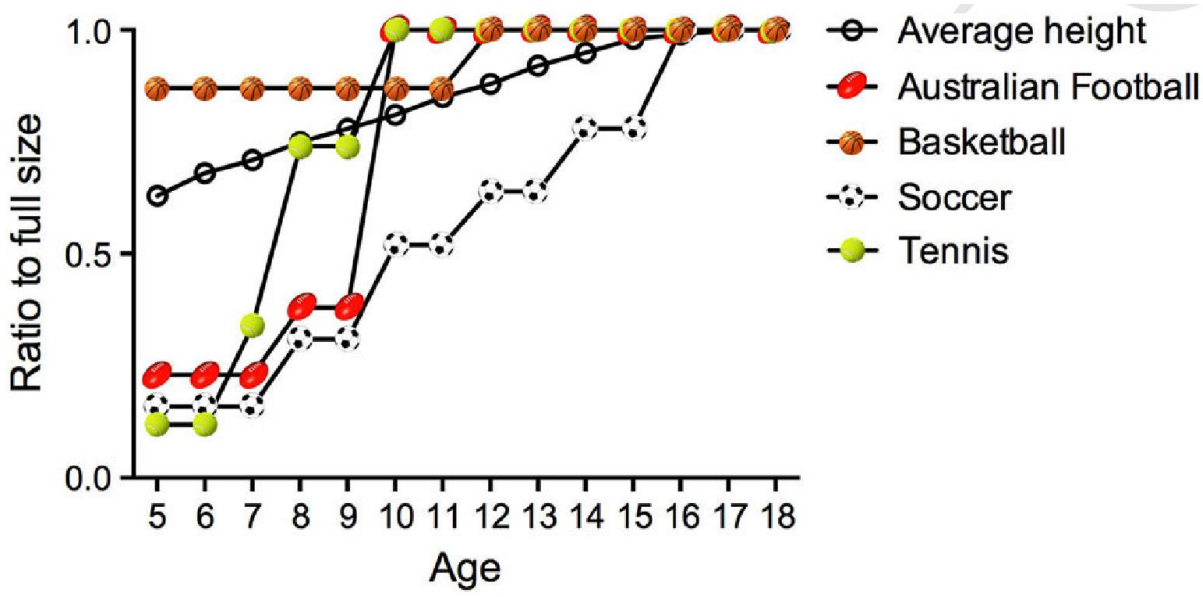

Figure 2: Scaled sports according to age (Buszard et al., 2016).

In a **basketball** study comprising 77 10-year-old children (Regimbal, Deller, & Plumpton, 1992), found 48 (62%) favoured using a junior ball (as opposed to a full-size basketball) and seven favoured using an adult-sized ball. Although the junior ball improved shooting performance for all children, shooting performance was drastically better when children used the ball of their choice, which was naturally a ball smaller than an adult ball.

Increased "shot efficacy" or "*the capacity to achieve the desired or expected effect from shooting"* (Arias, 2012a, p.54) has also been seen in children playing basketball with lighter basketballs (Arias, 2012a), and a lower basket (Chase, Ewing, Lirgg, & George, 1994). This was a result of the increased shooting success that children experienced when shooting in modified conditions. Primarily, an increased sense of skill mastery is linked to being a sign of motivation for the task (Duda, 1996). Significantly, actual motor competence is considered a reliable forecaster of physical activity in adolescent and adult years (Lopes, Rodriques, Maia, & Malina, 2011). Therefore, it could be possible that scaling equipment and play area for children also contributes to future or ongoing participation in physical activity. This has been shown to intricately associate with some health benefits, such as physical fitness and a reduced risk of obesity (Bailey, 2006).

Basketball studies also point toward advantages of scaling equipment for children during match play conditions. Arias and colleagues (2012a) studied the effect of ball weight on children's basketball match play performance. Five of Arias's studies focused on the same group of children. Findings, however, suggested that children executed more dribbling and passing (Arias, Argudo, & Alonso, 2012a), increased shot frequency and greater shot success (Arias, 2012b), and performed a higher percentage of attempted lay-ups (Arias, 2012a) when playing with a lighter ball (440g), as opposed to a regulation ball (485g). Furthermore, the lighter ball led to more one-on-one interactions, because the lighter ball gave the children opportunity to dribble and take on their opponents (Arias, Argudo, & Alonso, 2012b). Similar results have been reported with seventh-grade girls playing basketball, by showing a higher percentage of successful sets and serves during match play when using a lighter ball (Pellett, Henschel-Pellet, & Harrison, 1994). The above results are examples of when the environment is constrained; children will perform sporting skills with more success using a lighter ball.

3.4 SCALING EQUIPMENT IN TENNIS

3.4.1 Introduction

Over the past few years, scaling of equipment that has happened in other sports such as basketball and soccer has made its way to tennis. Scaling of equipment that looks at adapting the fully scaled sport, emulating the growth and development of children (Guggenheimer & Larson, 2013). Scaling in tennis was mostly an area without investigation, but recently the topic has been given some attention. Out of nine researched articles, seven have been submitted since 2010 (Buszard et al., 2014). Considering the importance of adapting tennis to the varying needs of children, researchers to date have shown the use of modified court and equipment, has facilitated improved skill acquisition and more fun (Farrow & Reid, 2010) more implicit learning (Buszard et al., 2014), improved forehand performance (Guggenheimer & Larson, 2013), increased rally speed, lower strike height on groundstrokes and more play at net in elite junior tennis players (Kachel et al., 2014); however, little research has been published on

how tennis players move between the three modified stages of a scaled tennis equipment program.

Specific to tennis, modified equipment, comprising low-compression balls, lighter and shorter racquets, reduced net heights, and smaller courts have been in use for several decades (Winter, 1980). However, many of these modifications have been introduced based on the argument and not from scientific evidence. According to the constraints-led approach to skill learning, the environment, the task, and the performer act together to induce motor performance (Davids, Renshaw, & Glazier, 2005).

Consequently, by scaling equipment, task constraints are changed, which can confine learners' movement patterns to advance skill acquisition. Using a tennis ball that bounces lower compared to an adult-sized ball, allows children to contact the ball at a more suitable height. Therefore, because children can hit the ball at a more appropriate height, it increases the chances of developing suitable movement patterns for tennis groundstrokes.

Researchers who have studied task/equipment scaling in tennis (Farrow & Reid, 2010; Guggenheimer & Larson, 2013; Kachel et al., 2014; Buszard et al., 2014) have shown potential benefits for children using lighter racquets on smaller courts with low compression balls. A lower compression ball travels slower through the air and bounces lower than a standard ball. This enables the player to hit the ball with better technique and more power despite the fear of the ball traveling out of the court (Farrow & Reid, 2010). Another researcher (Elliot, 1981) has also looked at scaling tennis racquets and its impact on hitting performance. Specifically, it was found that scaled racquets facilitate greater horizontal velocity and less vertical movement compared with larger adult-sized racquets (Groppel, 1977).

The use of scaled equipment has taken a roller coaster ride throughout the tennis community worldwide. Much criticism has come from coaches who feel that the method previously followed was good enough and helped both from participation and performance points of view. Coaches who have adopted scaled equipment with their

tennis players in their training, because of their lack of experience or knowledge are unaware of what competencies are needed, or in general, what does it means for a player to move from one stage to the next.

If further insight can be sought that could guide coaches, parents, and the national tennis federations on how tennis players experience each scaled equipment stage, proper and more efficient player development programs could be put into place. More research is needed to challenge the methods of how a tennis player moves through the three stages of a scaled tennis equipment training program.

Modifications that have been made through racquet technology over the past decade have increased the speed of the game of tennis dramatically, forcing beginning players to require a particular skill set right from the initial onset of playing the game. The use of scaled equipment has resulted in slower ball speed which has allowed the play of tennis at a faster rate (Guggenheimer & Larson, 2013). Previous research results using adults showed that using tennis balls of different sizes and types influenced the speed of play (Mehta & Pallis, 2001). When the ball received by tennis players is slower, the player can identify speed, movement, and spin of the ball. In observations of adults, it is plausible that similar benefits can be observed in children. Children should not start playing tennis with fast-moving balls, as the visual system is not adult-like (Kluka, 1999) and impact zone of groundstrokes is too high and could be detrimental to the biomechanics of each stroke (Barrell, 2008).

The USTA is the only tennis federation that has published competencies, but they are technically focused and have no tactical fundamentals (USTA, 2015). The aim of this investigation is to identify more reference tools that tennis federations, coaches, and parents can use.

Humans are continuously confronted with decision making. In making decisions, a person considers related benefits. For example, when deciding to participate in a sport, some benefits could convince a person to include some physical activity into daily life.

The same principle applies to the implementation of scaled tennis equipment. Coaches must familiarize themselves with the benefits of scaled equipment in tennis.

3.4.2 Benefits of implementing scaled tennis equipment

Buszard et al., (2016) completed an investigation on the scaling of sports equipment. Of the 25 articles they perused, four main areas were noted: (1) psychological factors; (2) skill performance and acquisition factors; (3) biomechanical factors; and (4) cognitive processing factors. The promotion of implicit learning is also an important benefit of learning that should be mentioned when coaching.

3.4.2.1 Psychological benefits

Of the 25 articles that were analysed by Buszard et al., (2016), five mentioned psychological benefits for children when using scaled equipment. For example, an eight year-old child playing tennis with low compression balls on smaller courts, stated more engagement during practice sessions compared with a child playing with standard tennis balls on a full-size court (Farrow & Reid, 2010). The environment created by the scaled condition increased the number of viable opportunities to strike the ball, which in turn increased their engagement in the task. Children using the full-size condition had fewer opportunities, which made them feel that the task was too complicated and less engaging. Children of similar age have stated a liking for, and more significant engagement when, using scaled equipment, including smaller racquets and lower compression balls (Buszard et al., 2014) and lower nets (Timmerman, de Water, Kachel, Reid, Farrow, & Savelsbergh, 2014).

3.4.2.2 Skill performance and acquisition factors

Scaling of equipment has been proven to lead to higher task success, and better performance in a range of skills compared to using the adult-sized equipment. For instance, children playing with scaled tennis equipment like low compression balls can hit the ball with greater ease (Guggenheimer & Larson, 2013). Standard balls have a higher bounce than low compression balls (Guggenheimer & Larson, 2013), enabling children to hit balls at appropriate waist height locations (Kachel et al., 2014). Additionally, children generate increased ball velocity while still maintaining hitting accuracy when using low compression balls, which reveals that children hit the low compression ball with more power and are not afraid to hit balls too far (Guggenheimer & Larson, 2013). Furthermore, it seems that performance is further enhanced when low

compression balls are used in combination with scaled racquets. Researchers (Buszard et al., 2014), however, have suggested that ball compression has more impact on hitting performance than racquet size, with low compression balls producing the best performances.

Scaling the task also contributes to skill learning during practice. Farrow and Reid (2010) found that a combination of low compression balls and smaller court size facilitated more volume of practice in eight-year-old beginner tennis players, compared to practice with standard balls on a full-size court, which led to associated impairments in learning. Adult-like practice sessions reduced the number of hitting opportunities, which also reduced the frequency of practice repetitions and, therefore, learning. Additionally, the combination of decreased hitting opportunities and a more challenging practice environment resulted in children in adult practice conditions showed fewer successful forehands and backhands, compared to scaled conditions (Farrow & Reid, 2010).

Elliot (1981) also agreed that beginner tennis players demonstrated greatest improvements in a range of skill tests when using scaled racquets (43cm (17in.) to 61cm (24 in.) racquets), compared with larger racquets 66cm (26 in. racquets), following 16 sessions of practice. Interestingly, the only skill in which performance with a larger racquet was commensurate with a smaller racquet was volleying, which could be influenced by the higher amount of inertia of a larger racquet. Lighter racquets allow children to use the racquet with greater ease, thereby facilitating the development of stroke-making ability (Beak, Davids, & Bennett, 2000).

Scaling equipment also contributes to better performance during match-play conditions. Skilled tennis players, using low compression balls resulted in faster rallies, more shots played at a comfortable height and more volleys at the net (Kachel et al., 2014). In principle, playing with a low compression ball resulted in tennis match play that resembled a professional adult match. A related study using skilled tennis players showed that by lowering the net also had a positive influence on tennis match-play performance (Timmerman et al., 2014). By lowering the tennis net from 0.91 to 0.67 m, players hit more waist-high shots and in front of the baseline, and more volleys and winners.

To summarize the skill acquisition research, it is evident that children:

- Perform skills better when equipment and play area are scaled; and
- Can play matches in a manner that closely resembles an adult match.

Skill acquisition, therefore, should improve when children play sport in a scaled environment. No published studies, however, mentioned above has investigated the impact of scaled equipment over an eight-week period.

3.4.2.3. Biomechanical factors

The main argument for the constraints-led approach is that the body is biologically designed to discover and self-organize optimal movement patterns instead of the constraints put upon the neuro-musculoskeletal system (Glazier & Davids, 2009). Hence, if children play tennis with scaled racquets, their bodies will self-organize movement according to the constraints imposed. Indeed, it is apparent from some studies that scaling equipment results in the production of more functional movement patterns. For example, when Buszard et al., (2014), tasked children to perform tennis forehands with low compression balls, two technical benefits were identified: (1) the racquet's path of the groundstrokes were swung from low to high; and (2) the ball was hit in front and to the side of the body. These benefits were more clearly seen when using the lowest compression of the three balls tested. The lowest compression ball bounces lower and slowest, moving through the air giving the children more time to adjust, and hit with the desirable technique. In basketball, when the basket height was lowered, players adapted movement patterns and executed shots with slightly flatter trajectories (Satern, Messier, & Keller-McNulty, 1989). Unfortunately, results of this study did not clarify if this adaptation was beneficial to shooting performance.

A study of significance conducted by Burton, Greer, and Wiese (1992), focused on 20 participants' throwing motions in four age groups: (1) 5-6 years, (2) 7-8 years, (3) 9-10 years and, (4) 18-33 years. Findings revealed that throwing technique regressed when balls were sized too large for participants' hand sizes. Particularly, when the diameter of the ball exceeded the participant's hand-width, the throwing technique regressed even

further in the backswing and forearm components. Participants adapted throwing techniques with the large ball size by shortening their backswings and using two hands to control balls. Conversely, participants showed better throwing techniques when they were able to grasp the balls easily.

Comparable results were also found when studying children's catching performance. Seven-year-old children showed more advanced catching styles when trying to catch small balls compared to large balls (Isaacs, 1980). Children showed a higher chance of catching balls cleanly with smaller balls, and without using their bodies for assistance. This feedback shows clear guidelines for coaches teaching throwing, and catching, as children require smaller balls to perform these skills, in a way that is sought after for most sport and physical education settings.

There is also an indication that scaling equipment may reduce the risk of injury, by constraining children's techniques to more effective and efficient movement patterns. For example, making a cricket pitch shorter not only makes it easier for junior fast bowlers but also produces more efficient movement kinematics, especially for younger bowlers (Elliot, Plunkett, & Alderson, 2005). Serious lower back injuries, such as stress fractures are common with junior fast bowlers (Elliot, Davis, Khangure, Hardcastle, & Foster, 1993). Elliot et al., (1993) found that the shortened pitch length would decrease the chance of lower back injuries by limiting shoulder counter rotation, thereby constraining the task to facilitate efficient movement patterns and avoiding injury.

Gagen, Haywood, and Spaner (2005) studied four 10-year-old children perform a forehand hitting task where they were asked to swing as hard as possible and hit the ball in the centre of the racquet to the best of their abilities. Four different racquets were used with different masses and lengths. The researchers forecasted that distinctive physical characteristics of each child would determine which racquet produced the most desirable results, as measured by the racquet head speed and accuracy of contact made on the centre of the racquet. Findings revealed that for each child, one racquet produced better speed and accuracy; however, physical characteristics did not predict optimal racquet selection. Further research is needed to understand the ramifications of using various equipment sizes when searching for optimal movement patterns.

3.4.2.4 Cognitive processing factors

A well-researched fact is that cognitive processes guide skill acquisition and performance. Attaining skills, with increased conscious involvement, characterized by the attempt to attain verbal rules about the skill consciously, is referred to as explicit motor learning (Magill, 1998). Acquiring skills via sub-conscious processes, where learners have problems verbalizing the step-by-step of the skill's performance, is termed implicit motor learning (Masters & Poolton, 2012). Over the past two decades, researchers (Masters, Poolton, & Maxwell, 2008; Liao & Masters, 2001) have consistently suggested that implicit acquisition of motor skills is better than explicit learning when performance is required in psychological environments that induce psychological stress or physiological fatigue. Additionally, dual-task transfer tests have identified that individuals who obtained a skill implicitly can simultaneously perform a cognitively challenging secondary task while performing the motor skill (Poolton, Masters, & Maxwell, 2007). Comparatively, individuals who have obtained a skill explicitly, usually have trouble multitasking in these transfer tests.

More specific to implicit learning is the concept of "errorless" or "error reduced" training. Over a range of skills, researchers (Zhu, Poolton, Wilson, Maxwell, & Masters, 2011) have shown that when errors are reduced in practice, skills are obtained with little demands on cognitive resources. Therefore, implicit learning benefits are present. Knowing that scaling equipment makes skills easier for children, thereby causing experiences to increase success, it can be deduced that scaling equipment can place fewer demands on working memory and stimulate implicit motor learning.

The implicit motor learning theory was recently studied using a dual-task method to determine children's skill performance when attention resources were engaged in a secondary task (Buszard et al., 2014). Children executed a basic tennis hitting task in two attention conditions (single and dual-task), using scaled and full-sized equipment. The scaled equipment consisted of a lower compression ball and a 58 cm (23 in.) length racquet, where the full-sized equipment consisted of an adult-sized racquet 69 cm (27 in.) in length. Results revealed that scaled equipment produced better hitting performance and technique, emphasizing that scaled equipment simplifies the skill for players. For less

skilled players, hitting performance was not upset by a cognitively challenging secondary task when using scaled equipment (Buszard et al., 2014). When using full-sized equipment, however, hitting performance decreased dramatically and increased skill difficulty through putting more substantial demands on working memory compared to scaled equipment. The less skilled children in this study, due to their lower tennis skills, had less working memory to draw upon, further stating the case that full-sized equipment place undue demands on working memory in less skilled players.

The impact of equipment modification on conscious processing can also be inferred from research involving adults. A golf putter that was designed to increase the difficulty in putting, induced greater preparation before the skill execution, which researchers (Beilock, Bertenthal, Hoerger, & Carr, 2008) associated with more significant conscious processing. Likewise, equipment that increased the difficulty of the skills demands, more significant attention from the participant during movement preparation and execution was noticed (Lam, Maxwell, & Masters, 2010). Therefore, keeping within the findings of Buszard and colleagues (2014), equipment that increases the difficulty of execution (e.g., full-size equipment), puts heavier demands on attentional resources, hence promoting more explicit control of motor performance (Buszard et al., 2014).

Egstrom, Logan, and Wallis (1960), when examining throwing skill acquisition, mentioned:

"…adjustments made during the practice periods while learning to throw the light ball accurately resulted in automatic adaptations at a subconscious level. When the subjects then transferred to the heavy ball after a period of practice, the increased weight could have elicited a response…. which in turn brought the impulse to consciousness ..." (p.424).

Therefore, throwing a lighter ball stimulates implicit motor learning compared to a heavier ball that engages explicit learning.

3.4.3 Scaling of sports equipment promotes implicit learning

A significant asset to the scaling of equipment, including tennis, is the ability of beginning tennis players to learn tennis skills implicitly. For coaches, parents, and

national tennis federations, learning implicitly is a powerful tool to provide the right foundation to allow the players to perform to their potential.

Fundamental movement skills, (FMS) that are obtained during childhood are known to provide a foundation of lifetime physical activity patterns (Haywood & Getchell, 2001), and facilitate excellence in sports (Abbott, Collins, Martindale & Sowerby, 2002). A correlation between motor proficiency and physical activity participation in childhood and adolescence (Lopes et al., 2011) was found. It is for this reason that training programs encourage the development of FMS in children is strongly recommended by physical education specialists (Haywood & Getchell, 2001). In a review of interventions that looked at developing movement skills, the following suggestions were made. There should be:

- Teamwork between teachers and researchers;
- A learning environment that is known to children; and
- A well-established theoretical model to guide the structure of motor skills training programs (Riethmuller, Jones, & Okely, 2009).

Motor learning models have recommended that when learners engage with the environment, they obtain feedback that allows them to assess their motor output (Wolpert, Ghahramani, & Flanagan, 2001). This feedback includes all sensory information required for movement, which is apparently an essential component of learning (Shumway-Cook & Woollacott, 2001). A common approach to the learning of motor skills has used theoretical models that employ movement outcome errors as a form of feedback, to locate motor control weaknesses, and to stimulate movement improvements (Capio, Poolton, Sit, Holmstrom, & Masters, 2013). As a result, learners collect consciously accessible declarative knowledge and rely upon conscious control to support skilled performance at least until the skill becomes automatic from sufficient practice (Capio et al., 2013).

One modern approach challenges traditional views by proposing that skills can be obtained without comparable gains in declarative knowledge and dependence on

conscious control (Masters & Maxwell, 2004). Masters (1992) explained such an approach as implicit motor learning. The benefits that come with learning skills implicitly are numerous and comprise reduced exposure to performance breakdown under psychological stress (Liao & Masters, 2001) or physical fatigue (Masters et al., 2008), and long-term skill retention (Poolton et al., 2007).

One paradigm established to promote implicit motor learning is termed "errorless learning" (Capio, et al., 2013). The term might imply an absence of errors; the paradigm only limits the environment to reduce the number of outcome errors committed during practice, especially in the early stages of learning (Poolton, et al., 2007). In developing practices in this manner, all forms of feedback are freely available. An increased success rate, however, lowers the requirement to consciously correct motor performance and reduces the amount of accumulated declarative knowledge (Maxwell, Masters, Kerr, & Weedon, 2001). Learners who execute fewer errors show limited reliance on conscious control in comparison with learners who make errors. It has also been mentioned that cognitively demanding secondary tasks, which load the processing resources required for conscious control, do not seem to upset motor skill performance of error-free learners. Lastly, the limiting of errors in learning has been shown to result in more substantial learning improvements, than in more error-driven learning programs (Maxwell et al., 2001).

The lowering of reliance on working memory resources, linked with reducing errors in learning, show that this way of learning might be more appropriate for the learning of motor skills in children with lower motor skills abilities. Less capable physical abilities have been proposed to sway children toward choosing more sedentary lifestyles to avoid movement difficulties (Wrotniak, Epstein, Dorn, Jones, & Kondilis, 2006). In response to these reduced errors during practice could lead to improved self-efficacy, which has been linked with experiences of successful movement performance (Capio et al., 2013). The ability to perform motor skills under physical fatigue, seen among implicit motor learners, could be a desired beneficial effect in promoting motor development in children (Capio, et al., 2013).

A challenge for learners is that their working memory capacity is still developing through childhood (Thomason et al., 2009). Adults process information quicker than children (Ferguson & Bowey, 2005). This sensorimotor hypothesis suggests that young children depend more on implicit memory than explicit memory to learn skills when, with adults, it is vice versa. To maximize motor learning with children, the practice should conform to limiting explicit working memory involvement in the learning process (Buszard et al., 2014).

Implicit motor learning is the acquisition of skill with minimal to no conscious understanding of the information that motivates learned behaviour. For children, a method to promote more implicit than explicit learning is the use of scaled equipment. Scaling equipment to match the physical size of children allows skills to be executed more easily (Farrow & Reid, 2010). Using the errorless learning paradigm, that suggests that by limiting errors during play, reduces explicit hypothesis testing; therefore, scaling equipment will limit working involvement during skill performance (Poolton et al., 2007).

3.4.4. International Tennis Federation (ITF) scaled tennis equipment program

In 2007, the International Tennis Federation (ITF) launched a worldwide marketing promotion looking at increasing tennis participation globally through a *Play and Stay campaign*. "Tennis…Play and Stay centres using the slogan 'Serve, Rally, and Score' and seeks to promote tennis as an easy, fun and healthy game to play" (Miley, 2007). Figure 3 was one of the marketing tools the ITF used in promoting the need to use scaled tennis equipment in tennis play. The figure provides a comparison of average height per age and bounce height of each stages' balls, thereby showing how much easier it is for young players to hit the ball at a comfortable height. Coaches who use slower compression red, orange, and green balls in coaching beginning players can promote the experience of children in their first experience to be a positive one, which involves playing the game as it is designed better for the young child (Miley, 2007).

The reason behind this worldwide campaign was that in 2002 the ITF established an Introduction to Tennis taskforce to investigate how improvements could be made to introduce tennis to starter players. The taskforce, headed by Dave Miley (ITF Director of Development), consisted of experts in tennis participation from some of the leading federations and coaching bodies (Miley, 2007). The following reasons were given for people leaving the sport (ITF, 2012a):

- Feeling that tennis is a tough game to start players because courts are too large and balls are too fast and bounce too high;
- Use of teaching methodology from a traditional way of thinking is understood by starter players as boring, and focus on technical needs, instead of looking more at the needs and abilities of the player;
- Competition from other sports and leisure activities, which are easier to learn, are shorter in duration or no learning curves;
- An understanding that tennis and competition are not convenient with formats not suited to starter players, with single elimination the norm;
- Lack of marketing that positions tennis as a healthy, lifelong game that can be enjoyed by players of all ages and abilities; and
- Lack of flexibility of the game to accommodate the needs and modern lifestyle of players.

The taskforce initially recognized that tennis is growing in some countries. Some established nations face a decline in participation because of lifestyle changes. The essential finding was that tennis was very good at attracting people but very poor at retention. The taskforce agreed upon the key messages of the *Play and Stay campaign* which include:

- Tennis can be easy and fun when coaches working with beginning players use slower red, orange, or green balls;
- Beginning players should serve, rally, and score from their first lesson;
- Tennis competition can be fun. Formats and scoring systems exist to suit all lifestyles;

- Tennis is healthy; researchers (Kovacs et al., 2016) in 2016 demonstrated this; and
- Tennis is a sport for all, and all players should have a rating to help them find players of a similar level to play with (Miley, 2007).

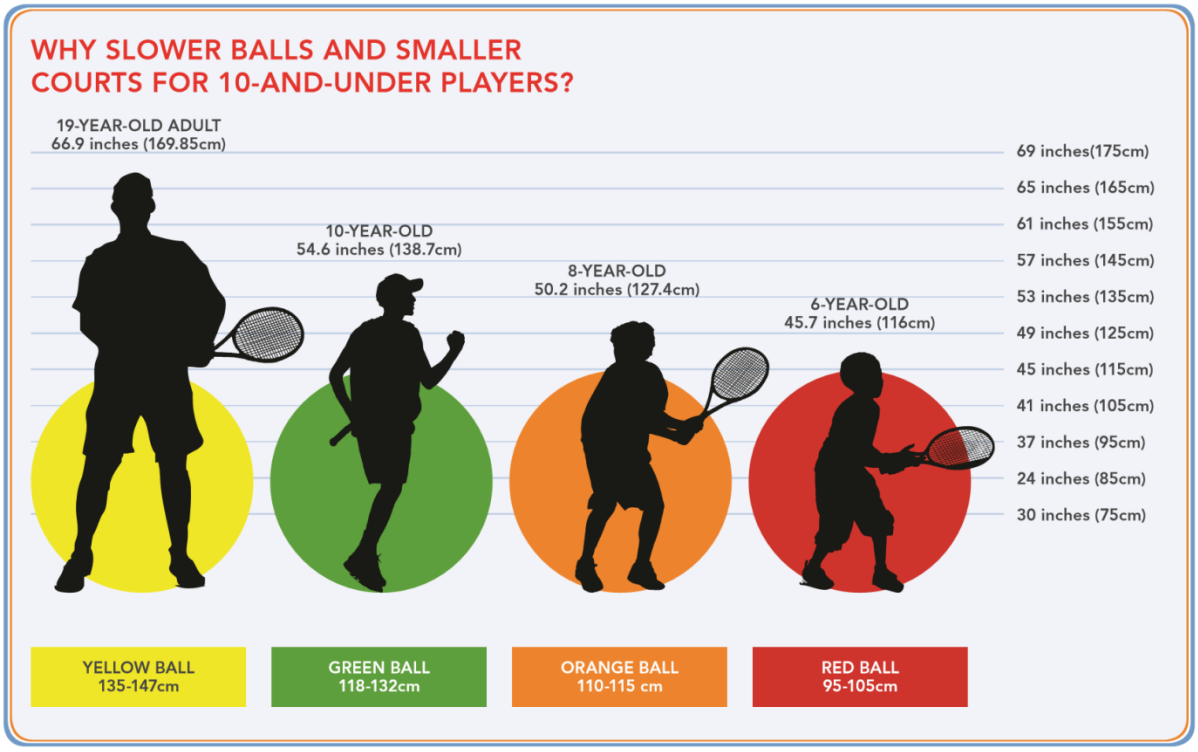

Figure 3: Average height to rebound height of approved tennis balls (ITF, 2012a).

The taskforce recognized by using the right ball with beginning players was instrumental in player retention. It is without question that slower balls allow players more time and control, thereby making it easier to rally. However, less than 10% of coaches worldwide are using slower balls with beginning players, which makes the push to have coaches using slower balls a crucial element of the *Play and Stay campaign*.

The use of slower balls can also benefit high-level juniors in their development of efficient technique and facilitate the implementation of advanced tactics when compared to play using a regular ball on a full court. A few of the major nations that include France have achieved much success utilizing slower balls to introduce tennis to adults. Similarly,

if adults are not able to serve, rally, and score on a full court using a regular ball, coaches should adapt ball and court size. Adults using a red ball on a red court are more likely to progress to an orange ball and the orange court at a quicker rate than children because of their advanced coordination levels.

Some coaches would question the role of technique development when getting starter players to serve, rally, and score from the first lesson. The response is that technique is an essential element of tennis play, and when coaches have used the slower balls to give players an opportunity to play tennis, they should then look to give players relevant technical and tactical instruction to assist them to serve, rally, and score more efficiently. This approach is similar to using the games-based approach, which is often misunderstood by tennis coaches.

Some of the coaches are apprehensive about the logistics of using the different balls and court sizes, as it will result in making their lessons more challenging to organize. However, learner-centered coaching, calls for doing the right thing for the student, and not doing what is convenient for the coach (Miley, 2007). More advanced planning and organization will be required. However, smaller courts will be speedy to set up by throwing down plastic lines; more players can be accommodated on a full tennis court and slower balls last longer than regular balls. The most prominent benefit to coaches using modified balls and courts is that the first experience by a starter player will be a positive one, and retention of players will be more natural (Miley, 2007).

In the USA, smaller racquets and slower balls have been used by tennis professionals to teach children for years. Primarily, the reasons for using modified equipment was so young children could learn basic stroke technique and striking skills. Coaches, in general, were successful working with beginner tennis players. However, children did not have a consistent format where they could play, learn, and compete at the local level, and nationwide by using the same rules, equipment, and courts (Anderson, 2007).

The United States Tennis Association (USTA), branded their modified rules program *Project 36/60,* which was developed in conjunction with community tennis and player development divisions. It was evident that more children would play, enjoy, develop, and

compete if the game was modified pending the skill level of the child. The goals of the project were to:

- Increase the number of players beginning to play tennis from the age of five.
- Increase the retention of players age 5-10 and beyond.
- Improve the technical, tactical and physical development of players age 5-10.

USTA analysed several successful programs in other countries that used modified equipment and realized that the delivery program in the USA needed to be different to engage more children playing tennis and retaining them in a program. The playing opportunities available to children needed to be considered; casual play, team practices, team competition, and individual competition to enable to capture every player just starting or already in the sport.

Considering the experiences and learnings of the other countries researched, the USTA came up with six specifications: age, court length and width, ball size, weight and rebound, racquet length, weight and grip size, net height and scoring system. In the summer and fall of 2006, 27 pilot sites, consisting of teaching professionals, park coaches, clubs, camps, and schools, tested the above specifications. Coaches, parents, and players gave feedback on their experiences and provided opinions and suggestions on the conclusion of their tennis sessions.

After analysing the feedback, six variables were agreed upon to be used for play across the USA. For the first time, young children could play the game and achieve success while learning the game both technically and tactically, because all variables were scaled to the age and skill level of the child.

Feedback from the pilots was very positive. More children played the game with less formal instruction; they were playing, competing and having fun. Children were able to play the game of tennis without going through the laborious task of learning the traditional models of strokes and tactics.

Parents of children noticed less frustration in their children, as they appeared to grasp fundamentals of the game much quicker. The play was energetic and exciting, rather than

dull and restricted. Coaches loved teaching because the children achieved more success and could develop technically and tactically at the same time.

As the positive findings of the pilot were started to get known, the project gathered momentum, and more stakeholders started to give their support. The tennis manufacturers agreed to put age-appropriate recommendations for the consumers on the retail level. The teaching organizations in the USA gave their best professionals support and assistance. Additionally, they offered training opportunities and communicated best practices to promote the program through their network of coaches.

Parents also got more involved, as they had better opportunities to lead programs, and volunteered to help out in the USTA Junior Team Tennis program. The tennis media did a good job of promoting, focusing on the benefit of starting children to play tennis with the correct equipment and court size as well.

To complement training programs, non-eliminations singles competitions, which provided multiple matches against different players, sprouted up all over the nation, focusing on the 10-and-under age group. Singles tournaments used a format that played matches according to time, which allowed players to experience multiple matches over a shorter period. The parents brought into this concept as this reduced the time commitment from three-day tournaments, to half and one-day tournaments (Anderson, 2007).

At the 2007 US Open, the USTA's grand slam tournament, where all top male and female professionals throughout the world came to New York, to compete for one of four grand slam crowns, was used as the platform to launch the 36/60 Project. The media event included the new curriculum, training videos, marketing materials, and competition formats. After the launch, training workshops were hosted in multiple locations throughout the USA. For people who could not attend, an online training program was created.

Over the years, the USTA has focused on the growth of this program in trying to get more children in the age group of 10-and-under, playing tennis. From initially naming the program project 36/60, the USTA changed it to *Quickstart tennis* and now have called it 10-and-under tennis. The last change to 10-and-under tennis is more in line with the

ITF's terminology, in trying to draw consistencies with worldwide programming methods. Although much criticism was directed towards the USTA in name changing, as on each occasion further education was required to each stakeholder groups of parents, coaches, and players. Figure 4 represents the evolution of 10-and-under tennis in the USA as promoted by the USTA. It also presents the justification for many stakeholders, particularly coaches complaining about the name change of programs.

Figure 4: Evolution of USTA Kids' Tennis (Hainline, 2012).

Typically, in any sport, the organizational structure can function at different levels***:*** international, national, regional, city, and club. It has already been referenced that the ITF is the governing body of tennis worldwide, with national tennis federations, such as the USTA, as their affiliates. Within the structure of national tennis federations, or in this example, the USTA is divided into sections, states, districts, and clubs. Each entity has full rights to frame elements of the 10-and-under program as they see fit; however, the USTA wished they would do this under their programming guidelines.

The outstanding organizational issues of concern from a synergy perspective in 10-and-under programming in the USA are the assigned court's sizes and equipment by chronological age, the training and education of coaches and the competitive structure for 10-and-under children.

The assignment of chronological age and coach training and education is the responsibility of the USTA. However, the 10-and-under competitive structures are organized and run at the state and district level and not so much input from the national organization. To identify the best practices regarding 10-and-under competitive structures is challenging to achieve when the responsibilities are assigned to lower levels of the organization.

Mention has already been made about the recent introduction of 10-and-under tennis and, consequently, the lack of experience of many coaches, adult players, and organizations. Ten-and-under tournaments that are run by states and/or districts follow traditional formats of elimination when they should be using more non-ranking non-elimination formats. A format of rankings is prevalent in 10-and-under tennis, which conforms typically to adult rules. Within the ranking system as well the ways a player can progress through the three stages are based on results, regardless of age, skills or size, conforming with the theory that there is an inherent desire by parents and players to quickly pass through stages to arrive at non-scaled tennis equipment.

3.4.4.1 ITF 10-and-under program

3.4.4.1.1 An overview of the 10-and-under tennis

The reasoning behind scaled tennis equipment is the advent of reducing possibilities of young children to fully participate in adult sporting environments. The success of young children is highly unlikely if they play on adult fields or courts, use equipment that is too large, too heavy, or too fast for them to handle, while at the same time competing in adult-style competition. Figure 5 represents how an orange court is more conducive for a 10-and-under player to cover a court based upon stride length. In trying to achieve earlier success, different sports have looked at making adaptations for children. For example, baseball has T-Ball, American football has flag football, and junior soccer uses a smaller

and lighter ball and a smaller field (Pankhurst, 2016). All these sports have competitive structures to match, where children play for shorter time periods and smaller-sized teams.

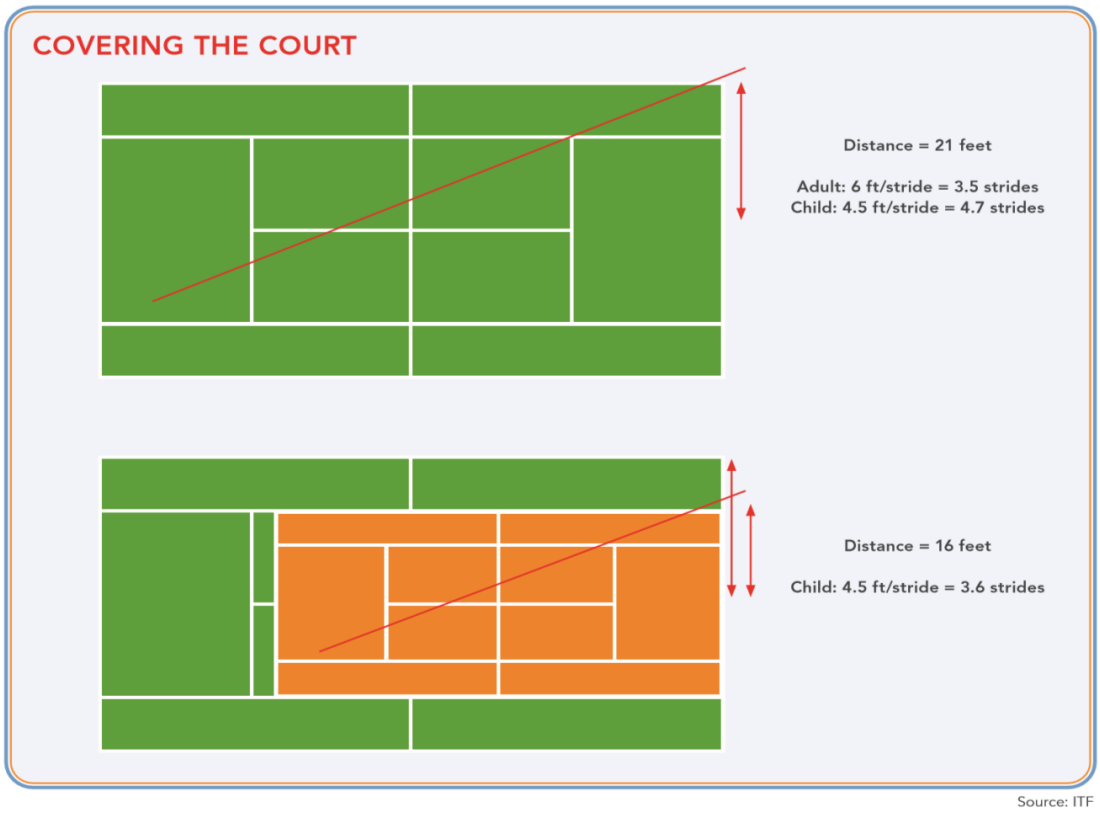

Figure 5: Covering the court (Hainline, 2012)

Similarly, developments that have been made in other sports have made their way to tennis through adaptation of court areas, balls, and racquets to make them more appropriate for 10-and-under children. The modifications are progressive, colour-coded, and relate to the chronological age of children.

From the above comments about scaled tennis equipment, a common factor is being relayed which is, as the children get older it is more conducive for them to adapt to more challenging equipment, balls, and court areas demands. These progressive adjustments mainly conform to the increase in size, strength and faster movement capabilities of young children. It is important to consider that younger children are smaller, have slower reaction times, and less strength and speed than older children, so scaling of equipment

makes perfect sense (Pankhurst, 2016). As an example, young children improve reaction speed and their ability to react to an incoming ball as they get older and gain experience. Therefore, they can adapt to a faster ball and bounce height (Pankhurst, 2016). The change in the different compression of balls is a significant one from the adult game.

The link between the different court sizes and colour-coded 10-and-under equipment is essential: the slowest red ball is used on the red (smallest) court, the faster orange on the orange court and the fastest green ball on the green court. The size of the court correlates with the average leg and stride length and height of the child. The increase in court size should be proportional and related to the development of the child. In tennis, it is crucial that the player can cover the width and length of the court by getting to the ball within the time frame available. As a gauge, a 6 ft. tall adult can typically move from the centre line to the sideline on a full-sized court in 3.5 strides, a 4 ft. 6in person requires 4.7 strides to complete the same task. By playing on an orange court, the same-sized child would be able to reach the side line in 3.5 strides (Figure 5) (Pankhurst, 2016).

In tennis, the length of the court depicts the server's position in relation to the net (Pankhurst, 2016). For a small child on an adult court, the baseline is too far from the net and too small to be useful when delivering service. Children will naturally adapt their techniques to fulfil the task which will require them to serve the ball up in a loop action just to get the ball over the net. Adults, in comparison to their height, can hit the serve in a downward trajectory into the service box.

The above adaptations to equipment and court areas that have been made to 10-and-under children are not the only changes that need to be made. Tennis matches have no fixed time dimensions. Therefore, 10-and-under tennis uses abbreviated scoring procedures, not to impose adult constraints on young children who are not able to cope, but rather due to growth and development (Pankhurst, 2016). For example, on a red court, players normally are recommended to play one game to seven points. On an orange court, players play the first to four games in a three-set match. Other alternatives used in 10-and-under

competition replicate other sports by having matches played according to time constraints. All these formats are shorter in length compared to adult matches.

3.4.4.1.2 Technical and Tactical development

The need to coach technical and tactical skills in any sport is an important component, and 10-and-under tennis is no exception. Malina (2008b) espoused the notion that youth development programs require systematic instruction, practice, and training in leading the way to athletic development. When considering 10-and-under children and learning necessary skills, two concepts are required to make progress in sport and tennis, namely: trainability and readiness (Balyi, Way, & Higgs, 2013; Malina, 2008b). Growth, development, and maturation are linked to trainability. It takes into consideration children's abilities to react to being trained in a specific skill, like a serve or backhand in tennis. Children may possess the necessary physical or athletic skills required to perform that specific activity because of the level of growth, maturity, and development. Furthermore, this is the issue of developmental or biological age being more relative or appropriate in 10-and-under tennis than chronological age. Additionally, the abilities of children can also be affected, individually, by the strategy used to teach those skills. In other words, if the child wants to learn a certain skill, it is essential to recognize that readiness is related to the ability to adapt to the environment and demands that the environment puts on each child (Malina, 2008b).

While some children of the same chronological age are physically able to learn specific skills, others cannot. Additionally, while children may be physically ready, they might not be mentally ready to learn. Readiness is also applicable to the competitive environment. Pankhurst (2016) discovered that learning about chronological ages and skill specificity relative to readiness is critical to development. These skills are generally related to chronological ages of 10-and-under children and must also be linked to data on biological and developmental ages of children.

3.4.4.1.3 Competitive Development

The competitive aspect of a sport is governed predominately by the level of cognitive and psychological development of the player. Some researchers, (Bloom, 1985; Baxter-Jones, 1995; Cote, 1999), parents, and coaches are conscious of the impact competition has on 10-and-under children. Bompa (2000), has emphasized that an average number of young athletes not able to cope with the physical and psychological demands of high-intensity training or organized competition.

A fundamental problem for youth athletes is that adult formats (championships, elimination events, rankings, and seedings) and concepts (winning, losing, promotion, and demotion) of competition are often deemed appropriate and necessary for them. From a tennis perspective, the issue is on a larger scale, as tennis is predominantly an individual sport, without hiding places that team sports offer.

Mostly, 10-and-under children have less coping skills and dealing with winning, and losing is difficult (Gould & Dieffenbach, 2003). In tennis, the required coping skills are not only necessary for winning and losing, but also trying to umpire their matches (making the appropriate line calls and keeping score). They also need to deal with other players, spectators, coaches, and parents.

Specific to 10-and-under tennis is the amount of competition that the children are playing regarding volume and frequency. What is currently happening is that significant amounts of 10-and-under children are playing too much competition and adhering to early sport specialization conditions. These aspects require more research regarding what is the appropriate amount and frequency of competition, taking into account the needs and abilities of 10-and-under children.

The essence of competition is rather ill-defined in junior tennis, particularly for 10-and-under players. At this age, concepts of winning and losing are difficult to comprehend and are in the process of learning how to compete. Ideally, the purpose of competition at

this age is about fun, new experiences, and enjoying the process. Unfortunately, this is often lost when winning and rankings are emphasized and made a focus in tennis play.

The format of competition at the 10-and-under age is fundamental. The individual format is mostly too much pressure for the player. It is recommended to have more play-competitive formats with little focus on winning and losing, and more team play competition formats (Hainline, 2012).

3.4.4.1.4 Training and Competition

Training and competition provide the foundation for the development of an athlete. Regarding the tennis community, training and competition allow the tennis player to have fun while still improving their game and engaging in various competitions that emphasize having fun and improving as a player (Hainline, 2012). The most prominent advantage of community tennis league is the ability to play in various formats, to suit the needs of the community and the individual and develop a sense of team camaraderie.

Training and competition provide an opportunity for a National Governing Body (NGB) to take control of the most critical pathway points in players' overall development. Balyi (2012) pointed toward competitive tennis at an early age and late specialization toward competitive sport. For an NGB to be successful in providing a framework and develop excellence in personal, athletic, and tennis-specific development, the structure must include patience required for long-term success. Any attempt to jump-start or miss any of the steps of late specialization will more than likely lead to combinations of peaking early, dropping out of tennis early, burnout, and overuse injuries (Balyi, 2012).

Patience does not mean the total avoidance of competition but taking part in a competition that drives and develops children and not conforming to adult-model competition and traditional tennis (Brouwers, Bosscher, Schaillee, Truyens, & Sotiriadou, 2010). Youth tennis players do not have the physiological components developed yet to engage in lengthy matches that utilize a best two-out-of-three-sets format, and there is no logical reason to force such an adult model on children. The significant advantage of 10-

and-under tennis is that scoring and competition can and should be flexible while using scaled courts and equipment (Hainline, 2012). For NGBs to be successful in facilitating appropriate environments that nurture long-term success, they should be willing to adjust competition, which is the best way to impact attitudes and behaviours of parents, coaches, administrators, and developing players. This structure of competition should be based on the best available evidence-based data and should not be driven by politics or traditional sentiments (DeCastilla & Pankhurst, 2012).

All player development training and competition recommendations should be driven by long-term athlete-development and late-specialization concerns. One could support that a long-term vision of training and competition should artfully combine fun, athleticism, incremental deliberate practice, a healthy competitive structure, and patience by all stakeholder groups (DeCastilla & Pankhurst, 2012). A prerequisite for participation involves fun and is the essential foundation of any long-term athletic development program (Hainline, 2012). There is much evidence that children's perceptions drive feelings of fun and enjoyment.

This excellent opportunity to incorporate the concept of 10-and under-tennis focuses on the element of fun. The key to 10-and-under tennis is the ability to learn tennis at an age and developmentally appropriate manner. How the players experience each stage of scaled tennis equipment program represents the pillars of tennis training. The training foundation for 10-and-under tennis is to develop athletic skills before they develop as tennis players (Hainline, 2012). Table 2 shows a comparison of what some countries have recorded regarding age, tennis training, other training, yearly matches, and total hours per week. This table further promotes the premise of this research showing a disparity between countries on tennis training and how players develop in each of the three stages of a scaled tennis equipment program.

COUNTRY AND ITF COMPARISON IN RECOMMENDATIONS FOR TENNIS-SPECIFIC AND GENERAL ATHLETIC TRAINING

Country or ITF	Age	Tennis Training (Hours/Week)	Other Training (Hours/Week)	Yearly Matches	Total Hours (Weekly)
Australia	4 – 7	2 – 4	5 – 7	n/a	7 – 11
Canada	5 – 6	1 – 4	4	15 – 25	5 – 8
ITF	6 – 8	1.5	2.5	Various formats/ scoring with short match format	4
U.S.	5 – 8	1.5 – 3	4.5 – 8	n/a	6 – 11
Australia	7 – 8	4 – 5	5.7	15 singles/ 25 doubles	9 – 12
Australia	9 – 10	7 – 9	5 – 7	15 singles/ 25 doubles	12 – 16
Canada	7 – 8	4 – 9	4.5 – 5	25 – 40	8.5 – 14
Canada	9-10 (boys)	8 – 10	5 – 6	30 – 45 singles/ 30 doubles/ 40 practice matches	13 – 16
	9 (girls)	6 – 8	4.5 – 5.5	24 – 30 singles/ 16 – 20 doubles/30 – 40 practice matches	10.5 – 13.5
	10 – 11 (girls)	10 – 12	5.5 – 7	30 – 45 singles/20 – 30 doubles/30 – 40 practice matches	15.5 – 19
ITF	9 – 10	4.5	4.5	Various formats/ scoring with short matches and multi – match format	9 – 12
U.S.	8 – 12	4 – 6	8 – 11	20 (8 – 9 years old) plus unlimited practice matches	12 – 17
Australia	10 – 12	10 – 12	6 – 8	35 – 45 singles/ 15 – 25 doubles	16 – 20
Canada	11 – 12 (boys)	10 – 12	5.5 – 7	45 – 60 singles/ 30 doubles plus 48 practice matches	15.5 – 19
Canada	11 – 12 (girls)	12 – 14	4 – 5	45 – 60 singles/ 30 doubles plus 48 practice matches	16 – 19
ITF	11 – 12	6	5	70 singles and 35 doubles matches	11 – 16
U.S.	10 – 13 (girls)	15 – 20 (combined with other training)	15 – 20 (combined with other training)	40 (by 11 years old) plus unlimited practice matches	15 – 20
U.S.	11 – 15 (boys)	15 – 20 (combined with other training)	15 – 20 (combined with other training)	60 matches (by 14 years old)	15 – 20

Source: USTA

Table 3: Country comparison of recommendations for tennis specific and general athletic training (Hainline, 2012).

As the above table reveals, there is not much consensus from a training perspective when it comes to 10-and-under tennis.

Tennis can be played as a team and/or individual sport for life. Fed Cup, Davis Cup, and Hopman Cup are examples of team tennis and support national team participation worldwide. In 10-and-under tennis, players can participate in a competition format that encourages fun. If children are having fun, they are more than likely to want to continue to have fun (Hainline, 2012). Taking this into consideration, competition formats for 10-and-under tennis should focus on team matches, short matches, and open competition. Young children like to play on teams, and physical and psychological attention spans of children are relatively short. If competitions are accessible and desirable, the whole family can take part (Pankhurst, 2013).

The ITF suggested the following guidelines for youth competition:

- Have short matches and multi-match formats;
- Do not keep records of results for children under the age of 8;
- Recommend to all tennis stakeholders the need to have competition that caters to all junior levels of play;
- Provide user-friendly competition;
- Competition for 10-and-under Tennis is like playing a game; and
- Compete against a variety of opponents on a variety of surfaces.

The above guidelines are based upon long-term athlete development and overall thinking by coaches and clinical scientists that healthy and fun competition is more important than a competitive environment that focuses on win-loss ratio and rankings. Experts (Unierzyski, 2006) across the board agree that the professional adult model of wins versus losses, combined with rankings, is forced on a child. Children, however, do not have developed abilities to deal with those types of stress.

The ITF does not allow 10-and-under children to participate in international events. There is a general feeling that national competition and rankings are not appropriate for 10-and-under tennis because such structure leans toward a focus on win-loss ratio and rankings, which will, in turn, lends itself to early specialization. NGBs should structure

competition in a way that promotes healthy and encouraging environments for players, parents, and coaches.

3.4.4.1.5 The different stages of a scaled tennis equipment program and the movement through the stages

In conjunction with the launch of the *Play and Stay campaign*, the ITF executed the fifth change to the game's rulebook in over a century (ITF, 2012a). The rule change mandated that ITF member associations use low-compression balls for all sanctioned 10-and-under competitions.

The ITF's *Play and Stay campaign,* was further defined by the launch of a Tennis 10s program. The Tennis 10s program is the ITF's scaled equipment program that is defined into three progressive stages: starting with red (Stage 3), then orange, (Stage 2) and finally the green (Stage 1). The goal is to progress through the three stages at a rate that is conducive to the player using the standard yellow ball. According to the ITF, the red, orange, and green stages of their Tennis 10s program is defined by the scaling of equipment and court size as per the below-ball, racquet, and court specifications (ITF, 2012b).

(a) The three different stages of the scaled tennis equipment program.

(i) Red stage

- The red foam ball (8-9 cm) is 1 cm larger than the red felt ball (7-8cm);
- An average regular yellow ball can rebound up to 62 cm higher than the red (Stage 3) foam ball;
- The red (Stage 3) foam ball is 8-9 cm in diameter and has a rebound height of 85-105 cm;
- The red (Stage 3) felt ball is 7-8 cm in diameter and has a rebound height of 90-105 cm;
- The net height can be 0.8-0.838 m high at the centre for red, 0.114 m lower than the full court net;

- Recommended racquet sizes for red (Stage 3) are 43 cm (17 in.)-58.4cm (23 in.); and
- Tennis10s red (Stage 3) is played on a court measured 10.97-12.8 m (36-42 ft) x 4.27-6.1 m (14-20 ft)

(ii) Orange stage

- The net height can be 0.8-0.914 m high at the centre for orange, as low as 0.114 m than the full court net;
- The orange (Stage 2) felt ball is 7-8 cm in diameter and has a rebound height of 105-120 cm;
- An average regular yellow ball can rebound up to 42 cm higher than the orange (Stage 2) felt ball;
- Recommended racquet sizes for orange (Stage 2) are 58.4-63.5 cm (23-25 in.); and
- Tennis10s orange (Stage 2) is played on a court measured 17.68-18.29 m (58-60 ft) x 6.1-8.23 m (20-27 ft).

(iii) Green stage

- The net height should be 0.914 m high at the centre for green (Stage 1), the same height as the full court net;
- An average regular yellow ball can rebound up to 12 cm higher than the green (Stage 1) felt ball;
- The green ball is now an official ball under the ITF Rules of Tennis and can be used at all levels of competitive play at national level;
- The green (Stage 1) felt ball is 7-8 cm in diameter and has a rebound height of 120-135 cm;
- Recommended racquet sizes for green (Stage 1) are 63.5-66cm (25-26 in.); and
- Tennis10s green (Stage 1) is played on the full-size court, measured 23.77 m (78ft) x 8.23 m (27ft).

The ITF recommends that 10-and-under players should only progress from stage to stage based on their technical and tactical competencies of that relevant stage and their success

in each respective stage of the competition (ITF, 2011). The ITF, however, has not produced any competencies for any of the stages. It is left to coaches to establish their own so-called competencies. With the diverse knowledge base of each coach worldwide, the way the children move through the different progressive stages would differ dramatically.

(b) The movement through the different stages

An essential facet of scaled equipment in tennis is the transition through the above mentioned three stages. The motivation for the process of transition is founded in the following frame of reference: **c**ertain tennis federations have enthusiastically embraced not just ball scaling but scaled court size, racquets, and net height, however, their recommendations lack empirical evidence (Farrow & Reid, 2010). Further confusion as to how young players move between the different progressive stages can be seen by how different countries vary in terms of their specifications of the stages of red, orange, and green.

National Federations Age recommendations per stage

National Federation	Red Stage	Orange Stage	Green Stage
Tennis Canada	5-7	7-9	9-10
Tennis Australia	5-7	8-10	9-10
ITF	5-7	8-10	9-10
USTA	6-8	7-10	9-10
British LTA	5-8	8-9	9-10

Table 4: Summary of age recommendations for scaled tennis equipment stages (ITF, 2012b)

Unfortunately, South Africa has no structure on how they use the three scaled equipment stages and immersion into their competitive pathway. From the above Table 3 and scaled tennis equipment programming specifications, it is clear to see each country make judgment on how to transition between the three stages of a scaled tennis equipment

program which uses age as a determining factor. Further insight is essential in guiding national tennis federations on putting forth better guidelines or recommendations, on how players perform and gain confidence in each stage and then transition between the three scaled stages. Age cannot be the only criteria to determine how players move between the stages, especially considering on how children develop at varying rates.

There are no clear guidelines on how young tennis players using scaled tennis equipment should develop as tennis players through the stages. The current thinking with parents and coaches is that the development should be fast tracked. This form of use of scaled tennis equipment involves people associating non-yellow balls as "not real" tennis balls, and they associate smaller courts as "not real" tennis courts. It is essential to educate all stakeholder groups that red, orange, and green balls are all appropriate parts of progression in tennis and are as real and appropriate for children as yellow balls are for adolescents and adults. The development as a player and movement between the stage colours is based on a natural progression in technique, skill, athleticism, and age. Because children mature differently, and because there is no known correlation between a speedy transition from childhood to teenage and adult performance, there are few reasons to accelerate the transition prematurely. The development within each stage initially and then transition between stages should not be understood as a "race" in which moving quickly is the same as "winning." When working with young athletes, winning should not be placed as a higher objective than proper development (DeVylder, 2012). Figure 6 reflects information on how complicated it can be for players developing their skills in each stage of a scaled tennis equipment program. The graph shows how when making the change there is a dip in playing level as the constraints have become more robust. Through each progression in the stage, there is a dip in playing level as shown by the line on the graph. If this is done at the appropriate time, consider when it is done at the wrong time. A more dramatic effect could be realized should a player make a transition at the wrong time. If a player transitions at the wrong time a more pronounced dip in playing level could occur which might result in the player feeling very discouraged and potentially leaving the sport.

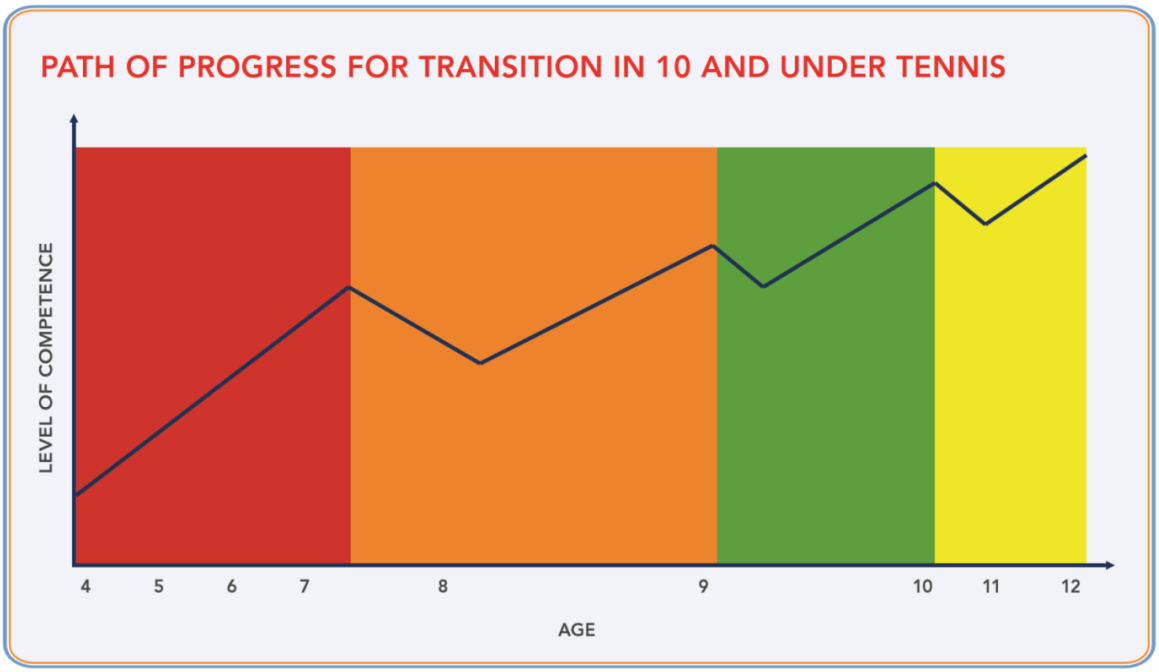

Figure 6: Path of progress for the transition of stages in 10-and-under tennis (Hainline, 2012).

From a competitive structure point of view, each respective national governing body (NGB) chooses the rules in the age groups or how to group youth for tournament play. For example, rather than designating a single year, or every two-year transition, would it be feasible to develop a competitive schedule that divides the year into two (DeVylder, 2012). The theory behind this schedule is that a child's success in sports is usually determined by his or her date of birth. If applying the strict calendar year, a child born in January has almost a one-year advantage over a child born in December, which is an essential factor in coaching youth athletes. A way to counter is that this age advantage is neutralized when children play in their age group until the month they age up (Hainline, 2012).

Other factors to consider are whether the development within each stage is a player development competition track or a community tennis-friendly player track. For player development purposes, the competition and training transition are in parallel, but even in this scenario, there can be flexibility. For example, a player can transition from the orange to green stage, but may still have difficulties in their game, like the forehand

volley. Using a deliberate practice/closed play teaching methodology practice, a coach could work correctly with the orange ball on the forehand volley, while the player otherwise trains with the green ball. The player can transition fully to the green ball after improving the technique in the backhand volley with the orange ball (Blackman, Lubbers, & Russell, 2012).

Should a player choose to move through the stages too fast, the player will more than likely feel frustrated at playing worse and might even lose interest. As shown in Figure 6, all players have a dip in their performances when transitioning from each stage. When this happens, less emphasis on competition during that phase is recommended.

Should a player not be ready technically to move to the next stage, the performance decrement could be expected to be greater. Should this transition take place, it could result in less fun for the player, and fun is what drives a player to continue to participate over time.

It is imperative for coaches to have a good understanding of maturational expectations of childhood, as well as the technical and tactical competencies that are conducive for the best player development within each stage (Malina, 2010b). Many national tennis federations are not clear on how young tennis players progress. Presently, they are using much of what the ITF has produced and provided in Figure 7:

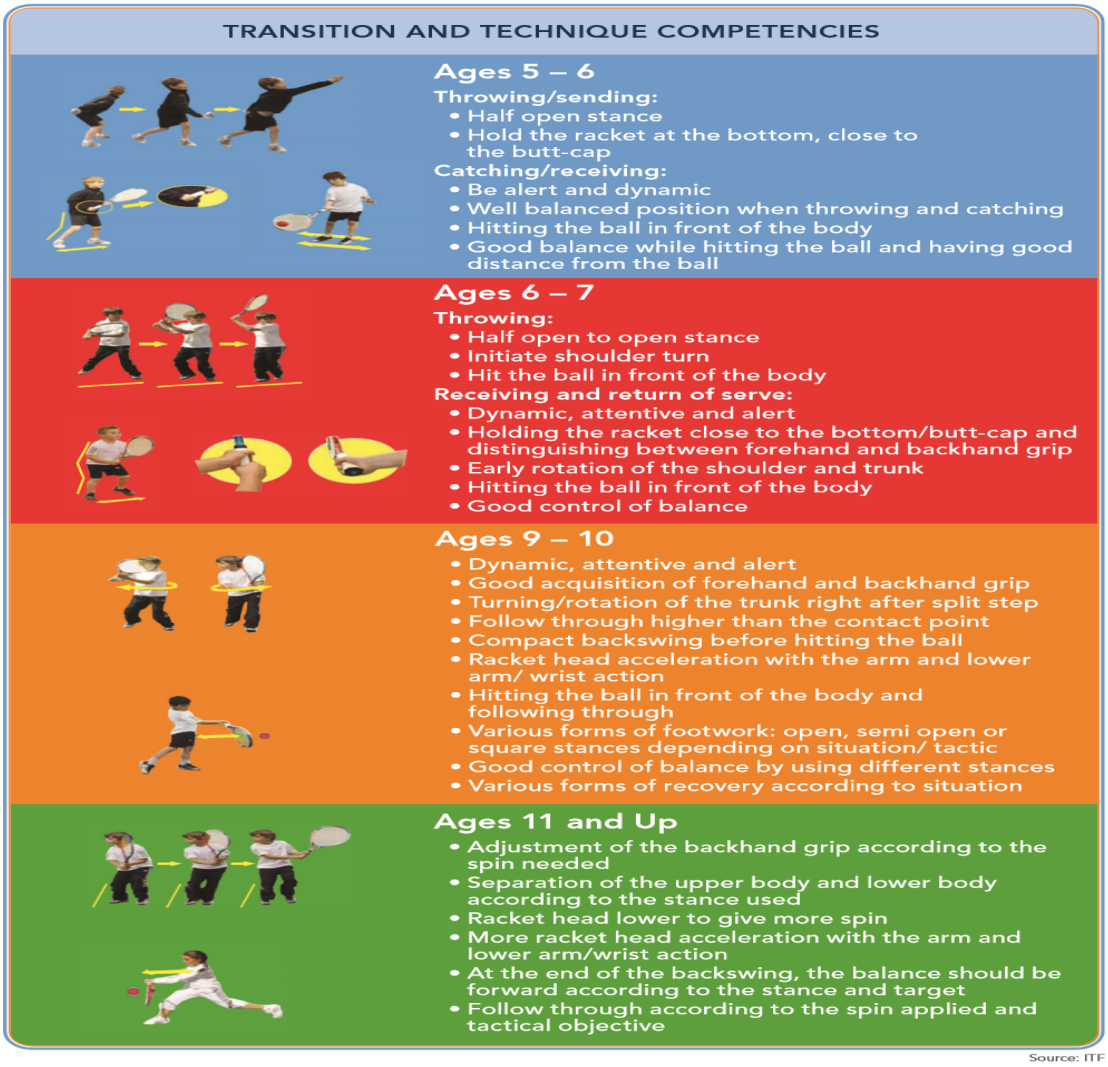

Figure 7: Transition and technique competencies (Hainline, 2012).

It should be noted that each transition is associated with more sophisticated stance, footwork, racquet swing, racquet grip, and separation of upper and lower body movements. An easy administrative method is to have players play in each stage based on age (DeVylder, 2012). The danger with this approach, however, is that it is uncertain if players are physiologically or technically ready to make that change. Moving at the wrong time could potentially lead to dropout in the sport. Even for skilful green ball 10-and-under tennis players, there is no support to suggest that players should be moved to a yellow ball before they should be. It is recommended that only in exceptional circumstances that a 10-and-under tennis player should make the full transition to a

yellow ball, with the caveat that the player's ability and player's ranking pre-puberty does not correlate with late teenage and adulthood success (Blackman et al., 2012).

It is accepted that 10-and-under tennis children can compete. The competition, however, should be fun while using a short scoring format. Competition for 8-and-under children ideally should last 20 minutes, thereby offering ample play opportunities with different players. As children grow and mature, they can handle longer duration matches, for example, nine- and 10-year-old children can play 2-out-of-3 short sets, which could last 20 to 45 minutes (Jones, 2012). Table 4 below provides a comparison of some countries on what they do within each age. The evidence is showing once again the lack of consistency between countries when it comes to scaled tennis equipment programming and competition.

10-AND-UNDER COMPETITION IN SELECT COUNTRIES

Country	Red Scoring	Red Match Format	Orange Scoring	Orange Match Format	Green Scoring	Green Match Format
Australia	Varies among territories	Various scoring and match formats	To be announced	To be announced	To be announced	To be announced
Belgium	Single tie-break to 10, or 7-point tie-break if limited courts	Round robin individual	10-point tie-break for recreational; 2-of-3 short sets for competitive	Round robin without winners for recreational; draws with consolation for competitive	10-point tie-break (Kinder Tour) or 2-of-3 short sets with tie-break at 3-3 for Volvo Tour	Round robin for Kinder Tour and draws for Volvo Tour
Canada	First to 15 or 21 points, alternate serves every 2 points; 10-15-minute timed matches	Round robin or team matches, to guarantee 2-3 matches	2-of-3 short sets with no-ad scoring, tie-break at 3-3	Round robins with team and individual; 3 matches minimum with time limit of 45 minutes	Same scoring format as for orange ball	Same as for orange ball
France	All scoring allowed; start 1-2-3-4, then regular scoring	Clubs free to choose format; strongly recommend doubles and team, plus multi-sport	Same as red for recreational; 2 sets of 4 games each with tie-break at 3-3 for competitive	Round robins and compass draws; promote teams and doubles, especially for girls	Set to 5 games, tie-break at 4-4, no-ad scoring	Compass draws Friday afternoon to Sunday noon
Great Britain	Regular tie-break and match	All round robin with teams	2-of-3 tie-break sets	Mostly round robin	2-of-3 short sets	Mostly elimination and compass draws
Netherlands	Tie-break and 2-of-3 tie-breaks, with much disparity	Round robins, team and individual competitions	2-of-3 short sets	Round robin with some elimination	2-of-3 short sets and some 2-of-3 sets to 6	Various formats
Spain	2-of-3 tie-breaks	Round robin and team matches in weekend comp	2-of-3 short sets, win by 2 with no-ad	Team and individual format, guarantee 2 matches; lasts 2-3 days	2-of-3 sets to 6 games	Round robin and elimination draws over 3-7 days

Source: USTA

Table 5: 10-and-under competition in select countries (Hainline, 2012).

The ITF does not allow 10-and-under children to play international events. Most NGBs do not stage national 10-and-under children competitions. Indeed, only two countries (Brazil and France) hold annual singles national 10-and-under championships. Great Britain, however, hosts national invitational tournaments for nine-and-under and 10-and-under children. Great Britain uses orange balls for its nine-and-under invitational event, green balls are used by Great Britain, Brazil, and France for 10-and-under national

events, and a shortened scoring format is also used. None of the countries mentioned above have national ranking systems in place (DeVylder, 2012).

3.5 ROLE AND RESPONSIBILITIES OF COACHES AND PARENTS IN THE 10-AND-UNDER PROCESS OF TENNIS COACHING WITH SCALED EQUIPMENT

Parents and coaches form two of the three stakeholder groups of a scaled tennis equipment program, the third group signifying players. How coaches and parents work together is essential in making a success of a scaled tennis equipment program. It is critical to the premise of this research to mention how best parents and coaches should interact to maximize the potential of players using scaled tennis equipment.

3.5.1 Coaches

Large proportions of 10-and-under players learn the game of tennis from a coach in an individual or group format. The purpose of early involvement of a coach is primarily because parents have not played tennis themselves (Pankhurst & Collins, 2015). Changes in modified tennis equipment are relatively a new concept to most parents. Nations that have adopted scaled tennis equipment recently in their programming have received resistance because coaches who played did not use scaled equipment (Pankhurst, 2016). This attitude of resistance instigated this researcher's motivation and related to this study's problem statement and aims to investigate coaches' perceptions of scaled equipment in tennis.

Further to this resistance, large numbers of coach education programs have been slow to adopt new teaching strategies to their courses, resulting in a lack of information for coaches to follow in their daily programming involving 10-and-under players (Pankhurst, 2016). Additionally, the information related to 10-and-under children's physical, physiological, mental, and social development has only recently been incorporated into coach education opportunities. Lastly, Malina (2008a) stated that learning and teaching of

skills are influenced by the selection and introduction of a strategy and technique of instruction to athletes.

Taking this concept further, coach behaviour and working practices with 10-and-under children, teenagers, or adults should adopt different teaching strategies as they have different needs and abilities. Therefore, it becomes essential for coaches to install appropriate and different environments (Vickers, 2008) to 10-and-under children for the following reasons:

- It is known that children like to have fun and be in the presence of adults;
- Coaches need to make frequent changes in activities to keep children engaged;
- Children learn predominantly through copying visually; and
- Children like to be around their friends, even though their friends might be differently skilled than them.

Therefore, coaches need to create a fun, non-threatening environment and have a range and variety of ideas that use visual stimuli. It is recommended that coaches teach their children to be active and limit the amount of verbal information that they provide (Kluka, 1999). For many coaches who have trained older children and adults, creating these different learning environments where 10-and-under children also learn skills through play by trial and error is challenging but not impossible. Many coaches still organize children in lines and feeding them balls to hit. Children like to move, and tennis is a game of movement while using a variety of different skills in a dynamic environment. Standing in lines and hitting a ball occasionally is not enjoyable or relevant for a 10-and-under child. Most coaches who start working with 10-and-under children are not aware of the impact of growth, maturation, and development. They are coaching 10-and-under children as older children and teenagers even though they have different physical, technical, and cognitive skills. Because of this difference in approach, coaches are not competent in teaching 10-and-under children (Pankhurst, 2016).

From a coach education perspective, coaches need to know how to organize and develop programs, lesson content and lesson frequency are specific to 10-and-under children. Studies (Bompa, 2000; Balyi et al., 2013) recommended that the amount of physical activity done by 10-and-under children should be proportionately less than it is for older children and adults. Additionally, studies (Cote, Baker, & Abernethy, 2007; Balyi et al., 2013), emphasized the need for young athletes to play a variety of sports and not to focus on just one sport. The purpose behind this stems from a perspective that basic motor skills and experiences could be developed to serve as a foundation for tennis-specific skills. Some children by the age of eight or nine show some interest in specializing in sport (Balyi et al., 2013).

From a tennis perspective, using modified equipment can help children advance skills at a younger age and become successful, equally, due to these initial successes coaches encourage more training and competition (Farrow & Reid, 2010). All stakeholders (coaches, parents, and sports organizations) need to be aware and cognizant of ramifications specializing in tennis at an early age (Farrow & Reid, 2010).

.

3.5.2 Parents

Some parents feel that coaches and sports organizations deliver tennis products that suit their needs (Pankhurst & Collins, 2015). Primarily, parents want only the best for their children and rely on coaches and sports organizations to deliver appropriate tennis products, considering ages of their children. On many occasions, however, there appears to be a lack of synergy between needs and abilities of children and available programs. With this occurrence, parents who know the needs of their children could be forced into products that are not suited to their children (Pankhurst & Collins, 2015). Because of a lack of other programs, however, parents assume that coaches and organizations know best. A typical scenario in many 10-and-under programs is that children are moved to the next stage of court, ball, and racquet for reasons other than growth and development. Those decisions usually result in children playing without their friends and could cause loss of confidence because of the lack of continued success.

As children progress in tennis development, they may be encouraged to have more lessons, enter more competitions and end up specializing in tennis. Parents are unaware of the benefits of staying in appropriate stages until their children are ready to move. There is a feeling among all stakeholders that there is a race to yellow. Additionally, this occurrence is evident as there is very little information available to players, coaches, and parents on how their child should develop within each stage of a 10-and-under program.

A goal of parenting is to do what is right for their children. Ten-and-under tennis can be an optimal opportunity for parents to promote health and well-being in their children and can promote pathways for some children to become elite tennis athletes (Hainline, 2012). The critical issue for parents is to conceptualize what they are trying to achieve when they encourage their children to play tennis. Youth sport should ideally promote athleticism with character development (Hainline, 2012). For some, this may culminate in a lifelong journey of keeping fit through exercise and sport. For others, this may lead them to scholastic varsity sports, national competition, and even international competition. If the goal of the parent is defined, and if the parent is educated, there is a higher chance of success in doing what is right for our children (Hainline, 2012).

Many children are introduced to tennis through their parents. Parental attitudes will significantly expose children's perceptions of the game (Pankhurst, 2016). Hopefully, the parent will reinforce that the basis of 10-and-under tennis should be to have fun. If children are associating fun with a sport, there is an excellent chance of succeeding and staying with that sport. Having fun should be interchanged with a goal of overall athletic development. It should be recommended not to force a child to play tennis. The foundation of all great competitors and lifelong sports enthusiasts is an excellent foundation in athleticism instead of a singular focus on one sport.

As children begin developing tennis skills, they call upon their parents to provide emotional, logistical, financial, and organizational support. The key from a parenting perspective is to provide support while still fostering an environment in which children thrive. Many tennis parents have a positive influence on their children's development (Hainline, 2012). They provide a positive influence, dependent upon love and support,

the ability to take responsibility for one's actions, focusing on hard work, and conveying good sportsmanship. Relatively small percentages (35%) of tennis parents follow inappropriate ideas that overemphasize winning and rankings to the detriment of long-term athlete development (Balyi et al., 2013).

Gould and colleagues (2009) described an "optimal parent push" as understanding how to motivate a child when he or she is lazy, while at the same time not being put under any undue pressure to succeed. There are some factors that optimal parent push is dependent on: age, athletic potential, and intrinsic self-motivation. Optimal parent push can go hand-in-hand with good coaching and usually requires parents to let go so that coaches can do their jobs. Coaches feel that when optimal parent push goes wrong, there is an overemphasis on winning, the presence of guilt as part of parent's motivation, or the parent fails to recognize adverse reactions from the child (Gould, Carson, Fifer, Lauer, & Benham, 2009).

Finding a homogenous culture of where the three stakeholders of a scaled tennis equipment program come together is a wish of any entity wanting to grow the game. The three stages of a scaled tennis equipment program have been created to show a skill development pathway that can get a young athlete from the very beginning to the traditional stage (yellow). How children progress and gain confidence are significant determining factors in whether they make it or quit the sport. This goes to the larger picture of tennis and the need to retain more players in the sport. With so many other distractions relevant to youth these days, more research and attention are required.

3.6 CHAPTER CONCLUSION

Multiple facets from a scaled tennis equipment point of view were examined in this chapter. The background went into specifics of scaled equipment in general and scaled equipment specific to tennis. Benefits of scaled tennis equipment were presented relative to areas of cognitive processing, skill acquisition, biomechanical, and psychological perspectives.

Programming elements were identified and described from a global perspective. A logical question was raised as to how players experience each stage of a scaled tennis equipment program. With so many versions of understanding of scaled tennis equipment programming, how do the three stakeholders maximize these opportunities to challenge the children safely and appropriately? Lastly, as in the previous chapter, all three stakeholder groups were analysed and their roles within a scaled tennis equipment program detailed.

The next chapter, chapter 4, will offer the research methodology undertaken in this thesis.

CHAPTER 4:

RESEARCH METHODOLOGY

4.1 INTRODUCTION

This chapter defines the research methodology applied in this investigation.

Mouly (1978) (as cited in Cohen, Manion, & Morrison, 2000) said people have long been concerned to understand the nature of their environment. Experience, reasoning, and research are actions that will contribute to the understanding of the environment.

Research, according to Kerlinger and Lee (2000) is a systematic, controlled, empirical, moral, and critical investigation of the natural phenomenon and is guided by theory and hypothesis about the presumed relations among phenomena. Thomas, Nelson, and Silverman (2005) agreed in principle on the nature of research by stating that the investigation implies a cautious and systematic means of solving problems and involves five characteristics namely: systematic, logical, empirical, reductive, and replicable. The primary objective of the research is to ascertain how things are compared to how they should be. Problems to be solved stem from many sources and can involve resolving controversial issues, testing theories, and trying to improve contemporary practice (Thomas et al., 2005). It involves establishing specific methods and means that can be used to facilitate a better understanding of a field or scope of the study, which requires the use of a variety of approaches and principles that can be used in research (Thomas et al., 2005). Bryman (2008) described *"methodology*" as a method for collecting data; however, choices of research method must be aligned with the specific research question being investigated.

The primary objective underlying this study is to gain insight into the success, or lack of success scaled tennis equipment programming has on the development of youth tennis players. To achieve the objective of securing the most appropriate data and understanding

from the stakeholders; interviews were conducted with the three stakeholders of a scaled tennis equipment program namely players, parents, and coaches. It is expected of the mentioned stakeholders to indicate their perceptions of the effectiveness of scaled equipment in the development of youth tennis. A pre-determined number of questions (pp. 159-160) were created for each stakeholder (players-4, parents-7, and coaches-9) that delved into an in-depth understanding of their perceptions of a scaled tennis equipment program.

Commonalities and differences regarding their perceptions of the questions were then analysed and presented in this dissertation. Grounded theory is an approach in which the researcher obtains a general, abstract theory for a process, action, or interaction derived from the views of the participants (Creswell, 2009).

As stated in Chapter 1, in a summary of the research methodology, the core aim underlying the framework of this investigation is that of exploring the perceptions of players, coaches, and parents on a scaled tennis equipment program. The objectives of the study were to:

- Investigate the ***perceptions of players*** on their experiences with each stage, (red, orange, and green) of a scaled tennis equipment program.
- Explore the ***views of the parents*** on their child's relative successfulness or unsuccessfulness in scaled tennis equipment programming.
- Examine **the knowledge and understanding of coaches** on how a player can successfully or not successfully navigate the three stages of a scaled tennis equipment program.
- Determine the ***overall and interactive perceptions of all three stakeholders*** (players, coaches, and parents) share about a scaled tennis equipment program,
- Provide ***recommendations*** for scaled tennis equipment programming practices.

4.2 RESEARCH DESIGN

Burns and Grove (2003, p. 195) define "research design" as:
"*The blueprint for conducting a study with maximum control over factors that may interface with the validity of the findings."*

Polit, Beck, and Hungler (2001), define research design as answering the research question or testing the hypothesis.

This investigation addresses the fact that there is a need for the understanding of scaled equipment in youth tennis participation.

The underlying design of this research is descriptive. The research was approached from a qualitative perspective as the perceptions of stakeholders in tennis about the use of scaled equipment has been evaluated.

Qualitative research is a situated activity which locates the observer in the world. Qualitative research consists of a set of interpretive, material practices that make the world visible. These practices transform the world. They turn the world into a series of representations, including field notes, interviews, conversations, photographs, recordings and memos to the self. At this level, qualitative research involves interpretive, naturalistic approach to the world. Meaning that qualitative researchers study things in their natural settings, attempting to make sense of or interpret phenomena regarding the meanings people bring to them (Denzin & Lincoln, 2005).

The primary stakeholders of a player's journey through the three stages of a tennis scaled equipment program (ITF, 2011) are players, coaches, and the player's parents. Keeping in mind that no research has been done to date, which looks at gathering the perceptions of stakeholders of a scaled equipment tennis program, the need to look at different angles in gathering more information was paramount to this research. Also considering the establishment of a formalized tennis scaled equipment program is a relatively new concept; further insight into the stakeholder's understanding is required. In gaining this

insight, a method of qualitative research was deemed more appropriate, due to the additional information that can be obtained through the asking of questions in an interview setting with the players, coaches, and parents of a scaled tennis equipment program.

The procedure for drawing a sample in this investigation is based on the model developed by Churchill and Iacobucci (2002). This model includes the identification of the population, the definition of the target population, the identification of the sampling frame, the selection of the sampling procedure, the determination of the sample size, the selection of sampling elements, and the collection of data.

4.2.1 The population

Creswell (2009), defines the concept "population" as the people available for a particular investigation. It is the entire group of individuals about whom the researcher desires to gather information. The term "universe" refers to all those stakeholders participating in some or other capacity in this study. Population includes players, coaches, and parents involved in tennis in some or other capacity.

4.2.2 Target population

A target population is a visibly defined group of people that have some features, appropriate to the investigation (Creswell, 2009). It is imperative that for this study the target population is appropriately defined, to provide meaningful data to this investigation.

The target population for this research is all players, parents, and coaches that have exposure to a scaled tennis equipment program. The USTA National Campus gave consent to ask parents of players participating in their scaled tennis equipment program (Appendix A). Although their program was only launched at the beginning of 2017, they have already established a thriving red, orange, and green stage program. A further data collection opportunity was identified through the USTA's Early Development Camps. The USTA through their Player Development Department offers orange ball and green

ball camps throughout the USA (Appendix B). These camps provided an excellent opportunity to gather data from players, parents, and coaches simultaneously.

4.2.3 Sample frame

When the target population has been determined, a list should be compiled of all those individuals that could be utilized in research (Churchill & Iacobucci, 2002). A sample frame involves all those persons in a population that best fit the profile as determined by the criteria set to restrict the population.

The sampling frame that was utilized in this study was to identify tennis facilities that had reasonable proximity to the researcher using scaled tennis equipment in their junior program. It is, for this reason, the USTA National Campus and Early Development Camps were chosen as data collection opportunities.

4.2.4 Research sample

Sampling is a strategy where the investigator can study a specific component of the population rather than the entire population, in other words gaining representation that can be reasonably accurate, cost-efficient, and time-saving (Vincent, 2005).

For this research, players of each ball colour (red, orange, and green) were identified. Also, parents of the players identified in the player's sample were approached to be part of the parent's sample. Lastly, coaches were identified that had at least two years' experience of using scaled tennis equipment in their program.

4.2.5 Sampling procedure

The researcher used a purposeful sampling method to select the participants for this study (Merriam, 2001). Purposeful sampling methods are consistent with qualitative research because they are known to discover what occurs in the field, the implications of what happens, and the relationships linking occurrences (Merriam, 2001). The participants chosen for this research in gaining more insight into scaled tennis equipment programming are tennis players, parents of the tennis players, and tennis coaches. The

reason for choosing these participants is that they are the primary stakeholders of a scaled tennis equipment program. All three stakeholders experience a scaled tennis equipment program on a year-round basis and have many experiences that can be shared and contribute significantly to this research. Each of the three stakeholders of players, coaches, and parents were sought after in the USA as that is where currently the researcher is based.

4.2.6 Sample size and respondents

4.2.6.1 Players

The scaled tennis equipment program as depicted by the ITF, calls for three stages namely: red, orange, and green. The stages have been designed using different ball compressions, racquet lengths, and court sizes emulating the growth of young children. According to the ITF, ages have been recommended for each stage being: red stage 5-8 ages, orange stage 8-10 ages, and green stage 9-10 ages. Players were identified that fit the stage and ITF age recommendations (ITF, 2011). It is only fitting of such research that appropriate perceptions are obtained from players participating in all three stages. Therefore, from the player's sample 63 total players were interviewed with a breakdown of 22 players (14 boys and eight girls) from the red stage, 21 players (10 boys and 11 girls) from the orange stage, and from the green stage 20 players (11 boys and nine girls). Through the questions posed to each player, the overall objective was to ascertain their success or lack of success at each stage.

4.2.6.2 Coaches

Coaches were identified from their experience in scaled tennis equipment delivery. Initially, a target of at least two years' experience was identified by the researcher. Coaches can provide excellent data as they can coach players of all three stages of red, orange, and green at the same time. They can also give appropriate feedback on certain aspects that they have seen contribute to the players being successful or unsuccessful for each stage.

Ten coaches were invited to take part in personal interviews and their data collected and analysed by the researcher. An almost even distribution of male and female was obtained with six males and four females' coaches taking part. The coaches chosen to be interviewed proved to be phenomenal samples as the average years of experience in coaching was 23 years and in scaled tennis equipment was 11.9 years.

4.2.6.3 Parents

Parents were identified from the players' sample, meaning that the player's parents were invited to take part in interviews. Parents provided excellent insight as they have seen their child's involvement and development in scaled tennis equipment and will share from a parent's perspective what can contribute to being successful or unsuccessful in the three stages of a scaled tennis equipment program. For the parent's sample, in total 30 parents were interviewed 10 coming from each stage of red, orange, and green in obtaining their insight into a scaled tennis equipment program.

4.2.6.4 Inclusion and exclusion criteria:

4.2.6.4.1 Inclusion criteria

- Participants were chosen according to the above criteria just explained for players, parents, and coaches;
- Researcher in conjunction with the player's coach identified the players from each stage in making sure they are predominately playing in that stage and have the appropriate age as stipulated by the ITF;
- Parents were chosen from all three stages, meaning their child was playing in that stage and had the appropriate age, and meet the player's criteria; and
- Coaches were chosen that are working with players in all three stages to obtain the necessary data for that stakeholder.

4.2.6.4.2 Exclusion Criteria

At the beginning of each interview conducted by the researcher it was mentioned that should they wish to discontinue at any point all they had to say was "stop." Through the

103 interviews, this did not happen once. Actually on the contrary all people interviewed were very enthusiastic in the delivery of their answers.

All participants were given an invitation letter to be part of this research and made fully aware of the conditions of participating in the study and written consent obtained from each stakeholder.

4.2.7 Data collection

4.2.7.1 Data collection process

Data collection for a qualitative study sets the boundaries for the study, which for this research involved interviews. Qualitative research is to identify the best participants, sites, documents, or visual material that will best assist the researcher in the understanding of the problem and research question. For this investigation which identifies the perceptions of the players, parents, and coaches, a semi-structured interview process was chosen. Mason (2002), agrees that interviews are one of the most commonly known forms of qualitative research. Qualitative studies often rely on interviews and smaller sample sizes to collect data (Smith, 2010).

4.2.7.2 Research instrument

Creswell (2009) defines interviews as using open-ended and unstructured questions that are few but prompt views and opinions from the participants. Structured interviews allow for the emergence of significant themes that may not emerge from a structured format and may reveal insights into attitudes and behaviours that may not be apparent when potential responses are restricted. As the researcher aims to uncover the perceptions and opinions of the respondents, a structured interview is appropriate (Crouch & McKenzie, 2006).

The recommendations made by Rossman and Rallis (2012) serve as a valuable framework for conducting interviews namely: getting access to the field setting, must have the ability to observe and interview the participants at the appropriate time, and gaining site entry. In qualitative research, the researcher is only borrowing the

participants for a short period to glean the appropriate data. The researcher needed to show diplomacy, personality, and artful persuasion to gain entry. The negotiations required to obtain access to the participants in a comfortable environment is essential and complex. It commences with the first contact, extends through the data collection, and follows through after the researcher has left the site.

Qualitative interviews were conducted to collect the data that will identify more information on what it takes to offer a scaled tennis equipment program. Interviews were conducted with all three stakeholders of a scaled tennis equipment program namely: tennis players, parents of the players, and tennis coaches. For all three stakeholders' interviews, a face-to-face method was used, and all interviews were videoed and/or recorded in making sure all data was appropriately transcribed and analysed. Should the tennis player wish their parent/s to be present for the interview, that request was accommodated by the interviewer. All interviews had a combination of parents being present and not being present. The interviews involved semi-structured, open-ended questions to elicit views and opinions from the participants (Creswell, 2009).

Epistemology, ultimately, is the justification of the knowledge generated in research is valid and contributes to the generation of new knowledge. It also tackles what constitutes viable sources of evidence and acceptable results of knowledge (Tennis, 2008). Over time two branches of philosophical epistemology have developed, namely: empiricism and rationalism.

Empiricism is the knowledge that is based upon input from our senses. A component of this form of research knowledge generation is referring to experience and observations when beliefs and claims are justified and proven (Tennis, 2008).

Rationalism focuses on reason, rather than experience and observations, as the key to justifying beliefs and claims. In other words, the source of new knowledge is the rational and logical human mind, and not the material world around us. Reasoning is the verified motive for research results (Tennis, 2008).

The formulation of the devised questions asked of the players, parents, and coaches was delving into the knowledge and understanding the researcher had from using scaled tennis equipment in practical examples over the past 20 years. Combined with an in-depth understanding of the backgrounds of the different stakeholders and how they interact in tennis programming the questions were formulated. The objective is on how to understand the perceptions of each stakeholder on how they navigate tennis program that uses scaled tennis equipment. Further to that being what those experiences are to assess whether it is a positive experience and contributes to being attracted and retained in tennis from a youth perspective. The researcher also executed a peer inquiry in making sure the questions asked delved into the appropriate reflective areas of each stakeholder that would contribute to obtaining the riches data. The knowledge obtained from this research adheres to the epistemological philosophy of empiricism. From the researcher following the qualitative research design and conducting all interviews himself the new knowledge presented has been from those experiences and observations. Thereby, justifying the findings of this research through this epistemological stance.

A pilot study involves a small sample, usually five to 10 (Vincent, 2005), who have the same background as the participants of the study. To satisfy the pilot purpose three players, coaches, and parents were chosen, to sample the questions in making sure they were easily understood and would stand the test when the main interviews were staged, to obtain the appropriate data. As a result of this pilot, the researcher adjusted the questions slightly for parents, coaches, and players. Questions were reduced from nine to seven for parents, as some of the questions were redundant. Players' questions were reduced from five to four questions, and coaches' questions were adjusted from 11 to nine. To obtain the best understanding of success or lack thereof relative to players, parents, and coaches involving a scaled tennis equipment program, players and parents of all stages of a scaled tennis equipment program were chosen.

An interview protocol involved the following components:

- Date, place, interviewer, and interviewee;
- Standard procedures prescribed for each interview followed by the interviewer;

- Each interview was recorded in making sure all appropriate data was obtained; and
- At the conclusion of the interview, a thank you statement was relayed to each participant for the time spent providing data for this research.

4.2.7.2.1 Interview schedule

Below are the questions asked of each player (Appendix F), parent (Appendix G), and coach (Appendix H), forming part of the qualitative research design that was asked to the stakeholders of a scaled tennis equipment program. All probe and subsequent questions fall under the framework of these questions using a semi-structured, conversational format. All questions were asked in person by the researcher.

4.2.7.2.2 Questions to the players

1. What is your favourite thing to do when you play tennis with your coach?
2. What is fun about playing tennis with your coach?
3. What did you like to do when playing tennis without your coach (who do you play with)?
4. What do you like the most about your racquet, court, and balls when playing tennis?

4.2.7.2.3 Questions to the parents

1. What makes you think a scaled tennis equipment program was of value for coaching your child?
2. Do you think your child did well when using scaled equipment? Why?
3. What do you think they could improve on from their use of scaled equipment? How?
4. In your opinion, what was your child's best experience when using the scaled equipment?
5. In your opinion, what was your child's worst experience when using the scaled equipment?
6. What are your overall perceptions of a scaled tennis equipment program, positive and/or negative? Why?

7. What was your child's feedback to you on scaled equipment?

4.2.7.2.4 Questions to the coaches

1. How long have you been involved in coaching children?
2. How long have you been using scaled equipment in your coaching?
3. What is your basic teaching methodology or coaching approach when using scaled tennis equipment?
4. Are your coaching approaches in scaled equipment different to non-scaled equipment?
5. How do you introduce your training activities to your players?
6. How do you keep your players engaged in their practices?
7. Do you agree with the current USTA recommendations for red, orange, and green scaled tennis equipment play and competitions? Why or why not?
8. What are your overall perceptions of a scaled tennis equipment program, positive and/or negative? Why?
9. How did you experience the players using scaled equipment in the different stages?

4.2.8 Data analysis and interpretation

Cresswell (2009) recommended six steps in conducting data analysis in qualitative research and was followed by the researcher in doing justice to the data collected:

Step 1: Organize and prepare the data for analysis. This requires transcribing the interviews, scanning material, typing up field notes, or organizing data into different types depending on the sources of information.

Step 2: Read through all data to get a feel for the general sense of the information obtained.

Step 3: Start in-depth analysis of a coding process. Cresswell (2009, p.157) defines coding as "*the process of organizing the material into chunks or segments of text before bringing meaning to information."* It comprises taking text collected during data

collection, segmenting sentences into categories, and identifying those groups with a term (Cresswell, 2009). A software program called, ATLAS.ti (Scientific Software Development, 2017) was used to code the data collected from all interviews to put them into segments that facilitated proper analysis of the data (Cresswell, 2009).

Step 4: Generate a description of the setting or people as well as categories or themes for analysis. The description made involved an in-depth interpretation of information about people, places, or events in an environment. A coding procedure was used to produce a small number of categories that ended up being the main conclusions of this research.

Step 5: Look for more **meaning of the description and themes** that was relayed in the qualitative narrative.

Step 6: Making an interpretation of the sense of the data. On completion of the data being transcribed and given codes and then divided into categories for analysis. Further analysis was made in making deductions about the red, orange, and green ball players and parents, and then a comparison made linking to the data obtained from the coach's interviews.

The above research methodology is comprehensive, ensuring that the appropriate amount and accurate data required to make an analysis and conclusions to facilitate insightful research into scaled tennis equipment programming was made.

4.2.9 Trustworthiness

From a qualitative research perspective, a critical aspect is to establish the trustworthiness of the research. Trustworthiness provides more insight into the validity and reliability associated with qualitative research, Guba (1981) suggest four constructs that bring more clarity namely: credibility, transferability, dependability, and confirmability.

4.2.9.1 Creditability

An essential goal with qualitative research is providing internal validity in which the study desires to follow through with its intended objective. The following aspects were covered in this research in establishing that creditability (Shenton, 2004):

a) Adoption of research methods. For this research, a qualitative research method was adopted. It was felt this design was more appropriate due to the availability of delving into the perceptions of each stakeholder.

b) Development of an early familiarity with the culture of participating organizations before the first data collection dialogues take place. Before each data collection opportunity, the researcher had a face to face meeting with the contact providing the data collection opportunity. Around that meeting, the researcher was able the gather a greater understanding and purpose of that organization before the first data collection.

c) Random sampling. Having the objectives looking at the perceptions of stakeholders of a scaled tennis equipment program being players, parents, and coaches, those participants were needed. However, once the players, parents, and coaches were identified from a purposive sampling point of view, random sampling was adhered to in preventing researcher bias.

d) Triangulation. To benefit from this strategy, three forms of data were sought out being players, parents, and coaches. The individual experiences and viewpoints can be verified against others, and thereby a vibrant picture of the attitudes, needs, or behaviour can be determined.

e) Tactics to ensure honesty in informants. For each interview, the researcher ensured to let the participants know that at any point they were allowed to discontinue the interview. Additionally, the independent nature of the researcher was emphasized.

f) Frequent debriefing sessions. As a best practice, the researcher periodically conducted a debriefing session in making sure to test developing ideas and interpretations, and insight from others would be able to recognise any biases and preferences that the researcher might have developed.

g) Peer scrutiny of the research project. Having established a relationship with other experts in the field frequent contact was made with them to provide a fresh perspective to the research.
h) Background, qualifications, and experience of the investigator. The researcher received no funding for this research. The researcher has been a tennis coach using scaled tennis equipment for over 20 years and was able to incorporate this experience in the interviews and glean the best available data.
i) Member checks. After each data collection opportunity, the researcher reflected to verify the emerging theories and inferences as they were forming from the dialogues.
j) A thick description of the phenomenon under scrutiny. An emphasis has been made by the researcher to be very detailed in describing the essences of this research to allow a better understanding by the reader and facilitate the creation of their contexts.
k) Examination of previous research findings. A thorough account was done by the researcher of the previous research and findings completed on scaled tennis equipment. Although nothing of this nature has been done before comparable research has been observed and presented.

4.2.9.2 Transferability

From an external validity perspective often questions are asked that can qualitative research findings be applied to a broader population. Questions are raised because findings of a qualitative project are centred on a small number of a particular environment and individuals, it is challenging to demonstrate the findings and conclusions are valid to other situations and populations (Shenton, 2004).

To counter this requires a thick description of the phenomenon under investigation to allow readers a proper understanding of it, therefore enabling them to compare the instances of the phenomenon described in the research report with the situations that have emerged (Shenton, 2004).

Researchers (Cole & Gardner, 1979; Marchionini & Teague, 1987; & Pitts, 1994) suggest that there be a focus on the ability to convey to the reader the boundaries of the study. Information on the following issues should be given from the beginning:

a) The number of organisations taking part in the study and where they are based. A detailed account of the organizations and where they are based have been presented in this chapter.
b) Any restrictions on the type of people who contributed data. For the player's sample being so young was restrictive for some of them due to inability due to adequately communicate their experiences of a scaled tennis equipment program.
c) The number of participants involved in the fieldwork. The number of participants in this research was 103, 63 players, 30 parents, and 10 coaches.
d) The data collection methods that were employed. Data collection methods employed were interviews with players, parents, and coaches of a scaled tennis equipment program.
e) The number and length of the data collection sessions. The number of data collection sessions were 35 ranging in length from 1-2 hours.
f) The time period over which the data was collected. The period for collecting data was one year.

It is hoped that through the context of the organization chosen, different formats of data collection and venue has contributed significantly to the transferability of this research.

4.2.9.3 Dependability

Speaking of the issue of reliability, techniques are recommended that should the work be repeated, in the same context, using the same methods and participants the similar results would be achieved. A way to address the dependability more specifically the processes used in the study should be relayed in detail. This detail allows the reader to assess the ability of the research practices have been followed (Shenton, 2004). For this to be achieved the research design and its implementation, operational detail of data gathering, and reflective appraisal of the project is presented in 4.2.

4.2.9.4 Conformability

The use of triangulation promotes confirmability due to the fact it reduces investigator bias. Miles and Huberman (1994) state that a critical aspect for confirmability is the ability of the researcher admitting his or her predispositions. Beliefs that underpin decisions made and methods adopted should be recognized with the research report. Reasons for choosing one approach when others could have been taken need to be explained and limitations provided (Shenton, 2004).

To benefit from this strategy, three forms of data were sought out being players, parents, and coaches. The individual experiences and viewpoints can be verified against others, and thereby rich picture of the attitudes, needs, or behaviour can be determined.

From a results, perspective theories that ultimately not coming from the data should be explained. Significant portion of this content about these areas could be derived from reflective processes (Shenton, 2004).

4.2.10 Entering the setting

Entering the setting requires many ethical considerations, due to the close personal contact with the participants. For the player and parent interviews, the same procedure and setting were followed. Prior approval of being able to use the players and parents as a sample was obtained as per Appendix (A and B). Both samples were taken in two types of settings. Setting 1: was at the National Campus where the researcher would in advance communicate with the Head coach of the red, orange, or green stage training session to identify the best session to do that data collection. Once a training session was established to conduct the interviews the Head coach would start the session with the warm up and assign the players to the appropriate coaches. The Head coach would announce to all parents to gather and introduce the researcher at which point the researcher would thank the Head coach for the introduction and then explain to all the parents a brief outline of the research and invite themselves and child to be interviewed. The researcher was mindful of making sure that they had a choice to participate or not to participate. For each parent wanting to be interviewed the researcher presented them the adult consent form (Appendix C) and invitation letter (Appendix E). Once all parents

were given the two documents, the researcher went to each of them one by one to do the interview. Before starting each interview, the waiver forms were signed and answer any questions they had about the interview. The researcher would then start recording, on approval of the interviewee, and proceed with asking the questions. Once the questions were asked, the researcher thanked the interviewee. Once the parent had finished the interview, the researcher presented the minor consent form (Appendix D) to sign, and then coordinate the best time to do the player's interview.

At times it was challenging to conduct and make an appropriate recording of the interview as the facility was very close to an airport and often there would be airplanes flying overhead. Some parents had additional children with them and would get distracted in the middle of the interview. The researcher was very sensitive to this and made sure on each occasion that the parent was in a right frame of mind to either stop or continue. Despite the few distractions, the parents were very engaged in the interview and on most occasions thought that the questions were outstanding and facilitated thought-provoking answers. After completion of the parent's interview, the researcher would ask permission to interview their child, on all occasions, the parent gladly complied. Again, sometimes this would prove a challenge from the player's sample as they had just finished an hour lesson in a hot and humid environment and were keen to hydrate and then get home to have dinner and do homework. The samples that were taken on the weekend were better from this point of view. As a result of the need to have more interviews for the players compared to the adults, once having enough parent samples the parents were approached to get approval to interview their child. Again, this provided the same setting as before as the player's sample. After each interview, the researcher thanked both parent and player.

Setting two was Early Development Camps that took place at the National Campus. Prior approval to use these camps as data collection opportunity was obtained from Kent Kinnear, USTA Director of Player Identification and Development (Appendix B). Before the camp, the researcher would communicate with the Head coach and confirm the logistics of this data collection opportunity. Out of the two settings, the camp offered a

much more natural data collection environment. Within each camp, as part of the program, there is a parent's meeting. On each occasion, after the parent's meeting, the researcher would be given an opportunity to speak to the parents and invite them to take part in an interview. As what was done with the National Campus sample after each interview the parent was asked if their child could take part in a player interview. Again, every parent agreed to this and signed the minor consent form (Appendix D). The player was then approached during a break in training to do the interview. The atmosphere when interviewing the player was more relaxed than the National Campus sample as all camps were hosted on the weekend and there were no time constraints imposed. As in the National Campus data collection for the camps both parent and player were thanked by the researcher on completion of the interview.

4.2.11 Ethical consideration

4.2.11.1 The right to privacy and non-participation

All information obtained from participants is essential to the study. No unnecessary information will be collected. All subjects will voluntarily participate in this research after they have been informed that they had the right to not participate in the study and to discontinue the test at any time. All participants will be required to sign an informed consent form.

4.2.11.2 The right to remain anonymous

A letter and numbers will be assigned to identify each participant for the player's sample PL and then the corresponding number. For parent sample, "P" and corresponding number. For coach "C" sample and corresponding number.

4.2.11.3 The right to confidentiality

All information, other than results from the tests, will remain confidential and will never be made available. Only the authors and supervisor of this study will have access to the original participant data.

4.2.11.4 The right to expect experiment responsibility

Participants will be informed from the onset of the study what the purpose of the study is. The researcher, supervisor, and Head of Department have signed the Faculty of Humanities Declaration of Ethical Intent.

4.2.11.5 Dissemination of research results

The findings of the investigation will be made available to all participants, the United States Tennis Association, and the researcher. The format of this research will be in the form of a Doctoral dissertation and scientific article using the APA format.

4.3 CHAPTER CONCLUSION

The methodology of this research was provided in this chapter. A qualitative research methodology grounded theory was deemed the most appropriate method for obtaining the perceptions of the three stakeholders of a scaled tennis equipment program. The justification for this method was detailed in this chapter along with sampling methods and then how the participants of the research were engaged. An overview of how the data was collected, processed, and analysed in making sure the trustworthiness of this research was preserved. Ethical considerations were also detailed in making sure again the validity and reliability of this research was kept. The next chapter goes into the analysis and interpretation of the data collected using a qualitative research design.

CHAPTER FIVE:
ANALYSIS AND INTERPRETATION OF RESULTS

5.1 INTRODUCTION

The research methodology was presented in Chapter 4, pp.149-168. A qualitative method of grounded theory was utilized to determine perceptions of parents, players, and coaches involved in a scaled tennis equipment program. All three stakeholder groups of a scaled tennis equipment program were interviewed to obtain in-depth data involving perceptions and understanding of successes or failures in participation during a scaled tennis equipment program. The analysis and interpretation of the data obtained from the interviews have been presented in this chapter.

The underlying objectives of this investigation were:

Objective 1: Investigate ***perceptions of players*** relative to their experiences within each stage (red, orange, and green) of a scaled tennis equipment program;

Objective 2: Explore ***perceptions of parents*** on their child's experiences in scaled tennis equipment programming;

Objective 3: Examine ***knowledge and understanding of coaches*** and how players navigate the three stages of a scaled tennis equipment program;

Objective 4: Determine ***holistic and interactive perceptions that all three stakeholder groups*** (players, coaches, and parents) share in a scaled tennis equipment program; and

Objective 5: Provide ***recommendations*** for scaled tennis equipment programming practices.

Data have been presented as follows:

- Different ***stated objectives of the research*** initiated the presentation procedure: perceptions (knowledge and understanding) of players, perceptions of parents, and perceptions of coaches;

- Each stakeholder group was discussed in accordance with the ***different stages of red, orange, and green***;

- Perceptions of each group are led by the ***relative research question;***

- A ***formulated statement*** to describe the status of the response;

- A ***summary of each question*** and each stage; and

- An ***executive summary for the specified group*** under investigation.

As detailed in Chapter four for each interview of players, parents, and coaches, a standard number of questions was asked. Follow-up questions were asked to clarify what was being asked and data were presented by the interviewee. For all players interviewed, the same four questions were asked; all parents had the same seven questions; and for all coaches, the same nine questions were queried. Analysis and interpretation of the findings have followed the order of the questions by gleaning the most appropriate data given by the interviewees for each of the questions asked. They have been presented in the progressive order of a scaled tennis equipment program, starting with red, then orange, and green stages. Once players' and parents' perceptions of a scaled tennis equipment program were presented, the coaches' followed.

The six steps of qualitative research data analysis and interpretation were followed as presented by Cresswell (2009) in Chapter four. Codes were assigned by using the ATLAS.ti (Scientific Software Development, 2017), a software program that best represented the context. Codes that were repeated for each question through stakeholder

group interviews were then noted by the researcher and have been presented as the best response to that question. This format of coding was completed for each answer by parent, player, and coach. The validity and reliability of the data was upheld through a trustworthiness approach that was detailed in Chapter 4. The epistemological philosophy grounded in empiricism was followed showing how through the researcher's experience and observation of data collection new knowledge was obtained that related to the three stakeholders of a scaled tennis equipment program. Additionally, appropriate quotes of the interviewees were noted and provided more understanding and justification of the common themes that were identified by the researcher specific to each question.

5.2 ENTERING THE SETTING

Qualitative research requires many ethical considerations because of close personal contact with participants. The following were considered:

- Participants were assured that provisions would be followed to safeguard their privacy and guarantee anonymity;
- The researcher gave detail about ethical matters through invitational and consent letters (see Appendices C, D, and E) before commencing data collection. The interview was conducted in a language that the participant could understand;
- The researcher stayed away from the sentiment that the participants felt like they were being evaluated;
- The researcher respected the rights of the interviewee; and
- The researcher conducted all interviews so that he was fully immersed and part of the research.

The investigator secured approval from the USTA National Campus Head Professional of Youth Programming (see Appendix A). The USTA National Campus is a newly built facility funded by the USTA that is the headquarters of the national governing body for the sport in the USA. The facility has 100 tennis courts of different sizes and surfaces. Surfaces include hard court, Hard-tru clay courts, and red clay courts. There are 8

permanent red-stage [10.97 m (36 ft.) by 5.49 m (18 ft.)] and 8 permanent orange-stage [18.29 m (60 ft.) by 6.4 m (21ft.)] courts. The facility opened to the public on 3 January 2017. Programming has been offered for every level and age of tennis players. Youth programming offers individual and group instruction for all three stages (red, orange, and green) represented in a scaled tennis equipment program.

Another source of data collection included Early Development Camps (EDC) hosted by the USTA. Camps have been offered throughout the USA that identifies and invite local orange and green ball tennis players to participate in half-day training opportunities. Approval was sought and granted after approaching the Director of Player Identification and Development (see Appendix B).

5.3 ANALYSIS AND INTERPRETATION OF THE RESULTS

5.3.1 Objective 1: Perceptions of players' experiences within each stage of a scaled tennis equipment program

The interview protocol was followed as per Chapter four. Each interview had the same four questions asked of all players. After analysis, common themes emerged; quotes from players were used to justify themes.

Considering ages of interviewees in most cases, answers were very short in length. The interviewer created a relaxed atmosphere to facilitate appropriate feedback.

Twenty-two red players (14 boys and eight girls) were interviewed, and their responses to the four questions were analysed. The analysis has been presented in the order of questions asked.

5.3.1.1 The red stage

The first stage of a scaled tennis equipment program, red, was explained in Chapter 3, pp. 135-136. Court dimensions of 10.97 m (36ft.) x 5.48 m (18ft.), racquet size of 48.2 - 58.4

cm (19-23 in), a ball with 75% compression and 10 % larger in size. A red player is one who uses the red stage racquet, ball, and court in training and competition.

Question 1: "What is your favourite thing to do when you play tennis with your coach?"

Perception 1.1: Playing with scaled tennis equipment allows players to participate in tennis with their coach.

Playing the game of tennis for a young child participating in tennis for the first time can be challenging if the equipment is not scaled to size and development. Using scaled tennis equipment allowed Red player 3 to do his favourite thing: *"Do fun games, I like to hit the ball over the net."*

Alternatively, Red player 8 liked to start service and hit volleys at the net. It was interesting to see the player wanting to hit volleys, as volleys have been perceived to be one of the easiest strokes to master in tennis. Emphasized also the need to have success as a beginner tennis player: *"I like to volley the ball at the net and serve to start playing."*

Red player 10 could not have put it any better when he said: *"I like to play games."*

Perception 1.2: Using scaled tennis racquet and ball facilitate players' abilities to hitting the ball.

A common theme when asking players what their favourite things to do involved hitting the ball. Hitting the ball can be synonymous with playing the game. Red player 8 verbalized this wish when stating: *"I like to hit the ball."*

Red player 21 reiterated what Red player 8 said, but more specific to the strokes of tennis: *"I like to play forehands*."

Much like the response about hitting volleys in the game, hitting forehands is one of the easier groundstrokes to master, as it is hit on the preferred side of the body. Reinforcing the desire to play the game requires the need to be successful.

Perception 1.3: Players like rallying the ball back and forth with their coaches.

Rallying the ball back and forth with a coach can be a form of tennis play. Players spoke about playing the game of tennis but verbalized it differently. Red player 7 stated: *"I like to rally the ball over the net."*

Rallying the ball back and forth from a tactical point of view is a solid developmental beginning for a young tennis player. This reference is important in their favourite thing to do with their coach. Incorporating competition and seeing how children can beat their scores are ways to incorporate a low-stress competitive environment. Red player 17 supported this notion: *"Rally back and forth. I like to see how many I can get and beat that number."*

Further support for rallying and playing the game was given by Red player 20: "*Rallying and playing games."*

Perception 1.4: Players like playing their favourite game with their coaches.

Again, the same theme resonated, but in a different manner. In quotes below, players gave the actual game they like to play with their coach. The coach played a game with them to enhance their tennis experiences, and players remembered the name of the game. Red player 13 liked: "*Up and down the river. Get to hit balls with other people back and forth."* Red player 14 verbalized: "*I like hitting the ball over the net with my coach. Lion is my favourite game."* Red player 18 enjoys playing a game: "*I like to play champs and chumps."* Red player 22 gave the name of the game that involved a warm-up type/athletic developmental game: *"It is lots of fun and lets us play dodgeball sometimes."* Being able to play the game contributed to the success of a scaled tennis equipment program. By using scaled tennis equipment, children had a higher likelihood to play the game. Because scaled tennis equipment conformed more to size and growth of young children and facilitated considerably the ability to play the game.

Four perceptions were identified for the first question of red players. They spoke about playing the game of tennis. Using scaled tennis equipment fulfills the child's wish better.

Question 2: "What is fun about playing tennis with your coach?"

Perception 2.1: Playing with scaled tennis equipment allows players to participate in tennis with their coach.

Using scaled tennis equipment facilitates the ability to play tennis with young children. Additionally, they liked to play a game. Red player 3 likes playing fun games by saying: *"I like to do fun games, it is easy to play tennis*." Red player 13 liked to play games that involved rallying: "*That we get to play lots of tennis games. Lots of rally games and point games."* A reference is made to scaled equipment when Red player 21 says*: "Games, games with tennis balls, particularly red balls."*

Perception 2.2: Playing with their coach and using scaled tennis equipment equates to fun.

Another common theme observed in question two was the recurring fun theme. Red players 14 liked having fun by playing games as reference in the quote: "*It is fun because we play games like ready-aim-fire."* Red player 18 liked having fun by playing points: *"I like playing points. It is fun to play points."*

Perception 2.3: Players like to play matches with their coach when using scaled tennis equipment.

Playing tennis with points alluded to the competitive side. This can be very risky with young players because they may not have appropriate skill levels. How children are introduced to competition and their understanding of the purpose are crucial to retention. This is seen in when Red player 13 likes to play matches with the coach by saying: "*That we get to play lots of tennis games. Lots of rally games and point games."* Red player 18 associates playing points as having fun: "*I like playing points. It is fun to play points."*

Red players, when playing with their coach, like having fun by playing matches.

Question 3: "What did you like to do when playing tennis without your coach (who do you play with)?"

The positioning of this question was to gather more information about what players did outside their training sessions. More specifically, who do they play with and what is that experience like? Again, through analysis of all interviews, common themes arose that included playing the game, playing as a family, and playing with friends.

Perception 3.1: Players in a scaled tennis equipment program like to play as a family when not playing with a coach.

Considering the constraints of the red stage (smaller courts, shorter racquets, and bigger ball), the ability to play tennis compared to orange and green stages appeared more natural. Playing as a family appeared to be important from a retention perspective for players and other family members. Finding things to do as a family promoted more tennis play. Also, having that ability for all family members to play relative to the red stage was greater because of a shorter racquet, a smaller court, and a bigger ball. Red player 9 supported this notation of play, not only with family members but also at home with the following quote: "*I like playing in our driveway and play with my brother."*

Red player 14 determined with the following quote: *"Play with mum, dad, and my brother. I like hitting the ball over the net. We play with the foam and hard red ball."*
That not only is the red stage playing condition followed in the coaching environment, but also when playing as a family. This can translate into to having success in both environments.

Perception 3.2: Players of scaled tennis equipment program like playing the game without their coach.

When players reflected on their experiences of playing with their coach, red players liked playing the game. Additionally, when not playing with their coach, they wanted to play the game. The ability to achieve this goal was better served when using the appropriate scaled tennis equipment. Red player 3 liked playing games and hitting the ball back and forth over the net: *"Do fun games, I like to hit the ball over the net."* Red player 13

echoed the same sentiments as Red player 3 by saying: *"My brother, mom, and dad. We do rallies, games, also sets. We play singles and doubles."*

Perception 3.3: Players in a scaled tennis equipment program like to play with their friends when not playing with a coach.

Having that social component with tennis play could be a solid selling point for a parent. The ability to engage in more relationships not only at school but also in sports settings contributes to their social competence. Success was critical in play with friends and can be promoted with scaled tennis equipment use. Red player 8 mentions:*"I like to play with my friends, rally, and hit the ball against a wall at home."*

For Red player 17 to voice some friends' names further supported their need to socialize and play tennis away from the coaching environment with the following quote: *"Playing points with my friends. I like playing with Xavier and Enock, because they are tough to play against. In the summer I play with my dad."*

Red players liked to play the game, play with friends, and with their family when not playing with their coach.

Question 4: "What do you like the most about your racquet, court, and tennis balls when playing tennis?"

The fourth question sought to obtain more insight into the experiences of using scaled tennis equipment. The purpose of this question was to identify the experiences whether successful or unsuccessful when using scaled tennis equipment.

Perception 4.1: Players like the scaled tennis courts because they are easier.

Red players 14 and 15 made the same observations and liked the size of the red stage court. Red player 14 stated: "*I like that my court is smaller,"* and Red player 15 indicated: *"I like playing on the smaller court."*

Red player 17 related that if the court were large, players would have a tougher time getting to and keeping the ball in play, further supporting the success of scaled tennis courts: "*I like the court size because if you always have a full court, then sometimes you will not be able to get the ball back."*

Red player 18 voiced additional support of playing on a smaller court through: *"I like the red court because it is smaller than normal court. It is easier."*

Perception 4.2: Players like their scaled tennis racquet.

As stated, players were asked to comment on their racquets. Many references were made about the colours and dampener on their racquets. This was confirmed by Red player 11: *"I love my Rafa racquet, and the racquet is my favourite colour*." Red player 21 added: "*I like the dampener."*

The racquet recommended for the red stage was the lightest and shortest to facilitate the success of players. This serves as additional confirmation of this objective when Red player 2 mentioned: *"I like them because they are lighter and helps me hit the ball."*

Red players were very vocal in their admiration for racquet appearance as well as the ease of hitting the ball. They also liked the courts they played on because it was easier to get to the ball and hit it back over the net.

5.3.1.2 The orange stage

Considering details provided in chapter 3, p. 134. The Orange stage is defined as having a court measuring 17.68 m (58 ft.) - 18.29 m (60 ft.) x 6.1 m (20ft.) - 8.23 m (27ft.). Recommended racquet sizes for Orange are 58.4 – 63.5 cm (23 - 25 in). The orange ball is a standard size with 50% compression. An orange player is one who uses the orange racquet, court, and ball in training and competition. Orange stage players were comprised of 21 players (10 male and 11 female).

Question 1: "What is your favourite thing to do when you play tennis with your coach?"

Perception 1.1: Playing with scaled tennis equipment allows players to play tennis with their coach.

Similar to feedback given by red players, orange players also wanted to play tennis with their coaches. Because of the children's ages, 10-and-under, and taking into consideration growth, maturation, and development, playing the game would primarily be achievable by using scaled tennis equipment. Orange player 11, stated: *"Really like playing points and rally games. It gives me a challenge. I like to play a lot of games because they are fun."*

Orange player 6 referred to working on things that made him a better tennis player, even on a mastery level: "*I like to work on my weaknesses, volleys, and backhand and like to work on them to get better and eventually master them."*

Perception 1.2: Players like rallying the ball back and forth with their coaches.

Rallying the ball back and forth with their coach or with other players in their group lesson is a form of playing the game. It was appropriate to further substantiate the desire of players to play tennis. Having the availability of scaled tennis equipment promotes the ability to rally and play the game. Orange player 2 confirmed this by mentioning: *"My favourite thing to do is practice, hit rallies, and stuff like that."* Orange player 13, spoke about comparing rallying with fun and moving around the court*: "I like to rally, because it is fun, running side to side and hitting the ball."*

Comprehensive feedback points towards wanting to play the game of tennis with the coach when using scaled tennis equipment, confirming feedback voiced by the red player.

Question 2: "What is fun about playing tennis with your coach?"

Perception 2.1: Players like to work on improving their tennis skills when playing with their coach.

Question two for the orange players provided much feedback on the ability to learning more about the game. Implicit learning is promoted when the player is having success. Essentially learning on their own terms. Orange player 4, supported learning with scaled tennis equipment when playing with a coach: *"Rallying with the coach, playing ping pong. By doing strokes and learning about other things so I can get better."* Further support for learning during practice is echoed by Orange player 15: "*Practice the skill and play points at the end of the lesson. Try and improve as a tennis player."*

Perception 2.2: Players like to play matches with their coach when using scaled tennis equipment.

Playing points against their coaches was a common theme for orange players in question two, supporting previous perceptions of playing the game and rallying. The use of scaled tennis equipment for young beginning tennis players can promote this ability when taking coaching lessons. Orange player 18 is very to the point: "*I like playing points. It is fun to play points."* Orange player 13 summarized the above comments of playing the game, rallying and playing matches by stating: "*That we get to play lots of tennis games. Lots of rally games and point games."*

Perception 2.3: Players like rallying the ball back and forth with their coaches.

Orange player 17 emphasized the requirement to rally and gave other avenues to satisfy this need with the quote: "*I like to rally, play against the wall, I like to play tennis with other kids. Rally and play points."* Orange player 5 referred to rallying and having fun with the coach: "*Because we get to do fun things, rally to each other."*

The responses to question two emphasized a need to play the game with references to rallying back and forth, playing matches, and learning more about the game.

Question 3: "What did you like to do when playing tennis without your coach (who do you play with)?"

Perception 3.1: Players in a scaled tennis equipment program like to play as a family when not playing with a coach.

Orange player 2 referred to playing with family members when not playing with the coach. Additional comment is made towards playing the game of tennis, with: *"I like to play with my dad and sister, we get to hit serves and play matches."*

An important comment was made by Orange player 11 about playing with family. When playing, they liked to play singles and doubles: *"I play with my brother, mum, and dad. We play a lot of singles, and sometimes doubles. I like playing more singles, you can run around more. It is more of a challenge."*

Perception 3.2: Players like to play matches when not playing with their coach.

Orange player 14's answer to question three highlighted a willingness when not playing with the coach in a group lesson to playing tournaments. Additionally, mentioning tennis play in a physical education session pointed to not only a way to get more children participating, but also having the ability to play tennis outside a traditional tennis court setting:*"I play with other kids in a group lesson and play tournaments. I played once with my mum when I was little. In school, because my dad is gym teacher during physical education, we will play tennis."*

Reference was made by Orange player 16 to playing in tournaments. The willingness to play competition can go a long way to solidify their sustenance in the sport: "*I get to play tennis with Alvin and other friends. We like playing points and making them run. I like playing tournaments, and playing against harder players. It is more challenging and gaining more experience."*

Perception 3.3: Players in a scaled tennis equipment program like to play with their friends when not playing with a coach.

Orange player 7 identified the social component of tennis without their coach. When playing with their friends, they liked to rally and play tennis, further supporting the success of a scaled tennis equipment program: *"I like to rally with my friends/partner."*

Orange player 15 made mention in the following quote, "*play with other people so I can make more friends"* of another reason to play tennis – to make more friends. To position the use of scaled tennis equipment as a way to make new friends could convince children and parents to participate in tennis.

Perceptions relayed in question three from orange players highlighted playing with friends and family when not playing with a coach. For the first time, players of a scaled tennis equipment program made mention of a desire to play tournaments when not playing with their coach.

Question 4: "What do you like the most about your racquet, court, and tennis balls when playing tennis?"

Perception 4.1: Players like scaled courts because they are easier.

Perceptions of red players on how smaller court size helped children play the game, was also seen with orange players. Orange player 17 pointed out that on a normal court their size did not allow them to cover the court efficiently: "*It is easier on the smaller court. If it is bigger, you have to run a lot."* Further support and success of a scaled tennis equipment program was shown by Orange player 18 who stated: *"I like the mini court because it is easier. But I like a challenge."*

Perception 4.2: Using scaled racquets and balls facilitates the player's ability to hit the ball.

The quote from Orange player 5 showed a combination of success by using both orange racquet and ball. This promoted the ability to play the game: "*I like the colour of my racquet, and it helps me hit hard and powerful balls. It is easy to hit with orange balls."*

Orange player 16 liked orange balls because they provided the ability to go to the net, hit a volley, and contact the ball with more precision: "*When I hit orange balls it is easier than green. You can do more like volley and be more precise, and be challenged."*

Perception 4.3: Players like their scaled tennis racquet.

Orange player 10 made a short and powerful comment with: *"I like it that I am able to control the ball with a racquet."*

The scaling of balls and courts for the orange stage makes it easier for orange players to play tennis. They also mentioned that they liked their racquets. Across the board, positive responses were given to scaled tennis equipment by orange players.

5.3.1.3 The green stage

The green stage of a scaled tennis equipment program has the standard dimensions of a tennis court, balls have 25 % compression and use racquets 63.5 cm (25 in) -66cm (26 in). A green player uses the above dimensions of racquet, court, and ball in training and competition. For the green stage, 20 players were interviewed (11 males and nine females).

Question 1: What is your favourite thing to do when you play tennis with your coach?

Perception 1.1: Players like to play matches with their coach when using scaled tennis equipment.

Playing matches is the competitive component of playing the game of tennis. Having success and positive experiences are very important. Players' favourite things to do were to play matches when training with their coach. Green player 2 showed passion for playing matches: "*I just love match play. I love competing and getting to know different players' styles because everyone has got a different way of competing and hitting. So, I love match play."*

Green player 10's comment: "*When I play tennis with my coach I like to play points with him because it challenges me to hit cross courts and down the line, different shot selection,"* is in line with playing matches. The desire to play points was a competitive desire. The following quote emphasized the player's wish to play matches when playing

with the coach: *"When I play tennis with my coach I like to play points with him because it challenges me to hit cross courts and down the line, different shot selection."*

Perception 1.2: Players like to work on improving their tennis skills when playing with their coach.

Wanting to improve is a significant aspect of sports participation. Green player 7 provided insight into that perception when playing with a coach. Using scaled tennis equipment makes it much easier and promotes more success compared to non-scaled tennis equipment, heaping more praise on the success of a scaled tennis equipment program with the following quote: "*I like it when he gives me information, and when I am having trouble learning something he does not just say, 'Do that.' He helps me go through the steps again, even if the whole class is getting it correct."*

These types of phrases are also a testament to the ability of the coach. However, it makes it easier for the coach to improve a skill by using scaled tennis equipment. Use of scaled tennis equipment promotes the ability to play the game by achieving successes. Green player 9 states: *"Every time I play with my coach there is something new to learn."*

Green players like to play matches and work on their game when playing with their coach.

Question 2: "What is fun about playing tennis with your coach?"

Perception 2.1: Playing with the coach and using scaled tennis equipment is fun.

Green player 12 went into specific detail of the connection with his coach: *"First of all, you need to like him to have fun with him. So I like him, and I have fun with him each day I play with him, because he says I am good."*

Green ball player 15's comments that link to fun and learning about the game of tennis while playing with a coach: *"We actually learn a lot of things and you get to play so much, and it is fun."*

Perception 2.1: Players like to work on improving their tennis skills when playing with their coach.

Question two revealed the need to facilitate play with the coach in a scaled tennis equipment program is an additional preference for tennis skill improvement. Green ball player 11 stated: *"They do not go as hard as they could. They go nice on you. I like the games they teach us and the skills. I also like the drills because I know they're gonna make me a better tennis player."*

Green ball player 13 made specific references to learning technique and tactics with the comment*: "Learning how to play and to hit, to other player weaknesses and to the sides, and hitting proper technique."*

Answers to this question revealed the need to learn skills as a tennis player. This stemmed from a desire to move to the next stage and out of scaled tennis equipment.

Question 3: "What did you like to do when playing tennis without your coach (who do you play with)?"

Perception 3.1: Players in a scaled tennis equipment program like to play as a family when not playing with a coach.

Green ball player 10 emphasized the desire to play as a family when not playing with a coach, also showing how important it was to improve tennis skills: "*Sometimes I play with my dad and my brother, and I try to apply what my coach taught me."* Green ball player 2 sought a less stressful environment when playing without the coach: "*I usually play with my dad, and we kinda mess around. We do not really play seriously."*

Perception 3.2: Players like to play matches when not playing with their coach.

Playing matches is a consistent theme for players not only when playing with a coach, but also without a coach. Green ball player 6 put it simply with: "*Rally and play matches mostly."*

Green ball player 4 made an interesting point. Referring to a competition program that linked to tournament play and how a player moves from one stage to the next with the following quote: *"There's a future chart that keeps your records when you go up, so you can see your kid records."*

A recurring theme emerged when not playing with a coach. Green players liked playing as a family and competing.

Question 4: "What do you like the most about your racquet, court, and balls when playing tennis?"

Perception 4.1: Using scaled racquets and balls facilitates the player's ability to hit the ball.

Reference to a red ball from a green ball player is great feedback. By reflecting on previous stages and how it fits together in a youth pathway is a positive perception of a scaled tennis equipment program. It also shows how the use of scaled tennis equipment contributed to retention. Green ball player 1 commented: *"The equipment usually matches the court, so like the red ball was bigger, so like it was easier to hit, and it was less bouncy, so it was better for the red ball court."*

Green ball player 14 felt that by using the appropriate ball made it easier to hit it. If it were easier to hit the ball, it would be easier to play the game, further promoting the success of a scaled tennis equipment program: "*So it'll be easier to hit the ball. If it's too big, it's too heavy. If it's too small, it's not the right size."*

Perception 4.2: Players like their scaled tennis racquet.

Previous comments made by the red and orange players were also heard by Green ball player 10 about the colours of the racquet that they used. Not only were ball colours preferred, but also racquet sizes: *"I like the colour of my racquet because it's very bright and the size of the racquet is appropriate for me."*

Green ball player 2's favourite professional tennis player was Rodger Federer and appeared to be a reason of choosing the racquet used: "*I think I like my racquet because it's the same as Roger Federer's, and I'm completely inspired by him. I have all his stuff, and yeah, he's amazing. So, I'm just inspired by him, and I love my racquet."*

Another reference was made by the green ball players to the ease of using a ball and racquet in the green stage.

5.3.1.4 Executive summary of the perceptions of players on a scaled tennis equipment program

Sixty-three (22-red, 21-orange, 20-green) interviews were conducted. The appropriate ethical protocols were observed. Every player was asked the same four questions. Each interview was audio recorded and then transcribed. Once interviews were transcribed, codes were assigned to each player's perception of a scaled tennis equipment program. Codes that were repeated and seen as common themes were then presented as part of each question's analysis. From the analysis of all the questions, 13 perceptions were repeated, and best represented the overall perceptions of the 63 players interviewed who participated in a scaled tennis equipment program including all three stages. The perceptions listed below are done in hierarchical order meaning that there was more mention of Perception 1, than Perception 2 and then working our way down to Perception 13, which had the least amount of representation among all of the perceptions of players of a scaled tennis equipment program, including its three stages of red, orange, and green:

- ***Perception 1: Players like their scaled tennis racquets;***

- ***Perception 2: Players like to play matches with their coach when using scaled tennis equipment;***

- ***Perception 3: Players like to play matches when not playing with their coach;***

- ***Perception 4: Playing with scaled tennis equipment allows players to play the game of tennis with their coach;***

- ***Perception 5: Players in a scaled tennis equipment program like to play as a family when not playing with a coach;***

- ***Perception 6: Players like rallying the ball back and forth with their coaches;***

- ***Perception 7: Playing with the coach and using scaled tennis equipment is fun;***

- ***Perception 8: Players of scaled tennis equipment program like playing the game without their coach;***

- ***Perception 9: Players like to work on improving their tennis skills when playing with their coach;***

- ***Perception 10: Using scaled racquets and balls facilitates the player's ability to hitting the ball;***

- ***Perception 11: Players like the scaled courts because they are easier;***

- ***Perception 12: Players like playing their favourite game with their coaches; and***

- ***Perception 13: Players in a scaled tennis equipment program like to play with their friends when not playing with a coach.***

It is evident that red players when playing with scaled tennis equipment with or without their coach, have the desire to play tennis. Lee (1999), supports this notion of playing the game through the desire of players demonstrating their ability to play the game to their coach and other players in that session. By using scaled tennis equipment, it was perceived to be much easier because the equipment was developmentally scaled. Perceptions of red players pointed to the validity of a scaled tennis equipment program. The reason for its success was that players wanted to play the game as quickly as possible under regulation conditions.

Orange players desired to play tennis. They further stated benefits and successes through the use of a scaled tennis equipment program because they can play the game sooner. This further advocate the research conducted by Farrow and Reid (2010) that show by using scaled tennis equipment over non-scaled tennis equipment more success can be achieved by the players.

The perceptions of players point towards a need to develop their tennis skills with scaled tennis equipment in a format of mastery (Lee, 1999). Due to this development of mastery of tennis skills players are feeling confident with their ability and then progress to testing their skills in a match or competition. Although competitive goals associated with sports participation don't arrive until a later age of 12, the focus on developing skills will provide a foundation and translate into a positive experience (Buchanan & Roberts, 1991). This wish of mastery of skills and the ability to achieve in the infancy of playing tennis points to a positive perception of scaled tennis equipment programming (Duda, 1987; Alvarez & Marquez, 2006).

5.3.2 Objective 2: Perceptions of parents on their child's experiences within each stage of a scaled tennis equipment program

With the above analysis provided, the following are the findings of the parents. A total of 30 parent interviews were conducted, 10 from each stage (red, orange, and green). Keeping with the same format, each of the questions was asked to parents. Answers were analysed, and codes were assigned. Once codes were analysed for each question, the most common themes were identified and explained.

5.3.2.1 The red stage

Question 1: "What makes you think a scaled (modified) tennis equipment program was of value for coaching your child?"

The first question was positioned to start the thought process of trying to obtain the appropriate data needed for this investigation. The data obtained for the first question provided a solid foundation for the other questions asked in the interview. To provide simplicity in data analysis and interpretation, all answers from question one through seven were coded and then grouped to identify common themes. Additionally, quotes were recorded and presented to provide further insight into this research. The most common themes indicating the value of scaled tennis equipment by the perceptions of parents were revealed.

Perception 1.1: The scaled tennis equipment program is indeed designed for young children.

Out of the 10 red parents interviewed, nine mentioned that scaled tennis equipment was of value to their children because it was designed for them. The equipment was scaled to the overall growth and development of their child. In one interview, a parent compared it to other sports that also used scaled equipment. Red ball parent 8 stated: *"I think it makes a lot of sense because it can be really big if they are put on a traditional court. I grew up playing baseball I would not start on the 90-foot field we would start on a smaller 42-*

foot. I started playing baseball in a modified manner; they called it T-ball. It makes sense that when the child grows, so does the court. I played tennis recreationally when growing up, on a normal sized court."

Red parent 10 associated a benefit of the equipment being scaled to the size of children: ***"****Due to the fact that the court, racquet, and ball are sized appropriately for my child and because of that he can have more success, it is not so hard to get the ball over the net."*

Red parent 3 felt that tennis was more accessible because of the scaling of tennis equipment. Specifically, non-scaled balls bounced too high. The reason for the high bounce was two-fold in relation to the child: (1) full compression and (2) the child was petite in stature. The high bounce was detrimental to a child's success: "*It has been helpful in that it makes it more accessible to her compared to the bigger court and yellow balls that bounce very high. It has made tennis more accessible."*

Red parent 1's comment stated that scaled tennis equipment was designed for young children. It keeps them engaged and can lead to better appreciation of the game: "*I think it is built for them and keeps them engaged, helps them better understand the rules of the game in a scaled form that is designed for them."*

Perception 1.2: Using scaled tennis equipment develops confidence in playing tennis.

Confidence is a potent mental tool in tennis participation, and it links to the belief in capabilities when playing the game. Red parent 6 mentioned: *"Having modified equipment makes it easier for her to conquer or have the illusion that she has confidence."*

Using scaled tennis equipment was of value to young players as it enabled the coach to teach tennis fundamentals. By developing these fundamentals, they can gain confidence. This would not be possible when using non-scaled tennis equipment. Clarification of this point was seen in Red parent 9's comment*: "I think it, first of all, is an opportunity to*

teach fundamentals but also gaining confidence when the kids use the large racquets and balls the players will lose interest."

Perception 1.3: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment.

Many sporting experts (Lee, 1999; Farrow & Reid, 2010; Buszard et al., 2014) have stated the need for children to have fun while playing a sport. Red parent 7's quote associated having fun with retention in the sport and the desire to take more tennis lessons: *"They have so much fun; they want to take more lessons during the week."*

The answers to question one in the red stage highlighted perceptions of fun, confidence, and scaled tennis equipment designed for youth. This verified the success of a scaled tennis equipment program.

Question 2: "Do you think your child did well when using scaled (modified) tennis equipment? Why?"

Question two is a follow-up to question one to gain additional insight into the perception of the parent, but more from a success point of view. As in question one, coding was done to facilitate appropriate analysis and interpretation.

Perception 2.1: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment.

For a parent to identify that their child had fun in a sports setting is valuable to all stakeholders of a scaled tennis equipment program. To have scaled tennis equipment contribute to success in parent perceptions provided further support for scaled tennis equipment. Red parent 5 stated: "*Yes, I think so, I have come to every class, the kids like it, and are useful."*

When a child refers to playing tennis outside of lessons points to the enjoyment of participation and the need to play more. Justification is shown in Red parent 6's reflection:

"*Yes, more successful and she even mimics it at home with her racquet. She has enjoyed it at the very least*."

Perception 2.2: The scaled tennis equipment program is indeed designed for young children.

From further feedback given in question one, there was an overarching theme of the use of scaled tennis equipment with the parent, feeling that it was designed for young children. This is a compelling comment as it can contribute to the success that can be achieved. Red parent 9 commented: "*It fits their sizes and skill levels. I already see the confidence growing in them*."

Red parent 4 made a comment about scaled tennis equipment use when an underlying theme of implicit learning was discussed. By scaled tennis equipment being designed for children, they can learn the game on their terms: "*Scaled tennis equipment made her feel more at ease with the sport, and so she did not think as much about if I cannot get to that ball, or the racquet is too heavy, and so it has helped her ease that fear to be able to play that sport."*

Having scaled tennis equipment designed for young children helps in having fun, as referenced by Red parent 3: "*Having racquets their size and balls that are slightly bigger makes it more fun. The design of racquets also helps."*

Perception 2.3: Using scaled equipment compared to non-scaled equipment provides success for players.

A common theme when comparing scaled versus non-scaled equipment emerged from parental perceptions. When young children play with non-scaled tennis equipment first and then play with scaled tennis equipment and achieve success, there is further support for the success of a scaled tennis equipment program. Red parent 10 mentioned: *"Yes, he has done much better than using a non-scaled tennis racquet and ball. With the non-scaled tennis racquet and ball my son did not have much success."*

With only regulation equipment available at home, parents allowed their child to use non-scaled tennis equipment when not participating in lessons. Red parent 7 provided feedback on non-scaled tennis equipment: "*Yes, better than standard size equipment, which we have at home."*

Red parent 8 spoke about having equipment sized to the child and then compared success when playing on a scaled tennis court: *"She is doing pretty well with it, just because it is more scaled to their size. They do not need to give it all they could just to get it over the net like on a normal sized court."*

Question two for the red stage parent had another comment about scaled tennis equipment. Also, reference was made to having fun. Scaled tennis equipment play was better than play with non-scaled tennis equipment.

Question 3: "What do you think your child's coach could improve upon from their use of scaled (modified) tennis equipment? How?"

This question was thought-provoking for interviewees, with some parents saying it was a great question. Additional intrigue was provided when they would hesitate upon reflection. Overall, feedback was positive about the coach's use of scaled tennis equipment in tennis lessons.

The investigator recognized comments provided were valuable to the research objectives and accurate reflections of perception. For each quote, the common theme is provided below.

Recommendation 3.1: Group players according to playing level.

Grouping players according to playing level was a suggestion made by Red ball parent 6. Having the ability to be on the same playing level made sense so players can push each other to improve tennis skills: *"I guess attention to the personalities in addition to their*

playing level. Some players can be intimated by other players. Just being able to balance skill level and personality in their groupings of players."

Recommendation 3.2: Coach achieving success facilitates implicit learning.

The comment made by Red ball parent 6 pointed out that by the coach getting players to play the game and be successful, they were implicitly learning the game: "*To an outsider, it looks like they are playing the game and that the technique is embedded into playing of the game."*

Very similar to the above quote referring to learning technique of playing tennis through playing the game (implicit learning). Red ball parent 2 supported the need for children to play the game: "*It looks to me using the ball from a programming perspective it is like they are playing the game, as opposed to learning technique."*

Recommendation 3.3: Add more racquet handling skills.

Red parent 4 hoped that the program added additional racquet handling skills to gain confidence: *"I do think that more activities with the racquet in hand especially for the four and five-year-old to get them more comfortable with that before swing is important."*

Recommendation 3.4: Check the size of the racquet.

Red parent 10 suggested to have each child use the appropriately sized racquet: "*They could have more consistency on what size racquet the players are using. They all having different sizes, and because of that they are having varying success."*

The suggestions provided how to make a scaled tennis equipment program more enticing as well as best practices to consider.

Question 4: "In your opinion, what was your child's best experience when using scaled (modified) tennis equipment?"

Questions four and five are positioned to speak to the experiences of the use of scaled tennis equipment by the children to compare/contrast their best/worst experiences. Three recurring themes emerged: Confidence in playing the game, having fun, and retention.

Perception 4.1: Using scaled tennis equipment develops confidence in playing tennis.

Red parent 6 spoke of her child verbalizing for the first time a desire to go to tennis practice, compared to participation in other sporting activities, confirming success through developing the confidence level of the child: "*First time I heard my child say it was time to go to tennis, compared to other sports that she participated in ballet and soccer, it took it at least a week's worth of practices for her not be in tears, feel comfortable with the group and the coaches, her enthusiasm for me was great to see."*

The best experience for Red parent 10's child involved the ability to play tennis and have success: "*The best experiences my child is having is being able to make contact with the ball, being able to rally, and within the rally being able to control it in having success and allowing his partner to hit it back to him."*

Further success was seen with scaled tennis equipment use by gaining confidence in playing the game. By playing on a non-scaled court, there would be no way for success, confidence, and ability to play the game, as confirmed by Red parent 3: *"Confidence, no way if she was playing on a regular court would she be able to play the game. Confidence in playing the game."*

Perception 4.2: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment.

For a child to have fun while playing a sport speak volumes from an experiential point of view. It is hard not to see that using scaled tennis equipment contributes to having fun. Red parent 8 confirmed these observations: "*Getting to know the game, having fun with it, she is only six years old, it is her first experience with it. Just having fun with it, getting a feel of the net being there, getting the ball over the net, overall having fun."*

Red parent 5 linked having fun with wanting more lessons during the week:*"They have so much fun; they want to take more lessons during the week."*

Perception 4.3: Using scaled tennis equipment facilitates retention in the game.

Having quality experiences using scaled tennis equipment contributed to registering for another session, another sign of the success of scaled tennis equipment. Red parent 1 also made mention of another daughter liking scaled tennis equipment. The ability to have goals moving onto the next stage is important: "*I am not sure. We signed up for another session, so my daughter does like it. It is nice to see my older child move onto the 60-foot court, which is a progression and more conducive to playing on a regular tennis court."*

For a red parent's question four, perceptions of confidence building, having fun and retention in a scaled tennis equipment program were provided.

Question 5: "In your opinion, what was your child's worst experience when using scaled (modified) tennis equipment?"

Across the board, there were not many references to worst experiences, which further supported the success of scaled tennis equipment. The only verbalized comments on worst experience were not very dramatic but more on suggestions to improve the program. Two comments were made on the number of children in a group and the right-sized racquet. Both these comments were also mentioned in question four. To improve these facets, the following recommendations must be considered.

Recommendation 5.1: The effective management/control of group size.

The two quotes from Red parent 1: "*But when there are too many players on the court especially on the smaller court, the activity goes down,"* and Red parent 3, "*I think they had too many players with the coaches on some occasions; she did not understand what to do. She felt left out because she did not know what to do,"* emphasized the need to

make sure the coach-to-player ratio does not become too high. If this is not adhered to could result in a lack of success in scaled tennis equipment programming.

Recommendation 5.2: Provide the right-sized racquet.

By not having the right-sized racquet for a player could negate the purpose of using scaled tennis equipment, as it is designed for youth. Playing with a racquet that is too large could result in being unsuccessful and prevent the ability to play the game successfully. This lack of success could happen in the environment of their friends and be detrimental if their friends had the right racquets and achieved success: "*In the beginning, he did not have the right sized racquet. Until he made the change the experiences that he had were not that positive."*

Red parents made suggestions to this question. The suggestions given as recommendations need to be noted by facilities or coaches running scaled tennis equipment programs.

Question 6: "What are your overall perceptions of a scaled (modified) tennis equipment program, positive and/or negative? Why?"

Question six was positioned to ascertain the overall perceptions of scaled tennis equipment in a parent's eyes. From the analysis done, answers were positive, pointing to the use of scaled tennis equipment as being successful. In most cases, parents summarized and reflected on their comments made in previous questions.

Perception 6.1: Scaled tennis equipment is indeed designed for young children.

As alluded to before, question six was positioned as an overall reflection opportunity. Comments to previous questions were repeated. It is essential, however, to have an overall feeling of their perception of a scaled tennis equipment program. Further support for having scaled tennis equipment designed for young children is stated in Red parent 1's quote, making references to their own childhood playing experiences: "*With using*

scaled tennis equipment, they are eased into the sport better and not thrown into the deep end. My husband and I played with standard equipment as kids."

Further support was seen for the use of scaled tennis equipment being designed for children. Additional support for scaled equipment being made for children was seen with a comparison to adult equipment. Red parent 2 stated: "*I think it is positive because there is something tailored to children, much better than giving them adult equipment to play the game of tennis."*

Red parent 8 continued the positivity of scaled tennis equipment and how it was designed for youth. Mention was also made of how a child moves to the next stages; however, this should be done once they have grown and better-suited to the larger court, larger racquet, and smaller ball: *"It is positive like I said before. The equipment lets them grow; it lets them play the game, as they get bigger they can move on to a court that is more their size. They do not have to give it all they got to just to get it over the net. It helps they do not have the whole size court to cover. Comparing it to baseball, you start off small because kids are small in size."*

Red parent 10 made a statement about wishing when he first started playing tennis that he had access to scaled tennis equipment: "*The experiences that we have had are very positive, I only wish I had access and was able to play with these types of modified balls when I was learning and playing tennis as a junior."*

Perception 6.2: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment.

Having fun and developing a desire to play tennis through scaled tennis equipment contributes to retention in the sport as what is explained by Red parent 7 in this quote: *"It is our second session. She loves it and happy with the success hence the reason for coming back for the second session."*

In the context of answer six and overall perceptions of a scaled tennis equipment program, consistent mention was made of scaled tennis equipment designed for young children.

Question 7: "What was your child's feedback to you on scaled (modified) tennis equipment?"

Question 7 combined both parent and player perceptions of a scaled tennis equipment program. Although the feedback was somewhat neutral, specific references made by a parent of their child's feedback spoke to fun, engagement, retention, and progression to the next stage in tennis.

Perception 7.1: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment.

The next two quotes from Red parent 5: "*They love it; they are coming right now, they started one day a week and now would like two times a week,"* and Red parent 8, "*one thing she likes is the integrated activities where they are moving her around. Not hitting the ball and just waiting around. No lines and getting bored. They are getting all the kids moving at the same time,"* spoke to the success and fun that their children gained when playing tennis with scaled equipment. There was also an element of retention, as they wanted to continue to play. For a parent, participation in sport comes from elements of financial and emotional investment.

Perception 7.2: Using scaled tennis equipment facilitates retention in the game.

The ability to progress within a scaled tennis equipment program is motivation for the child to practice even at home. Having fun with tennis also seemed to promote this form of retention as was seen with the quote from Red parent 10: *"He loves to play tennis, we play tennis in the driveway sometimes, he wants to progress to the orange ball and is very motivated to do that."*

Red parent 6, when asked, replied with the child's comment about wanting to play more tennis. Excellent retention tool when playing tennis with scaled tennis equipment, also making new friends, and being able to listen to their coach was a great life skill to have. Significant feedback to receive and further promote the success of a scaled tennis equipment program were evident: "*Can I play more, she has already asked me if she can sign up for another one, she has enjoyed and made friends, learning about teamwork, learning to follow direction from her coach, which is for me a life skill."*

5.3.2.2 The orange stage

What was done in the analysis for red stage parents was also completed for orange stage parents.

Question 1: "What makes you think a scaled (modified) tennis equipment program was of value for coaching your child?"

Perception 1.1: Scaled tennis equipment program is indeed designed for young children.

Further support of scaled tennis equipment being designed for children was in line with the red parent's feedback. Orange parent 5 was to the point when it was stated: "*It is right-sized equipment scaled to the kids."*

Orange parent 4 provided further insight into the child's success by aligning the scaled equipment with success and, in turn, wanted to continue to play tennis. There was also sentiment for the ability to play the game: "*It makes me think that it is of value because I can see that she wants to continue the lesson and she feels that she is progressing. She is having success, and she likes to be able to hit the ball rather than see the ball go right pass her if it was not a scaled ball. More touches with the ball."*

Perception 1.2: Using scaled equipment develops confidence in playing tennis.

The reduced compression of a scaled ball causes it to bounce lower than a standard ball. This promotes a contact point more in line with the waist level of the player and promotes

appropriate technique, implicitly. Through developing proper fundamentals from a technical point of view contributes to the success and confidence of the player. Orange parent 1 stated: *"Ever since he has started working with modified equipment his technique has improved, he has gained more confidence and had more fun."*

Compression of the orange ball and its slow movement through the air was emphasized by Orange parent 2: *"I think to lose the fear of the ball and what they get from the ball. My child is hitting the ball better because the ball is coming slower."*

Perception 1.3: Using scaled tennis equipment compared to non-scaled equipment provides success to the players.

Comparing scaled to non-scaled tennis equipment is of much value. Questions asked did not promote this comparison which provided further value and input when it was mentioned voluntarily by parents. Orange parent 2 supported the success of scaled tennis equipment over non-scaled tennis equipment when it was stated: *"I think it has helped him with learning to control the ball and keep it within certain parameters. It is less intimidating than looking and playing on a normal court."*

Orange parent 3 compared success with scaled tennis equipment when tennis play was first begun and wished that he had learned tennis through scaled tennis equipment use*: "I think it allows them to have less room for error, he is able to have control of the ball, in the beginning, they can also be more precise as they have a small court, compared to when I played tennis which was with the normal tennis racquet and ball."*

Perception 1.4: Using scaled tennis equipment results in more engagement on the player's behalf.

Young children using scaled tennis equipment seemed to be more engaged, as they achieved more success playing the game. Additional insight was given by Orange parent 1, linking the ability to understand and conform to the rules of the game: "*I think it is built for them and keeps them engaged and help them better understand the rules of the game in a scaled version that is right for them."*

As was the case with the red parents, question 1's response supported the use of scaled tennis equipment. Statements supported the use of scaled tennis equipment that has been designed for young children, giving player's confidence to improve.

Question 2: "Do you think your child did well when using scaled (modified) tennis equipment? Why? "

Perception 2.1: Scaled tennis equipment program is indeed designed for young children.

As per the equipment description mentioned earlier in this section, orange balls have 50% compression and move more slowly through the air. Orange parent 4 referred to this and stated it was the reason for his child doing well and appeared to cater to the needs of players: *"Absolutely and for the reasons I just said, I think she did well because it gave her time to get to the ball."*

Perception 2.2: Using scaled tennis equipment develops confidence while playing tennis.

Orange parent 3 made a compelling, yet short, response to the question by saying*: "Yes, comfort builds confidence."*

Orange parent 5 linked the scaled tennis equipment to success and confidence. Reference was made to the low bounce of the orange ball which appeared to contribute to success: "*Yes, it is in proportion, everything was modified to his height. He achieved success and confidence. The bounce of the ball also helps. He started in red and now is in orange and it was scaled to his development."*

Similar responses to question one referenced scaled tennis equipment designed for children and developed confidence in the player's ability to play the game.

Question 3: "What do you think your child's coach could improve on from their use of scaled (modified) tennis equipment? How?"

The following recommendations were proposed:

Recommendation 3.1: Facilitate parent education.

As a suggestion, Orange parent 8 stated the importance of parental education to improve a scaled tennis equipment program by providing information that can help children improve as tennis players when they play as families: *"Maybe they should let them know how to improve or let the parents know how to improve. I would like more information from coaches on how to work with my child when we play."*

Recommendation 3.2: Introduce a variety of activities.

What Orange parent 9 suggested appears relative to an aspect of coaching that needs to be part of best practice: "*I am not sure how they can improve, I have been impressed every week, something different, I have seen her use a variety of things for varieties of skills. Using a big bouncy ball to work on the backhand is brilliant. It looks like a game, but at the same time, they are working on techniques. I have been really impressed."*

Orange parent 10's suggestion relates to how and when players transition from one stage to the next. This quote spoke to the need to ensure that all players in the group lesson were at the same playing level: "*Recognizing that certain children are now past a certain scale, that they now need to move them forward, because I don't want my child to lose interest. Right now she is in class with kids that are maybe just beginning, and she is a little past that, she likes to rally, she rallies all the time with her father, and she is missing that. It is only because they do not have the in-between skills class. I would like her to stay in the orange ball stage, but more drills that aligned with a player that has progressed to orange."*

Responses to question three as parents reflected on worst experiences of their child's participation were valuable, but suggestions were also provided on how to improve scaled tennis equipment programming. This is a crucial component of this research and

well received. Providing recommendations on how to improve and attain further success in scaled tennis equipment programming is valuable to not only this investigation but facilities running a scaled tennis equipment program. Overall, feedback stated by parents was very positive.

Question 4: "In your opinion, what was your child's best experience when using scaled (modified) tennis equipment?"

Perception 4.1: Scaled tennis equipment is indeed designed for young children.

Orange parent 3 was quoted in comparing a standard to a scaled racquet and the manner that equipment is more suited to the child: "*When we first started playing tennis I brought my child a regular racquet to use. He looked clunky when playing. When we were introduced to modified equipment, we adapted right away. It just fits like a puzzle."*

Orange parent 9, confirmed the ability to play the game as a result of scaled tennis equipment and how it fits her son, linking in success along with attitude towards tennis and willingness to play: "I *think it is that instant success feeling. After the very first lesson here he came out and didn't know tennis could be so fun. It was huge, and that is when I said what is the difference, you can see them hitting back and forth and running all over the place. When they do make an error, it is not as bad because of less distance to cover. This is a big boost to my son's attitude because of the success he is achieving."*

Perception 4.2: Using scaled tennis equipment develops confidence in playing tennis.

Serving in tennis is seen by many as the most difficult stroke to master. It is difficult because of all the body parts that need to be coordinated to execute the stroke. It is also the most important, as each point is started with a serve. The comparison is made by Orange parent 1 after playing on a standard court and moving to a scaled tennis court. The child was able to serve the ball into the court for the first time: "*With serving, because he was practicing with the normal court and with modified equipment use he was able to get the ball in. It was nothing to do with pace or spin or winning the point it just that he was getting the ball in."*

The use of scaled tennis equipment contributed to Orange parent 6's child success in tournament play*: "Basic skills, when she played tournaments she enjoyed it much better due to success and confidence."*

Perception 4.3: Using scaled tennis equipment is resulting in more engagement on the player's behalf.

Through the use of scaled tennis equipment, Orange parent 4 thought her daughter could focus and be more engaged: *"Focus, more determined to do better."*

The best experiences of scaled tennis equipment use as shared by parents are confidence and engagement.

Question 5: "In your opinion, what was your child's worst experience when using scaled (modified) tennis equipment?"

Two valuable didactical founding principles were recommended by the orange parents on how to make a scaled tennis equipment program more successful.

Recommendation 5.1: Facilitation of group size.

Orange parent 7 suggested that there should be attention paid towards the player to coach ratio: "*Not bad experience with equipment, but when there are too many players on the court especially on the smaller court when coaches transition to a few kids on the court becomes better."*

Recommendation 5.2: The management of progression.

Orange parent 3 suggested that when players moved from one stage to the next, it should be done at the right time: "*There was no worst experience. As the kids grow, they can become too big for the red court. This court is too big for them. When they were in red, it was perfect, and now they are in orange which is perfect. When they moved, it is all about timing. We just listened to our coach on when was the right time to move."*

Question 6: "What are your overall perceptions of a scaled (modified) tennis equipment program, positive and/or negative? Why?"

Perception 6.1: Scaled tennis equipment is indeed designed for young children.

Relative to overall perceptions of a scaled tennis equipment program, Orange parent 4 stated: *"Positive, it makes her better, having success."*

Orange parent 5 supported the perception better when saying: *"It is right sized equipment scaled to the kids."*

Perception 6.2: Using scaled tennis equipment compared to non-scaled equipment provides success for the players.

When the comparison of having more support for scaled over non-scaled supports the success of a scaled tennis equipment program. Orange parent 9 stated: *"I have to say we were on the fence when we first started, my husband was traditionally trained, I do not know if this can work. This is crazy and silly. He has seen the difference and his brother in Atlanta. Brother was saying I was telling you this is a better way to learn tennis. It has been a great experience. It seems to be a lot more fun compared to when I played tennis with non-scaled tennis equipment."*

Orange parent 10 stated that using scaled tennis equipment helps children learn the game. However, it was pointed out that use of the right size equipment is paramount: *"I think everything is positive. That is my overall perception. It is positive because it is letting the kids learn the game. It is consistent with their hitting if it was non scaled they would not be able to do that. Negative is making sure the kids are placed in the right scaled equipment."*

Again, more references to the issue of the use of scaled tennis equipment being designed for youth were made.

Question 7: "What was your child's feedback to you on scaled (modified) tennis equipment?"

Perception 7.1: Using scaled equipment develops confidence in playing tennis.

The quote by Orange parent 9 was a loaded one. Overall, there appeared to be much positivity directed toward scaled tennis equipment used by his son. Mention was made of success, playing the game, developing foundational skills, and signing up for another session: "*Success, the feeling of enthusiasm for the whole game has increased dramatically. He is feeling successful, and he is capable of doing more than he was doing before. He is building quicker the foundational skills. This is our first session, and we have already signed up for the summer session. He can't wait for the summer session to start."*

Rallying the ball back and forth and developing a love for tennis builds confidence for Orange parent 10's child: "*I never really asked her if she liked the big balls. They just keep rallying and love being able to be successful and reaching their own goals."*

Perception 7.2: Progression through the stages of scaled tennis equipment program helps motivation.

Transitioning through the different stages of a scaled tennis equipment program is vital in making sure the child achieves success, confidence and be able to play the game. Orange parent 2 suggested that the first stage (red) allowed their child to understand the dimensions of the court and how to change from one stage to the next*: "He loves it, thanks us for taking him to lessons. He understands the dimensions are going to change. He has seen how the requirements changed from red to orange and how they are going to change moving from orange to green. The court gets bigger, ball is faster, racquet is longer. However, by using modified equipment, he has been able to understand more the skills of playing the game."*

Orange parent 5 felt strongly about his son's success with scaled tennis equipment to the point that he earned a coaching certification to support and assist his child's development

through the stages of a scaled tennis equipment program: "*He wants to play full-size tennis, he has always been ahead in terms of his age. He is always trying to get ahead. I never ask him to play tennis, he is always asking me. I have a coaching certification to help my child and also to keep my coach Marcelo on his toes. Whenever we play I try and push him a little."*

Perception 7.3: Using scaled tennis equipment facilitates retention in the game.
Orange parent 8's child felt confident about playing the game with scaled tennis equipment and initiated that request with the parent and not vice versa: "*He asks me to play more, my child asks me not me asking him."*

Overall, the parents did not receive any feedback from their child. Parents, however, see the benefits of being part of a scaled tennis equipment program.

5.3.2.3 The green stage

Question 1: "What makes you think a scaled (modified) tennis equipment program was of value for coaching your child?"

Perception 1.1: Scaled tennis equipment is indeed designed for young children.
An underlying theme that emerged to green from red and orange parents involved scaled equipment designed for their children. Green parent 1, linked its value and the ability to learn fundamentals while using scaled tennis equipment: *"I think it was of value because the small equipment just makes it easier for children to learn the fundamentals."*

Green parent 2 mentioned that scaled tennis equipment allowed children to play the game at an earlier age. Reference is made relative to the slowness of the ball approaching the children and the extra time allowed to track the ball and hit it back over the net*: "I think it helped them play at an earlier age. They could hit the ball over the net. The ball is moving slower over the net. There are a lot of things to think about, how to hold the*

racquet, where to stand. It got them playing, and that is what they want to do. They are kids, and kids want to play."

Perception 1.2: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment.

Because tennis equipment has been scaled and made it easier to play the game, more rallying is promoted which reduces the need to pick up balls as explained by Green parent 6: "*Well, I think it helped him have more success more quickly, and avoid some of the frustration of starting to play tennis. Spencer and I began to learn tennis at the same time, and I remember thinking, 'Oh my gosh,' if I could just hit some balls instead of just picking them up all the time, it might be a lot more fun."*

Perception 1.3: Using scaled tennis equipment helps accelerate skill development.

Being able to develop tennis skills as a young tennis player contributes to the success and can go a long way to retention in the sport, as Green parent 4's commented: "*Well, I think it was good because he could learn the skills and the pace is slower. He's not having to worry so much about the speed of the ball, but can concentrate on what he's trying to accomplish in terms of every skill."*

With what was observed in red and orange parents, it was evident with green parents answering question one, that the consistency of using scaled tennis equipment designed for children was well received. However, more feedback was seen by green parents towards skill development and having fun.

Question 2: "Do you think your child did well when using scaled (modified) tennis equipment? Why?"

Perception 2.1: Using scaled tennis equipment develops confidence in playing tennis.

Green parent 1's perception of confidence was very powerful and further promoted successful use of scaled tennis equipment with young children playing the game of

tennis: *"I think it just gives them confidence that they can actually hit the ball over the net at an earlier age."*

Perception 2.2: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment.

By having confidence in playing the game because of the relative ease of play contributes to the fun and enjoyment players receive from the game, as relayed by Green parent 8: *"Yeah, I think that it gave them a lot of confidence. They had a lot of fun. They could hit something right away, so all those things were positives."*

Perception 2.3: Using scaled tennis equipment helps accelerate skill development.

Using scaled tennis balls which have lower compression and move through the air slower helps from a skill development point of view, allowing players to learn techniques of the sport at their own pace. Green parent 6's perception of scaled tennis equipment program included: "*Well, again, I just think the slower balls give them more time, and a lot of the things that the coaches have asked them to do are very technical, so in order to have the time to think through all those steps, body positions, and grips, I think, having extra time. So that's what the slower balls gave him, for sure."*

From question one to question two, emphasis was shown toward the benefits of skill development and fun, with additional references to developing confidence.

Question 3: "What do you think your child's coach could improve on from the use of scaled (modified) tennis equipment? How?"

Perception 3.1: Effective transitioning between the stages of scaled tennis equipment program promotes success.

For question three, there was consistent feedback on how the child should transition between the stages of scaled tennis equipment, particularly in the context of what the coach needs to improve upon. Green parent 2 emphasized the need to play longer in the orange stage to facilitate good play in the next stage: *"A long period on orange balls and*

that is where they developed the most as a tennis player. They got the grasp on how to play. In green, they played to a higher level."

Green parent 4, liked their coach's tactic of alternating balls to allow a reasonable transition between the stages: "*I think that our coaches go back and forth if they need to, even when they're on the regular ball in 12-and-under. I've seen them bring out a basket of the green dot balls to sort of slow things down, show them something else or teach them something new."*

As stated above, an essential point of conversation for green parents was directed towards the way players' transitions between stages of a scaled tennis equipment program.

Question 4: "In your opinion, what was your child's best experience when using scaled (modified) tennis equipment?"

Perception 4.1: Effective transitioning between the stages of scaled tennis equipment program promotes success.

As what was seen in question three with effective transitioning, it was also carried over into question four, further suggesting the favourite topic of how a child progresses through stages of a scaled tennis equipment program. Green parent 2 emphasized the focus they had in their transition from red to orange: "*I think their best experience was when they got away from red and into orange. I thought that is when they could really play. They felt like what the adults are doing. Orange was brilliant. They developed an all-around game style."*

There was an overall sentiment observed from parents' perspectives that they liked the transition into green as it was very similar to play on a traditional court and conditions. Green parent 6 states this feeling with the following comment: "*Well, I actually think his transition to green ball this year was probably his favourite, because he was able to play on a full court size and, so when we take it out into the real world to play with friends, green balls move fast enough to be able to make it into the full court. So there was a little*

bit less frustration about not being able to cover the whole court with the orange balls, which just kind of die after a certain distance. So I think now he feels like he can play with friends, or play with other adults because he's finally able to use the ball that moves far enough to get to the other side."

Perception 4.2: Using scaled tennis equipment helps accelerate skill development.

Green parent 7 stated that by using scaled tennis equipment, it helped his daughter make goals in skill development and how to progress and move successfully to the next stage of a scaled tennis equipment program: "*I think it's not a single event but a kind of general experience which is that she knows how to have goals and to set goals, both individual and sort of as a group and developmentally. To set goals and to know what's coming next and to be working hard towards those goals and achieving them and continuing to look forward and incorporate both successes and failures along the way. So, in that sense, there's a road that she's walking down and working hard along the way, but all the while, really enjoying herself."*

More feedback was received on how to transition between stages of a scaled tennis equipment program. There was reference directed toward skill development and the significance of how to transition between stages of a scaled tennis equipment program.

Question 5: "In your opinion, what was your child's worst experience when using scaled (modified) tennis equipment?"

Perception 5.1: Effective transitioning between the stages of scaled tennis equipment program promotes success.

Green parent 1 relayed frustration when her daughters reached the top level of a stage where there are hardly any other players to play. This forced the parent to seek other players to play in the next stage even though they might not be ready for that next stage:

"For us it was when they were at the top of their level, who do they get to play with and still make it fun? Where you can go out and hit the ball, not so much the equipment but finding other people of the same level to hit with."

Green parent 5 mentioned an occurrence on what happened when his son moved to the next stage and the unwillingness to move back: "*Let's play with the orange ball for an hour. Once they come to a green ball or a yellow ball, they don't want to play with the previous ball… Yeah."*

Consistent feedback and perceptions of a scaled tennis equipment program point toward the need to have more information and a better understanding of how to transition between the stages. A few challenges were provided by parents when answering this question and stated the need to have a better understanding of how to transition.

Question 6: "What are your overall perceptions of a scaled (modified) tennis equipment program, positive and/or negative? Why?"

Perception 6.1: Scaled tennis equipment is indeed designed for young children.

Green parent 3, piles on more praise of the success of a scaled tennis equipment program by saying it has been overall a positive experience. This is the last stage for their son in a scaled tennis equipment program*: "It is a positive experience, given a chance to start at a young age. He was able to feel the difference in different stages."*

A positive response was made by Green parent 6 in that equipment was designed for her son and able to play much sooner than expected because of using scaled tennis equipment: "*I would say positive. It allowed him to get playing, and experiencing what the game feels like a lot sooner."*

Perception 6.2: Using scaled tennis equipment compared to non-scaled equipment provides success to the players.

Reference was made by Green parent 8 to a ball bouncing too fast because it is a non-scaled ball. By using a scaled ball, the reduced ball speed allowed their child to develop confidence; this confidence was evident for each stage: "*It gave them a lot of confidence*

when they were able to move through the balls and have success at each stage rather than moving too quickly or using a ball that was bouncing too fast for them."

Green parent 4 stated a point of comparing scaled and non-scaled ball use. Also making a distinguishing fact because of their size, and they would not be able to cope with a normal ball: *"Plus, some of them can handle the speed. Their bodies aren't developed enough yet, or some of them are tiny. We don't have that problem. But to handle that, what the regular balls gives them."*

Further parental support for scaled tennis equipment program is given in this question by mentioning that scaled tennis equipment is designed for children, and it is better than non-scaled tennis equipment.

Question 7: "What was your child's feedback on scaled (modified) tennis equipment?"

Perception 7.1: Effective transitioning between the stages of scaled tennis equipment program promotes success.

The reason for providing this long quote of Green parent 2 was because of the powerful statement on how to handle the transition between the different stages of a scaled tennis equipment program. The overall sentiment involved staying patient and using the next stage as a motivation. The move to the next stage should be earned and not just given. This is a great practice model in potentially not only educating coaches but also other parents that by transitioning at the right time provides more success in scaled tennis equipment play: "*They really liked it. When he was red, he wanted to go to orange, and then orange go onto to green and then same for green. I had to hold him back and to make sure he was ready to move up. When he moved up, he felt like he had achieved something. I wanted to make sure that the conditions were conducive to his strength. I also like it as I would hit with my child and I don't like hitting with the soft balls. The whole family had a positive experience. I don't know tennis that well. I was trying to find out how to have fun and then develop as a player. Scaled tennis equipment helps with*

this. All kids want to do is hit the ball, if they get to see a basket of balls all they want to do is hit."

Green parent 4 stressed that because of the nature of a scaled tennis equipment program and its three stages, players and parents can get carried away by treating it as a race to the non-scaled (yellow) stage. Green parent 4 also makes a recommendation of using skill development as the primary criteria to transition between the stages: *"So they always think that they're not where they should be. They always want to be further ahead. That's good motivation sometimes for the kids, but also it doesn't let them be patient enough with staying on the ball that they need to stay on, and I see that even in the parent group. Some parents get really caught up in the colour of the ball, and they lose focus of the skill building, right? So everybody's in this mad rush to get to green ball. Everybody thinks it's this big sprint, when in fact it's just, it's a marathon, right?"*

Valuable feedback on how to be cognizant of making sure transition happens at the right time, and ideally relative to the skill development of the player. The ability to transition to the next stage should be earnt and not just given. This provided internal motivation and emphasis on skill development.

5.3.2.4 Executive summary of the perceptions of parents on a scaled tennis equipment program

Through conducting 30 (10 red, 10 orange, and 10 green) interviews with parents of players in a scaled tennis equipment program, an overall analysis has been presented below.

As previously mentioned in each interview, answers given by each parent were recorded by audio and then transcribed. Software program coding was accomplished by using ATLAS.ti (Scientific Software Development, 2017) to identify common themes of parent perceptions of a scaled tennis equipment program. Codes were assigned to all answers. The common themes for each question were given as per stages of a scaled tennis equipment program of red, orange, and green. Through this commonality of assigned

codes, the following nine codes/common themes best represented the perceptions of parents to the seven questions asked of them and are listed in hierarchical order:

- ***Perception 1: Scaled tennis equipment is indeed designed for youth children;***
- ***Perception 2: Using scaled tennis equipment develops confidence in playing tennis;***
- ***Perception 3: Using scaled equipment compared to non-scaled equipment providers success to the players;***
- ***Perception 4: Effective transitioning between the stages of scaled tennis equipment program promotes success;***
- ***Perception 5: Using scaled tennis equipment is contributing to the emotional experience of fun and enjoyment;***
- ***Perception 6: Using scaled tennis equipment results in more engagement on the player's behalf;***
- ***Perception 7: Using scaled tennis equipment facilitates retention in the game;***
- ***Perception 8: In scaled tennis equipment program what can be improved to make it more successful; and***
- ***Perception 9: Using scaled tennis equipment helps accelerate skill development.***

With the above themes presented regarding additional frequency ***Perception 1 (Scaled tennis equipment is indeed designed for young children)*** is mentioned the most. Lee (1999) emphasizes that through sport participation children like to demonstrate their ability, mastery of skill, and experiences of success. Having scaled tennis equipment designed for the development, growth, and maturation of the child to facilitate success is

paramount to the success of a sports program. By tailor-making, the design of the equipment to enable the kids to play the sport can only contribute to the success of young children playing and being retained in the game. Positioning scaled tennis equipment as a program that has been designed for them can speak to all stakeholder groups about the success of a scaled tennis equipment program.

According to Scholder and McGuire (2007), the most fundamental reason for continued participation in a sport is fun and enjoyment. The use of scaled tennis equipment as stated by the parents provided their children with fun and enjoyment, mainly from a perspective that it is designed for youth. A mental aspect of confidence was also mentioned by the parents that can also contribute to the success and then in turn fun and enjoyment (Farrow & Reid, 2010).

According to parents, the ability to develop tennis skills through the use of scaled tennis contributes to a mastery motivational climate. The scaled tennis equipment being designed for the players to facilitate this accelerated development of skills (Buszard et al., 2016).

In summary, perceptions of parents in all three stages of scaled tennis equipment programs were positive and optimistic. Feedback from parents indicated the design for youth, development of confidence, fun and enjoyment, and promotion of skill development were important characteristics of the program.

5.3.3. Objective 3: The knowledge and understanding of coaches on the navigation of a player through the stages of a scaled tennis equipment program

As in the case of players and parents, coaches were invited to be part of this research as one of the stakeholder groups of a scaled tennis equipment program. Ten coaches were invited and interviewed to gather perceptions of a scaled tennis equipment program. Coaches were identified based on their understanding and programming knowledge of scaled tennis equipment. The same nine questions were asked of all coaches. The answers

to all questions were analysed for consistency in code themes and then presented below in the order of the questions asked.

Question 1: "How long have you been involved in coaching children?"

Ten coaches interviewed had 230 (average 23 years) years of experience combined coaching children. The amount of years of coaching experience provides great validity and creditability of perceptions working with young children.

Question 2: "How long have you been using scaled equipment in your coaching?"

Ten coaches had accumulated 119 years of experience (average 11.9 years) using scaled equipment in their programs. This is a solid amount of experience utilizing this type of programming.

Question 3: "What is your basic teaching methodology or coaching approach when using scaled tennis equipment?"

Perception 3.1: Coaches like to use the cooperative teaching style when coaching their players using scaled tennis equipment.

Most coaches said they preferred a cooperative teaching style. Cooperative teaching style is a method of engaging the player in skill improvement. Coach 1 made a reference that adopting a cooperative teaching style was like the coach guiding the player to learn the game: "*It is hard to summarize that it has evolved over time when we first start to play with kids who can't play. We start with individual and partner activities in a cooperative manner with another child. It is getting tennis professionals away from the cart so that they coach in three dimensions. It is the biggest change we have had, global coaching, or whatever you call it. It has gone from the coach controlling to players controlling, and I am just guiding them."*

Coach 5 echoed Coach 1's comments in explaining the independence of the player's method of learning the game. Coach 5 described a command style of teaching which was as a suggestion to be avoided: *"It is to really facilitate the player's ability to be*

independent and to play, more student-driven. Have it mirror actual tennis, rather having to be more artificial, where the coach controls the environment."

Perception 3.2: Coaches like to coach using the constraints-based coach to promote success with their players.

Constraints-based coaching refers to manipulating the racquet, court, ball, and task to the skill level of the player. Coach 3 indicated: *"Making the games, I use very age-appropriate, in order to do that I need to assess the child's athleticism, which is largely done during the warm-up. Warm up gives me a good sense of how to challenge the child with their tennis skills. Ultimately, I look to create situations so that players are able to succeed."*

Coach 6 spoke explicitly about the availability of the coach to adapt activities to match player development to promote confidence and success. Changing constraints by using scaled tennis equipment makes it easier for the coach and the player to achieve success: *"Gosh, the basic approach is have the ... I guess it's to try to have the desired outcome in mind. And for me, the desired outcome was always for the kid to feel like they're growing in confidence. I think being able to use scaled equipment if a coach is mindful, they're able to scale up or down the activities appropriately. There's always a different progression or regression you can take to give them that."*

When asked to share information on their teaching methodology using scaled tennis equipment, the consensus was that the coach liked to use a combination of cooperative style and a constraints-based approach.

Question 4: "Are your coaching approaches in scaled equipment different to non-scaled equipment?"

Perception 4.1: Coaches approaches in scaled tennis equipment are the same as non-scaled tennis equipment coaching.

Coach 7 confirmed the perception. It can be observed that through scaled tennis equipment use in coaching and the ability to adapt activities to the development of the player, it has transcended to use with non-scaled tennis equipment: "*No, my mind set when coaching any child is to develop the player the best way I can, development is development. Hitting crosscourt with yellow ball is the same as using red balls. Coaching approach for me is making it appropriate to the child's development. At a young age if they start to rally on red court, they should have basic parameters by learning to hit to open spaces visually. Make advances when the players improve their cognitive development on the court. My approach is the same with scaled and non-scaled tennis equipment. Get the most out of that player for every session."*

A short comment made by Coach 10 presented perceptions of coaching approaches when using scaled and non-scaled tennis equipment: *"I would say I have pretty similar expectations no matter what ball or equipment I'm using."*

A majority of coaches stated that they have similar approaches in scaled to non-scaled tennis equipment coaching practices.

Question 5: "How do you introduce your training activities to your players?"

Perception 5.1: Coaches like to demonstrate their activities to their players when introducing training activities.

Children liked to see a visual on what the coach asks them to do. Younger children do not have the attention span to listen to a coach for a long duration. Coach 1 used a demonstration when to show activities to players: "*Demonstrating with the kids. Every time I explain something, it is got to be visual."*

A similar feeling was expressed by Coach 2: "*Visually, personally I would take another student in the group, while I am giving them the verbal instruction. I will demonstrate with another student."*

Coaches across the board relayed the best way to introduce activities to players was a demonstration and providing players with visuals.

Question 6: "How do you keep your players engaged in their practices?"

Perception 6.1: Coaches like to change the activities to keep their players engaged in practices.

The ability to keep players engaged can retain players and further stated the success of a scaled tennis equipment program. The best method of doing that, according to Coach 5, altered the activities: "*Changing up the activities, partner activities show everyone has a role and is active, using clothes pegs and cones for competition."*

Coach 2 used progressions by altering activities to keep players engaged: "*So I am really diligent about changing the activity, trying to keep the flow of the clinic in a group setting. Making sure you are not staying on a subject too long, always trying to progress the drill in a few minutes, making variations very quickly."*

Perception 6.2: Coaches like to use the cooperative teaching style when coaching their players using scaled tennis equipment.

The use of cooperative teaching style that was mentioned in question three was also stated in question six. This question is positioned in the context of keeping players engaged compared to question three which focused on teaching methodology. Coach 3 commented: "*Two ways, lots of cooperative activities, ask questions, use open-ended questions to get the child to think, no yes or no answers. Lots of questions using how, lots of cooperation, pairing up players, so they are doing partner work and as a team."*

Coach 6 spoke about the definition of cooperative style in making sure players were not lectured to, working with the players and not working them out: *"Letting them feel like they're part of the plan and part of their training, rather than someone who's just being dictated to. I think kids tend to respond really strongly when they feel like they're being worked with and not just worked out."*

In trying to keep players engaged in scaled tennis equipment practices, coaches were interviewed using two strategies. The first method was to adapt activities and the second involved the use of a cooperative style of teaching.

Question 7: "Do you agree with the current USTA recommendations for red, orange, and green scaled tennis equipment play and competitions? Why or why not?"

Perception 7.1: More team play is required for players participating in scaled tennis equipment program.

Coach 1, when speaking about the current USTA competitive products for scaled tennis equipment, there is too much focus on competition, stemming from a reason that a majority of 10-and-under competition play has rankings. To correct this, Coach 1 recommended having more team competition. This could replicate what other youth sports have done, such as baseball, basketball, and soccer: ***"****It is too competitive, it is not focused enough on the team, kids need to play regardless."*

Coach 3 agreed with Coach 1 in the assessment and need for more team competitions. More team competition facilitates more fun with friends and increases the likelihood of stress reduction associated with competition. Developmentally for some children, this trait has not been developed: *"Ten-and-under competition needs to be more team-based events, easier access, team base and easier access will facilitate better retention. More fun with friends, winning together, losing together. The team competition will help the players cope better emotionally with competition."*

Perception 7.2: Scaled tennis equipment competition should conform to skill development, and not age.

In addition to feedback on having more team competition. Coach 8 supported competition based on playing level (competencies). By having more level-based play in competition would promote more competitive matches and prevent having players losing

badly:*"That it has to be tied to competencies. That the pathway has to be more tied to competency base than tournament based."*

Coach 9 felt that skill development should be a big factor for structuring competition. This would provide confidence in the player's ability to compete: "*Yes, the red ball I feel that we started just recently, next court orange ball are playing and wanting to move to orange court but not ready, and cannot even rally. Making sure players are ready before they move up. Players are not even able to rally and score and want to move up."*

Coaches recommended more team competition for players participating in a scaled tennis equipment program. Additionally, they would like to see competition be based on skill level to promote more competitive matches through level-based play.

Question 8: "What are your overall perceptions of a scaled tennis equipment program, positive and/or negative? Why?"

Perception 8.1: Coaches are very positive in their perception of a scaled tennis equipment program.

All coaches were positive about the use of a scaled tennis equipment program. Coach 5 provided feedback that referred to the essence of scaled equipment, allowing children to have more touches and success because the equipment was designed for them: "*Overall very positive, from a developmental sense, looking at the size of the children, more touches per training and matches."*

The comparison was made by Coach 6 with other sports and what they have done with their scaling of equipment, further supporting the need and success of scaled tennis equipment: "*Wow. I think from a positive standpoint, it's pretty simple. I don't know if it's a good enough scientific answer to say that ... Well, every other sport does it so why doesn't tennis? But, really it makes sense."*

The perceptions expressed by coaches when speaking of overall perceptions of a scaled tennis equipment program were positive.

Question 9: "How did you experience the players using scaled equipment in the different stages?"

Perception 9.1: Scaled tennis equipment competition should conform to skill development and not age.

Question 9 was a culmination of the time spent with each coach. Each question built upon the information and understanding of transitioning players through the stages from a coaching perspective. How players move between the stages of a scaled tennis equipment program is a hot topic in coaching circles. Coach 8 built upon question seven's answers in making sure how player transitions were based on skill development/competencies. The program that Coach 8 was responsible for had a fun way of putting competencies on racquets players played with, which also reflected what competitions they played: *"It needs to be competency-based tied with competition, so I've been part of a program where we actually know the kids and the parents ... We made an actual grip and then put the competency on their grip so that parents knew that for pre-rally this was the competency. Alternatively, they were missing a serve. Okay that's what they needed to work on to get to the next competency. They also knew that what was tied to that competency and they had to play a play day to get to the next level."*

Coach 4 revealed transition between stages of a scaled tennis equipment program. Coach 4 agreed with Coach 8 regarding sports skill development. Coach 4 suggested having a "hodgepodge basket" which is a great name and consists of having a basket of balls with different compressions. This way a coach can adjust the use of the ball to develop the player to achieve success. This method referred back to question three by asking the teaching methodology of the coaches. They collectively used the constraints-based approach: "*It is my favourite part of coaching. I love working with players that are transitioning. We really have to develop better athletic skills. In my experience when playing different sports while growing up, I was able to develop those skills. Every club*

with 10-and-under program even with high schools they need a "hodgepodge basket." All different colour balls, extremely vital to the development of players, particularly as athletes. Transitioning players I will get players to use their 26-inch racquet and play with all the different types of balls, and then when they get 27-inch racquet, I will have them use all the different types of balls again to develop those different types of skills."

Coach 10 believed that transition should be done gradually, changing one constraint at a time: size of court, ball, or racquet. There seemed to be a common theme of making sure that when changing conditions of play (stage), the focus should be on success. There could be a slight dip in the level of play as constraints change. It would be natural to have challenges in that adaptation. At least it would not be as severe as making changes at the wrong time: *"I think that you change one specification at a time, so moving from a 36-foot court, going back to 60-foot court, I like to go to a 42-foot court first and use a red ball, and then slowly start to move the court back and change the ball, but I try not to change more than one aspect of equipment more than once. I only like to do one at a time. They can succeed, and so also, like anything, too much change occurs, it's overwhelming, so I like to have them have success. I like them to get comfortable, and then we'll challenge them more."*

The underlying suggestion by coaches when speaking on how a player transitions between stages of a scaled tennis equipment program is to have it based on skill development rather than age.

5.3.3.1 Executive summary of the knowledge and understanding of coaches on the navigation of players through the different stages of a scaled tennis equipment program

Feedback obtained was valuable information to parents, tennis facilities, national tennis federations, and other coaches on how to be successful in the administration of a scaled tennis equipment program. Additional information was provided that gave suggestions on how players should transition between stages of a scaled tennis equipment program.

The main data gleaned from coaches on how to navigate the three stages to arrive at non-scaled tennis equipment points towards making sure the right skill development is acquired before making the next step. Also, feedback was given that this transition should not be done by age but by skill development. The reason behind this was that players develop at differing rates. As figure 6 in chapter three has shown, when players make transitions from one stage to the next, there is a dip in playing level. Should that skill development or competency not be attained, that dip could be exaggerated and, therefore, put players at risk of success.

All perceptions made by coaches are mentioned below and are listed in a hierarchical order:

- ***Perception 1: Coaches like to coach using the constraints-based coach to promote success with their players;***

- ***Perception 2: Scaled tennis equipment competition should conform to skill development, and not age;***

- ***Perception 3: Coaches like to demonstrate their activities to their players when introducing training activities;***

- ***Perception 4: Coaches approaches in scaled tennis equipment are the same as non-scaled tennis equipment coaching;***

- ***Perception 5: Coaches are very positive in their perception of a scaled tennis equipment program;***

- ***Perception 6: Coaches like to use the cooperative teaching style when coaching their players using scaled tennis equipment;***

- ***Perception 7: Coaches like to change the activities to keep their players engaged in practices; and***

- ***Perception 8: More team play is required for players participating in scaled tennis equipment program;***

Coaches, as one of the stakeholder groups, have a crucial role in how they utilize scaled tennis equipment programming. In trying to attract and retain players in their program, they have adopted some best practices that other facilities and coaches could learn from.

To summarize, they included:

- Adoption of a cooperative teaching style;
- Constraints-based approach to promote success;
- Demonstration of their activities;
- Adaptation of their activities to keep players engaged;
- Competition to promote more team play; and
- Skill development over age when moving up a stage.

The USOC's coaching framework has many components that are linked with the findings of coaches offering a scaled tennis equipment program. The framework speaks to being aligned with athlete centred outcomes from a coaching perspective. In the framework, they state the 4 C's of competence, confidence, connection, and character. The above bullet points have many touch points over the 4 C's. An attempt will be made to correlate the points into the 4 C's (USOC, 2017).

A cooperative style of teaching relates to the connection the coach establishes with the player. Using this method engages the player in the practices and therefore building the coach and player relationship. Using constraints-based approach is also a component of the USOC coaching framework and more falls explicitly under the C of confidence. Adaptation of the activities to keep the players engaged also falls under constraints-based

approach. The use of this approach adapts the task to the ability of the player and establishing those athlete centred outcomes (USOC, 2017).

The ability of a coach to demonstrate the activities relates to the C of competence. Having that technical and tactical knowledge to be able to deliver that demonstration in the best possible way, so that all players understand (USOC, 2017).

Three of the four C's are covered by the coaches feedback that speak to a coaching framework that focuses on athlete centered outcomes. It is through the use of scaled tennis equipment that coaches can achieve this framework and be as a coach developing the athlete to their full potential (USOC, 2017).

These above perceptions are positive findings in this investigation that refer to multiple facets of how to teach, engage players, transition between stages, and provide competitive formats.

5.3.4 Objective 4: The holistic and interactive perceptions of stakeholder groups in all stages of a tennis equipment program

Through questions asked to all three stakeholder groups of a scaled tennis equipment program involving 103 participants, it is without question that they perceived a scaled tennis equipment program to be a success.

From ***players'*** perspectives, they wanted to play the game of tennis. They wanted to rally the ball back and forth. They wanted to play points and, by playing points, they wanted to play matches. As they progressed through the stages, they verbalized a willingness to play tournaments. The use of scaled tennis equipment provided them with fun and enjoyment (Lee, 1999; Farrow & Reid, 2010). The reasons for fun and enjoyment contributed to the amount of success and mastery of the tennis skills (Scholder & McGuire, 2007). By having success, they were implicitly learning how to play the game (Buszard et al., 2014).

Within this overall theme of playing the game of tennis, players liked different environments of their coach, friends, and family. Sport, or in this case tennis influences psychosocial development through interaction with peer status and acceptance (Martens, 2012).

As players experience each stage and progress and gain more experience, they spoke of the need to improve tennis skills or mastery (Powell, 1990). This is a natural occurrence, as the progressive stages of red, orange, and green provide goals to attain. Their ultimate goals were to reach the non-scaled equipment stage of yellow. However, this should only be done once necessary tennis skills have been obtained. Moving from one stage to the next at the wrong time could lead to unfortunate experiences and potentially to stop play altogether.

Relative to the scaled tennis equipment players used, references were made about the ease the ball was to hit and the more natural occurrence of covering the court. They also spoke about how they liked the appearance of their racquets. Having the ability to use equipment that facilitates player's abilities to play the game, and that playing the game is a huge goal for them results in success of a scaled tennis equipment program.

Parents felt that scaled tennis equipment program has been designed for their child not only to play the game but also achieve success. Because of the stature and development of young children, ensuring that adult constraints are not imposed on them is crucial to the success of a scaled tennis equipment program (Guggenheimer & Larson, 2013). Parents comprehensively thought that was not the case and felt that because of the equipment being scaled for them resulted in confidence toward playing the game. Considering players' feedback, they wished to play the game and use scaled tennis equipment.

Parents also perceived that because of the equipment designed for their child, they experienced fun and enjoyment when playing tennis. Fun and enjoyment also translated into retention (Scholder & McGuire, 2007). The positive experiences children had

resulted in signing up for more sessions. Another contributing factor to fun, enjoyment, and retention is the amount of engagement children experience when using scaled tennis equipment (Buchanan & Roberts, 1991). The equipment scaled for them was perceived to be easier to get to the ball and hit it. This contributed to more engagement and success (Farrow & Reid 2010).

Parents provided recommendations for the success of a scaled tennis equipment program. Suggestions were insightful. Notably, one parent spoke about the need to make sure each child had the right-sized racquet. Another suggestion was to ensure the engagement trait where player-to-coach ratio needed to remain low.

How players experience each stage and progress between the stages was a consistent point of conversation, particularly with orange and green stage parents. The issue of progression was an essential concept to ensure the success of a scaled tennis equipment program. If done at the wrong time, it could be detrimental to the success of the player.

Finally, scaled tennis equipment helped children accelerate their skill development (Powell, 1990). Having the ability to learn the game at a faster rate and being more equipped to play the game pointed to the success of a scaled tennis equipment program.

Coaches, having a vast amount of coaching experience, emphasized much positivity toward scaled tennis equipment. The teaching style the coaches preferred to use with their players in a scaled tennis equipment program was a cooperative style. The constraints-based approach was also applied in conjunction with the cooperative teaching style. The coaches liked to change constraints of racquet, ball, court, and task to facilitate player success. The constraints-based approach also resulted in the engagement of players (USOC, 2017). Coaches reported that the approach mentioned above was the same as when they worked with players using non-scaled tennis equipment.

The activities that were used when working with players experienced the most amount of success when they demonstrated activities and tried to adapt activities to keep the players engaged.

They recommended that the hot topic of how to transition between the stages should be done predominantly according to tennis skill, and achieve the right competencies in that stage before moving to the next progressive stage. Within the concept of skill development, they also felt that competition and to promote level-based play should be staged according to skill level and not age (Buchanan & Roberts, 1991). They also thought that team competition should be the primary focus for players in a scaled tennis equipment program. This took into consideration the age of the children and not wanting a pressured environment and early specialization.

Overall, stakeholders of a scaled tennis equipment program spoke of much positivity. Particularly, parents and coaches felt that players achieved success because of the overall design of a scaled tennis equipment program. Within the methods of how to transition between stages of a scaled tennis equipment program, feedback was received by all three stakeholder groups that spoke of being patient and only transitioning once they have achieved the right skill level.

5.3.5 Objective 5: Recommendations for scaled tennis equipment programming practices

By asking questions to parents, questions three and five provided recommendations on what would make a scaled tennis equipment program successful. Question three asked if there was anything their coach could do to improve. Question five asked the parent to reflect on the worst experience the child had in a scaled tennis equipment program. Suggestions arose for improvement. Overall, perceptions pointed to success, but small improvements could be made.

One of the perceptions (***Perception 8: In scaled tennis equipment program, what can be improved to make it more successful?)*** related to parents providing feedback on what

they thought should be done to improve or make a scaled tennis equipment program more successful.

Thirty parents provided answers that included questions three and five. The following perceptions were given that point to making a scaled tennis equipment program better:

- Group players according to playing level;
- More racquet handling skills;
- Size of racquet;
- Group size;
- Parental education; and
- The transition between stages of a scaled tennis equipment program.

Of the above perceptions on how to improve a scaled tennis equipment program, three were repeated. Those included size of the racquet, group size, and transition through stages of a scaled tennis equipment program.

Recommendation 1: Grouping of players according to their levels of ability.

The first perception of grouping players according to playing level is common feedback in coaching circles. According to the USOC Coaching Framework, this recommendation can contribute profoundly to the connection and competence of a coaching program (USOC, 2017). The reason for having this is to allow players within a coaching group to be challenged. There are a few players who match up in playing a level that could result in either being over challenged or too easy for them. Within youth programming, sometimes it could be difficult to achieve knowing that players progress at different rates.

Recommendation 2: Focusing on the development of racquet handling skills.

Mention was made of more racquet handling skills which in the USOC Coaching Framework relates to the competence of playing the game and a need to be covered by the coach (USOC, 2017). Even though parents who gave feedback only provided their perceptions, this does not match up with players wishing to play the game. Working on

racquet handling skills were individual skills and not partner skills, which facilitate playing the game of tennis.

Recommendation 3: Choosing racquet size according to player's ability.

Size of the racquet was part of vital feedback in the essence of this research. If a racquet is not the right size, it could hurt not only physically but also their abilities to play the game.

Recommendation 4: Effectively managing group size.

Group size refers to making sure there is an appropriate player-to-coach ratio. Parents who mentioned this spoke that there were too many players per coach. Too many players for the coach can result in lack of activity and engagement of players and results in lack of success in scaled tennis equipment programming.

Recommendation 5: Introduction of parent education on scaled tennis equipment.

A few parents wanted to have more education in the nuances of a scaled tennis equipment program. Again, according to the USOC Coaching Framework, the occurrence of more parents meeting contributes to the connection that the coach establishes with the parents (USOC, 2017). More specifically, some activities that the coach could give them to work with their child at home or when they play as a family. Another was what potential determents are on how players move from one stage to the next in a scaled tennis equipment program.

Recommendation 6: Effective movement between the stages.

Even though this was not a specific question asked, organically this topic was presented by the parent and coaches. Transitioning between stages of a scaled tennis equipment program was an interesting comment as it seems to be a hot topic among players, parents, and coaches. Parents wanted to know more about how their child moved between the stages. Having more information available to parents and players will help coaches offer successful programs.

The above recommendations are of added value to the available literature and could provide substantive advice to facilities and coaches offering scaled tennis equipment programs, additionally, it shows credence to the USOC Coaching Framework and its influence in coaching and programming as most comments tie into this framework (USOC, 2017). The feedback is straightforward and achievable by coaches in making the program more successful. Taking the benefits of scaled tennis equipment and using the recommendations mentioned above can improve each scaled tennis equipment program.

CHAPTER 6:

CONCLUSIONS, RECOMMENDATIONS, AND IMPLICATIONS FOR FURTHER RESEARCH

6.1 INTRODUCTION

This chapter presents the overall findings of this research which investigated the perceptions of a scaled tennis equipment program in the eyes of the players, parents, and coaches. Collecting the most relevant data to the objectives of this research, qualitative research designed was felt to be the most appropriate. All three stakeholders of a scaled tennis equipment program namely: players, parents, and coaches were interviewed by the researcher to a set amount of questions. The same questions were asked to each respective stakeholder in trying to find more insight into whether they perceived their involvement in a scaled tennis equipment program to be a successful or unsuccessful experience. In total, 103 interviews were conducted, transcribed and then analysed to present common themes that best reflected their perceptions of a scaled tennis equipment program. Trustworthiness of the research was upheld in making sure of the validity and reliability of the data collected. The experience and observations derived by conducting the face to face interviews by the researcher served as data for this research design in establishing the epistemology philosophy. The conclusions will be presented in order of the objectives as stated in chapter one and four.

6.2 PERCEPTIONS OF PLAYERS

The first objective as stated in Chapter one and four is to ***investigate the perceptions of players on their experiences with each stage, of a scaled tennis equipment program.***

The three stages of a scaled tennis equipment program are red, orange, and green as stated throughout this investigation. For the red stage 22 players, orange stage 21, green

stage 20 players, making it a total of 63 players that were interviewed, which support the transferability of this research. Every interview was either audio or video recorded to analyse all the data in providing dependability of the player interviews. On completion of each interview, the researcher listened to the recording in making sure all answers were understood. The answers were then transcribed with the help of ATLAS.ti (Scientific Software Development, 2017) software program. All quotes by the players were analysed and then assigned codes. Coding was then catergorized into universal themes that best represented the understanding of the players to the four questions.

The perceptions or common themes provided by each player included each stage of a scaled tennis equipment program (red, orange, and green). Considering the perceptions of the players for each question and through the three stages of a scaled tennis equipment program, 13 perceptions emerged that best represented the players' data.

Before delivering the overall perceptions of the players, it should be prefaced that the same questions were asked to all players. The first two questions asked what the players thought was fun or their favourite thing to do with their coach. The third question requested what they liked to do without their coach, and lastly what they thought of their stage's court, racquet, and ball.

After conducting in-depth analysis and presenting the 13 perceptions in the previous chapter, further analysis was conducted and three conclusive findings emerged.

The first finding through the questioning of the players and what was their favourite and fun thing to do with their coach when using scaled tennis equipment they liked to play matches, play the game, rally back and forth, have fun, improve their play, and play their favourite game. The reason to bucket these terms together is due to the evidence that there is an overriding theme of wanting to play. The Aspen Institute Project Play Report (The Aspen Institute, 2015) has suggested eight plays through their research that they point towards enhancing the youth sport experience. There are two plays in particular presented in the Aspen Report "ask kids what they want to do" and "reintroduce free

play" that align with the above wishes of the players interviewed (The Aspen Institute, 2015, pp 13, 15). To promote a better attraction and retention to tennis is allowing the children to play the game.

Another Aspen Report Play that is applicable is think small. Meaning introducing scaled sporting equipment to youth so they can maximize space and also allow the kids to play the game as soon as possible (The Aspen Institute, 2015). The use of scaled tennis equipment allowed the players to play the game of tennis much quicker compared to using non-scaled tennis equipment (Farrow & Reid, 2010).

Having the ability to play the game of tennis even though new to the game presents great value to young players. The play represents an adult version of tennis but because equipment is scaled it allows that possibility of playing the game (Kachel et al., 2014). From a tennis perspective, scaled tennis equipment facilitates success in the perceptions of young players.

The second finding showed that players of a scaled tennis equipment program when not playing with their coach, preferred to play matches, play the game, and play with their friends or family. Very similar to the feedback when they played with their coach, again showing a great desire to play the game of tennis. The reference to playing with their friends using scaled tennis equipment is also in line with research stating that preference even though they might be on a weaker playing level (Lee, 1999). Knowing that a family could have multiple tennis playing levels, using scaled tennis equipment could be a great equalizer in allowing all family members to play simultaneously.

The third finding was that the players liked using scaled racquets, balls, and courts because it made it easier for them to hit the ball. Allowing for success will not only increase the confidence of that young tennis player but also facilitated implicit learning (Buszard et al., 2014). Making sure the player is using the right scaled tennis equipment is also paramount in trying to achieve that success (Buszard et al., 2014). Players verbalized that they felt that using scaled tennis equipment made it easier to cover the

court and hit the ball over the net which assisted in their overarching desire to play the game.

6.3 PERCEPTIONS OF PARENTS

The second objective investigates the perceptions of ***parents on their child's relative success or lack thereof in scaled tennis equipment programming.***

The same data collection procedures were followed by parents and players in making sure the trustworthiness of the data was upheld. In total, 30 parents were interviewed, 10 from each stage (red, orange, and green).

As with the players, the same seven questions were asked to each parent. By giving initial codes and assigning common themes to the answers, overall perceptions were established. In the 30 parents over the three stages, nine perceptions emerged. From those nine perceptions, further refinement was done to summarize the perceptions of parents into three areas.

The overwhelming feedback from parents was that scaled tennis equipment is designed for their child. The equipment that they used facilitated them achieving success and then promoting implicit learning (Buszard et al., 2014). Contributing to being a program that focuses on developing athlete centred outcomes (USOC, 2017).

The first parent finding leads into the second finding being that because scaled tennis equipment is designed for youth, in turn, it developed confidence, success, and because of the success and confidence, the child has fun. Considering the lack of fun that is primarily associated with dropout of sport scaled tennis equipment programs facilitates engagement and retention (Scholder & McQuire, 2007). Within the observations, parents also made references to other sports that use scaled equipment and tied in the benefits compared to using non-scaled tennis equipment (Farrow & Reid, 2010; Guggenheimer & Larson, 2013; Buszard et al., 2014; Kachel et al., 2014;).

Another factor that the parents mentioned that related to scaled tennis equipment being designed for youth was that skill development is accelerated. Because scaled equipment

was better suited to youth's growth and development children, they were able to become competent in tactical and technical skills that are similar to playing adult-like tennis. (Guggenheimer & Larson, 2013). By developing tennis skills at an accelerated rate and being a better tennis player conforms to the mastery climate atmosphere which in turn contributes to retention in a sport (Morgan, 2016). Having that ability to improve and become better can only point to the success of a scaled tennis equipment program.

All the terms mentioned above refer consistently to the success of a scaled tennis equipment program. The role of the parents as mentioned by Fredericks and Eccles (2004) in youth sport is to provide two functions: (1) to provide those sports experiences and (2) to interpret those sports experiences. For a scaled tennis equipment program through roles parents play, extreme satisfaction is evident when they interpret those sports experiences. They could see that the decision for their child to play tennis using scaled tennis equipment was validated as defined by the terms they used when asked to reflect and share their perceptions.

The third area of noteworthy feedback from parents were transitioning between the stages of a scaled tennis equipment program. The lack of cohesion in the sporting triangle (Lee, 1999) with two or three stakeholder groups could cause much frustration. Because of the nature of a scaled tennis equipment program and the progressive steps, there is a requirement for all stakeholder groups to work together in making sure the transition is done at the right time. If within a group training environment, players' friends move up and they do not, this could cause tension in the child's desire to keep playing. This is one of the most significant challenges with tennis coaching programs and is central to a more prominent picture on how children develop and mature at different rates (Malina, 2008a). The need to have a sporting triangle where all stakeholder groups are working together was echoed in the parental interviews by them requesting more parental education of how their child can progress.

A phrase of "race to yellow" is often verbalized when referring on scaled tennis equipment programming. Parents that were interviewed in the green stage reiterated that

making the transition at the right time facilitates success. Players and parents are in a good position to provide advice as they have seen their child move from red to orange, orange to green, and then observing how they would then move into the yellow (non-scaled tennis ball) stage. Across the board, parents echoed the sentiments that the transition needs to take place when the child has developed all the skills at that stage before progressing. One parent said, “Patience is required.”

6.4 PERCEPTIONS OF COACHES

The last of the stakeholder groups to relay the overall findings are the coaches, their objective being to ***examine the knowledge and understanding of coaches on how a player can successfully or not successfully navigate the three stages of a scaled tennis equipment program.***

The same process that was used with the parents and players was also used with coaches. The same nine questions were asked of the 10 tennis coaches. The vast experience of the coaches using scaled tennis equipment provided considerable trustworthiness to the data obtained. For the coaches’ sample, eight perceptions emerged, reflecting coaching players using scaled tennis equipment. This was further refined as done with players and parents to three observations.

The first finding for coaches working with players that used scaled tennis equipment was that their coaching approaches were using demonstrations to show the activities, cooperative style of teaching, constraints based coaching, and changing up the activities to promote success with the players they were working with.

Because of the young age of players participating in a scaled tennis equipment program (ranging from 5-11 years age), there was an underlying need to change up the activities to keep the children engaged. Due to the different growth, development, and maturity levels of children within the age bracket of scaled tennis equipment program, in particular, the short attention spans of the players this way of organizing their activities was very well received by the parents (Malina, 2008a).

The use of a constraint-based approach to skill acquisition is a process of self-organization that is reliant on constraints enforced on the system (Davids et al., 2008). Within a scaled tennis equipment program, coaches have constraints of racquet, ball, task, and the court to manipulate and facilitate success with the players. The access to the scaled tennis equipment helps facilitate the constraints approach due to having the equipment to manipulate in addition to the task and environment constraints. These coaching approaches that the coaches are adopting promote according to the USOC Coaching Quality Framework a better connection with their players (USOC, 2017). The ultimate focus of these coaching approaches according to the coaches is to improve the player's skills in promoting that mastery motivational climate that will facilitate staying in the sport (Morgan, 2016).

The second finding of the coaches were that they felt by using scaled tennis equipment caused player successes and contributed to the overall scaled tennis equipment program in a positive light. Additionally, they spoke about their coaching approaches that they use the same methodology in scaled as non-scaled equipment coaching. From a USOC Coaching Framework point of view, this installs confidence with the player which contributes to the success of a scaled tennis equipment program (USOC, 2017).

Lastly, when asked to reflect, coaches supported players in a scaled tennis equipment program playing team competition. The reason to support team play was to cater to the lack of experience from a skill development point of view, not to become too specialized (Balyi et al., 2013). They also felt that competition should be based according to skill to promote level based play and not done according to age. With this age of children there tends to be differences in development (Malina, 2008a).

6.5 OVERALL PERCEPTIONS OF THE STAKEHOLDERS

The overall, and interactive perceptions of all three stakeholders (players, coaches, and parents) share about a scaled tennis equipment program.

From the interviews conducted with the players, parents, and coaches there is no doubt of the success of a scaled tennis equipment program. Players when asked what was fun or favourite thing to do with their coach or without their coach, they talked about being able to play the game in a setting with their friends or family. Because of scaled tennis equipment being more in line with the growth and size of the player, it makes it feasible to play the game when comparing to non-scaled tennis equipment (Malina 2008a; Buszard et al., 2016; Pankhurst, 2016).

For parents, the most potent comment and was iterated throughout the answers to the questions was that a scaled tennis equipment program was designed for their child. The fact that it was more suited for their child provided them confidence, fun and enjoyment, and an ability to play the game.

From a coaches' perspective, they felt by making available scaled tennis equipment to children in their program was a very positive occurrence. The coaches who were sampled for this research spoke from a background of phenomenal experience because of their time spent both as a coach using scaled and non-scaled tennis equipment in their coaching practices.

As referenced above, a scaled tennis equipment program is of great value not only attracting but retaining children in the sport due to their overall ability to play the game in a positive learning environment. Scaled tennis equipment provides parents as investor and evaluators much value to them through their child's positive experience in playing tennis. Using scaled tennis equipment also gives them an ability to play a sport for a lifetime as a family while keeping fit.

6.6 RECOMMENDATIONS

Through the questions asked to the parents and coaches, a few questions were positioned that gathered insight into being able to ***provide recommendations for scaled tennis equipment programming practices.***

From parent's perceptions, references were made to ensure their child was using the appropriately sized racquet according to tennis skill and size. Additionally, they thought to have a player-to-coach ratio that was manageable and needed in providing the appropriate engagement and instruction to their child. Furthermore, they would like to see more parent education delivered by the coach that speaks specifically to how their child transitions between the stages of a scaled tennis equipment program.

Through the coaches' questions, there was two stand out messages. The need for a teaching methodology to use the constraints-based approach with a cooperative teaching style surfaced. From competition comes a pathway to have them start off in a team format and then participate in competition based on skill level rather than age.

6.7 IMPLICATIONS FOR FURTHER RESEARCH

The quality and quantity of the data gathered by this investigation were far beyond the expectations of the researcher. Of the scaled equipment research done to date, none of them looked at a qualitative element of stakeholders groups using a scaled tennis equipment program.

The findings of this research pointed toward the success of a scaled tennis equipment program. There were also recommendations on how best a player perceives each stage of a scaled tennis equipment program. However, a deeper dive is needed in providing more specific criteria or competence in each stage and how players enter and leave each stage. Competencies are needed from a holistic approach, looking at technical, tactical, mental, physical, and competitive components for each stage.

Additionally, it would be interesting to see how scaled tennis equipment could best apply to players starting the game between the ages of 11-18. Because there are players of all ages who wish to start the game, due to the ease of starting with scaled equipment as shown through this research, the use and application of scaled tennis equipment could be more widespread and not only with children aged 10-and-under. It would be interesting to

research and see how the racquet, ball compressions, and court sizes could be manipulated for success. The potential findings would indicate the use of scaled tennis equipment but could be different racquet, ball, and courts size for the three stages.

Consistent messaging was received by the coaches that suggested more team play for 10-and-under competition as opposed to individual tournament play. No research has been done on competition for 10-and-under players to date. Some theories have been presented that speak to shorter duration and time based but nothing concrete (Pankhurst, 2016). It would be of interest to understand what the suggestive formats for team play would be conducive to play. Also, what would be the role of ranking or rating with scaled tennis equipment competition?

From the parents' perspective, they noticed a lack of engagement when the coach to player ration went up to high. From a coaching and programming point of view, it would be worthwhile research to understand for the respective scaled tennis equipment stage what is the appropriate coach to player ratio that promotes maximum engagement and activity for the player.

Another recommendation of research would be to determine if there should be a stage before the current first stage of red. There are currently countries (France, Belgium, and Australia) that have introduced one or even two stages before red to facilitate play for children younger than five years old. For those stages before red stage what would be the best racquet, ball, and court dimensions that would promote success, also should we have one or two stages.

Lastly to make sure the right equipment is being produced from a manufactures point of view valuable research could go into making sure the racquets sizes in terms of racquet size, length of racquet, and composition of the racquet are the right recommendations for each stage. Racquets are a crucial part of playing tennis using scaled tennis equipment.

6.8 FINAL STUDY CONCLUSIONS

Since the International Tennis Federation launched their *Play and Stay campaign* in 2007 to promote more awareness of scaled tennis equipment use with young players, the reception of this program has been met with mixed emotions. There is evidence that scaled tennis equipment has been used prior to 2007 in individual countries around the world (Belgium, England, and France). The reason for the mixed responses in the knowledge level of the stakeholder groups of a tennis program was still in its infancy. Since 2007, research into this area has improved dramatically, and it is hoped that this research will also contribute to the cause of providing more information to stakeholders, in pointing out the future needs and celebrate the successes.

This research was able to establish the below findings:

- Players feel like they are able when using scaled tennis equipment to play the game, match play, rally back and forth, have fun and improve their skills with their coach;
- Players feel like they can when using scaled tennis equipment able to play the game, match play, play with friends and family when not playing with their coach;
- Players like using scaled racquet, balls, and courts as it makes it easier to hit the ball and rally back and forth;
- Parents like that a scaled tennis equipment program is designed for youth;
- Due to the reason scaled tennis equipment program is designed for youth the child is able to: attain successes, have fun, develop confidence, develop skills at an accelerated pace, and appropriate engagement which leads to retention;
- Parents would like to see that the appropriate skills are developed before moving one stage to the next;
- Coaches are able when their students use scaled tennis equipment to use constraints to develop the skill level of their players;

- Coaches feel they use the same methodology with scaled tennis equipment as non-scaled tennis equipment of cooperative style, use of demonstrations, and changing up activities; and
- Coaches think competition should conform to skill and not age, and more team play when they are in a scaled tennis equipment program.

A conclusive statement on this research points towards the success and positivity of a scaled tennis equipment program that can attract and retain young players in the game of tennis as perceived by the players, parents, and coaches of a scaled tennis equipment program.

References

Abbott, A., & Collins, D. (2004). Eliminating the dichotomy between theory and practice in talent identification and development: Considering the role of psychology. *Journal of Sports Sciences, 22*(5), 395-408.

Abbott, A., Collins, D., Martindale, R., & Sowerby, K. (2002). *Talent identification and development: An academic review.* Edinburgh, Scotland: Sport Scotland.

Adler, P. A., & Adler, P. (1998). *Peer power: Preadolescent culture and identity.* New Brunswick, NJ: Rutgers University Press.

Alvarez, E., & Marquez, S. (2006). Dropout reasons in young Spanish athletes: Relationship to gender, type of sport and level of competition. *Journal of Sport Behaviour, 29*(3), 255-269.

Amade-Escot, C. (2006). Student learning within the didactique tradition. In D. Kirk, D.Macdonald, & M. O'Sullivan (Eds.), *Handbook of physical education* (pp. 347-365). London, UK: Sage.

Ames, C. (1987). The enhancement of student motivation. In D. A. Kleiber & M. Maehr (Eds.). *Advances in motivation and achievement* (pp. 123-148). Greenwich, CT: JAI Press.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80(3),* 260-267.

Ames, C., & Maehr, M. (1988). *Home and school cooperation in social and motivational development.* Department of Education, (OSER Grant No. De-H023T80023).

Anderson, K. (2007). United States Tennis Association Project 36/60. *ITF Coaching & Sport Science Review, 42,* 17.

Arias, J. (2012a). Does the modification of ball mass influence the types of attempted and successful shots in youth basketball? *Human Movement, 13,* 147-151.

Arias, J. (2012b). Influence of ball weight on shot accuracy and efficacy among 9-11-year-old male basketball players. *Kinesiology, 44,* 52-59.

Arias, J., Argudo, F., & Alonso, J. (2012a). Effect of ball mass on dribble, pass, and pass reception in 9 to 11-year-old boys' basketball. *Research Quarterly for Exercise and Sport, 83,* 407-412.

Arias, J., Argudo, F., & Alonso, J. (2012b). Effect of the ball mass on the one-on-one game situations in 9 to 11-year-old boys' basketball. *European Journal Sport Science, 12,* 225-230.

Australian Sports Commission. (1991). *Sport for young Australians: widening the gateway to participation*. Canberra, Australia: Australian Sports Commission.

Bailey, R. (2006). Physical education and sport in schools: A review of benefits and outcomes. *Journal of School Health, 76,* 397-401.

Baker, J., Cote, J., & Abernethy, B. (2003). Sport-specific practice and the development of expert decision-making in team ball sports. *Journal of Applied Sports Psychology, 15,* 12-25.

Balyi, I. (2012, February). Long-term athlete development: Overview. In B. Hainline (Chair). *USTA Youth Tennis Symposium*. Symposium conducted at USTA Youth Tennis Symposium, Tampa, FL.

Balyi, I., Way, R., & Higgs, C. (2013). *Long-term athlete development.* Leeds, UK: Human Kinetics.

Barrell, M. (2008). *Tennis 10s Manual*. London, UK: International Tennis Federation.

Baxter-Jones, A. D. G. (1995). Growth and development of young athletes: Should competition levels be age-related? *Sports Medicine*, *20*(2), 59-64.

Beak, S., Davids, K., & Bennett, S. (2000). One size fits all? Sensitivity to moment of inertia information from tennis racquets in children and adults. In S. Haake & A. Coe, (Eds.), *Tennis science and technology* (pp. 109-118). Oxford, UK: Blackwell Publishing.

Beilock, S., Bertenthal, B., Hoerger, M., & Carr, T. (2008). When does haste make waste? *Journal of Experience Psychology Application, 14*, 340-352.

Blackman, M., Lubbers, P., & Russell, G. (2012). *USTA player development: High performance 10 & under training*. Bradenton, FL: United States Tennis Association.

Bloom, B. (1985). *Developing talent in young people*. New York: Ballantine Books.

Bompa, T.O. (2000). *Total training for young champions*. Champaign, IL: Human Kinetics.

Bowker, A., Boeknoven, B., Nolan, A., Bauhaus, S., Glover, P., Powell, T., & Taylor, S. (2009). Naturalistic observations of spectator behaviour at youth hockey games. *The Sport Psychologist*, *23*, 301-316.

Brouwers, J., Bosscher, V., Schaillee, H., Truyens, J., & Sotiriadou, P. (2010). The relationship between performances at U-14 international youth tournaments & later success in tennis. *Journal of Medicine and Science in Tennis, 15*(3), 21-25.

Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford, UK: Oxford University Press.

Buchanan, F., & Roberts, G. C. (1991). *Perceptions of success of children in sport*. Unpublished manuscript, University of Illinois, Champaign-Urbana, IL.

Burns, N., & Grove, S.K. (2003). *Understanding nursing research* (3rd ed.). Philadelphia: W.B. Saunders.

Burton, A.W., Greer, N.L., & Wiese, D.W. (1992). Changes in overhand throwing patterns as a function of ball size. *Pediatric Exercise Science*, *4*(1), 50-67.

Buszard, T., Farrow, D., Reid, M., & Masters, R. (2014). Scaling sporting equipment for children promotes implicit processes during performance. *Conscious Cognition*, *30,* 247-255.

Buszard, T., Reid, M., Masters, R., & Farrow, D. (2016). Scaling the equipment and play area in children's sport to improve motor skill acquisition: A systematic review. *Sports Medicine*, *46*(2), 829-843.

Capio, C., Poolton, J., Sit, C., Holmstrom, M., & Masters, R. (2013). Reducing errors benefits the field-based learning of a fundamental movement skill in children. *Scandinavian Journal of Medicine and Science in Sports*, *23,* 181-188.

Carvalho, J., Araújo, D., García-González, L., & Iglesias, D. (2011). The decision-making training in tennis: what scientific foundations can be applied in training programs? *Journal of Sports Psychology, 20* (2), 767-783.

Carvalho, J., Correira, V., & Araujo (2013). Constraints-based Coaching. *ITF Coaching and Sport Science Review, 60* (12), 10-11.

Cervello, E., Santos Rosa, F., Calvo, T., Jimenez, R., & Iglesias, D. (2007). Young tennis players' competitive task involvement and performance: The role of goal orientations,

contextual motivational climate, and coach initiated motivational climate. *Journal of Applied Sport Psychology*, *19*(3), 304-321.

Chase, M., Ewing, M., Lirgg, C., & George, T. (1994). The effects of equipment modification on children's self-efficacy and basketball shooting performance. *Research Quarterly for Exercise and Sport, 65*, 159-168.

Churchill, G., & Iacobucci, D. (2002). *Marketing research: Methodological foundations* (8^{th} ed.). Orlando, FL: Harcourt College Publishers.

Coakley, J. (2006). The good father: Parental expectations and youth sports. *Leisure Studies*, *25*(2), 153-163.

Cobb, J., & Houle, D. (2011). *Shift ed: A call to action for transforming K-12 education*. Thousand Oaks, CA: Corwin.

Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education*. London: Routledge Falmer.

Cole, J., & Gardner, K. (1979). Topic work with first-year secondary pupils. In: E. Lunzer & K. Gardner, (Eds.), *The effective use of reading*. (pp. 167-192). London: Heinemann, Heinemann Educational Books for the Schools Council.

Cooper, D., & Schindler, P. (2001). *Business research methods*. New York: McGraw-Hill.

Cote', J. (1999). The influence of the family in the development of talent in sport. *Sport Psychologist, 13,* 395-417.

Cote', J., Baker, J., & Abernethy, B. (2007). Practice and play in the development of sport expertise. In G. Tenenbaum, & R. C. Eklund, (Eds.), *Handbook of sport psychology*. (3rd ed.), (pp. 184-202). Hoboken, NJ: Wiley.

Cote', J., & Fraser-Thomas, J. (2007). Youth involvement in sport. In P. R. E. Crocker (Ed.), *Introduction to sports psychology: A Canadian perspective* (pp. 266-294). Toronto: Pearson-Prentice Hall.

Cote´ J., & Hay, J. (2002). Children's involvement in sport: A developmental perspective. In J. M. Silva, & D. E. Stevens (Eds.), *Psychological foundations of sport* (pp. 484-502). Boston, MA: Allyn and Bacon.

Crespo, M., & Reid, M. (2007). Motivation in tennis. *British Journal of Sports Medicine*, *21*, 6-21.

Crespo, M., & Reid, M. (2009). *Coaching beginner and intermediate tennis players*. London: International Tennis Federation.

Creswell, J. (2009). *Research design: Qualitative, quantitative, and mixed method approaches*. (3rd ed.). London: Sage Publications.

Crouch, M., & McKenzie, H. (2006). The logic of small samples in interview-based qualitative research. *Social Science Information*, *45*(4), 483–499.

Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs.* San Francisco: Jossey-Bass.

Davids, K., Araújo, D., Hristovski, R., Passos, P., & Chow, J. Y. (2012). Ecological dynamics and motor learning design in the sport. In N. Hodges & M. Williams (Eds.), *Skill acquisition in sport: Research, theory, and practice* (2nd ed.), (pp. 112-130). Abingdon, UK: Routledge.

Davids, K., Button, C., & Bennett, S. (2008). *Dynamics of skill acquisition: A constraints-led approach*. Champaign, IL: Human Kinetics.

Davids, K., Renshaw, I., & Glazier, P. (2005). Movement models from sport reveal fundamental insights into coordination processes. *Exercise Sports Science Review*, *33*(1), 36-42.

DeCastillia, H., & Pankhurst, A. (2012, February). Training and competition: Finding the proper balance. In B. Hainline (Chair). *USTA Youth Tennis Symposium*. Symposium conducted at USTA Youth Tennis Symposium, Tampa, FL.

Deci, E. L. (1975). *Intrinsic motivation*. New York: Plenum.

Deci, E., & Ryan, R. (1985). *Intrinsic motivation and self-determination in human behaviour*. New York: Plenum.

DeFrancesco, C., & Johnson, P. (1997). Athlete and parent perceptions in junior tennis. *Journal of Sport Behaviour*, *20*, 29-36.

Denzin, N. K., & Lincoln, Y. S. (2005). *The Sage handbook of qualitative research* (3rd ed.). Thousand Oaks, CA: Sage.

DeVlyder, M. (2012, February). Early specialization: Tennis-specific concerns. In B. Hainline (Chair). *USTA Youth Tennis Symposium*. Symposium conducted at the USTA Youth Tennis Symposium, Tampa, FL.

Duda, J. L. (1981). *A Cross-cultural Analysis of Achievement Motivation in Sport and the Classroom*. Unpublished doctoral dissertation, University of Illinois, Champaign-Urbana, IL.

Duda, J. L. (1987). Toward a developmental theory of children's motivation in sport. *Journal of Sport Psychology, 9*(2), 130-145.

Duda, J. L. (1992). Motivation in sport settings: A goal-perspectives approach. In G.C. Roberts (Ed.), *Motivation in sport and exercise* (pp. 57-91). Champaign, IL: Human Kinetics.

Duda, J. (1996). Maximizing motivation in sport and physical education among children and adults. *Quest, 48,* 290-302.

Duda, J. (2005). Motivation in sport: the relevance of competence and achievement goals. In A. Elliot & C. Dweck (Eds.), *Handbook of competence and motivation* (pp. 318-335). New York, NY: Guildford Press.

Ebbeck, V. (1994). Self-perception and motivational characteristics of tennis participants: The influence of age and skill. *Journal of Applied Sports Psychology, 6*(1), 71-86.

Egstrom, G., Logan, G., & Wallis, E. (1960). Acquisition of throwing skill involving projectiles of varying weights. *Research Quarterly, 31,* 420-425.

Elliot, B. (1981). Tennis racquet selection: A factor in early skill development, *Australian Journal of Sports Sciences, 1,* 23-25.

Elliot, B., Davis, J., Khangure, M., Hardcastle, P., & Fester, D. (1993). Disc degeneration and the young fast bowler in cricket. *Clinical Biomechanics, 8,* 227-234.

Elliot, B., Plunkett, D., & Alderson, J. (2005). The effect of altered pitch length on performance and technique in junior fast bowlers. *Journal of Sports Sciences, 23,* 661-667.

Ericsson, K., Krampe, R., & Teschromer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, *100*, 363-406.

Evans, J. (1985). *The process of team selection in children's self-directed and adult-directed games*. Unpublished doctoral dissertation. University of Illinois, Champaign-Urbana, IL.

Ewing, M. E. (1981). *Achievement orientation and sports behaviour in males and females.* Unpublished doctoral dissertation. University of Illinois, Champaign-Urbana, IL.

Ewing, M. E., & Seefeldt, V. (1996). Patterns of participation and attrition in American agency-sponsored youth sports. In F. L. Smoll (Ed.), *Children and youth sports: A biopsychological perspective* (pp. 31-35). Madison, WI: Brown & Benchmark.

Farrow, D., & Reid, M. (2010). The effect of equipment scaling on the skill acquisition of beginning tennis players. *Journal of Sports Sciences, 28,* 723-732.

Ferguson, A., & Bowey, J. (2005). Global processing speed as a mediator of developmental changes in children's auditory memory span. *Journal of Experimental Child Psychology*, *91*, 89-112.

Ford, P., Ward, P., Hodges, N., & Williams, A. (2009). The role of deliberate practice and play in career progression in sport: The early engagement hypothesis. *High Ability Studies*, *20*(1), 65-75.

Fransen, J., Pion, J., Vandendriessche, J., Vandorpe, B., Vaeyens, R., Lenior, M., & Philippaerts, R. (2012). Differences in physical fitness and gross motor coordination in boys aged 6-12 years specializing in one versus sampling more than one sport. *Journal of Sports Sciences*, *30*(4), 379-386.

Fredricks, J. A., & Eccles, J. S. (2004). Parental influence on youth involvement in sports. In M.R. Weiss (Ed.), *Developmental sport and exercise psychology: A lifespan perspective* (pp. 145-164). Morgantown, WV: Fitness Information Technology.

Gagen, L., Haywood, K., & Spaner, S. (2005). Predicting the scale of tennis racquets for optimal striking from body dimensions. *Pediatrician Exercise Science*, *17*, 190-200.

Gerard, J. (2008, November 18). Pushy parents poisoning junior tennis. In *The Daily Telegraph,* S2.

Glazier, S., & Davids, K. (2009). Constraints on the complete optimization of human motion. *Sports Medicine, 39,* 15-28.

Goldstein, J. D., & Iso-Ahola, S. (2008). Determinants of parents' sideline-rage emotions and behaviours at youth soccer games. *Journal of Applied Social Psychology*, *38*, 1442-1462.

Gould, D., Carson, S., Fifer, A., Lauer, L., & Benham, R. (2009). Social-emotional and life skill development issues characterizing today's high school sport experience. *Journal of Coaching Education, 2*, 1-25.

Gould, D., & Dieffenbach, K. (2003). Psychological issues in youth sports competitive anxiety, overtraining, and burnout. In R. Malina & M. Clark (Eds.), *Youth sports: Perspectives for a new century* (pp. 149-170). Monterey, Mexico: Coaches Choice.

Gould, D., Lauer, L., Rolo, C., Jannes, C., & Pennisi, N. (2006). The role of parents in tennis success: Focus group interviews with junior coaches. *The Sport Psychologist, 22*, 18-37.

Groppel, J. L. (1977, March). *Tennis racquet selection based upon selection anthropometric indicators*. Paper session presented at the American Alliance for Health, Physical Education & Recreation National Convention, Seattle, WA.

Guba, E.G. (1981). Criteria for assessing the trustworthiness of naturalistic inquiries. *Educational Communication and Technology Journal*, 29, 75-91.

Guggenheimer, J., & Larson, E. (2013). The effects of scaling tennis equipment on the forehand groundstroke performance of children. *Journal of Sports Science, 12,* 323-331.

Guttmann, A. (1978). *From ritual to record: The nature of modern sports*. New York: Columbia University Press.

Hainline, B. (2012). *Positioning Youth Tennis for Success*. White Plains, NY: USTA.

Hammond, J., & Smith, C. (2006). Low compression tennis balls and skill development. *Journal of Sports Science and Medicine, 5,* 575-581.

Hardoy, M., Serius, M. Floris, F., Sancassiani, F., & Carta, M. (2011). Benefits of exercise with mini tennis in intellectual disabilities: Effects on body image and psychopathology. *Clinical Practice & Epidemiology in Mental Health, 7*(1), 157-160.

Harvey, S., Kirk, D., & O'Donovan, T. M. (2014). Sport education as a pedagogical application for ethical development in physical education and youth sport. *Sport, Education, and Society*, *19*(1), 41-62.

Harwood, C., & Knight, C. (2009a). Understanding parental stressors: An investigation of British tennis parents. *Journal of Sports Sciences, 27*, 339-351.

Harwood, C., & Knight, C. (2009b). Stress in youth sport: A developmental investigation of tennis parents. *Psychology of Sport and Exercise, 10,* 339-351.

Harwood, C., & Swain, A. (2002). The development and activation of achievement goals within tennis: A player, parent and coach intervention. *The Sport Psychologist, 16*, 111-137.

Hastie, P. (2010). *Student-designed games: Strategies for promoting creativity, cooperation, and skill development*. Champaign, IL: Human Kinetics.

Haywood, K.M., & Getchell, N. (2001). *Lifespan motor development.* (3rd ed.). Champaign, IL: Human Kinetics.

Hellstedt, J. C. (1987). The coach/parent/athlete relationship. *The Sport Psychologist, 1*, 151–160.

Holt, N., Tamminen, K. Black, D., Sehn, Z., & Wall, M. (2008). Parental involvement in competitive youth sport settings. *Psychology of Sport and Exercise, 9*, 663-685.

Hsu, L. (2004). Moral thinking, sports rules and education. *Sport, Education, and Society*, *14*(3), 339-352.

International Tennis Federation. (2011). *Tennis 10s: The ITF guide to organizing 10 & under competition*. London: International Tennis Federation.

International Tennis Federation. (2012a). *The ten-and-under competition rule change*. Retrieved from http://www.tennisplayandstay.com/tennis10s/rule-changes/the-10-and-under- competitionrule-change.aspx

International Tennis Federation. (2012b). *Tennis10s leaflet*. London: International Tennis Federation.

Isaacs, L. (1980). Effects of ball size, ball colour, and preferred colour on catching by young children. *Perceptual Motor Skills*, *51,* 583-586.

Jenny, S. E., Manning, D., Keiper, M. C., & Olrich, T. W. (2017). Virtual athletes: Where eSports fit within the definition of sport. *Quest*, *69*(1), 1-18.

Jones, C. (2012, February). Transition from 10-and-Under to 12s: U.S. community tennis perspective. In B. Hainline (Chair). *USTA Youth Tennis Symposium*. Symposium conducted at the USTA Youth Tennis Symposium, Tampa, FL.

Kachel, K., Buszard, T., & Reid, M. (2014). The effect of ball compression on the match-play characteristics of elite junior tennis players. *Journal of Sports Sciences, 33*, 320-326.

Kerlinger, F. N., & Lee, H. B. (2000). *Foundations of behavioural research* (4th ed.). Holt, NY: Harcourt College.

Kidman, L., McKenzie, A., & McKenzie, B. (1999). The nature and target of parents' comments during youth sport competitions. *Journal of Sport Behaviour, 22*, 54-58.

Kiselev, S., Espy, K., & Sheffield, T. (2009). Age-related differences in reaction time task performance in young children. *Journal of Experimental Child Psychology*, *102*(2), 150-166.

Kleiber, D. A., & Hemmer, J. (1981). Sex differences in the relationship of locus control and recreational sport participants. *Sex Roles, 7,* 801-810.

Kluka, D. A. (1999). *Motor behavior: From learning to performance.* Englewood, CO: Morton Publishing Company.

Knight, C. J., Boden, C. M., & Holt, N. L. (2010). Junior tennis players' preferences for parental behaviours. *Journal of Applied Sport Psychology*, *22(*4), 377-391.

Kolt, G., & Capaldi, R. (2001). Why do children participate in tennis? *ACHPER Healthy Lifestyles Journal*, *48*(2), 9-13.

Kovacs, M., Pluim, B., Groppel, J., Crespo, M., Roetert, P., Hainline, B., ……..Jones, T. (2016). Health, Wellness and Cognitive Performance Benefits of Tennis. *Journal of Medicine and Science in Tennis*, 14-21.

Kretchmar, R. S. (2005). Why do we care so much about games? *Quest*, *57*, 181-191.

Lam, W., Maxwell, J., & Masters, R. (2010). Probing the allocation of attention in implicit (motor) learning. *Journal of Sports Science, 28,* 1543-1554.

Launder, A. (2001). *Play practice: The Games Approach to teaching and coaching sport*. Champaign, IL: Human Kinetics.

Lawn Tennis Association. (2015). *Mini-tennis*. Retrieved from http://www.lta.org.uk/LTA-Mini-Tennis/.

Lee, M. J. (1999). *Coaching children in sport*. New York: Spon Press.

Lee, M. J., & Austin, H. (1988). *Dimensions of coaching behaviour in children's sport*. Report to the Research Committee of the National Coaching Foundation. Leeds, Yorkshire, England.

Lee, M. J., & Cockman, M. J. (1991). *Ethical issues in sport III: Emergent values among youth football and tennis players.* Report to the Sports Council Research Unit, Tavistock Place, London, England.

Liao, C., & Masters, R. (2001). Analogy learning: A means to implicit motor learning. *Journal of Sports Science, 19*, 307-319.

Lopes, V., Rodrigues, L., Maia, J., & Malina, R. (2011). Motor coordination as predictor of physical activity in childhood. *Scandinavian Journal of Medicine Sports Science*, *21*, 669-996.

Loy, J. (1968). The nature of sport: A definitional effort. *Quest*, *10*, 1–15.

MacNamara, A., Button, A., & Collins, D. (2010). The role of psychological characteristics in facilitating the pathway to elite performance. Part 1: Identifying mental skills and behaviours. *The Sport Psychologist*, *24*, 52-73.

Magill, R. (1998). Knowledge is more than we can talk about: implicit learning in motor skill acquisition. *Research Quarterly for Exercise and Sport, 69*, 104-110.

Malina, R. (2008a). Skill acquisition in childhood and adolescence. In H. Hebestreit & O. Bar-Or (Eds.), *The young athlete: The encyclopedia of sports medicine XIII* (pp. 96-111). Malden, MA: Blackwell Publishing.

Malina, R. (2008b). Biocultural factors in developing physical activity levels. In A. L. Smith & S. J. H. Biddle (Eds.), *Youth physical activity and sedentary behavior: Challenges and solutions* (pp.141-166). Champaign, IL: Human Kinetics.

Malina, R. (2010a). Top ten research questions related to growth and maturation of relevance to physical activity, performance, and fitness. *Research Quarterly for Exercise and Sport, 85*, 157-173.

Malina, R. (2010b). Early sport specialization: Roots, effectiveness, risks. *Current Sports Medicine Reports, 9*, 364-371.

Martens, R. (1986). Youth sport in the USA. In M.R. Weiss & D. Gould (Eds.), *Sport for Children and Youths* (pp. 27-35). Champaign, IL: Human Kinetics.

Martens, R. (1988). Helping children become independent, responsible adults through sports. *Competitive sports for children and youth* (pp. 297-307). Champaign, IL: Human Kinetics.

Martens, R. (2012). *Successful Coaching* (4th ed.). Champaign, IL: Human Kinetics.

Marchionini, G. & Teague, J. (1987). Elementary students' use of electronic information services: an exploratory study. *Journal of Research on Computing in Education, 20*, 139-155.

Masters, R. (1992). Knowledge, nerves and know-how-the role of explicit versus implicit knowledge in the breakdown of a complex motor skill under pressure. *British Journal of Psychology*, *83*, 343-358.

Masters, R., & Maxwell, J. (2004). Implicit motor learning, reinvestment and movement disruption: what you don't know won't hurt you? In A. Williams & N. Hodges (Eds.), *Skill acquisition in sport: research, theory and practice* (pp. 207-208). London, UK: Routledge.

Masters, R., & Poolton, J. (2012). Advances in implicit motor learning In N. Hodges, A. Williams (Eds.). *Skill acquisition in sport: research, theory and practice* (2nd ed.), (pp. 59-75). London: Routledge.

Masters, R., Poolton, J., & Maxwell, J. (2008). Stable implicit motor processes despite aerobic locomotor fatigue. *Conscious Cognition*, *17*, 335-338.

Mason, J. (2002). *Qualitative Research (*2nd ed.). New York: Sage Publications.

Maxwell, J., Masters, R., Kerr, E., & Weedon, E. (2001). The implicit benefit of learning without errors. *Quarterly Journal Experiential Psychology*, *54*, 1049–1068.

McCarthy, P., Jones, M., & Clark-Carter, D. (2008). Understanding enjoyment in youth sport: A developmental perspective. *Psychology of Sport and Exercise, 9*, 142-156.

McPherson, G. E. (1997). Giftedness and talent in music. *The Journal of Aesthetic Education, 31*(4), 65-77.

Mehta, R., & Pallis, J. (2001). The aerodynamics of a tennis ball. *Sports Engineering, 4(*4), 177-189.

Merriam, S. (2001). *Qualitative research and case study application in education*. Hoboken, NJ: Jossey-Bass.

Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: an expanded sourcebook*, (2nd ed.). California: Sage.

Miley, D. (2007). Tennis...Play and stay. *ITF Coaching & Sport Science Review*, *42*, 2-3.

Miller, A.T. (1985). A developmental study of the cognitive basis of performance impairment after failure. *Journal of Personality and Social Psychology*, *49*, 529-538.

Mohamed, H., Vaeyens, R., Matthys, S., Multael, M., Lefevre, J., Lenoir, M., & Philippaerts, R. (2009). Anthropometric and performance measures for the development of a talent detection and identification model in youth handball. *Journal of Sport Sciences, 27*(3), 257-266.

Molinero, O., Salguero, A., Alvarez, E., & Marquez, S. (2010). Reasons for dropout in youth soccer: A comparison with other team sports. *European Journal of Human Movement, 22,* 21-30.

Morgan, K. (2016). Reconceptualizing Motivational Climate in Physical Education and Sports Coaching: An Interdisciplinary Perspective. *Quest*, *69*(1), 95-112.

Mouly, G. (1978). *Educational Research: The Art and Science of Investigation*. Boston: Allyn and Bacon.

Newell, K. (1986). Constraints on the development of coordination. In M. Wade & H. Whiting (Eds.), *Motor development in children: Aspects of coordination and control* (pp. 341-360). Boston, MA: Martinus Nijhoff.

Nicholls, J.G. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.

Nicholls, J., & Miller, A.T. (1984). Development and its discontents: The differentiation of the conceptions of ability. In J. Nicholls (Ed.), *Advances in motivation and achievement Vol. 3: The development of achievement motivation* (pp. 185-218). Greenwich, CT: JAI Press.

Ntoumanis, N., & Biddle, S. (1999). A review of psychological climate in physical activity settings with specific reference to motivation. *Journal of Sport Science, 17*, 643-665.

Omli, J., & LaVoi, N. (2009). Background anger in youth sport: A perfect storm? *Journal of Sport Behaviour*, *32*, 242-260.

Pankhurst, A. (2013). How tennis players learn motor skills: Some considerations. *ITF Coaching & Sports Science Review, 60*, 6-7.

Pankhurst, A. (2016). 10U Tennis: The essentials of developing players for the future. In A. Colvin & J. Gladstone (Eds.). *The Young Tennis Player* (pp. 1-16). Switzerland: Springer International Publishing.

Pankhurst, A., & Collins, D. (2015). Talent Identification and development: The need for coherence between research, system, and process. *Quest, 65*(1), 83-97.

Pearson, N. (2009, June 22). Britain's tennis superbrats and their over-pushy parents. *The Times*, pp. 4.

Pellett, T., Henschel-Pellett, H., & Harrison, J. (1994). Influence of ball weight on junior high school girls' volleyball performance. *Perceptual Motor Skills*, *78*, 1379-1384.

Penney, D., & Clarke, G. (2005). Inclusion in sport education. In D. Penney, G. Clarke, M. Quill, & G. Kinchin (Eds.), *Sport Education: Research-based practice* (pp. 41-54). London, UK: Routledge.

Pitts, J.M. (1994). *Personal understandings and mental models of information: a qualitative study of factors associated with the information-seeking and use of adolescents*, PhD Thesis, Florida State University.

Polit, D.F., Beck, C.T., & Hungler, B.P. (2001). *Essentials of nursing research methods, appraisal, and utilization*, (5^{th} ed.). Philadelphia: Lippincott.

Poolton, J., Masters, R., & Maxwell, J. (2007). Passing thoughts on the evolutionary stability of implicit motor behaviour: Performance retention under physiological fatigue. *Consciousness Cognition, 16*, 456-68.

Powell, B. (1990). *Children's perceptions of classroom goal orientation: Relationship of learning strategies and intrinsic motivation* (Unpublished master's thesis). University of Illinois, Champaign-Urbana, IL.

Ramsden, P. (2003). *Learning to teach in higher education*. (2nd ed.). New York: Routledge.

Reeves, C., Nicholls, A., & McKenna, J. (2009). Stressors and coping strategies among early and middle adolescent premier league academy soccer players: Differences according to age. *Journal of Applied Sport Psychology, 21*, 31-48.

Regimbal, C., Deller, J., & Plumpton, C. (1992). Basketball size as related to children's preference, rated skill and scoring. *Perceptual Motor Skills, 75,* 867-872.

Riethmuller, A., Jones, R., & Okely, A. (2009). Efficacy of interventions to improve motor development in young children: A systematic review. *Pediatrics, 124,* 782-792.

Roberts, G.C. (1984). Achievement motivation in children's sport. In J. Nicholls (Ed.), *The development of achievement motivation* (pp. 251-281). Greenwich, CT: JAI Press.

Roberts, G., Treasure, D., & Conroy, D. (2007). Understanding the dynamics of motivation in sport and physical activity: an achievement goal interpretation. In G. Tenenbaum & R. Eklund (Eds.), *Handbook of Sport Psychology* (3rd ed.), (pp. 3-30). Hoboken, NJ: John Wiley.

Rossman, G., & Rallis, S. (2012). *The research journey: Introduction to inquiry*. New York: The Guildford Press.

Russell, J., Martindale, P., Collins, D., & Daubney, J. (2005). Talent development: A guide for practice and research within sport. *Quest, 57*(4), 353-375.

Sanchez-Miguel, P.A., Leo, F.M., Sanchez-Oliva, D., Amado, D., & Garcia-Calvo, T. (2013). Parents' behaviour in their children's enjoyment and a motivation in sports. *Journal of Human Kinetics, 36,* 169-177.

Satern, M., Messier, S., & Keller-McNulty, S. (1989). The effect of ball size and basket height on the mechanics of the basketball free throw. *Journal of Human Movement Studies, 16,* 123-137.

Scholder, M., & McGuire, R.T. (2007). *Coaching athletes: A foundation for success.* Los Angeles: LA 84 Foundation.

Scientific Software Development. (2017). ATLAS.ti Qualitative data analysis (Version 8) [Computer Software]. Retrieved from http://atlasti.com/

Sfard, A. (1998). On two metaphors for learning and the dangers of choosing just one. *Educational Researcher, 27*(2), 4-13.

Shenton, A.K. (2004). Strategies for ensuring trustworthiness in qualitative research projects. *Education for Information, 22,* 63-75.

Shields, D., Bredemeier, B., LaVoi, N., & Power, C. (2005). The behaviour of youth, parents, and coaches: The good, the bad, and the ugly. *Journal of Research in Character Education, 3*(1), 43-59.

Shumway-Cook, A., & Woollacott, M. (2001). *Motor control: Theory and practical applications*. (2nd ed.). Baltimore: Lippincott Williams & Wilkins.

Smith, M. (2010). *Research methods in sport*. London: Learning Matters.

Smoll, F., & Smith, R. (1979). Coach effectiveness training: A cognitive behavioural approach to enhancing relationship skills in youth sport coaches. *Journal of Sport Psychology, 1,* 59-74.

Stein, G., Raedeke, T., & Glenn, S. (1999). Children's perspective of parent sport involvement: It's not how much, but to what degree that's important. *Journal of Sport Behaviour, 22,* 1-8.

Stokes, S. (2002). Visual literacy in teaching and learning: A literature perspective. *Electronic Journal for the Integration of Technology in Education, 1*(1), 10-19.

Suits, B. (2007). The elements of sport. In W. J. Morgan (Ed.), *Ethics in sport* (pp. 9-19). Champaign, IL: Human Kinetics.

The Aspen Institute. (2015). Sport for All Play for Life: A Playbook to get every kid in the game. Washington D.C.: The Aspen Institute.

Tennis, J. T. (2008). Epistemology, Theory, and Methodology in Knowledge Organization: Toward a Classification, Metatheory, and Research Framework. *Knowledge Organization, 35,* 102-112.

Tennis Canada, (2015). *Progressive tennis-innovation in junior development*. Retrieved from http://www.tenniscanada.com/files/Innovation%20in%20Junior%20Development%20EN.pdf

Thomas, J.R., Nelson, J.K., & Silverman, S.J. (2005). *Research methods in physical activity*. (5th ed.). Champaign, IL: Human Kinetics.

Thomason, M., Race, E., Burrows, B., Whitfield-Gabrieli, S., Glover, G., & Gabrieli, J. (2009). Development of spatial and verbal working memory capacity in the human brain. *Journal of Cognitive Neuroscience*, *21*(2), 316-332.

Timmerman, E., de Water, J., Kachel, K., Reid, M., Farrow, D., & Savelsbergh, G. (2014). The effect of equipment scaling on children's sport performance: The case for tennis. *Journal of Sports Science, 33*(10), 1-8.

Tofler, I., Knapp, P., & Drell, M. (1999). The "achievement by proxy" spectrum: Recognition and clinical response to pressured and high-achieving children and adolescents. *Journal of American Academic Child Adolescence Psychiatry, 38*(2), 213-216.

Tofler, I., Knapp, P.K., & Larden, M. (2005). Achievement by proxy distortion in sports: A distorted mentoring of high achieving youth. *Clinical Sports Medicine, 24*(4), 805-828.

Unierzyski, P. (2006). Foundations for tennis talent identification and player development tennis programs. *ITF Coaching and Sport Science Review, 39*, 3-5.

United States Olympic Committee, (2017). *Quality Coaching Framework*. Champaign, IL: Human Kinetics.

United States Tennis Association, (2015). *10-and-Under Tennis Competencies*. Retrieved from http://www.usta.com/About-USTA/Player-Development/10_and_under_tennis_competencies_instruction/

Ur, P. (1999). *A course in language teaching*. Cambridge, UK: Trainee Book.

Vaeyens, R., Güllich, A., Chelsea, R., & Philippaerts, R. (2009). Talent identification and promotion programmes of Olympic athletes. *Journal of Sports Sciences, 27*(13), 1367-1380.

Van de Pol, P., & Kavussanu, M. (2011). Achievement goals and motivational responses in tennis: Does the context matter? *Psychology Sport Exercise, 12*(2), 176-183.

Vickers, J. (2007). *Perception, cognition, and decision training*. Champaign, IL: Human Kinetics.

Vickers, J. (2008). Skill acquisition: Designing optimal learning environments. In D. Collins, A. Button, & H. Richards (Eds.), *Performance psychology: A practitioner's Guide* (pp. 191-206). Oxford, UK: Churchill Livingstone.

Vidoni, C., & Ward, P. (2009). Effects of fair play instruction on student social skills during a middle school sport education unit. *Physical Education and Sport Pedagogy*, *14*(3), 285-310.

Vincent, W. (2005). *Statistics in Kinesiology* (3rd ed.). Champaign, IL: Human Kinetics.

Visek, A., Harris, B., & Blom, L. (2013). Mental training with youth sport teams: Developmental considerations and best-practice recommendations. *Journal of Sport Psychology*, *4*(1), 45-55.

Ward, P., Hodges, N. J., Starkes, J. L., & Williams, A. M. (2007). The road to excellence: Deliberate practice and the development of expertise. *High Ability Studies*, *18* (2), 119-153.

Watson, L. (2003). *Lifelong learning in Australia.* Canberra: Commonwealth of Australia.

Weinberg, R., & Gould, D. (2015). *Foundations of sport and exercise psychology*. (6th ed.). Champaign, IL: Human Kinetics.

Weiss, M., & Duncan, S. (1992). The relationship between physical competence and peer acceptance in the context of children's sport participation. *Journal of Sport and Exercise Psychology*, *14*(2), 177-192.

Weiss, M., & Ferrer-Caja, E. (2002). Motivational orientations and sport behaviour. In T. Horn (Ed.), *Advances in sport psychology* (pp. 101-184). Champaign, IL: Human Kinetics.

Weiten, W. (2014). *Psychology: Themes and variations*. Andover, Hampshire: Cengage Learning.

Whitehead, J. (1990). Achievement orientations and sport persistence. *Journal of Sports Sciences, 8*(1), 87-88.

Wiersma, L., & Sherman, C. (2005). Volunteer youth sport coaches' perspectives of coaching education/certification and parental coaches of conduct. *Research Quarterly for Exercise and Sport, 76*, 324-338.

Wilson, S. (1989). *A study of women's achievement orientation in two types of sport*. (Unpublished master's dissertation). University of Warwick, UK.

Wilson, G., & Stacey, E. (2004). Online interaction impacts on learning: Teaching the teachers to teach online. *Australasian Journal of Educational Technology, 20*(1), 33-48.

Winter, G. (1980). *A child is not a little adult: Modified approaches to sport for Australian children*. Hobart, Australia: Division of Recreation, Education Department, and Tasmanian State Schools Sports Council.

Wolpert, D., Ghahramani, Z., & Flanagan, J. (2001). Perspectives and problems in motor learning. *Trends in Cognition Science, 5*, 487-494.

Wrotniak, B., Epstein, L., Dorn, J., Jones, K., & Kondilis, V. (2006). The relationship between motor proficiency and physical activity in children. *Pediatrics, 108*, 1758-1765.

Zhu, F., Poolton, M., Wilson, M., Maxwell, J., & Masters, R. (2011). Neural co-activation as a yardstick of implicit motor learning and the propensity for conscious control of movement. *Biological Psychology*, *87,* 66-73.

APPENDICES

Appendix A: Approval letter to conduct interviews at USTA National Campus.

15 March 2017

University of Pretoria: The Research Proposal and Ethics Committee (Faculty of Humanities)

The United States Tennis Association National Campus gives Mr. Karl Davies full permission to attend our scaled tennis equipment clinics that are staged at our facility, in his research of understanding the perceptions of players, parents, and coaches of a scaled tennis equipment program.

We are happy to work with Mr. Davies and provide him the necessary assistance in obtaining the data he needs to analyse. Mr, Davies is permitted to attend any scaled tennis equipment training sessions and able to interview the players, and parents, attending each session, as long as prior approval is sought and that the actual interview does not interrupt the overall flow of the session.

Kind Regards

Rita Gladstone
Head Tennis Professional

Appendix B: Approval letter to conduct interviews at USTA EDC Camps.

1st May 2017

University of Pretoria: The Research Proposal and Ethics Committee (Faculty of Humanities)

The United States Tennis Association (USTA) Player Development Department gives Mr. Karl Davies full permission to use the Early Development Camps (EDC) that are staged around the United States of America, in his research of understanding the perceptions of players, parents, and coaches of a scaled tennis equipment program.

We are happy to work with Mr. Davies and provide him the necessary assistance in obtaining the data he needs to analyze. Mr, Davies is permitted to attend an EDC camp within proximity of his home base and will be able to interview the players, parents, and coaches attending each camp, as long as it does not interrupt or disturb the flow of the camp.

Any further information or clarification required I would be more than happy to assist.

Kind Regards

Kent Kinnear
Director Player Identification and Development

Appendix C: Adult consent form.

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities
Department of Sport and Leisure Studies

Adult Consent Form

You are invited to participate in a research study conducted by Karl Davies, a doctoral student, from the UNIVERSITY OF PRETORIA (Humanities Department). This research is hoping to explore the experiences of players, parents, and coaches in a scaled tennis equipment program. You were selected as a parent or coach as a possible participant in this study because of your participation in a scaled tennis equipment program.

If you decide to participate, that will involve no more than 10 general questions, and take no longer than 30 minutes. Our conversation will be videoed and the researcher will also be taking notes, to obtain the appropriate data for this research.

We foresee no risks, or discomforts that you might endure, as you will only be reflecting on your scaled tennis equipment experiences. It is anticipated that you will not receive any personal benefit from participating in this interview. However, the information gathered will be of tremendous value to this research, and potentially dictate scaled tennis equipment programming worldwide.

Any information that is obtained in connection with this study and that can be identified with yourself will remain confidential, and will be disclosed only with your permission or as required by law. Subject identities will be kept confidential by the researcher, by assigning a letter Pa, or C, and a number to each participant. Once the interview is concluded your identity will be safeguarded and the information you will provide to each question.

This study has no funding and therefore is not bound by any organization, to share the information obtained in this research.

LC de Villiers Sports Grounds
Sports Centre, Room 2-14
University of Pretoria, Private Bag X20
Hatfield, 0028, South Africa
Tel: +27 (0)12 420 6039 / 3685
Email: lourens.human@up.ac.za
Web: www.up.ac.za/sport-leisure-studies

Fakulteit Geesteswetenskappe
Departement Sport- en Vryetydstudies

Lefapha la Bomotho
Kgoro ya Dithuto tša Dipapadi le Boitapološo

Your participation is voluntary. Your decision whether or not to participate will not affect you or your child's relationship with the United States Tennis Association. If you decide to participate, you are free to withdraw your consent and discontinue participation at any time without penalty.

If you have any questions about the study, please feel free to contact Karl Davies, Cell (407) 868-1691, email- karlmd17@gmail.com, 9278 Reymont st., Orlando, FL 32827. The supervisor of this research is Dr. Gerrie Van Wyk and his email address is Jgu.VanWyk@up.ac.za

Your signature indicates that you have read and understand the information provided above, that you willingly agree to participate, and you may withdraw your consent at any time, and discontinue participation without penalty, that you will receive a copy of this form, and that you are not waiving any legal claims.

_____ (Signature)

_____(Date)

Faculty of Humanities
Department of Sport and Leisure Studies
Fakulteit Geesteswetenskappe
Departement Sport- en Vryetydstudies
Lefapha la Bomotho
Kgoro ya Dithuto tsa Dipapadi le Boikhutso

Appendix D: Minor consent form

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities
Department of Sport and Leisure Studies

Minor Assent form

Your child is invited to participate in a research study conducted by Karl Davies, a doctoral student from the UNIVERSITY OF PRETORIA (Humanities department). This research is hoping to explore the experiences of players, parents, and coaches in a scaled tennis equipment program. Your child was selected as a possible participant in this study because of their participation in a scaled tennis equipment program.

If you decide to allow your child to participate, that will only involve four general questions, and take no longer than 15 minutes. Our conversation will be videoed and the researcher will also be taking notes, to obtain the appropriate data for this research.

We foresee no risks, or discomforts that your child might endure, as they will only be reflecting on their scaled tennis equipment experiences. It is anticipated that your child will not receive any personal benefit from participating in this interview. However, the information gathered will be of tremendous value to this research, and potentially dictate scaled tennis equipment programming worldwide.

Any information that is obtained in connection with this study and that can be identified with your child will remain confidential, and will be disclosed only with your permission or as required by law. Subject identities will be kept confidential by the researcher, by assigning a letter P and a number to each participant. Once the interview is concluded the identity of your child will be safeguarded, and the information he or she will provide to each question.

This study has no funding and therefore is not bound by any organization, to share the information obtained in this research.

Your child's participation is voluntary. Your decision whether or not to allow your child to participate will not affect your child's relationship with the United States Tennis Association. If

LC de Villiers Sports Grounds
Sports Centre, Room 2-14
University of Pretoria, Private Bag X20
Hatfield, 0028, South Africa
Tel: +27 (0)12 420 6039 / 3685
Email: lourens.human@up.ac.za
Web: www.up.ac.za/sport-leisure-studies

Fakulteit Geesteswetenskappe
Departement Sport- en Vryetydstudies

Lefapha la Bomotho
Kgoro ya Dithuto tša Dipapadi le Boitapološo

you decide to allow your child to participate, you and/or your child are free to withdraw your consent, and discontinue participation at any time without penalty.

If you have any questions about the study, please feel free to contact Karl Davies, Cell (407) 868-1691, email karlmd17@gmail.com, 9278 Reymont st., Orlando, FL 32827. The supervisor of this research is Dr. Gerrie Van Wyk and his email address is Jgu.VanWyk@up.ac.za.

Your signature indicates that you have read and understood the information provided above, that you willingly agree to allow your child to participate, that you and/or your child may withdraw your consent at any time and discontinue participation without penalty, that you will receive a copy of this form, and that you are not waiving any legal claims.

_____ (Signature)

_____(Date)

Faculty of Humanities
Department of Sport and Leisure Studies
Fakulteit Geesteswetenskappe
Departement Sport- en Vryetydstudies
Lefapha la Bomotho
Kgoro ya Dithuto tsa Dipapadi le Boikgafo

Appendix E: Invitation letter to conduct interview

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Humanities
Department of Sport and Leisure Studies

Plain English language statement/Letter of Invitation

Dear Sir / Madam,

My name is Karl Davies and I am currently involved in an approved doctorate research program, through the University of Pretoria that is being supervised by Dr. Gerrie Van Wyk. The research I am undertaking is looking into the perceptions of tennis players, their parents and coaches on their experiences, as they navigate the three stages of a scaled tennis equipment program. The title of research proposal is;

Perceptions of players, coaches and parents on a scaled tennis equipment program

Apart from anecdotal reports, little is known about the effectiveness of a scaled tennis equipment program. It is hoped that this study will assist in providing a framework in scaled tennis equipment programming.

This study consists of interviewing players, parents and coaches involved in a scaled tennis equipment program in reaching the objectives of this research. Interviews will be scheduled face to face with players, coaches, and parents. The interviews with the parents and coaches will be approximately 30 minutes in length, and with the players approximately 15 minutes in length (or longer if you wish to share additional insights and information). All the information you share during this study will be treated in the strictest confidence.

LC de Villiers Sports Grounds
Sports Centre, Room 2-14
University of Pretoria, Private Bag X20
Hatfield, 0028, South Africa
Tel: +27 (0)12 420 6039 / 3685
Email: lourens.human@up.ac.za
Web: www.up.ac.za/sport-leisure-studies

Fakulteit Geesteswetenskappe
Departement Sport- en Vryetydstudies

Lefapha la Bomotho
Kgoro ya Dithuto tša Dipapadi le Boitapološo

If you have any questions about this study, please do not hesitate to contact me at [karlmd17@gmail.com], 407-868-1691.

Yours sincerely,

Karl Davies

Faculty of Humanities
Department of Sport and Leisure Studies
Fakulteit Geesteswetenskappe
Departement Sport- en Vryetydstudies
Lefapha la Bomotho
Kgoro ya Dithuto tša Dipapadi le Boiketlo

Appendix F: Questions to players.

1. What is your favourite thing to do when you play tennis with your coach?
2. What is fun about playing tennis with your coach?
3. What did you like to do when playing tennis without your coach (who do you play with)?
4. What do you like the most about your racquet, court, and balls when playing tennis?

Appendix G: Questions to parents.

1. What makes you think a scaled tennis equipment program was of value for coaching your child?
2. Do you think your child did well when using scaled equipment? Why?
3. What do you think they could improve on from their use of scaled equipment? How?
4. In your opinion, what was your child's best experience when using scaled equipment?
5. In your opinion, what was your child's worst experience when using scaled equipment?
6. What are your overall perceptions of a scaled tennis equipment program, positive and/or negative? Why?
7. What was your child's feedback to you on scaled equipment?

Appendix H: Questions to coaches.

1. How long have you been involved in coaching children?
2. How long have you been using scaled equipment in your coaching?
3. What is your basic teaching methodology or coaching approach when using scaled tennis equipment?
4. Are your coaching approaches in scaled equipment different to non-scaled equipment?
5. How do you introduce your training activities to your players?
6. How do you keep your players engaged in their practices?
7. Do you agree with the current USTA recommendations for red, orange, and green scaled tennis equipment play and competitions? Why or why not?
8. What are your overall perceptions of a scaled tennis equipment program, positive and/or negative? Why?
9. How did you experience the players using scaled equipment in the different stages?