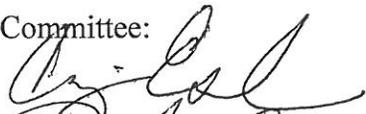
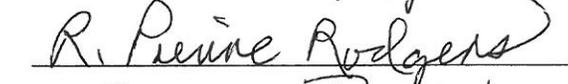
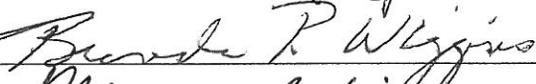


EFFECTS OF INDIVIDUAL OR GROUP TRAINING AND ANXIETY FOR YOUTH
BASKETBALL PLAYERS' SKILL DEVELOPMENT

by

John Ennis
A Project
Submitted to the
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of
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The Requirements for the Degree
of
Master of Science
Sport and Recreation Studies

Committee:

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Effects of Individual or Group Training and Anxiety for Youth Basketball Players' Skill
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Summer Semester 2013
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DEDICATION

This is dedicated to my loving parents, John and Cecilia; my accomplished sisters, Jill and Christine; my caring girlfriend, Amanda; my determined bosses, Alex and Mandy; and my dog Cooper.

ACKNOWLEDGEMENTS

I would like to thank my family, friends, and supporters who have made this happen, especially my loving parents and girlfriend for motivating me with my research. My Advisor, Professor Esherick, and Drs. Baker and Rodgers of my committee were of invaluable help. Finally, thanks go out to George Mason University for providing me with the opportunity to further my education and grow into the person I have become today.

TABLE OF CONTENTS

	Page
List of Tables	vii
List of Figures	viii
Abstract	ix
Chapter One	1
Problem Statement	1
Definitions	2
Purpose of Study	2
Hypotheses	3
Limitations	3
Conclusion.....	4
Chapter Two.....	6
Literature Review	6
Why Does Experience Matter?	7
Training Individually.....	8
Group Training.....	11
Sport Competition Anxiety Test	13
Conclusion.....	14
Chapter Three.....	15
Methodology	15
Instrumentation.....	16
Research Design	16
Data Collection.....	21
Chapter Four	23
Results	23
Chapter Five.....	29
Conclusion.....	29

Summary of Procedures	29
Implications for Practice	30
Summary of Major Findings	30
Recommendations for Future Study.....	31
Appendices.....	32
References.....	36

LIST OF TABLES

Table	Page
Table 1 SCAT Scores And Total Average Improvement	25
Table 2 Group Versus Individual Total Average Improvement	25
Table 2a t-test Comparing Improvement In Scores Between Individual and Group Subjects	26
Table 3 Experienced Versus Inexperienced Total Average Improvement	26
Table 3a t-test Comparing Improvement In Scores Between Experience and Inexperienced Subjects	27
Table 4 Group Versus Individual Total Average Improvement for Inexperienced Subjects	27
Table 5 Group Versus Individual Total Average Improvement for Experienced Subjects	28
Table 6 Comparison of Total Average Improvement for All Subjects.....	28

LIST OF FIGURES

	Page
Table	
Figure 1 Inverted –U Hypothesis Model	10
Figure 2 Catastrophe Theory Model	12

ABSTRACT

EFFECTS OF INDIVIDUAL OR GROUP TRAINING AND ANXIETY FOR YOUTH BASKETBALL PLAYERS' SKILL DEVELOPMENT

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George Mason University, 2013

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The purpose of this study is to determine, based on experience level, if group or individual training will be more effective for youth and high school basketball players. This research is being conducted because youth basketball is a critical time for players to develop fundamental skills and prepare themselves to make a high school team. This information will be valuable to basketball trainers or coaches as it may contribute to the improvement and success of their own players and teams. Furthermore, the foundation of this research derives from these research questions: How will training in an individual setting affect a player who has little to no experience with basketball? How will training in a group setting affect a player who is already experienced with basketball? The procedural technique for this study is an experimental design with the use of the Sport Competition Anxiety Test. Testing occurred during the first and tenth week and subjects trained once a week for eight weeks in between testing. All subjects were instructed to take the SCAT immediately prior to testing. Tests consist of Mikan series, stationary

dribbling, shooting ladder, dribble weave, passing at target, attacking the gaps, lane slides, push-ups, and free throws. The 60 subjects in this study were selected via the probability method of stratified random sampling.

CHAPTER ONE

Problem Statement

Throughout the world today, popularity and participation in sports is growing rapidly (Hecimovich, 2004). Sports help keep youths physically active and also provide a good environment for the individual to grow socially due to social comparison which can create further arousal (Weinberg and Gould, 2011). Due to this steady increase in popularity, sports have become more competitive. We live in a world that is driven by people who strive to be the best. This is especially true in the world of sports. Many coaches place such a heavy emphasis on winning instead of developing young athletes the correct way. If coaches focused more on proper development, it is likely winning will become easier (Martens, 2012). There are now many ways athletes are improving their skills, such as playing one sport year-round, playing for more than one team at a time, attending camps and clinics, and receiving specialized training. All of these are potential ways for athletes to improve their skills and athletic performance.

Every player is different and will master certain skills at different speeds. It may take more time for someone who is new to the game to be able to make five free throws in a row than it would for someone who has been playing for a few years. The player who is new to the game may need instruction on shooting form fundamentals whereas the experienced player may already know that information. Additionally, a more

experienced player will be able to handle certain drills that involve game-like situations while the new player is still learning basic skills such as dribbling and passing. During specialized training, players train either individually or with a group, which raises a key research question: “Based on experience level, will group or individual training be more beneficial for skill development to youth and high school basketball players?”

Definitions*

Specialized training – year-round training for a single sport

Diversified training – year-round training for multiple sports

Individual training – only one player in training sessions

Group training – more than one player in training sessions

Experienced player – must have played organized basketball for at least three years or have received specialized training for at least one year

Purpose of Study

The purpose of this study is to determine, based on experience level, what type of training is more effective for youth and high school basketball players’ skill development. This research is being conducted because youth basketball is a critical time for players to develop fundamental skills and prepare themselves to compete for a spot on a high school team. This information will be valuable to basketball trainers or coaches as it may contribute to the improvement and success of their own players and teams. One example of why this is valuable for a trainer is to know when a player should be training individually, and when he or she should be training with a group. Unique players may

*All of these terms have been defined by the author specifically for this research.

have similar struggles such as shooting form or ball handling, but experience level is a large determining factor when assessing what type of training is best for the player.

Another example is for a coach who has some players who are developing properly and others who are not. Learning certain skills, such as dribbling or shooting, will vary per athlete based on experience level, and so will other aspects of training or practice such as terminology, which must be learned as well. Being able to apply the research from this study and determine what type of training or practice techniques for certain players may help improve a team as a whole.

Hypotheses

Based on the review of literature, the following hypotheses were proposed:

Hypothesis 1:

Individual training will be more beneficial than group training based on skill development for those with little to no experience playing basketball.

Hypothesis 2:

Group training will be more beneficial than individual training based on skill development for those with experience playing basketball.

Hypothesis 3:

Subjects with an average level of anxiety will improve, based on skill development, more than low and high level of anxiety subjects.

Limitations

The first limitation of this study is the ability to draw conclusions from a sample size about a larger population. The sample size must be large enough and all of the

subjects must be selected at random to draw the most accurate conclusions. Another limitation is the perception of instruction or feedback by the athletes and the coaches' abilities to teach. Everyone learns differently and at a different rate. Validity is another limitation because an original data collection form was not used. The SCAT (Martens, 1977) provides this research with validity because of its use in prior researches, and reliability because all of the subjects took the test under the same conditions in the same facility. One very important limitation during this research was attendance. This study did encounter 9 subjects who were absent for at least one training session and 6 subjects who had to drop out due to scheduling conflicts or injury/illness. Another limitation is the possibility that the subjects encountered some external, unrelated experience that could alter their performance, or they could simply have an "on" or "off" day. The last limitation that is the most challenging is the ability to assess the subjects in a more game-like situation. While all of the skills the subjects improved upon are important, being able to translate them into a game-situation is of utmost importance.

Conclusion

Every player learns and develops in different ways and speeds. The purpose of this research is to determine, based on experience, whether group or individual training is more effective for youth and high school basketball players' skill development. The three hypotheses, individual training will be more beneficial than group training based on skill development for those with little to no experience playing basketball; group training will be more beneficial than individual training based on skill development for those with experience playing basketball; and subjects with an average level of anxiety will

improve, based on skill development, more than low and high level of anxiety subjects, were formulated from the research question stated above and the review of literature.

The review of literature (Chapter Two) will discuss effective strategies used in training athletes such as the relationship between experience levels and will to improve; training productivity/efficiency; arousal level and competitiveness; and sport competition anxiety.

Chapter Three will explain the methodology used throughout this research, such as the sample size and sampling bias; procedural technique; details of the drills; and the scoring system. In Chapter Four, the results of this current research are analyzed through the use of descriptive and inferential statistics. And Chapter Five discusses how the hypotheses are supported; the summary of procedures and findings; implications for future practice; and recommendations for future studies.

CHAPTER TWO

Literature Review

The focus of this investigation is to determine what type of training is more effective for youth and high school basketball players. In this review of related literature, pertinent research was examined on this given topic to develop an effective method of gathering information in order to determine if there is any significance between training individually or in a group based on experience level. Unfortunately, coaching and training athletes from this perspective is a subject that is under researched (Martin et al., 2009; Turman, 2003). This specific research is important to the sports world because people will always critically analyze the way people train, but may not always know what type of setting is best. Finding the most effective and beneficial training method will help maximize player improvement, which is the ultimate goal for youth and high school coaches and trainers.

This topic is important to the researcher who has played sports his entire life and still holds on to some of the things coaches and trainers have told him. It is important for coaches to be aware of the way they are coaching or training to help maximize improvements for the athletes with whom they work, which is why the focus on training setting based on experience was selected. Furthermore, the research gathered has been

organized by themes based on experience, individual training, and group training. These themes are then divided into subthemes consisting of specialized training, practice productivity, and competitiveness.

Why Does Experience Matter?

Specialized Training. One topic that is popular in the sports world today is youth and high school level athletes engaging in diversified and specialized training (Baker, 2003; Leite and Sampaio, 2012). According to Malina (2010), contributing factors for why specialized training has become increasingly popular may include a parent's desire to give his or her child an edge; labeling youth as talented at an early age; pursuit of scholarships and professional contracts; and the increase in expertise research improving the sporting services industry. While the concepts of diversified and specialized training pertain to the idea of one sport versus multiple sports, they can be further analyzed. When training for one sport, there are endless game-like scenarios that coaches and trainers try to emulate so the athletes can learn to familiarize themselves and be comfortable when executing the same situations in games. Coker (2005) states that acquiring certain fundamental skills require more attention and to detail and repetitions than others, meaning some situations can be taught more effectively training individually, such as shooting form and ball handling skills, while other situations can be taught more effectively with a group, such as facing pressure from a defender and making strong decisions with and without the ball in your hands. All of these skills can be developed in either setting, but the purpose of this research is to determine what is most beneficial for each athlete based on their experience level.

According to Harrist and Witt (2012), it is important for the trainers to develop quality experiences that promote beneficial development. Since sports participation consumes the greatest percentage of time for youth participating in structured voluntary activities, this time should be enjoyable as well. In addition, trainers should create positive developmental opportunities in which the athlete is capable of achieving. With that being said, Zeng (2003) argues that anxiety and self-confidence are considered to be two important psychological factors that influence athletic performance. Providing achievable obstacles to overcome anxiety will put athletes in a position to succeed, causing them to create positive experiences and build self-confidence at the same time.

When conducting research for the present study, subjects were compared to each other based on age and experience level. The reason for this is that excellent performance in sport has a strong positive relationship with the accumulated hours of practice (Goncalves et al., 2011). The will to reach excellence in performance can be considered as a condition to engage in more demanding practice. Experience level will be a key factor examined because while the experienced athletes may have a higher will to improve and reach peak performance, the inexperienced athletes may potentially improve quicker as they begin to apply newly learned information and techniques that the experienced athletes are already using.

Training Individually

Practice Productivity. Rink (2002) noted that the single most critical instructional variable for the development of skill proficiency is the amount of practice time an athlete spends at an appropriate level. Coker (2005) added to this by stating that

one major hindrance to maximizing the amount of time athletes are actively engaged in quality practice time is the “wait time” that results from limited equipment or facility space. This relates directly to basketball because, while basketballs are not expensive or hard to find, basketball hoops are far more expensive and are often very limited inside of facilities due to the special demands that they require. When training individually, the athlete is not forced to share a basketball or hoop with others resulting in more repetitions during the allotted practice time. Training individually eliminates “wait time” which is ultimately caused by a lack of equipment or space.

Increased “wait time” has a directly negative effect on arousal level (Coker, 2005). Athletes will get bored and struggle to retain information if there is too much time in between repetitions. Movahedi et al. (2007) discussed the Inverted-U hypothesis by Yerkes and Dodson which predicts that performance is best at a moderate optimal level and progressively worsens with either increases or decreases in arousal.

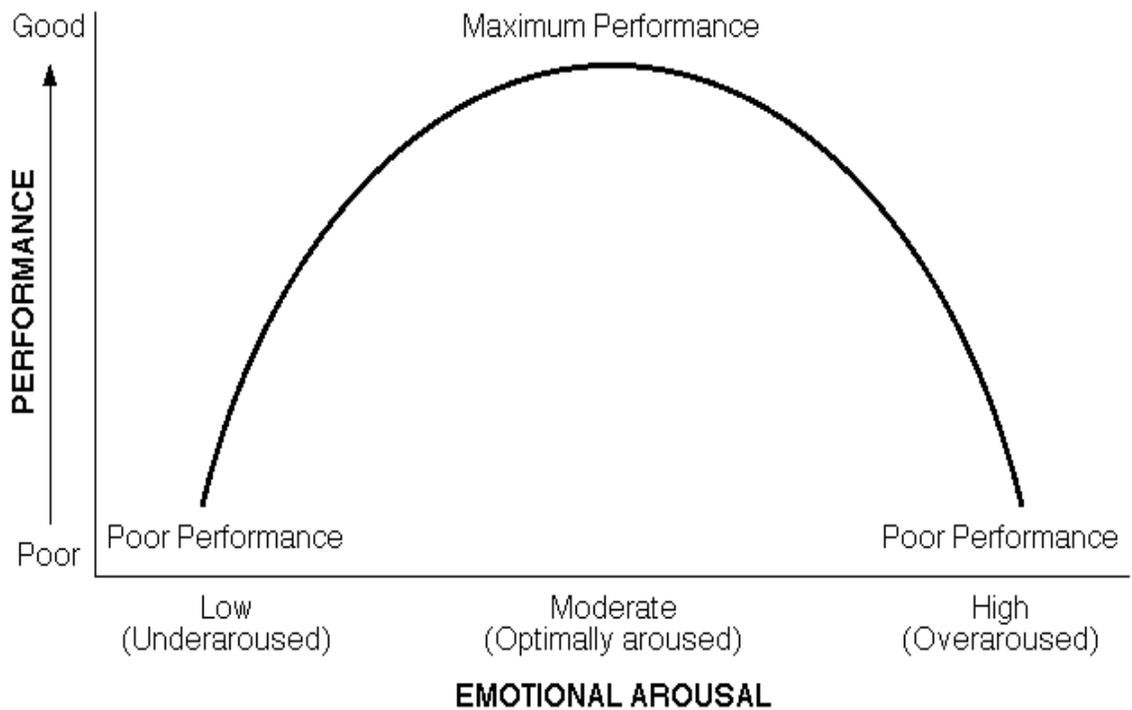


Figure 1

Training an athlete individually may be easier when it comes to “wait time,” but getting an athlete to maintain their optimal level of arousal without any competition may be difficult. Achieving this optimal level of arousal can positively impact an athletes’ ability to concentrate, which can lead to improvements in task performance. Individual training allows the athlete more time to focus on basic fundamentals first, such as shooting form, ball handling, and ability to use their weak hand. They also receive all of the trainers’ attention, minimizing the risk of learning bad habits. In addition to receiving all of the trainers’ attention, workouts will be geared specifically for that individual instead of focusing on what a group struggles on as a whole.

Group Training

Coker (2005) also mentions that creative solutions must be developed to resolve equipment and facility challenges in order to maximize the learners' activity time. Certain products have been invented to combat these hindrances in the basketball world, such as The Gun, a basketball shooting machine that rebounds and projects the ball back to the user. An invention such as this minimizes the amount of "wait time" in line when multiple athletes are training together by eliminating the need to rebound or pass after a shot. While this solution may not be the most inexpensive, it certainly maximizes activity time. Other creative solutions that are inexpensive consist of modifying drills that increase participation such as adding a rebounding or passing line, or using circuit training to ensure all subjects are active and get equal time for each skill being learned.

Competitiveness. While group training has the possibility of more "wait time" than individual training, which potentially leads to less prescribed fundamental training, being in a group allows for competitive drills. It is difficult for an inexperienced player to play "game-speed" and pretend they are beating their defender with each move they perform. It is also difficult to teach 1-on-1 or man-to-man defensive principles during individual sessions because there is no opponent to play against. Working in groups allows competition to occur and, therefore, more game-like situations from which to learn. According to Weinberg and Gould (2011), competition can also lead to increased arousal. It is common for coaches and trainers to see increased effort and production from athletes when an opponent is added, mainly because of the heavy emphasis many coaches place on winning.

Hardy and Fazey (1987) discussed the Catastrophe Theory by explaining how psychological arousal and cognitive anxiety past a certain point can cause immense stress on athletes and cause sudden drops in performance during competition, also known as a “choke.”

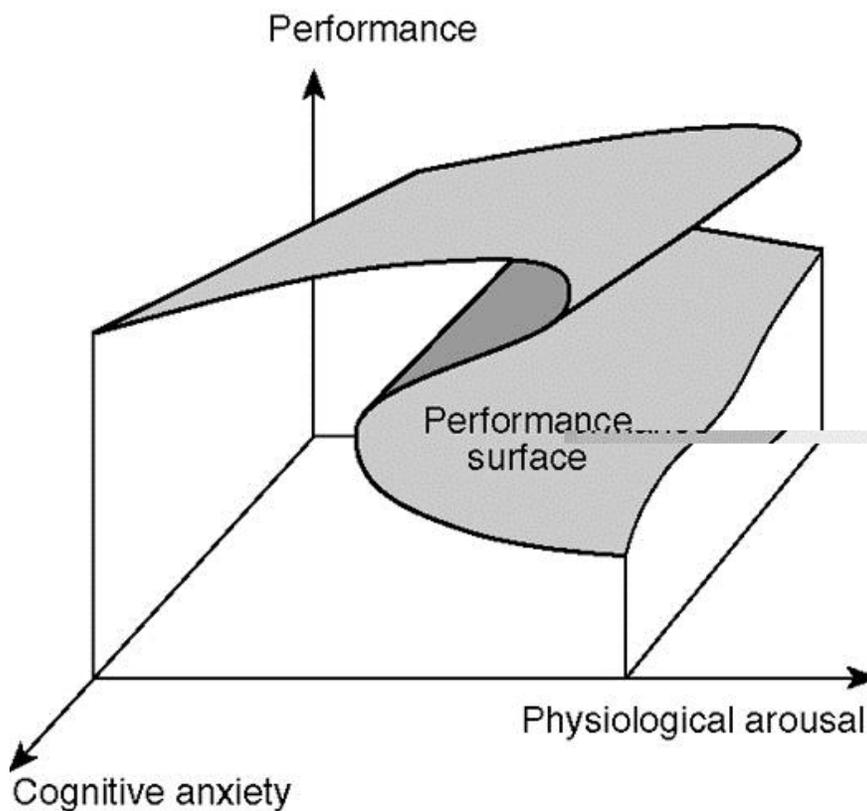


Figure 2

Given this direct correlation between arousal level and competition (Weinberg and Gould, 2011), training in a group setting is a good idea when trying to achieve peak athletic performance.

Competitiveness is not the only perk that group training provides; the ability to perform well in front of your peers teaches an individual to cope with anxiety and build self-confidence. There is also a mental side to basketball that needs to be developed, such as decision-making skills, problem solving, and ability to work and communicate with others. An athlete may be the best player on the team but will end up hurting the team if he or she cannot play well with others. It will be difficult to practice how to be a team player in an individual setting.

Sport Competition Anxiety Test

The Sport Competition Anxiety Test (Martens, 1977) is an instrument that is commonly used to assess how athletes feel in regards to their anxiety level during a competitive situation. The SCAT has been used by Marchant et al. (1998) and Kenow and Williams (1999) in their respective studies. The SCAT is a good indicator of competitive state anxiety as the questions are easy to understand, relate directly to the topic, and only takes a few minutes to complete. The test consists of 15 questions with a response scale of *rarely*, *sometimes*, or *often*. The scoring system for the responses assigns one point to a response of rarely, two points to a response of sometimes, and three points to a response of often. Two questions, 6 and 11, are scored with a reverse scoring system, where three points are assigned to an answer of rarely and one point is assigned to an answer of often. The test also incorporates five questions that are not scored to avoid the possibility of intentionally trying to skew the data and to keep the subjects thinking normally. Given this scoring system for each question, the total scoring range is between 10 and 30, with less than 17 considered to be a low level of anxiety, 17 to 24 as

an average level of anxiety, and over 24 as a high level of anxiety. Using the SCAT helps provide the present research with validity as it has been used in many previous studies (Martens, 2012).

Conclusion

A review of literature provided unique insight regarding effective strategies used in training athletes. Some contributions consist of developing positive experiences; ability to cope with anxiety and build self-confidence; the relationship between experience levels and will to improve; training productivity/efficiency; arousal level and competitiveness; and sport competition anxiety. Each of these areas will vary depending on who the trainer is and what style of coaching is employed. Even though every coach will be different, certain adjustments can be made to help benefit all types of athletes.

The contributions of this literature review stated above predominantly came from Martens (1977), Hardy and Fazey (1987), Zeng (2003), Coker (2005), Movahedi et al. (2007), and Goncalves et al. (2011). Also, Zeng (2003), Coker (2005), and Goncalves et al. (2011) state their findings only to follow them up by saying empirical evidence is lacking or further research is required to draw definite conclusions. Extending those studies may yield more supportive facts and conclusions. It is important for coaches to take the information and correctly apply it to both an individual and group setting. The coach may have the right resources, but if the application process is instituted incorrectly by the coach, the improvements of the athletes may be hindered.

CHAPTER THREE

Methodology

Youth basketball players who currently train at Evolution Basketball (Merrifield, Virginia), a basketball training company for boys and girls ranging from fourth grade up to college, were studied. Trainers were both male and female and all had been instructed the same way on how to properly test the subjects. Words of motivation were allowed to be given, but specific feedback regarding techniques or strategies of each drill were not. The selection of subjects in this study was the probability method of stratified random sampling. This method was selected because the research subjects were divided into four separate groups based on whether they were experienced or not, and if they trained individually or with a group. The sample size consisted of 60 random youth basketball players, which is 10 players per trainer, 32 males and 28 females, who met the requirements for this research. Of the 60 subjects, 37 of them were considered experienced by Evolution's definition while 23 of them were not; 39 subjects trained in a group setting while 21 of them trained individually. The selection process will be further explained in the Data Collection section. The subjects who were randomly selected met the following criteria: a) were currently training with Evolution Basketball, b) were youth basketball players between the ages of 9 and 19, and c) had the ability to make the time commitment to attend the training sessions for this research. These characteristics were

important because it ensured that all of the subjects would receive the same forms of instruction while training and limited the possibility of absences throughout this study. The attendance rate for all subjects as a whole was 95 percent based on the fact that subjects had to miss a session because of unexpected emergencies.

Instrumentation

The instrument used to collect the scores was an original instrument created specifically for this research. It best assessed the skills that were being taught throughout the study, which were shooting around the rim; on-the-ball defensive capabilities; ball handling; jump shooting with proper footwork; passing accuracy; and free throws. The layout of the instrument had a specific order of drills to ensure each subject followed the correct sequence, and designated places for the trainers to record scores after each drill. All of the trainers were familiarized during the intervention with the data collection instrument. At that time, they were also instructed to explain each drill thoroughly, answer all questions regarding drill format, ensure drill execution was correct, and not provide specific feedback about technique that would give any sort of advantage.

Research Design

The procedural technique for this study was an experimental design with the use of the SCAT. In order to determine how athletes perceive their own competitive state anxiety, which is a mental aspect of basketball, all subjects were instructed to take the SCAT first. The intended purpose of this was to assess the current levels of anxiety immediately prior to testing, and was only tested during the initial baseline test. It is also worth noting that the SCAT scores did not have any influence on the subjects' total test

scores; it was used for subject comparison purposes only. Upon completion, subjects were then instructed to warm-up by jumping rope 200 times on both feet. This warm-up was chosen because it was a dynamic warm-up that properly prepared each subject by increasing heart rates and targeting multiple muscle groups (Samson et al., 2012). After the warm-up was completed, the Mikan series, originally invented by ABA and NBA Hall of Famer George Mikan (Basketball-Reference.com, 2011), was the first basketball drill. This drill was selected because it tested an essential skill for all subjects, especially taller players. (Borner, 1996). Mikan series consisted of finishing shots around the rim: alternating right and left-handed lay-ups jumping off of two feet and one foot, two-handed put backs on both sides, one-handed swings with elbow extension under the rim (spinning the ball off the backboard), one-handed put backs on both sides, and one-handed lay-ups on both sides (rapid fire). Mikan series required no set-up and was a 5-minute drill in which every basket scored was worth 1 point. The trainer kept the time while the subject counted every point out loud to ensure accuracy. This was done for every drill that required time and score.

Box agility was the next drill. This drill was used because of its use by the NBA at the NBA combine which was personally witness by the author. Box agility tests for ability to change direction, speed, and play on-the-ball defense. Four cones were set up around the lane on both blocks and both elbows, which is where the free throw line meets the lane line. Subjects started at the left block, outside the lane line, and always faced the same direction. The drill started with a sprint up the lane to the elbow, a change of direction into a slide across the free throw line, a change of direction into a backpedal

down the lane, and another change of direction into a slide across the lane under the rim, ending up where the test began. Once the subjects got their left foot outside of the lane, they immediately changed direction going in the reverse direction around the lane, ultimately resulting in two laps around the lane. Each subject was timed twice, keeping the best time for their score. This was the only drill in which there was a reverse scoring system because a lower time needed a higher score to remain consistent with the scoring system. Times were subtracted from 20 to calculate the score. This was a 2-minute drill because of set-up and a 30-second rest in between bouts.

Stationary dribbling was after box agility and is an Evolution Basketball (2013) original drill that tested for ball handling skills. Subjects were instructed to make as many crossover moves, without moving their feet, from right hand to left hand as many times as possible in 30 seconds, every dribble being worth .1 point. The next move was to add a dribble in between each crossover, with every crossover being worth .1 point. This was a 1-minute drill that required no set-up.

Shooting ladder followed stationary dribbling and is also an Evolution Basketball (2013) original drill that tests for the ability to catch and shoot. This shooting drill had eight spots, above the block, above the first hash mark, above the middle hash mark, and at the elbow, all on both sides of the lane. Each subject shot for 30 seconds at each spot before rotating. Subjects were instructed to use the backboard when shooting above the blocks, but not from any of the other spots. This was a 4-minute drill that required no set-up and every basket was worth 1 point.

Dribble weave, another Evolution Basketball (2013) original drill, came after the shooting ladder. This drill emphasized ball handling into scoring lay-ups. Four cones were set up along the lane line in which the subjects were instructed to make a specific ball-handling move before each cone. The ball-handling moves for high school players consisted of dribbling two basketballs together, dribbling two alternating, and dribbling one basketball between the legs and double crossover. The moves for middle school players were all one basketball moves including crossover, between the legs, double crossover, and in and out. The moves for elementary school players were all one ball as well and were right hand only, left hand only, crossover, and double crossover. After the last move was created, subjects were instructed to turn towards the inside of the lane and make a lay-up on the opposite side of the rim. If any move was incorrect or the subject lost the ball, the weave must be restarted. Each move was performed for 30 seconds on the left side, and then again on the right side. Lay-ups were worth 1 point each. This was a 5-minute drill because of the required set-up.

Passing at a target was a basic passing drill that was seen used by many coaches witnessed by the author (Evolution Basketball, 2013). Subjects were instructed to stand 15 feet away from a wall, with a specific cinder block outlined, and to hit the cinder block with as many chest passes as possible in 30 seconds. The same test was done for right-hand only and left-hand only passes. Each successful hit of the block was worth 1 point. This was a 1.5-minute drill that required no set-up.

Attacking the gaps, the last Evolution Basketball (2013) original drill, was also the last drill that involved a basketball and emphasized footwork going into jump shots.

From the right wing (three feet behind the 3-point line for high school subjects, one foot behind the 3-point line for middle school subjects, and on the 3-point line for elementary school subjects), subjects were instructed to take three different types of shots: one dribble in a straight line towards the rim with the right hand and the footwork being right, left, right, two dribbles right towards the baseline with the right hand and the footwork being right, left, right, left, right, and two dribbles left towards the free throw line with the left hand and the footwork being left, right, left, right, left. From the left wing, all of the shots were the same but subjects were instructed to dribble with the opposite hand and use opposite footwork. Each shot was executed for 1-minute with every make being 1 point. This was a 6-minute drill that required a minimal set-up of one cone.

Athleticism and endurance, key components to skill development for basketball players, was tested after all of the basketball drills. Lane slides are defensive slides in which subjects had to slide the distance of the lane as many times as possible in 30 seconds while not crossing their feet. This tested for lateral movement which is important when playing on-the-ball defense. Each time the subject touched a line was 1 point. Once the lane slides were finished, subjects performed as many push-ups as possible until failure. This tested upper body strength and endurance which is important when finishing games while fatigued and making shots around the rim. Each push up was worth 1 point. Given the wide range of strengths of each subject, 3 minutes total were given to complete both of these tests.

Throughout the test, a total of ten free throws were attempted by each subject in five sets of two. This tested the subjects' ability to make free throws under pressure

while tired. The free throws were shot after immediately after Mikan series, shooting ladder, dribble weave, attacking the gaps, and lane slides. Each made free throw was worth 2 points and depending on each subject's routine before free throws, 2 minutes were allotted to shoot all ten shots.

Evolution offers a summer camp every year and the theme behind it is "At 211 degrees water is very hot. At 212 degrees, water boils. Boiling water creates steam, and with steam you can power a train. One extra degree makes all the difference (Evolution Basketball (2013))." With some of the initial scores getting into the lower and mid-400s, the total score was then added and divided by 2 to get the final score. Dividing the scores by 2 put them in a more appropriate range for players to attempt to reach 212 as a total score. Achieving this feat would classify a player as "212 Elite" at Evolution. The subjects were informed of this opportunity which added a motivation and social comparison factor to be considered "Elite" among peers.

Data Collection

When assessing what type of training setting was more effective for skill development among youth basketball players based on experience level, the overall improvement in test scores between group and individual training were compared, as well as the difference between experienced and non-experienced players. During the first week, immediately after the completed informed consent form was given to the trainer, the initial baseline test was administered. This was followed by one training session per week for eight weeks, ending with the same baseline test during the tenth and final week. The 60 subjects trained with six trainers at Evolution Basketball. Groups were created

based on skill level, something that was determined by the trainers. There was not a strict workout plan throughout the eight weeks for the trainers to use because there was not normally a specific plan that all of the trainers must utilize. Also, every individual and group was different and required different drills and instruction based on specific areas that need the most improvement.

In order to comply with the Human Subjects Research Board and be approved, the researcher engaged in CITI training; created a proposed consent/assent form; selected participants randomly and kept information confidential by creating a coding system; did not offer subjects direct benefits; and informed subjects this study does not add to normal risk of injury. It was the researcher's responsibility to record the scores after the test had been completed. There were no ethical problems incurred by subjects in this research. The subjects' identities and scores were kept confidential at all times. The purpose of this study was to find what was most effective when training youth basketball players. The original tool described above was effectively used to measure training performance for this study. The use of the previously-validated SCAT was reliable because all of the subjects took the test in the same environment in the same facility, and was used to assess self-reported anxiety levels of subjects.

CHAPTER FOUR

Results

When analyzing the statistical data, an Excel spreadsheet was used in which subjects were coded based on their experience level and training setting. At the beginning of this study, the experienced group consisted of 37 subjects while the inexperienced group consisted of 23, and 39 subjects trained in a group setting while 21 trained individually, for a total of 60 subjects. At the end of this study, the experienced group finished with 35 subjects and the inexperienced group finished with 19, also leaving 35 group subjects and 19 individual, for a total of 54 subjects. The 6 subjects who were unable to complete the study dropped out due to a scheduling conflict or injury/illness. The average age of the 54 subjects was 13.6 years old with our youngest subject being 9 and the oldest being 18. All 54 subjects had played at least one season of basketball prior to this research, including 13 subjects who played at the high school level. This research finished with 28 males and 26 females; 16 males and 19 females were considered experienced while 12 males and 7 females were considered inexperienced.

Among the 54 subjects who completed the study, 47 of them improved in their overall test scores, which consisted of scores from Mikan series; box agility; stationary dribbling; shooting ladder; dribble weave; passing at a target; attacking the gaps; lanes

slides; pushups; and free throws. All of the inexperienced and individual subjects improved, the 7 subjects who did not improve were all considered experienced and trained in a group setting. It is worth noting that of the 7 subjects who did not improve overall, all 7 improved in at least one drill. Also, 5 group subjects and 1 individual subject were absent for 1 session and 3 group subjects were absent for multiple sessions. The group of all 9 subjects with absences consisted of the 7 subjects who did not improve along with 2 others who did improve, which potentially led to the unimproved outcome. After analyzing the descriptive statistics of each drill, box agility, lane slides, and pushups showed the least improvement among all subjects while Mikan series and shooting ladder had the greatest improvements. This potentially occurred due to the increased chances of scoring points during high volume shooting drills. The drills that did not experience as much improvement had fewer chances to score points, which resulted in a smaller margin of improvement.

Table 1 addressed hypothesis 3, subjects with an average level of anxiety will improve, based on skill development, more than low and high level of anxiety subjects, by comparing SCAT scores and average total improvement. The average level of anxiety group experienced the most improvement in scores, but there was no statistical significance when further assessing this comparison.

Table 1
SCAT Scores And Total Average Improvement

SCAT Levels of Anxiety	N	Mean
Low	15	2.62
Average	36	3.86
High	3	2.93

In order to address hypothesis 1, if a player has little to no experience playing basketball, then individual training will be more beneficial than group training for skill development, and hypothesis 2, if a player has experience playing basketball, then group training will be more beneficial than individual training for skill development, the average difference between the initial and final baseline test scores (total improvement) of each group were compared. Table 2 is a comparison of only group and individual subjects based on their improvement in scores. The average improvement for individual subjects is 2.57 points higher than the group subjects. Table 2a is an independent t-test comparing the average improvement in scores between individual and group subjects, which found a significant difference between the means of the two groups ($t = 2.563$, $p < .05$).

Table 2
Group Versus Individual Total Average Improvement

Setting	N	Mean
Group	35	2.56
Individual	19	5.13
Total	54	3.46

Table 2a

t-test Comparing Improvement In Scores Between Individual and Group Subjects

Improvement	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Equal variances assumed	.185	.669	2.563	52	.013

Table 3 is a comparison between experienced and inexperienced subjects, also based on their improvement in scores. The inexperienced subjects improved by an average of 1.61 points more than the experienced subjects, which is not as much of a discrepancy as the comparison between group and individual subjects. Table 3a is an independent t-test comparing the average improvement in scores between experienced and inexperienced subjects that did not find a significant difference between the means of the two groups ($t = -1.541, p > .05$).

Table 3

Experienced Versus Inexperienced Total Average Improvement

Experience	N	Mean
No	19	4.50
Yes	35	2.89
Total	54	3.46

Table 3a

t-test Comparing Improvement In Scores Between Experienced and Inexperienced Subjects

Improvement	Levene's Test for Equality of Variances		t-test for Equality of Means		
	F	Sig.	t	df	Sig. (2-tailed)
Equal variances assumed	1.536	.221	-1.541	52	.129

Table 4 analyzed only inexperienced subjects by comparing improvement scores of those who trained in a group and individually. Hypothesis 1 stated: If a player has little to no experience playing basketball, then individual training will be more beneficial than group training. Considering the rate in which the individual subjects improved compared to the group subjects in Table 2, the inexperienced individual subjects improved by an average rate of 2.20 points more than its group counterpart.

Table 4

Group Versus Individual Total Average Improvement for Inexperienced Subjects

Inexperienced	N	Mean
Individual	13	5.20
Group	6	3.00
Total	19	5.13

In Table 5, only experienced subjects were analyzed by comparing the improvement scores of group and individual subjects. Hypothesis 2 stated: If a player has experience playing basketball, then group training will be more beneficial than individual training. Table 5 does not differ from Tables 2 or 4 in that the individual subjects improved on average at faster rate, this time by 2.51 points, which is more than double its counterpart.

Table 5

Group Versus Individual Total Average Improvement for Experienced Subjects

Experienced	N	Mean
Individual	6	4.98
Group	29	2.47
Total	35	2.89

Table 6 shows a comparison of all of the means together.

Table 6

Comparison of Total Average Improvement for All Subjects

	Individual	Group
Experienced	4.98	2.47
Inexperienced	5.20	3.00

CHAPTER FIVE

Conclusion

Summary of Procedures

To further investigate how the training operated, it was not be a surprise that the individual subjects improved twice as much as the group subjects did. Individual training usually consisted of heavy emphasis on shooting form, ball handling, finishing shots around the rim, and strength/agility development. Group training also placed heavy emphasis on these fundamentals, but at a less prescribed rate. Group training also included drills that incorporate more game-like situations and concepts against an actual defender, something that was not tested for in this study because of its subjective nature. All of the fundamentals that the individual subjects focused on were more closely related to what this study was testing for, which potentially gave an advantage to the individual subjects over the group subjects for this study only. The individual subjects did receive feedback regarding game-like situations and concepts, but did not spend nearly as much time on those drills as the group subjects did due to the nonexistence of competition. Group sessions spent about half of the time working on individual skill work and the other half working on competitive situations, so it was understandable their improvement in scores was only half of what the individual subjects experienced.

Implications for Practice

The purpose of this study was to determine, based on experience level, what type of training is more effective for youth and high school basketball players' skill development. This research was conducted to contribute to the development of fundamental skills of youth athletes and prepare them to compete for a spot on a high school team. It is important for a trainer or coach to know when a player is struggling and the cause the struggles, especially if it can be avoided by changing practice settings or drills. All players learn differently and at different speeds, but certain teaching techniques may be used to help unique players with similar struggles. Experience level is also an important determining factor when assessing the development of athletes. Learning certain skills and terminology will vary per athlete based on experience level. The ability of coaches and trainers to apply this research and implement it correctly will be valuable, regardless of the sport, as it may improve the success of their own players and teams.

Summary of Major Findings

The statistical findings of the data analysis supported the first hypothesis in that players with little to no experience playing basketball benefited from individual training more than group training. The second hypothesis was not supported because the players with experience playing basketball benefitted more from individual training, not group training. These findings contradict previous studies from Seidentop (2002) and Pettigrew (1984) in that the group subjects did not improve more than its individual counterpart. The third hypothesis was supported in that the average level of anxiety group improved

more than the low and high level of anxiety groups. This may have been due the uneven amount of subjects in each anxiety group.

Recommendations for Future Study

It is recommended that further investigations utilize a consistent measure for assessing tactical and strategic game-like situations. This is difficult because every player is different, but it is not impossible. Perhaps the use of film analysis and computer technologies, while costly and time consuming, could provide a mechanism for these assessments, however there are still other limitations. The level of competition must be the exact same for every player which is extremely difficult to replicate. Does the researcher play defense for every subject the exact same way? What if a contested jump shot for one subject is accidentally higher or lower for another subject? One possible future study for group training could be to train certain players from one specific league during the offseason, after a season has already ended, and see how those players improve during the next season against the exact same teams/competition. However, it may be difficult to have the exact same teams and players participate for two seasons in a row. Another potential future study that may be easier to implement could from applying this research to another team sport, such as soccer or lacrosse, to see if similar results occur. While this research provides evidence that supports individual and group training, further research is necessary to clearly state what type of training will most benefit athletes overall based on experience level.

APPENDICES

Appendix A

Letter of Intent

John Ennis

2800 Juniper Street #11, Fairfax, Va. 22031 * 703-622-9444 * jennis1@gmu.edu

October 20, 2012

George Mason University
4400 University Drive
Fairfax, VA 22030

Dear Participant,

You have been selected to participate in this research because of your current participation in basketball training. I am a graduate student at GMU and am conducting this research for my Master's degree to compare improvement levels of athletes based on experience and type of training, group or individual. The answers and testing you provide will help to further understand the development of basketball players from the youth level up to college.

As a voluntary participant, you may withdraw from the study at any time. You will receive a score based on your testing. These scores will not be confidential unless you request otherwise. If your score is in the top 10 for your age group, your name and score will go up on the wall at the warehouse. Your time and feedback is greatly appreciated, thank you.

Regards,

John Ennis
Researcher

Appendix B

Evolution Basketball Rating System

Player Name: _____ **Grade:** _____ **Experience:** _____

Sport Competition Anxiety Test: _____

Warm up: 200 jumps feet together with a jump rope

Mikan series: _____

Box agility: 1st time: _____ 2nd time: _____

Two free throws: ____/2

Stationary dribbling: 1st score: _____ 2nd score: _____

Shooting ladder: _____

Two free throws: ____/2

Dribble weave: _____

Two free throws: ____/2

Passing at target: _____

Attacking the gaps: _____

Two free throws: ____/2

Lane slides: _____

Two free throws: ____/2

Push-ups: _____

Total score: _____

Appendix C

Sport Competition Anxiety Test

Reach each statement and decide how you feel when you compete in sports.

	Often	Sometimes	Rarely
1. Competing against others is socially enjoyable.	A	B	C
2. Before I compete, I feel uneasy.	A	B	C
3. Before I compete I worry about not performing well.	A	B	C
4. I am a good sport person when I compete.	A	B	C
5. When I compete, I worry about making mistakes.	A	B	C
6. Before I compete I am calm.	A	B	C
7. Setting a goal is important when competing.	A	B	C
8. Before I compete I get a queasy feeling in my stomach.	A	B	C
9. Just before competing, I notice that my heart beats faster than usual.	A	B	C
10. I like to compete in games that demand considerable physical energy.	A	B	C
11. Before I compete I feel relaxed.	A	B	C
12. Before I compete I am nervous.	A	B	C
13. Team sports are more exciting than individual sports.	A	B	C
14. I get nervous wanting to start the game.	A	B	C
15. Before I compete I usually get uptight.	A	B	C

Appendix D

PARTICIPANT/PARENT INFORMED CONSENT FORM

RESEARCH PROCEDURES

This research is being conducted to compare improvement levels of athletes based on experience and type of training, group or individual. If you agree to participate, you will be asked to answer a few questions about your experience level and perform certain tests/drills for a score.

RISKS

This research adds no injury risk to the normal training program.

BENEFITS

The benefit to you as a participant for this research is that you may become a better basketball player. There may also be potential benefits for athletes from the youth level up to the collegiate level based on training type.

CONFIDENTIALITY

The basketball scores produced from this study will be available to all players and coaches as that is consistent with the normal training program regardless of the study or not. Confidentiality of basketball scores may be requested. SCAT scores will be kept confidential by assigning numbers to participants and allowing only the research staff to handle the completed test.

PARTICIPATION

Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

ALTERNATIVES TO PARTICIPATION

If you decide to withdraw from the study, please notify the researcher immediately. There is no alternative to the research so the participant may train as usual.

CONTACT

This research is being conducted by John Ennis from the College of Education and Human Development at George Mason University. He may be reached at 703-622-9444 for questions or to report a research-related problem. Since the researcher is a student, you may contact the student's advisor via email at craig_esherick@yahoo.com. You may also contact the George Mason University Office of Research Subject Protections at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research. This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT

I have read this form and agree to participate in this study.

Parent signature (unless 18 years old)

Date

Participant Name (please print)

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CURRICULUM VITAE

John Ennis graduated from Robinson Secondary School, Fairfax, Virginia, in 2006. He received his Bachelor of Science degree in Health, Fitness, and Recreation Resources from George Mason University in 2011. He returned to Robinson and has been employed as a coach for five years.