Exploring the Relationship between Learning Agility and College Basketball Performance

Armin McCrea-Dastur

A Dissertation Submitted to the Faculty of
The Chicago School of Professional Psychology
In Partial Fulfillment of the Requirements
For the Degree of Doctor of Philosophy

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Dedication

With no doubt, I would not have reached this milestone without the loving support of my family. My husband, David, has been my partner, my cheerleader, my motivator, my sounding board, my rock, and my best friend. He has picked up more slack than I wish to think about as I juggled the roles of wife, mother, daughter, sister, friend, colleague, and student. He deserves this degree as much as I. He believed in me even when I didn't. And when I wanted to quit, he reminded me why I shouldn't. Without him, I wouldn't be the person I am today. I am a better person because of him. For that, there are no words to thank him enough.

My children, Roxanne and Donovan, have been patient with me as I hid in my office hour after hour reading, writing, editing, and writing some more. They are truly the epitome of unconditional love and acceptance. They have taught me a lot about who I am and who I wish to be. They make me realize every day what is really important in life. I dedicate this to them and want them to remember that if you want something enough, nothing can stop you. I believe you each will accomplish great things in life. Believe in yourself and keep your eye on the ball.

To my parents and brother, Nari, Dinoo, and Adil Dastur, I thank you for rearing me with the drive and dedication to reach for aspirational goals and persevere through adversity. Thirst for knowledge has always been in our family and is a part of who I am. Through them, I have learned every moment in life is an opportunity to learn or teach. My parents' generosity and compassion towards others has inspired the way I live my life and shaped my sense of purpose. My brother's courage has encouraged me to push on

when times get tough. I now feel fully enabled to continue the legacy of Dastur women, and the tradition of teaching to make the world a better place.

Acknowledgements

Without the consistent and persistent support of my committee and the faculty of The Chicago School of Professional Psychology, I would not be in this position today. There are many people I would like to thank. Dr. Nancy Davis, my former dissertation chair and current dissertation committee member, has been like a guardian angel. She watched over me at every step coaching me, pushing me, inspiring me, and picking me up when I was down. She removed herculean obstacles and road blocks to pave the way for my success. I not only respect her professionally but admire her personally. It takes a special being to reach people at such a deep level. I am honored to have had her touch my life and proud to call her my friend. We did it Nancy!

Dr. Daniel Dayton, who stepped in when I needed him the most, thank you for accepting the responsibility of getting me past the finish line. I have enjoyed getting to know him and appreciate the support he has shown me. His creative nature and vast experience was just what I needed to get me through one of the toughest points of my journey.

Dr. Steve Ross taught me a lot about what it means to support someone. He never faltered when things got tough and found ways to lift me up when I was down. Even when others were questioning my success, he stood behind me like a true team member. His dedication and commitment to me and my success was undoubted and cherished.

Dr. Linda Liang found ways to enable my success. Through the school's educational support services, she found a way to provide resources and accommodate my needs through a learning disability. Without her support and guidance, I truly do not think I could have been allowed to flourish. She not only supported me academically but

also took the time to support me personally. Her kind words and encouragement got me over some major milestones.

My deep appreciation goes out to Dr. Kenneth DeMeuse and Korn/Ferry International for their support and partnership of this study. In addition, Dr. Kevin King and Matthew Dallman coached me through different parts of the process and provided guidance that was much needed. All of you held my hand and walked me through some of what seemed to be the darkest parts of this journey. I truly cannot thank you enough.

My supervisors at Kraft Foods and Mondelēz International have been tremendously supportive. I want to thank Pat Donegan, Lora Haak, Kayla Cohen, John Markham, Marangelie Olivo, and Dorria Ball for being such great leaders and allowing me the flexibility to achieve my goals, both professionally and personally. They each have taught me something about growth and development.

Finally, I want to thank all the coaches in my "Carolina Family" who participated in this study. Without your loving support I could not have completed this study. I know the challenges and pressures of collegiate basketball and know it was not easy for you to help the success of this study. But you all did it anyway because you wanted to help me and the advancement of this research. For that, I am eternally grateful.

Abstract

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This quantitative study explored the relationship between learning agility, the willingness and ability to learn from experience and apply learning to new situations, and performance in collegiate basketball guards. Learning agility is used in the business industry during talent management discussions to identify potential. Assessing potential grows in important as the implications of collegiate sport becomes more financially relevant. To date, sport psychology research has not been able to determine a reliable source to identify potential; therefore, learning agility may be a practical construct for coaches and sport psychology consultants. This study sampled 32 guards from Division I men's college basketball programs. The research hypothesis was not supported and no significant results were found; however, a trend toward significance was found when an increase in participants was added to a second ANOVA analysis. This warrants future testing, with a larger sample size, to determine if significant results may be found.

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Chapter 1: Nature of the Study

Organizations are surrounded by complexity. Some complexity may be created by design, resulting from strategic business decisions, and some complexity may be inherent to the industry itself (Birkinshaw & Heywood, 2010). According to Gucciardi, Hanton, and Mallett (2012):

> Regardless of the achievement context (e.g., sport, workplace, education), individuals must successfully negotiate a variety of different stressors, challenges, and adversities (e.g., injury, performance expectations and targets, work-life balance) if they are to perform to their potential and reach their goals. (p. 1)

Understanding the complexity and learning to navigate through the uncertainty is how successful performers thrive under pressure, overcome adversity, and maintain consistency through challenges (Fletcher & Wagstaff, 2009; Gucciardi et al., 2012; Marion & Uhl-Bien, 2001). As a result, leaders of sport and business organizations need to manage performance through complex systems (Fletcher & Wagstaff, 2009).

Competitive sport in collegiate athletics presents its own challenges. Athletes are confronted with constantly changing environments of complexity, as the competition changes with every game. The need to quickly learn from environmental cues is essential for athletes because success relies on their ability to learn and apply the learning as game play occurs. While playing sport, it is crucial for athletes to gain "information from the ball, teammates and opponents and decide on an appropriate response with time and space pressure" (Sampaio, Godoy, & Feu, 2004, p. 1237). Elite athletes have an ability to "read the game" (p. 1237) and learn from the context of the experience, as the game is occurring, resulting in higher levels of performance (Sampaio et al., 2004). This

contextual experience seems to be crucial to successful athletic performance, since lower levels of contextual learning may present uncertainty and pressure in a dynamic environment, resulting in lower levels of performance (Sampaio et al., 2004).

Problem Statement

Evidence for successful prediction of potential has emerged in the organizational literature but has not yet been applied to collegiate athletics. Because collegiate athletics is a major financial industry, the need to predict potential performance in athletics has proportional financial implications (Robbins, 2010; Van-Yperen & Duda, 1999). Research shows as revenue sports, such as football and basketball, become successful and compete in the postseason, donations increase throughout the year and sometimes into the following year (Humphreys & Mondello, 2007).

Additionally, the National Collegiate Athletic Association (NCAA) has limited the number of scholarships schools can distribute each year, in an effort to maintain a subjectively equal level of talent among teams (NCAA, 2011). Therefore, with the spots for scholarship athletes limited, the recruitment of talent with high potential becomes strategically more important. If schools make errors assessing potential in prospective student-athletes, two things may result: (a) the loss of a scholarship spot to a lower potential athlete, or (b) the loss of a high-potential athlete to a competitor or rival team (Spieler et al., 2007). Therefore, accurately assessing potential talent is truly crucial to the success of collegiate sport.

Purpose of the Study

The purpose of this study is to examine how learning agility may be used to assess potential successful performance in men's Division I collegiate basketball student-athletes.

Background of the Problem

If learning from experience is crucial to athletic success, it seems coaches could benefit from detecting the psychological aspects that aid in this type of learning. The research supporting this effort and evaluating potential successful performance in sport has been inconsequential and provides insufficient information to practice (Weinberg & Gould, 1995). Without research on the psychological characteristics leading to successful performance in sport, physical tests and game-related statistics have been measures used in recruiting (Sampaio, Janeira, Ibáñez, & Lorenzo, 2006). However, these measures alone have been found to be insufficient to predict potential performance (Kuzmits & Adams, 2008).

Other measures, such as work ethic and learning capacity, are being used by coaches to assess prospective student-athletes, but coaches commonly rely on the subjective judgments of high school coaches and talent scouts (Johnson, 2005). These judgments may not demonstrate an adequate measure of potential because these assessments are limited to the assessment of current skills. Although coaches and trainers tend to be experts in identifying physical characteristics that conceivably lead to successful performance in sport, they may lack the knowledge of how to objectively assess psychological characteristics when making recruiting decisions (Giacobbi, Whitney, Roper, & Butryn, 2002; Giacobbi, 2000; Spieler et al., 2007). In the recruiting

of student-athletes, there needs to be more objective analysis of how current game-related statistics relates to successful performance in the future.

The nature of the psychological processes necessary to reach optimal levels of performance in extremely demanding conditions continue to be explored in sport. Unfortunately, sport psychology research to date on the psychological aspects of success and failure of student-athletes has been inconsistent and unreliable. Still less empirical work has been done to characterize the psychological aspects that contribute to potential during transitions to higher levels of competition (Comper, 1993). The need to conceptualize these psychological aspects is clear, because doing so might allow coaches to successfully recruit prospective student-athletes with the psychological qualities necessary for potential successful performance.

Research Questions

A quantitative study explored the relationship between learning agility and student-athlete performance in collegiate men's basketball. The inquiry of this study was: Does the performance of higher learning agile student-athletes improve at greater rates than the performance of lower learning agile student-athletes? For the purpose of this study, performance was assessed through use of basketball game-related statistics specific to playing position. This focus was important because the demands upon different playing positions (i.e. guard, forward, and center) and the coaches' evaluations of players by positions vary, largely in characteristics associated with physique (Ackland, Schreiner, & Kerr, 1997) and proximity of major playing time in relation to the basket (Sampaio, Janeira et al., 2006).

Learning agility is the ability and willingness to apply learning to new situations (Eichinger, Lombardo, & Capretta, 2010). This study focused on addressing the research question through game-related performance statistics of collegiate basketball guards. Guards oftentimes run the offense and adopt a leadership role on the court (Wooten, 1992). They are good ball handlers and set up plays transitioning from offense to defense. Guards are expected to "have the intelligence to read the defenses and adjust the offense accordingly" (Wooten, 1992, p. 64). It is hypothesized:

> H_1: A composite game-related statistical performance measure will increase by greater amounts, over time, in guards with high learning agility than in guards with lower learning agility.

Research Method and Design

This study approached 20 Division I basketball programs and sought to have the participation of approximately 40 guards. The researcher explained the study's goals and methods to a member of the coaching staff of each program, to request permission to communicate directly with the guards on their teams. In this study, four variables were measured: (1) Games played, (2) Learning Agility, (3) Player performance, and (4) Coach assessment, all of which will be described in greater detail in chapter three.

In particular, learning agility was measured using the viaEDGE™, a self-report measure published by Korn/Ferry International that is comprised of an overall learning agility score and five factors of learning agility (DeMeuse, Dai, & Hallenback, 2010). The players who volunteered to participate were asked to complete the viaEDGE™ assessment online. Korn/Ferry facilitated the data processing and individual aggregate reports were sent to the researcher for analysis.

Application of Results

To reiterate, the hypothesis of this study stated that there would be a significant relationship between learning agility and performance in sport. Establishing a statistically significant relationship between learning agility and performance in sport would contribute to the existing organizational leadership literature by establishing the generalizability of the construct of learning agility beyond an organizational setting. If the hypothesis of this study was found to be statistically significant and demonstrated a connection between identifying potential in sport through a measure developed in business, it may support the testing of other constructs across the two industries, theoretically supplementing the research of both fields.

Additionally, statistically significant results may inform applied sport psychology research and practice. This study aimed to expand the knowledge base for collegiate coaches to recruit student-athletes, in Division I men's basketball programs, with high potential for successful performance. Mental toughness is the main psychological aspect considered when evaluating athletes (Connaughton, Hanton, Jones, & Wadey, 2008). However, there has been conceptual ambiguity around defining what mental toughness is, how it contributes to successful performance in sport, and how it is developed (Crust, 2007). Establishing a relationship between learning agility and performance in sport may inform how student-athletes learn and what contributes to success in sport, thus bridging the gap in the current mental toughness research.

Theoretical Framework

The foundational literature that informs learning agility and this study is "goal orientation". Goal orientation can be defined as a mental framework that an individual

has to approach (or to avoid) achievement situations (Ciani & Sheldon, 2010). There are two major models of goal orientation; one offered by Dweck and the other by Nicholls. Dweck's (1986) model of goal orientation is founded on a theory of intelligence; whereas, Nicholls' (1975) model of goal orientation is based on achievement attributions. Because Nicholls' model of goal orientation links performance as a major attribute of competence (success or failure), it more closely parallels the context of a sport setting (wins and losses) than does Dweck's model. Nicholls' work in goal orientation has been the theoretical foundation of goal orientation in the sport psychology research and the foundation of the work of Joan Duda.

Duda (1985) transferred the concepts of goal orientation from a purely academic and educational setting to a sport and exercise setting. In sport, goal orientation has been used to determine motivational attributions (Duda, 1985), competence attributions (Duda & Nicholls, 1992), and performance attributions (Roberts, Hall, Jackson, & Kimiecik, 1995). Goal orientation defines how one learns, how much effort one places on certain activities, and what one will learn from experiencing certain activities. Goal orientation is a relevant theoretical theory for this study because learning agility concentrates on learning from experience.

Another concept that informs the groundwork of this study is "mental toughness." Mental toughness has been defined as "having the natural or developed psychological edge that enables you to, generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer" (Jones, Hanton, & Connaughton, 2007, p. 247). Mental toughness has been referenced by coaches, athletes, and sport psychologists as the major psychological contributor to sport

success (Weinberg, Butt, & Culp, 2011; Crust, 2007; Crust & Azadi, 2010; Connaughton, Hanton, & Jones, 2010; Connaughton et al., 2008; Jones et al., 2007; Thelwell, Such, Weston, Such, & Greenlees, 2010; Gucciardi et al., 2012). However, empirical research has not provided conceptual clarity, and researchers have yet to agree upon a definition, which has led to the failure of developing valid measurements (Crust, 2007). Recent research is making advancements on defining dimensions of mental toughness, and subsequently developing a valid instrument to measure the construct. A concentrated effort is sport specific; however, the generalizability of the findings will remain unknown until a valid and reliable instrument can be developed and widely utilized and accepted by the sport community.

As stated, thus far, the research on mental toughness has demonstrated the "need to develop a valid and reliable measure" allowing mental toughness to be assessed (Jones et al., 2007, p. 262). Recently, sport psychology research has made progress in showing construct validation of mental toughness assessments (Gucciardi et al., 2012). However, consistent results have yet to be established (Sheard, Golby, & van Wersch, 2009). With several instruments measuring different constructs presumed to encompass mental toughness, the need to develop a "consensual definition" (p. 18) and characterize the components included to define mental toughness seems to be the current focus of the research, rather than the development of a statistically valid measurement (Gucciardi et al., 2012). Regardless, valid mental toughness measures may be irrelevant when it comes to predicting successful performance. Mental toughness quantifies current skill levels; it does not quantify potential skill levels associated with future successful performance. Even more, research has determined three stages of mental toughness

development over the early, middle, and later years of sport experience (Connaughton et al., 2010).

The lack of clarity and practical knowledge around mental toughness poses a problem for the field. For instance, while collegiate coaches are recruiting, they would benefit from the ability to predict how prospective student-athletes may deal with the increased pressure and complexity of sport at the college level. This prediction may be most applicable through a construct used not to identify current skill levels, but rather to identify potential.

In the business world, potential is identified through a construct called "learning agility." Learning agility is a measure of one's "willingness and ability to learn new competencies in order to perform under first-time, tough, or different conditions" (Lombardo & Eichinger, 2000, p. 32). The ability to learn and apply learning in new ways may contribute to what helps athletes cope with the demands of sport. Thus, learning agility is perhaps an antecedent to mental toughness. If true and mental toughness is an aspect or result of high learning agility, collegiate coaches could benefit from instruments that assist in measuring learning agility, rather than the less tangible construct of mental toughness. And indeed, valid and reliable learning agility instruments that show evidence for successful prediction of potential have emerged in the organizational literature. However, these instruments have not yet been applied to sport performance.

Definitions

- 2-point field-goals (made/attempted): Awarded points to a player who successfully manages to shoot the basketball through the net within the three-point line.
- 3-point field-goals (made/attempted): Awarded points to a player who successfully manages to shot the basketball through the net when behind the three-point line.
- Assists: A pass to a teammate that leads to a basket. The player who passes the ball to the player who scores the basket is credited with an assist.
- Change Agility: The concepts of change agility are geared toward making things better or different. Change agile individuals remain calm under pressure and undertake the burden of the situation when they know the changes are needed. They take consequences of change as learning opportunities (Eichinger et al., 2010).
- Free-throws (made/attempted): An unguarded shot attempt taken from the foul line. The shot is awarded to players who are at the receiving end of an opponent's foul (penalty for breaking a rule of the game).
- Learning Agility: According to Eichinger et al. (2010), "The ability and willingness to learn from experience, and subsequently apply that learning to perform successfully under new or first-time conditions" (p. 17). The construct is comprised of five dimensions: mental, people, change, results, and self-awareness.

- Mental Agility: The concepts of mental agility are geared toward inquisitiveness, complexity, curiosity, and innovation. Mentally agile individuals analyze problems deeply and search for meaning through comparisons of what they know from past experience. They also help others think through issues to come to solutions (Eichinger et al., 2010).
- Mental Toughness: Refers to having a psychological advantage over the competition because of an ability to cope better with the demands of sport and perform consistently, confidently, focused, and controlled under pressure (Jones et al., 2007).
- Minutes Played: Time a player is actively participating in game play. Minutes played were used as the denominator, to normalize a composite player performance score, among players who play a minimum of five minutes in a game.
- People Agility: The concepts of people agility are geared toward being a good communicator and being able to adapt and work with diverse types of people. They relate well with other people and are good at presenting their perspective (Eichinger et al., 2010).
- Potential: Refers to an individual's latent possibility of being or becoming successful. An individual's potential is equivalent to having the foundational skills to succeed at a certain skill, combined with the right opportunities to build experiences from which to learn, and an adaptability to learn and apply the learning (Korn/Ferry International, 2011).

- Results Agility: The concepts of results agility are geared toward delivering results in new and tough situations. Results show that agile individuals find a way to succeed and are more resilient during adversity. They have a personal presence and ability to adapt to the needs of others that aids in building successful teams (Eichinger et al., 2010).
- Self-awareness: The concepts of self-awareness refer to the extent of how well one knows their strengths and weaknesses. Self-aware individuals seek feedback to get information on making positive changes in their behavior (Eichinger et al., 2010).
- Steals: A gain of possession by a defensive player, usually on a pass or dribble. The offensive player is credited with the turnover, while the defensive player is credited with the steal.
- Turnovers (reverse scored): A loss of offensive possession of the ball by passing the ball out of bounds, committing a foul, or having the ball stolen by the opposition. Turnovers were subtracted from the other elements of the player performance score.

Assumptions, Scope, and Limitations

The findings may not be generalizable to athletes of different gender, age, experience, level of competition, or sport because the research in this study was limited to male collegiate basketball student-athletes in NCAA Division I programs. Participants came with varied levels of experience. Experienced gained during non-conference games may provide the learning necessary for the increased difficulty of conference games. Thus, control measures were put in place for this study to measure a point in time at the

first half of non-conference play, the second half of non-conference play, the first half of conference play, and the second half of conference play.

Outline of Remaining Chapters

This dissertation is outlined in five chapters. Chapter 1 presents a rationale for learning agility as a relevant construct to the field of sport. The importance of accurate assessment of potential in prospective student-athletes is developed and research questions are presented. Applications of the projected results are offered to both research and practice. Research variables and concepts have been operationalized, for the function of this study.

Chapter 2 presents a review of the literature. First, the limited empirical research around learning agility is provided. Then, goal orientation is reviewed as the theoretical foundation for learning agility. Finally, the relevant literature on mental toughness is presented to establish an understanding of the psychological factors contributing to successful performance in sport.

Chapter 3 describes the research design and methods utilized for this study. The relationship between dependent and independent variables and a hypotheses are offered. Materials, procedures, and participants are described in detail.

Chapter 4 explores findings derived from the data collected through correlational analysis. An evaluation of results is reported through descriptive and inferential statistical analysis. Each proposed hypothesis is investigated.

Chapter 5 includes a summary of the findings. Conclusions and recommendations are made on the applicability and contributions of the results to research and practice. Limitations are offered to assist future research.

Chapter 2: Review of the Literature

Introduction

This chapter includes the relevant literature pertaining to the present study. Definitions, theories, and rationale are discussed to provide context to the contribution of this study to current research and applied practitioners. Only studies adding the most relevance to the theoretical grounding of this study were examined. First, the limited research conducted on learning agility is reviewed. Subsequently, the theoretical foundation of goal orientation is presented from an academic and sport perspective. A brief overview of goal orientation's founding theorists is highlighted, and then a deeper review is conducted within the sport psychology research. Next, the literature established in sport regarding game-related statistical performance measures and psychological measures of mental toughness is presented. Finally, assumptions and conclusions regarding significant relationships are offered.

Problem Statement

Evidence for successful prediction of potential has emerged in the organizational literature but has not yet been applied to collegiate athletics. Because collegiate athletics is a major financial industry, the need to predict potential performance in athletics has proportional financial implications (Robbins, 2010; Van-Yperen & Duda, 1999). Research shows as revenue sports, such as football and basketball, become successful and compete in the postseason, donations increase throughout the year and sometimes into the following year (Humphreys & Mondello, 2007).

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teams (NCAA, 2011). Therefore, with the spots for scholarship athletes limited, the recruitment of talent with high potential becomes strategically more important. If schools make errors assessing potential in prospective student-athletes, two things may result: (a) the loss of a scholarship spot to a lower potential athlete, or (b) the loss of a high-potential athlete to a competitor or rival team (Spieler et al., 2007). Therefore, accurately assessing potential talent is truly crucial to the success of collegiate sport.

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Learning agility is the ability and willingness to apply learning to new situations (Eichinger et al., 2010). This study focused on addressing the research question through

game-related performance statistics of collegiate basketball guards. Guards oftentimes run the offense and adopt a leadership role on the court (Wooten, 1992). They are good ball handlers and set up plays transitioning from offense to defense. Guards are expected to "have the intelligence to read the defenses and adjust the offense accordingly" (Wooten, 1992, p. 64). It is hypothesized:

> H_1: A composite game-related statistical performance measure will increase by greater amounts, over time, in guards with high learning agility than in guards with lower learning agility.

Literature Review of Learning Agility

Developed and used primarily in the practitioner world of business, the construct of learning agility is relatively new to the academic world and is a relatively new concept in general. The business world remains the main context and foundational source of examples and data collection of learning agility. However, the construct may have significant possibilities to be applied beyond the business world.

Through the limited empirical research that exists, learning agility has been described as "the ability to learn from experience" (Clark, 2008, p. 11), street smarts, or practical intelligence (DeMeuse et al., 2010). Learning agility is referred to as one's "willingness and ability to learn new competencies in order to perform under first-time, tough, or different conditions" (Lombardo & Eichinger, 2000, p. 32). Learning agile individuals have an instinctive and intuitive sense regarding people and tasks. Learning agility has been described as an ability to know what to do, when you don't know what to do (Eichinger et al., 2010).

High learning agile individuals experiment with new things, take risks, and deal well under conditions of complexity or ambiguity (Eichinger et al., 2010). Research has shown when individuals fail to succeed, it may be due to the blockage of new learning or fear of new experiences (Lombardo & Eichinger, 2000). Learning agility is about learning from experience and applying the learning in new and different ways. As stated earlier, learning agility is a multi-dimensional construct. These dimensions are mental agility, people agility, change agility, results agility, and self-awareness (Lombardo & Eichinger, 2000).

Mentally agile individuals tend to be creative in situations of challenge, ambiguity, and complexity (Lombardo & Eichinger, 2000). They possess the capacity to think broadly and make connections about consequences and root causes. Individuals who are high in mental agility search for meaning. The inquisitive nature of mentally agile individuals may allow for the development of inventive solutions. Even more, mentally agile individuals shift easily from one action or solution to another, in response to the needs or demands of the existing situation (Eichinger et al., 2010).

Individuals with people agility have the ability to have social skills, treat others with respect, maintain composure, and are resilient (Lombardo & Eichinger, 2000). They are able to clearly explain complicated concepts to others. Individuals who are high in people agility bring out the best in others, and by understanding the needs of others, they make people around them better. They come to intuitive, quick, and accurate conclusions about people. Additionally, individuals who are people agile seemingly have fun doing almost anything (Eichinger et al., 2010).

Change agile individuals are curious, inquisitive, and experimental (Lombardo & Eichinger, 2000). They relish developmental opportunities and tinkering with new ways of doing things. Individuals who are high in change agility can "take the heat" even when things may get personal (Eichinger et al., 2010, p. 135). They do not mind living with the consequences of failure, because they are focused more on the outcome and are determined to see things through to completion. Change agile individuals are willing to take risks without fear of failure; either there is no failure (i.e., success), or there is failure, which is interpreted as an opportunity to learn and find a new way to succeed (Eichinger et al., 2010).

Results show that agile individuals exhibit perseverance, high motivation, and a presence of success that inspires others (Lombardo & Eichinger, 2000). They deliver success under pressure situations by making quick accommodations and adapting to changing environmental needs. Individuals who are high in results agility may be counted on to perform well in tough situations. There is hard work, high standards, and a willingness to make sacrifices to get things done. They strive to multi-task and recognize the requirements of any given situation. Most importantly, results agile individuals "can inspire a team to work hard" (p. 153) and assist in building high-performing teams (Eichinger et al., 2010). People who are high in results agility feel confident in leadership positions and pressure situations (Eichinger et al., 2010).

Self-awareness is the fifth factor of learning agility. Individuals high in self-awareness know their limitations and have an ability to compensate for weaknesses through a capability to develop and respond to feedback. This transparency of strengths and weaknesses allows high learning agile individuals to be situationally responsive to

the needs of others and the environment around them. They are continuous learners (Eichinger et al., 2010).

To this point, only the positive side of learning agility has been presented. There are other characteristics of learning agile individuals that may be viewed as negative attributes. Because they are adept at seeing the bigger picture and determining the best way to solve an issue or problem, they become impatient with others who don't follow their logic. They may get bored easily if projects get bogged down while they are anxious to move on to the next challenge. They can be perceived as too risky and may push others beyond their abilities. Sometimes, they may be perceived as selfish, and thus not always the best leaders, because many times they can be thinking about the task itself (how to make it better, how to execute it properly) rather than the development of their team or people around them. Furthermore, at times, they may think their views are superior to others (Korn/Ferry International, 2011). It is important to understand which dimensions are high for the learning agile individual, and leverage them accordingly.

Developing and distinguishing learning agility. Determining an individual's level of learning agility, early in their career, becomes instrumental in providing people with the right developmental opportunities. Learning agile individuals absorb as much as possible from learning experiences and apply the learning in challenging situations they face later in their careers (Eichinger et al., 2010). This aptitude to apply learning to new situations is what differentiates an individual's ability to attain and sustain successful performance in situations of change and adversity (McCall, Lombardo, & Morrison, 1988).

Successful individuals develop knowledge, skills, and abilities over their entire career (Lombardo & Eichinger, 2000). Research conducted on executives (again, a very specific population that serves as a data source for application beyond the business world) has shown that successful executives, versus executives who have failed, learned from job assignments. They learn from early career assignments, first supervisory experiences, project work, start-up businesses, fix-it businesses, and turnaround businesses. Furthermore, increases in scope — meaning an expansion of responsibilities, tasks, and authority — have been shown to provide challenging and key opportunities for learning. Developmental assignments and providing challenging opportunities seem to be the best ways for executives to learn valuable lessons from failure and to succeed as they move to higher levels of scope (McCall et al., 1988).

Developmental assignments are not the only way to learn from experience. Having a variety of different managers or leaders can teach individuals about organizational practices and politics (McCall & Lombardo, 1990; McCall et al., 1988). Providing high learning agile individuals with leaders with diverse styles can be beneficial for the longevity of their careers (McCall et al., 1988). Working with individuals who are different may help them learn how to accommodate different styles and make adjustments to their style in pursuit of a common goal. Organizational agility, the ability to politically move through an organization to get work done in an effective and efficient manner, may be a skill developed as individuals work their way up the ladder (Eichinger et al., 2010).

Because highly learning agile individuals learn from experience and apply it in new situations, self-awareness and response to feedback are critical competencies in

increasing their effectiveness. This self-awareness may be gained early in one's career by providing learning agile individuals with planned developmental assignments. For instance, a planned developmental assignment may be described as a "zigzag" or lateral move to provide the breadth of knowledge that later in their career they may leverage as they are placed in strategic and ambiguous situations (Korn/Ferry International, 2011). Providing feedback consistently and candidly in order to increase their awareness could reinforce these opportunities.

Resilient individuals who learn from experience tend to remain successful throughout their careers longer than individuals who hide, defer, or avoid accountability. Exposure to diverse assignments, composure under pressure, maturity with problems, and greater interpersonal skills are key aspects that vary between accounts of success and failure. Many who get derailed in their careers did not admit their mistakes and did not allow themselves the opportunity to learn from those mistakes. High learning agile individuals accept accountability and deal with conflict in a constructive, non-defensive manner, providing them greater opportunity for success (DeMeuse et al., 2010).

Measuring learning agility. The Choices Architect® and viaEDGE™ are two measurements used to assess learning agility. Findings suggest a normal distribution among the general population within organizations. No significant gender, age, or cultural differences have been determined. Most importantly, the construct has shown to be relatively stable. According to DeMeuse et al. (2010), "Test-retest reliability coefficients (30-day interval) ranged from 0.81 to 0.90 for different facets of learning agility" (p. 125).

When it comes to performance, high performers scored significantly higher in learning agility than low and moderate performers (Eichinger & Lombardo, 2004). Furthermore, when high learning agile people were promoted, their performance was rated higher than people with low or moderate learning agility scores. It may be that learning agility contributes to successful performance when promoted because there are many new and challenging learning opportunities, keeping the highly agile learner engaged.

It can be argued that high learning agility is, at times, more important in certain jobs and at certain career stages than pure high performance. As individuals move to higher levels in their careers, leadership tends to require more conceptual and less tactical skills. Depending on the demands of the job, leaders may be asked to play different roles, at different times, with different people. As leaders are asked to play an increasingly complex role in today's organization, learning agile leaders are better equipped to deal with these pressures. Leaders who can balance role ambiguity or role clarity may be more effective than leaders with polarized views (DeMeuse et al., 2010).

Theoretical Framework: Goal Orientation

Goal orientation has been considered "relevant to learning agility" (DeMeuse et al., 2010, p. 126) and provides groundwork in empirical data for the limited research published on learning agility. Although goal orientation only informs part of what has been established as the independent construct of learning agility, it is particularly relevant to the theoretical framework of this study since it additionally provides an empirical base in the sport industry. Understanding individual behavioral patterns toward motivation and goal attainment is valuable in predicting potential successful performance.

Achievement goals define the reasons one participates in certain behaviors and may explain motivation toward that behavior (Maehr, 1989). Attributions toward success and failure can directly affect the way one approaches future behavior (Nicholls, 1978). Goal orientation has been studied deeply in the sport psychology research.

Conceptual history of goal orientation. Goal orientation was simultaneously, yet independently, explored by several theorists. Nicholls (1975) and Dweck (1986) are two of the leading researchers who established goal orientation as a measure of how children attributed achievement. Each researcher approached the concept in a different way; however, the findings were quite similar. Dweck (1986) developed her theory of goal orientation upon intelligence. Nicholls (1975) based his theory of goal orientation upon perceived views of competence.

Dweck (1986) discovered goal orientation not only informed how success and failure were attributed by children, but about motivational patterns toward goal attainment. A learning orientation affects task choices one will pursue by focusing on process and mastery through exerted effort. To acquire knowledge, skills, or abilities, learning oriented individuals are not afraid or ashamed to display ignorance or incompetence. In contrast, a performance orientation may affect task choice and persistence of action which is determined by the assessment of perceived ability. A person with a tendency to be performance-oriented may tend to engage in tasks only where they feel confident in the probability of success and shy away from tasks that may exhibit their incompetence (Dweck, 1986).

Individuals with a learning goal orientation tend to interpret obstacles, challenges, or difficulties as a prompt to increase effort and make adjustments; both can be a result of

improved performance in times of adversity. Individuals with a performance goal orientation tend to interpret failure as a result of their ability, not effort. Thus, errors are attributed to a lack of ability and may be perceived as a prediction of future failures. Withdrawal of effort and a decrease in performance may occur during times of challenge and as a result of defensive coping reactions (Dweck, 1986).

People with performance orientation are more likely to use defense mechanisms to protect the perception inability. For instance, self-handicapping is a defense mechanism that may occur when feelings of inadequacy transpire and one's ability to perform successfully in a task is questioned (Elliot, Cury, Fryer, & Huguet, 2006). Holding back effort may be exhibited as a precaution toward possible failure. This lack of effort is demonstrated to ensure ability cannot be attributed to the potential failure. If failure occurs, one's conscious lack of effort is accredited (Riggs, 1992). Self-handicapping is therefore a maladaptive coping mechanism. Clear adaptive and maladaptive motivational patterns have been established in the research on achievement behavior. Adaptive patterns of motivation encourage the attainment and maintenance of personally challenging achievement goals (Dweck, 1986). Maladaptive patterns of motivation are related to lack of effective goal setting and may lead to destructive and ineffectual behavior toward those goals. Adaptive patterns have been linked to learning orientation and promote persistence, perseverance, and challenge seeking. Maladaptive patterns of behavior have been linked to avoidance of challenges, helplessness, and lower persistence when faced with adversity (Dweck, 1986).

Dweck was not the only researcher at the time investigating goal orientation. Nicholls (1975) described an approach to achievement motivation. His research looking

at child development defined individuals as either task or ego oriented and found they adopted goals accordingly. Task orientation defines success based on past performance. Ego orientation defines success based on a comparison to others. Unlike the earlier discussed model of goal orientation, task and ego orientation both use performance as a measure of competence (Nicholls, 1975).

Similar to Dweck, Nicholls (1975) explored concepts of effort and ability as causal attributions on how children define success and failure. However, Nicholls found an individual's self-concept was an antecedent of success or failure attribution. Individuals logically draw causal conclusions, on the basis of outcomes and attributions, on the basis of "self-enhancing, approval-seeking, or defensive motives" (Nicholls, 1975, p. 379). Effort is controlled internally and can be recognized and monitored rather than inferred, as in the case of ability. When tasks and outcomes are thought to be important to self-concept, defensive mechanisms or "self-enhancing interpretations" (p. 381) become more relevant than when a task is deemed as unimportant (Nicholls, 1975). Ability, on the other hand, is a capacity in relation to effort. According to Nicholls (1978), "Ability refers to what a person can do, and evidence of optimum effort is required before we accept performance as indicative of ability" (p. 800). Therefore, effort must exist to its fullest potential for ability to be completely realized. Hence, effort and ability are not independent concepts but interdependent (Nicholls, 1978).

Effort may be determined by task difficulty. If few people are able to succeed at a task, it may be attributed to a special skill or acquired ability. Therefore, success in tasks that few people succeed can be considered due to ability rather than effort. The pattern found in achievement motivation research suggests individuals with high self-concepts of

ability are more likely to participate in challenging situations with drive and persevere despite the possibility of failure. Therefore, ego oriented individuals possessing a high level of competence in their ability exhibit similar patterns as task oriented individuals; both engage and persist in difficult tasks (Nicholls, 1978).

Because sport clearly uses performance as a measure of success, Nicholls' goal orientation theory seems to fit well within the fundamental nature of competition. In many individual sports, such as track and field, golf, and swimming, successful performance is measured by an assessment of improving upon past performances. Taking seconds or even fractions of seconds off of one's best performance can be constituted as a success.

Personal performance is not the only measure of success or failure in sport. Many team sports use outcomes as the factor of how well the team performed against the competition, defined by a clear winner and loser. The outcome based measure of success or failure undoubtedly exemplifies ego orientation, in that assessment of competence is based upon a comparison to others.

Goal Orientation in Sport

Many of the studies of goal orientation in sport have examined students of physical education classes. The psychological characteristics influencing potential success can be assumed to be different between elite athletes and recreational participants enrolled in sport classes, due to the physical dedication and mental commitment to sport. Therefore, the focus of the research reviewed as a foundation for this study will consist of research utilizing competitive athletics. The sport psychology research has explored the relationship between goal orientation and the purpose of sport (Duda, 1989; Roberts,

Hall, Jackson, & Kimiecik, 1995; Whitehead, 1995), definitions of success and failure (Duda, 1985; Duda & Nicholls, 1992; Duda & White, 1992; King & Williams, 1997; Roberts & Treasure, 1996; Van-Yperen & Duda, 1999), explanations of behaviors and achievement strategies (Roberts et al., 1995), and stress-coping strategies (Pensgaard & Roberts, 2003). Findings within a sport context have consistently supported previous results conducted within an academic setting.

Similar to findings in academic settings, task oriented involvement engages learning or mastery as a determinant of goal attainment and competence, on the basis of improvement upon past performances (Duda, 1985, 1989). Ego oriented involvement engages judgments of social comparison to assess goal attainment and bases perceived competence on external judgments. Whereas ego orientation relates to perceived views of ability, task orientation relates to exerting effort (Duda & White, 1992; King & Williams, 1997; Van-Yperen & Duda, 1999).

Definitions of success and failure can be classified by categories specific to personal characteristics, particular behaviors, or situational outcomes (Duda, 1985). According to Duda (1989), "Beliefs concerning the purpose of sport among high school athletes were significantly predicted by whether the athlete focused on skill mastery and personal improvement (i.e., a task orientation) or being better than others (i.e., an ego orientation)" (p. 329). Ultimately, goal orientation is an important mediator of task choice, performance, persistence, and exerted effort (Duda, 1995; King & Williams, 1997). One's goal orientation provides a means to differentiate athletes in a competitive setting (Roberts et al., 1996).

Competitive athletes will most likely act, feel, and think in a way in which their behavior will approach success or avoid failure to demonstrate competence (Ciani & Sheldon, 2010; Duda, 1985, 1989, 2007; Duda & White; 1992). Over the past decade, the achievement orientation research classified goal orientation as a 2 x 2 framework, accounting for the task-ego and approach-avoidance distinctions (Ciani & Sheldon, 2010; Elliot, Murayama, & Pekrun, 2011). Primary findings remain consistent with past research; however, results specific to task avoidance goal orientation have been inconsistent. The concept seems to be difficult to understand and measure because task avoidance is "striving to avoid performing worse than one's past performance" and seems to be subjective and easily confused with the concept of task approach goal orientation, which is improving upon past performances (Ciani & Sheldon, 2010, p. 129). Researchers suggest older athletes may be primarily task avoidance goal oriented, due to the desire to slow the natural deterioration of their skills and ultimately their performance. Researchers advise that learning from past experience may provide task approach goal oriented athletes the lessons needed to improve in new ways (Ciani & Sheldon, 2010). However, these assumptions continue to need supportive empirical evidence.

What has been proven is a link between perceived ability, goal orientation, and consequent behavior. When ability is perceived as high, both ego oriented and task oriented individuals respond to achievement opportunities with behaviors considered adaptive, such as determination and perseverance. When perceived ability is low, an ego oriented individual may adopt maladaptive behaviors, such as withdrawal or lack of

persistence (Duda, 1989, 2007). These are similar findings to the earlier discussed goal orientation theorists.

Research continues to demonstrate that ego orientation is related to the use of maladaptive coping strategies, such as denial (Pensgaard & Roberts, 2003) and self-handicapping (Elliot et al., 2006). Ego orientation has been found to relate to athletic anxiety. Because task oriented athletes are less concerned with the evaluations of others, they seem to demonstrate more problem-focused coping strategies (Pensgaard & Roberts, 2003). Problem-solving behaviors may lead to a perceived intrinsic control athletes have over their goals, skills, and ability. In contrast, ego orientation has been linked with performance impairment; due to stress caused by external factors out of the athlete's control (Van-Yperen & Duda, 1999).

Athletes high in task orientation tend to choose moderately challenging tasks to be motivated through intrinsic activities, to persist through adversity (Duda, 1995), to display cooperative behavior, to see the value in trying hard, to socialize into following the rules, and to have more positive feelings of self-esteem (Duda, 1989; Duda & Nicholls, 1992; Roberts et al., 1995). Athletes high in ego orientation tend to be extrinsically motivated, to choose very hard or very easy tasks as an excuse to withdraw effort or devalue the task (Duda, 1995), to view sport as a way in which social status can be increased, and to teach individuals how to succeed through challenges elsewhere in their lives (Duda, 1989; Duda & Nicholls, 1992; Roberts et al., 1995). Clearly goal orientation is related to several dispositional tendencies and behavior.

Dispositional tendencies of goal orientation may be a result of childhood experiences. Thus, goal orientation can be considered a result of learning from

experience and developing a tendency to apply that learning. Goal orientation influences how athletes interpret and respond to performance in achievement settings (Duda, 1995). According to Whitehead (1995), "Between the ages of 5 and 13, most children go through four phases in discriminating between ability and effort as determinants of performance, until they recognize ability as capacity which limits the effect of effort" (p. 433). Children near this age begin to understand success can be achieved with an increase in effort, even when the presence of ability is low. This type of awareness may be deemed as more of an adult conception of ability.

Therefore, children who are in middle school, who have not developed the connection of effort to outcome, may feel the need to drop out of competitive sport to avoid failure when an ego orientation is present and ability is deemed as low (Whitehead, 1995). Additionally, athletes with an ego orientation and low perceived ability may find few opportunities to exhibit competence in a competitive athletic setting. Therefore, it may be that ego oriented athletes with a low perceived level of ability would select or be selected out of competitive sport, leaving only ego oriented individuals with a high level of perceived ability remaining at elite levels of competitive sport (Duda & Nicholls, 1992).

Even though achievement orientations differ by age, they seem to be generalized across athletics. As athletes age, task orientation seems to decrease. This decline in task orientation may be because of the situational factors of sport, reinforcing ego orientation (Whitehead, 2004). The situational factors of elite sport may specifically affect achievement orientation. Task oriented individuals with low levels of competence at the elite stages of competition may receive fewer opportunities to develop skills and "more

likely be bench warmers" (Duda & Nicholls, 1992, p. 291). In general, "Sport seems structured for showcasing athletic prowess and weeding out those with less talent" (Duda & Nicholls, 1992, p. 297).

Because situational factors may evoke different goal oriented reactions, it is understandable how task and ego orientation may be presumed as independent dimensions (Roberts et al., 1995). The interdependence of the orientations, termed orthogonal, has been established within athletic and academic settings (Gernigon, Arripe-Longueville, Delignieres, & Ninot, 2004; Pensgaard & Roberts, 2003). Researchers suggest it may be advantageous for athletes to adopt a task orientation in practice and an ego orientation in competition (Duda 1995; Roberts et al., 1995). Findings suggest athletic success may be influenced by an increase in effort and working hard during practice thus leading to skill development, which are attributes of task oriented athletes.

Researches have implied that athletes' high in task and high in ego orientation may have the highest propensity toward success (Van-Yperen & Duda, 1999). However, research findings are inconsistent, failing to prove any conclusions definitively. Some results suggest high task/high ego oriented athletes behave similarly to that of high ego orientated subjects (Roberts et al., 1995), and other research has demonstrated they behave similar to high task oriented subjects (Roberts et al., 1996). Perhaps this inconsistency may be explained by thinking of achievement orientation as a means to an ends. In order to be ego oriented and appear competent to others, one may need to be task oriented to master skills. However, ultimately being recognized for winning is essential in sport; the judgment of others being deemed and reinforced as important makes sense.

Perhaps high levels of task orientation may potentially neutralize the maladaptive effects of high ego orientation (Roberts et al., 1996). Task orientation has proven to be a factor in performance improvement and skill development (Van-Yperen & Duda, 1999). This connection conceivably could be an important determinant in the selection process of prospective student-athletes. However, the environment of competitive athletics may foster more of an ego orientation of "interpersonal competition, public evaluations, and normative feedback" (p. 363) ultimately diminishing the tendency to be task oriented (Van-Yperen & Duda, 1999). As athletes move into higher levels of competitive sport, ego orientated behaviors seem to continually become more pronounced (Duda, 1989; Gernigon et al., 2004).

Perceived competence becomes an extremely important factor to motivation and attributions in sport. It may be assumed task oriented individuals have an advantage of viewing effort and learning as a means to success. However, in higher levels of competitive sport, it can be argued all athletes have a high level of ability, or they would not have succeeded to the elite stages of sport. Therefore, it becomes doubtful that ability alone will result in success at higher levels of athletic participation. Successful elite athletes may need more than just talent.

Performance Measures in Sport

Cited above, elite athletes tend to be ego oriented and rely on external performance indicators as a measure of achievement and success. Therefore, one way to measure successful performance in sport is to observe and track game-related statistics. Game-related statistical analysis is presently one of the most commonly used methods to analyze basketball performance (Sampaio, Ibáñez, Lorenzo, & Gomez, 2006). Coaches

use game-statistics to evaluate performance because it offers a valid, objective, and reliable way to analyze performance (Ibáñez et al., 2009; Sampaio et al., 2004).

Game-related statistics. A group of researchers in Portugal have dedicated years of research to better understand how game-related statistics relate and discriminate with various elements in the game of basketball (Sampaio et al., 2004). These researchers first set out to see if game-related statistics could classify performances by a player's level of competition. Findings suggest more senior players recognize and anticipate competitor actions as well as more accurately expect environmental outcomes (Sampaio et al., 2004). Patterns were identified by level of competition by player game-statistics.
For example, a skilled center can secure an offensive rebound near the basket and, based on contextual information, decide to pass the ball to the guard to restart the offensive phase. Probably, the response in this game situation of a less skilled center could be to attempt a field-goal that would be unsuccessful or be blocked by a defender (Sampaio et al., 2004, p. 1237).

Researchers continue to classify basketball performance through game-related statistics and look at starters (those who play at the start of the game) and non-starters (players on the bench at the start of the game). Since coaches are deliberate about the process they take to identify players who start games, it is understandable that researchers explore game-related statistics between starters and non-starters and how these statistics affect game outcomes. In general, starters were characterized as quicker and better decision makers than their non-starter counterparts. According to Sampaio, Ibáñez, Lorenzo, & Gomez (2006), "When best teams won games, differences were also attributable to assists and characterize starters as better on making fast decisions in

passing the ball to a player in a favourable position to score" (p. 492). Findings suggest starters committed fewer fouls, a game-related statistic associated with team wins. Overall, starters were characterized by profiles defined by game-statistics, while non-starters outcomes were less clear and could not be defined by homogeneous results (Sampaio, Ibáñez et al., 2006).

Starting position is not the only deliberate decision coaches make to establish successful teams. Research that differentiates game-statistics associated with winning and losing teams aids coaches in making important game decisions (Ibáñez et al., 2009). Findings determine that two-point field goals and assists are found to be related with successful teams. Additionally, winning teams have higher 3-point field goal percentages and higher defensive rebounds (the ability to recover an opponent's missed shot), suggesting they are better conditioned to shoot from farther away and compete for ball possessions. Generally, research suggests decision-making, accurate game interpretation, anticipation, team coordination, and overall smart plays become more important as consecutive games occur. However, the effect of fatigue on performance, through game-statistics, is still unclear (Ibáñez et al., 2009).

Most importantly, for this study, research findings suggest the demands across playing position differ. Clear profiles discriminating guards, forwards, and centers across three different leagues have been established. Most of the results can be explained by "basket proximity" (Sampaio, Janeira et al., 2006, p. 177). Guards and centers game-related statistics tend to be offensive, since they play close to the basket for easy 2-point field goals or far away from the basket for 3-point field goals. Similarly, differences between forwards and centers tend to be defensively related, and they play mid-court in

transition where the majority of the physical contact takes place. However, differentiating within position becomes more difficult (Sampaio, Janeira et al., 2006).

Because players are all talented at the elite level, and players are asked to play similar roles by position, the difference between successful and non-successful players seems to be psychological (Sampaio, Janeira et al., 2006). Discriminative game-related statistics have proven to differentiate between basketball level of completion (Sampaio et al., 2004), starters and non-starters (Sampaio, Ibáñez et al., 2006), game outcomes (Ibáñez et al., 2009), and playing positions (Sampaio, Janeira et al., 2006). However, no known research has attempted to explore the psychological characteristics associated with potential for future successful performance, through game-related statistics.

Psychological Characteristics

Currently, the empirical research evaluating potential success in sport does not always inform practitioners (Weinberg & Gould, 1995). However, coaches and athletes often cite psychological aspects of sport and competition as the defining factor to high achievement in sport. Furthermore, psychological factors may be what affect an individual's competitive edge. According to Comper (1993), "Many coaches will also remark that the difference between elite and sub-elite athletes of equal physical caliber lies in their motivation, in their will to win, or their ability to psych themselves up" (p. 79).

Few studies in sport have explored the relationship of cognitive ability and performance. Of the studies exploring the relationship between intelligence and potential athletic success, limited significant relationships have been established (Adams & Kuzmits, 2008; Kuzmits & Adams, 2008; Lyons, Hoffman, & Michel, 2009). The

National Football League (NFL) uses the Wonderlic Personnel Test to assess potential draft picks; however, correlations proving any connection to successful performance in the NFL has yet to be established (Lyons et al., 2009).

The NCAA explored the relationship between sport participation and academic performance and found significant relationships defined by the type of sport one played. The student-athletes associated with revenue generating sports, such as football and basketball, were more likely to be related to low academic performance than other sports (Understanding academic performance, 1991). The reasoning behind the findings was not identified; in addition, environmental and psychological factors were areas suggested for future research.

Consequently, the research informing the psychological aspects of student-athletes have been inconsistent and unreliable (Comper, 1993). There is little research in sport conceptualizing the psychological characteristics of elite collegiate student-athletes. There seems to be even less research, for selection and recruiting purposes, that dimensionalizes the aspects that contribute to the potential of these prospects to succeed at the next level of competition where complexity increases (Comper, 1993). Of the empirical research done on the psychological concepts contributing most to potential success, the term used is often referred to as mental toughness.

Theoretical framework: Mental toughness. Mental toughness has been referred to as "one of the most used but least understood terms in applied sport psychology" (Jones et al., 2007, p. 244). Mental toughness can be described as having an edge on the competition, by utilizing an ability to cope with the intricacies of the demands of specific sports. Specifically, a mentally tough athlete is essentially more consistent and better

than others in "remaining determined, focused, confident, and in control under pressure" (Jones et al., 2007, p. 247). Because of their psychological skills, mentally tough athletes produce higher levels of performance and with higher consistency.

Drive, leadership, stress management, coachability, self-belief (Humara, 2000), motivation (Duda & Nicholls, 1992), and ability to deal with distractions and unplanned events (Gould, Eklund, & Jackson, 1993; Gould, Guinan, Greenleaf, Medbury, & Peterson, 1999) are psychological factors contributing to successful athletic performance and can be holistically perceived as mental toughness. Mentally tough athletes, through awareness and personal experience, believe in their abilities. They believe successful performance is achievable and drive relentlessly toward the goal. A perceived arrogance may be otherwise described as "knowing that they can take on and beat the best in the world" by working through adversity and obstacles (Jones et al., 2007, p. 248).

Mentally tough athletes adapt to any given situation and respond to specific environmental factors. They attribute successful performance to both ability and effort. They are competitive with both themselves and with others. They are self-aware and know where they need to improve to continue to grow and get better. According to Jones et al. (2007), "They are not afraid to put themselves on the line" (p. 254). They make the tough decisions under pressure situations and enjoy the experience. They are resilient and not afraid of making mistakes (Jones et al., 2007).

Mentally tough athletes "learn from what happened and pick out the learning points to take forward for future performances" (Jones et al., 2007, p. 259). They know they can persevere through failure; thus they learn from the experience and do not avoid failure. They use what failure has taught them to succeed in the future. They tend to be

learning oriented and stay focused on the task at hand, not distracted by the outcome; "winning can be considered a bonus" (Jones et al., 2007, p. 258).

Mental toughness has been seen by coaches, athletes, and sport psychologists as the major psychological contributor to sport success (Connaughton et al., 2010; Connaughton et al., 2008; Crust, 2007; Crust & Azadi, 2010; Gucciardi et al., 2012; Jones et al., 2007; Thelwell et al., 2010; Weinberg et al., 2011). However, empirical research has not provided conceptual clarity. Researchers have yet to agree upon a definition, which has led to the failure of developing valid measurements (Crust, 2007).

Conceptual advancement of mental toughness. Most of the early work on mental toughness was qualitative. Higher level themes appeared around belief, focus, goals, controlling the environment, pushing to the limit, regulating performance, handling pressure, awareness and control of thoughts/feelings, handling failure, and handling success (Jones et al., 2007). In 2002, Jones, Hanton, and Connaughton established a definition of mental toughness that they later validated as:

> Having the natural or developed psychological edge that enables you to: generally, cope better than your opponents with the many demands (competition, training, lifestyle) that sport places on a performer; specifically, be more consistent and better than your opponents in remaining determined, focused, confident, and in control under pressure. (Jones et al., 2007, p. 247)

However, the extent of how generalizable the qualitative findings are beyond elite performers is unclear. The population used by Jones et al. (2007) was world-class athletes, coaches, and sport psychologists who worked with them. On the basis of the definition, mental toughness is an endpoint. Jones et al. (2007) provided the

characteristics associated with this desired endpoint, but they don't go beyond that to explain how to get there.

Around the same time, another set of researchers developed a theory of 4C's of mental toughness (Clough, Earle, & Sewell, 2002). The 4C's of mental toughness are control, commitment, challenge, and confidence. One of the assumptions of this theory is that people that are mentally tough view adversity as a challenge, and use the experience as an opportunity for growth and development. Clough et al. (2002) found and defined the construct as:

> Mentally tough individuals tend to be sociable and outgoing; as they are able to remain calm and relaxed, they are competitive in many situations and have lower anxiety levels than others. With a high sense of self-belief and an unshakeable faith that they can control their own destiny, these individuals can remain relatively unaffected by competition or adversity. (p. 38)

To address the previously stated limitation of qualitative mental toughness research, Clough et al. (2009) developed an assessment to measure the 4C's called the Mental Toughness Questionnaire 48. Even though the instrument has backing with construct validity, there is still lack of information on psychometric rigor placed on the development of the measure (Gucciardi, 2010). Even more, it seems the 4C's model was grounded in a theoretical framework based on a concept of hardiness, a dispositional concept that incorporates control, commitment, and challenge (Kobasa, 1979). Conceptually, developing a theory based on research from another field without generalizable findings may be problematic (Gucciardi, 2010).

Still addressing the limitation of qualitative research, Gucciardi, Gordon, and Dimmock (2009) used qualitative research to inform quantitative measures of mental toughness. Their main goal was to understand the process of how mental toughness enabled athletes to succeed. Core competencies were defined as the ways that athletes approached, assessed, and answered the demands of sport through self-awareness and feedback. The following definition was proposed:

> Mental toughness is a collection of experientially developed and inherent sport-general and sport-specific values, attitudes, cognitions, and emotions that influence the way in which an individual approaches, responds to, and appraises both negatively and positively construed pressures, challenges, and adversities to consistently achieve his or her goals. (Gucciardi et al., 2009, p. 2).

Even though the research addresses the limitations in previous methodology, most of the research conducted by Gucciardi and colleagues is in one sport, Australian football, and may be limited by "contextual boundaries of this unique sport, thereby limiting the ability of their model to generalize to other sports and contexts (e.g. organizational settings)" (Gucciardi, 2010, p. 617). Generally, the mental toughness research has concluded that:

> Mental toughness is multifaceted; made up of multiple key components including values, attitudes, cognitions, emotions, and behaviours; consists of a core group of key components that would not vary significantly by sport (e.g. self-believe, attention control, self-motivation/work ethic, positive and tough attitude, enjoy and handle pressure, resilience, quality preparation, and sport awareness); and is important for both positive (e.g. winning streak) and negative (e.g. injury) life experiences. (Gucciardi, 2010, p. 617)

Measurements. The concentration of the mental toughness research primarily has been on identifying a definition and dimensions. Some think an "insufficient effort has been devoted to the development of a reliable and valid measure of mental toughness in sport" (Sheard et al., 2009, p. 186). Of the research devoted to development of a mental toughness measurement, there has been insufficient psychometric evidence supporting the use of the tools in practice. The lack of accurate measurements may be due to the lack of a conceptual definition of mental toughness, and therefore the construct is difficult to measure (Connaughton et al., 2008). The major measures in the current research are the Mental Toughness Questionnaire 48, the Mental Toughness Inventory, the Psychological Performance Inventory, the Sports Mental Toughness Questionnaire, and the Cricket Mental Toughness Inventory.

The Mental Toughness Questionnaire 48 (MTQ48; Clough et al., 2002) measures overall mental toughness and the subscales (commitment, emotional control, life control, challenge, interpersonal confidence, and confidence in abilities) defined by Clough's 4C model. However, little evidence of psychometric rigor of the instrument's development has been published, and the validity of the scale has been scrutinized (Sheard et al., 2009).

The Mental Toughness Inventory (MTI; Middleton et al., 2004) is comprised of sixty-five questions measuring twelve components of mental toughness. Even though the MTI has evidence of construct validity, there does not seem to be further support for a sound theoretical foundation. The primary concern of the measure is the limited population used for validation purposes. Only elite adolescent age high school athletes

(mean age of 14 years old) were used during the psychometric testing of the instrument. Further testing is recommended to determine generalizability (Middleton et al., 2004).

The Psychological Performance Inventory (PPI; Loehr, 1986), much like the MTQ48, was presented with little evidence in the grounding in psychometric support. Analysis of the use of the tool has been tested, and little support has been established for the instrument (Sheard et al., 2009). Further research was conducted to develop an improvement to the measure, the PPI-A. The confirmatory factor analysis offered support for the PPI-A having psychometric backing (Sheard et al., 2009). However, the main flaw determined in the research is the omission of control as a factor in the scale. Control is repeatedly found in the research as a consistent element of mental toughness. The oversight of adding the dimension to the PPI-A measure is deemed as an insufficient measure of the multidimensional construct of mental toughness (Jones et al., 2007).

The Sports Mental Toughness Questionnaire (SMTQ; Sheard et al., 2009) has shown primary psychometric support. However, little research has used the measure to date. Collecting mental toughness data over time is recommended to establish construct validation (Sheard et al., 2009).

Sport-specific measurements have been established to avoid the limitation of generalizability. Gucciardi (2011) developed and replicated significant findings with independent samples for validation of the Cricket Mental Toughness Inventory (CMTI). The homogeneous sample does not provide generalizable findings and has limited contributions to other sports (Gucciardi, 2011).

Overall, measurements of mental toughness to date have been insufficient. Inconsistent findings may be due to insufficient measurements, ultimately due to the lack

of a clear definition. It would seem a concept would be difficult to measure if researchers do not know what they are measuring. According to Gucciardi et al. (2012):

> It might be more prudent for researchers to pursue a common understanding to formulate a consensual definition and the primary facets that do and do not belong to it, rather than taking a statistical approach to validate a specific measurement model. (p. 18)

Development. Within the last few years, many researchers have focused attention on the development of mental toughness. Using the results from some of the mental toughness measurements, such as Loehr's PPI, researchers have profiled the strengths and weaknesses of athletes for developmental purposes. According to Connaughton et al. (2008):

> Many specific mental skills training programs have been designed to develop mental toughness in performers, as it was believed mental toughness was not an inherited gift but the fruits of learning which were acquired through hard work, understanding, and practice. (p. 196)

Both positive and negative experiences have proven to aid in the development of mental toughness (Gucciardi, 2011). However, no psychometric support has been offered for the PPI. Therefore, inaccuracies may be found when using the PPI, due to the lack of predictive validity (Connaughton et al., 2008).

Other developmental strategies have been established around mental toughness. Self-talk, emotional control, and relaxation methods have been found to be important with the use of psychological strategies in a practice setting. In a competitive setting, the same three strategies correlated significantly with mental toughness as well as goal-

setting. Additionally, environmental factors play an essential role in the development of mental toughness (Crust & Azadi, 2010).

Furthermore, research investigating elite athletes' mental toughness development has revealed four career phases; three phases of development and one phase of maintenance. Skill mastery, competitiveness, successes, international competitive experience, education and advice, the use of psychological skills, access to an understanding social support network, and reflective practice were all found to be factors that influence the development and maintenance of mental toughness (Connaughton et al., 2010). According to Connaughton et al. (2010), "In addition, competitive experience allowed performers to become more familiar with and cope more positively in future competitions, and being involved in a process of reflection enabled familiarization of competition-specific symptoms" (p. 190). It is thought these experiences provide individuals with the basis of learning to become self-aware and adjust to the environmental factors around them (Connaughton et al, 2010).

Spending time involved in sport may provide the opportunities to gain learning from experience; however, if the desire to learn is not there, little may be gained. When looking at years of playing experience and desire to achieve, an inverse relationship was found. Exposure alone may be insufficient to learn from experience; engaging in reflective, behavioral, or cognitive practice may be the best way to develop mental toughness (Gucciardi, 2011).

When asked about how mental toughness is built in their athletes, coaches indicated they create a challenging practice environment, positive mental environment, and opportunities for mental toughness learning (Weinberg et al., 2011). According to

Weinberg et al. (2011), "Thus, helping athletes to develop game plans and constructively learn from their strengths and areas for improvement (successes and failures) may become an important part of practice as much as actual physical practice" (p. 170). Coaches can help establish the right environment to help athletes develop mental toughness.

Summary and Conclusions

To most descriptions of the construct, mentally tough athletes seem to be high learning agile. They can identify what to do when they don't know what to do. Research on mental toughness has demonstrated the "need to develop a valid and reliable measure" (p. 262) allowing mental toughness to be assessed (Jones et al., 2007). Learning agility may help bridge the identified gap between research and practice in sport psychology.

Even though the construct was developed for leadership in business, the need it fills in business is very similar to the current need in sport. Coaches continually seek better ways to evaluate the qualities of prospective student-athletes and how these qualities can inform or predict successful sport performance (Giacobbi, 2000). In today's world of doing more with less, the construct of learning agility measures the capability of individuals to excel in a world of ambiguity and autonomy (Korn/Ferry International, 2011). Learning agility may help coaches predict the potential of prospective student-athletes to be successful in a world dependent on working with others in a dynamically complex, constantly changing, results-driven environment of sport. Application of learning agility to the sport world seems to be a natural next step. The purpose of this study is to examine how learning agility may be used to assess the potential for successful performance in men's Division I basketball student-athletes.

Chapter 3: Research Design and Method

The purpose of this study was to examine how learning agility may be used to assess potential successful performance in men's Division I collegiate basketball student-athletes. This study focused on collegiate basketball guard's performance through a measure of game-related statistics. Potential was assessed by a measure of learning agility; the ability and willingness to apply learning to new situations (Eichinger et al., 2010). The methodology is presented below in the following sections: problem statement, hypothesis and rationale, research design, procedures, participants, instrumentation, data processing, assumptions and limitations, and ethical assurances.

Problem Statement

Evidence for successful prediction of potential has emerged in the organizational literature but has not yet been applied to collegiate athletics. Because collegiate athletics is a major financial industry, the need to predict potential performance in athletics has proportional financial implications (Robbins, 2010; Van-Yperen & Duda, 1999). Research shows as revenue sports, such as football and basketball, become successful and compete in the postseason, donations increase throughout the year and sometimes into the following year (Humphreys & Mondello, 2007).

Additionally, the NCAA has limited the number of scholarships schools can distribute each year, in an effort to maintain a subjectively equal level of talent among teams (NCAA, 2011). Therefore, with the spots for scholarship athletes limited, the recruitment of talent with high potential becomes strategically more important. If schools make errors assessing potential in prospective student-athletes, two things may result: (a) the loss of a scholarship spot to a lower potential athlete, or (b) the loss of a high-

potential athlete to a competitor or rival team (Spieler et al., 2007). Therefore, accurately assessing potential talent is truly crucial to the success of collegiate sport.

Hypothesis and Rationale

The inquiry of this study is: Does the performance of higher learning agile student-athletes improve at greater rates than the performance of lower learning agile student-athletes? H_1: A composite game-related statistical performance measure will increase by greater amounts, over time, in guards with high learning agility than in guards with lower learning agility.

A quantitative study explored the relationship between learning agility and student-athlete performance in Division I collegiate men's basketball. This study focused on addressing the research question through game-related performance statistics of collegiate basketball guards. For the purpose of this study, "performance" was assessed through use of basketball game-related statistics specific to playing position.

Research Design

To explore the relationship between learning agility and game-related statistics in basketball, the discriminating game-related statistics used in this study are based on the work of Sampaio, Janeira et al. (2006). They found at least 73.7% of specific game-related statistics could discriminate to correctly classify players by their respective playing positions. These results suggest the assessment of players and respective game-related statistics are homogeneous by playing positions.

Aside from the demographic variables of age (18-19, 20-21, 22 + years old); ethnicity (Caucasian, African-American, Asian, Hispanic, Other); years of experience (1-5, 6-10, 11-15, 15+); class status (freshman, sophomore, junior, senior); starting status

(starter, non-starter); and scholarship status (full scholarship, part scholarship, no scholarship), there are four types of variables measured in this study, as defined in Chapter 1: (1) games played, (2) learning agility, (3) player performance, and (4) coach assessment. Measurements of each of the variables are explained next.

Games played. Games played is the cumulative number of games in which a player has played. It is essentially a measure of time. If a player had played in the first three games of the season, missed the fourth, then played the fifth, that fifth game was recorded as the fourth game the player had played.

Learning agility. Learning agility was measured using the viaEDGE™, a self-report measure published by Korn/Ferry International that is comprised of an overall learning agility score and five factors of learning agility (DeMeuse et al., 2010). The five factors of the viaEDGE™ are mental agility, people agility, change agility, results agility, and self-awareness. To ensure the veracity of the data, five verification scales are used in the viaEDGE™ assessment. The verification scales are primarily used to identify people who attempt to disguise their true characteristics in order to receive a desired outcome. For example, some people may agree more strongly with a statement than they otherwise would have if they believe doing so will increase their chances of securing a learning agility score associated with a desired job or promotion (DeMeuse et al., 2011). As participants faced no positive or negative consequences as a result of this study, there was little motivation to manipulate scores. Completion of the assessment through the test publisher, Korn/Ferry, ensured participants' responses could be confidently compared to norm responses to allow for quality checks and perhaps to allow for additional, deeper analysis if necessary.

Player performance. Player performance was measured by summing six separate measures and averaging across minutes played per game. The specific measures chosen were identified by previous research as the most indicative contribution of basketball guards (Sampaio, Janeira et al., 2006). That is, solely by examining various game measures, an algorithm could correctly identify which position a person played better than 67% of the time and as much as 98% of the time (Sampaio, Janeira et al., 2006). It follows that these measures represent the areas in which each position is most likely to contribute to overall team performance. As this study was focused solely on the performance of guards, the measures chosen for this study are those that are best able to differentiate guards. They are:

- 2-point Field-Goals (made/attempted): Awarded points to a player who successfully manages to shot the basketball through the net, when within the three-point line (Wootten, 1992).
- 3-point Field-Goals (made/attempted): Awarded points to a player who successfully manages to shoot the basketball through the net, when behind the three-point line (Wootten, 1992).
- Assists: A pass to a teammate that leads to a basket. The player who passes the ball to another player who scores the basket is credited with an assist (Wootten, 1992).
- Free-Throws (made/attempted): An unguarded shot attempt taken from the foul line. The shot is awarded to players who are at the receiving end of an opponent's foul (penalty for breaking a rule of the game) (Wootten, 1992).

- Player Performance Score (PPS): Calculated for each player for each game in which they play more than five minutes. It was calculated as follows:

$$PPS = \frac{(assists+steals+3pfg+2pfg+fts-turnovers)}{minutes\ played}$$

- Steals: A gain of possession by a defensive player, usually on a pass or dribble. The offensive player is accredited the turnover, while the defensive player is accredited the steal (Wootten, 1992).
- Turnovers (reverse scored): A loss of offensive possession of the ball by passing the ball out of bounds, committing a foul, or having the ball stolen by the opposition. Turnovers were subtracted from the other elements of the player performance score (Wootten, 1992).

Game-related statistics divided by playing time to create "rate variables" has been used in several studies (Ibáñez et al., 2009; Sampaio et al., 2004; Sampaio, Ibáñez et al., 2006) and has proven to be a valid measure of game performance. The performance variable was measured at a continuous level and was not grouped into artificial categories such as high, moderate, and lower performance.

Coach assessment. Coach assessment was measured via a single question survey sent to a member of each of the participants' coaching staff. This survey item asked coaches to rate how much he or she thought each guard on their team has lived up to their potential over the past season(s) on a -3 to +3 scale with +3 being "Great Improvement, 0 being "No Change," and -3 being "Great Decline". Initial analysis was to determine the need to use or not use coach assessment data as supplementary.

Procedures

Twenty men's basketball programs were approached in order to recruit approximately 40 guards from Division I men's collegiate basketball programs. Initial contact was made by phone, email, or text to coaches in the researcher's network of contacts. Once the coach verbally agreed to be part of the study, the researcher e-mailed preliminary documents to the basketball program. Coaches were asked to forward the relevant documents (player introductory letter, player informed consent form, and player demographic information form) to the guards on their team who had collegiate experience so player statistics could be used for performance measurement. The preliminary documents were comprised of an introductory letter to the coach (Appendix A), and informed consent form to the coach (Appendix B), a one-page coach assessment survey (Appendix C), and introductory letter to the player (Appendix D), an informed consent form to the player (Appendix E), and a player demographic information form (Appendix F). Prospective participants were given a phone number to reach the researcher if they have any questions or concerns. Coaches were directed to return the one-page coach survey and coach informed consent back to the researcher by fax or email. Guards who agree to participate in the study were asked to sign the informed consent document, fill in the demographics form, and return it to the researcher via fax or email.

Once the researcher received consent from student-athlete participants, the researcher provided the names and email addresses to the Korn/Ferry Global Survey Center. Participating guards received a link from assessmentcenter@kornferry.com

allowing them to take the viaEDGE™ assessment. Guards completed the viaEDGE™ online and were able to download a summary report after taking the assessment.

Participating guards had two weeks to complete this assessment. Email reminders to complete the assessment were sent by the researcher to players seven days before it was due, three days before it was due, and on the day that it was due. An additional request was made two days before the assessments were due to the coaching staff to advocate for completion.

The viaEDGE™ assessment data was scored by Korn/Ferry. Korn/Ferry sent scored reports to the researcher. When the researcher received the reports from Korn/Ferry, names were removed and reports were coded with ID numbers for confidentiality purposes.

The researcher collected game-related statistical measures from archival game records (2011-2012 season and 2012-2013 season) from the school's basketball office, communications office, or official athletic department website. In addition to the game-related statistics, the coach assessment of how well the guard has lived up to the expectations of their potential was considered for analysis. Demographic data was requested by each player.

Overall learning agility scores were grouped into three categories: high (100-67), moderate (66-34), and lower (33-0) levels of learning agility. Averages were calculated within each category and then examined against composite game-related player performance scores by ANOVA analysis. All coaches who participated in the study received a summary of the aggregate results.

Participants

Approximately 40 guards from Division I men's college basketball programs participated in this study. A convenience sample, drawn from the researcher's network, comprised a preliminary set of potential participants. From there, a snowball sampling method was employed, in which coaches were asked for referrals of other schools that may be interested in participating in the study. The sampling process continued until an adequate number of guards agreed to participate.

Instrumentation

There are three different types of items used in the viaEdge's assessment of learning agility. Likert-type items present a statement and ask respondents to indicate how much they agree or disagree with it. An example statement is, "I like to experiment with new ways of doing things." Respondents can select either, "strongly disagree," "disagree," "neutral," "agree," or "strongly agree." A second type of item, work and life experience topics, ask respondents to answer questions like, "How many languages do you speak?" Individuals are given alternative from which to choose. The third and final type of item presents individuals with a workplace scenario, offers several alternative answers, and asks them to indicate what they would do in that situation (DeMeuse et at., 2011).

The internal reliability, for overall learning agility scale, contains a Cronbach's Alpha of .88. Construct validity was examined through both convergent and discriminant validity analysis. Related validated scales from Korn/Ferry, the *Learning from Experience*™ interview and *Choices*® multi-rater assessment, correlated with overall learning agility scales as measured by the viaEDGE™ at $r = 0.48$ and $r = 0.61$

respectively. Discriminant evidence came from correlations with the *Hogan HPI* and *HDS* personality assessments as well as from the *Decision Styles* assessment. There were several significant correlations between learning agility and measures on these assessments. However, these correlations were moderate and in the direction one would logically expect. Overall, the pattern of relationships found in the discriminant validity analysis indicates that the viaEDGE™ is measuring different constructs, as expected (DeMeuse et al., 2010).

Data Processing

Korn/Ferry facilitated data processing. Individual and aggregate reports were sent to the researcher for analysis. Data from this study was analyzed using a 3 x 2 x 2 repeated measures ANOVA. Learning agility scores, at three levels (high, moderate, and low), classified levels of learning agility for the purposes of this study. Composite game-related statistical scores were compared between the first and second halves of the non-conference season as well as between the first and second halves of the conference season. Because conference and non-conference season games represent different levels of challenge, player's scores were compared separately within each portion of the season as well as between each portion of the season.

Prior to this analysis, data was coded and reviewed for accuracy. Preliminary analyses were conducted to ensure all assumptions of the repeated measure ANOVA were met or could be mitigated. Any missing data in the Player Performance variable for a particular game was inputted for each player by using that player's average Player Performance score over the previous three games. Following this, descriptive statistics were calculated and examined. In addition, a graphical analysis of the data was analyzed

to identify any potential trends. Performance was plotted on the Y-axis and games (a measure of time) were plotted on the X-axis. Separate lines were plotted for players falling within each of the three levels of learning agility. Data from the Coach Assessment Survey may be used in a follow-up analysis if some idiosyncrasy in Player Performance scores prevented accurate and robust analysis.

Assumptions and Limitations

The research in this study was limited to male collegiate basketball student-athletes at the NCAA Division I level. Therefore, the findings may not be generalizable to athletes of different gender, age, experience, level of competition, or sport. Demographic data may not be generalizable beyond the parameters of this study as well. It was assumed all participants would be 18 years of age or older, constituting them as adults and able to volunteer freely to participate in the research study.

It was assumed each basketball program would have a varied level of difficulty in their schedule. Generally, programs schedule less difficult games early in the season during non-conference games and schedule more difficult games in conference season. Coaches tend to use the start of the season as a learning opportunity for the different strategies promoted by their program and provide players with developmental opportunities early in the season (Wootten, 1992). Thus, control measures were taken in this study to measure a point in time at the first half of non-conference play, the second half of non-conference play, first half of conference play, and second half of conference play.

Participants have a varied level of experience, prior to and during collegiate game play. Eligibility and injury may keep student-athletes from playing time. Controls, such

as composite scoring and rate variables, were placed to equalize statistics across players. Each player's results were divided by time played, by that player, to arrive at a derived rate variable (Sampaio, Ibáñez et al., 2006).

Presumptions were made that participants would respond to the self-assessment truthfully to all questions, since the viaEDGE™ assessment checks for this. It was anticipated the steps to ensure confidentiality and anonymity encouraged honesty. Players were informed of the measures taken to protect their identity and that no intended harm would result from participation of this study.

A limitation of the viaEDGE™ is that it is an organizationally based assessment. There are questions referring to the work-related behaviors, values, or preferences which may be less fitting to a student-athlete population that may not have years of experience in the workforce. However, it is assumed players would be able to understand the context of the described situation and be able to answer, as closely as they could, to what they might do in that situation.

Since learning agility has been found to be a "relatively stable construct" (DeMeuse et al., 2010), archival game-related statistics were used. Ideally, future-oriented measures would be used to determine potential performance; however, timing of the study did not provide that opportunity. The possible consequences of this approach are discussed in chapter five, when the limitations of the study are addressed.

Coaches were asked to complete a one-question survey. It is recognized that single-survey scales tend to be unreliable and generally not accepted in empirical literature. However, since the item was to be used to support the quantitative analysis

and not to serve as the main source of the analysis, the survey item is assumed to be adequate for that purpose.

Limited studies were found using game-statistics discriminating players by position. Used in this study are findings discriminating and defining players by position of Ackland et al. (1997) and Sampaio, Janeira et al. (2006). By using a narrow number of studies, as the basis of the methodology, the findings may be limited.

Ethical Assurances

All effort was made to protect the privacy and dignity of participants, in line with Institutional Review Board (IRB) regulations. Participants were exposed to no greater than minimal risk. The identification of the subjects/and or their responses would not reasonably place the subject at risk of criminal or civil liability or be damaging to the subject's financial standing, employability, insurability, reputation, or be stigmatizing, unless reasonable and appropriate protections were implemented, so that the risk to privacy and breach of confidentiality are no greater than minimal.

Players completed an online assessment and coaches completed a one-question survey, neither of which addresses sensitive topics. The documents linking players and coaches to this research were the informed consent documents and records. After informed consent documents were returned to the researcher, participants were coded with a participant ID. The viaEDGE™ assessment reports were coded with the appropriate participate ID as soon as received from Korn/Ferry. During the gathering of performance data, the informed consent records were checked to ensure that a player's performance is associated with the correct participant ID in the data file. Published data

and data shared with coaches were in aggregate form and no individual participant was identifiable.

Permission to approach student-athletes for consideration was acquired from the coaching staff, establishing the voluntary agreement of the athletic program to participate in the study. Informed consent forms clearly communicated the freedom of participants to agree or decline involvement in the study. Participants were given the right to withdraw from the study at any time.

To ensure confidentiality, the researcher ensured the coaching staff would not know who from their team participated. Only aggregate data were shared with coaches. Therefore, they did not know who, if any, of their guards participated in the study.

Chapter Summary

This quantitative study explored the relationship between learning agility and game-related statistics in basketball. Approximately 40 guards from Division I men's collegiate basketball programs were approached to participate in this study. A convenience sample, drawn from the researcher's network, comprised a preliminary set of potential participants. From there, a snowball sampling method was employed.

The variables measured in this study were: (1) games played, (2) learning agility, (3) player performance, and (4) coach assessment. Games played is simply the cumulative number of games in which a player has played. Learning agility was measured using the viaEDGE™, a self-report measure published by Korn/Ferry International that is comprised of an overall learning agility score and five factors of learning agility. Player performance was assessed by use of game statistics; these include assists, 3-point field-goals (made/attempted), 2-point field-goals (made/attempted), free-

throws (made/attempted), turnovers, and steals. Coach assessment was measured via a single question survey sent to a member of each of the participants' coaching staff. All effort was made to protect the privacy and dignity of participants.

Chapter 4: Results

This study focused on collegiate basketball guard's performance through a measure of game-related statistics. This chapter is a presentation of results. Demographic, descriptive, and inferential statistics are presented and analyzed.

Purpose of the Study

The purpose of this study is to examine how learning agility may be used to assess potential successful performance in men's Division I collegiate basketball student-athletes.

Problem Statement

Evidence for successful prediction of potential has emerged in the organizational literature but has not yet been applied to collegiate athletics. Because collegiate athletics is a major financial industry, the need to predict potential performance in athletics has proportional financial implications (Robbins, 2010; Van-Yperen & Duda, 1999). Research shows as revenue sports, such as football and basketball, become successful and compete in the postseason, donations increase throughout the year and sometimes into the following year (Humphreys & Mondello, 2007).

Additionally, NCAA has limited the number of scholarships schools can distribute each year, in an effort to maintain a subjectively equal level of talent among teams (NCAA, 2011). Therefore, with the spots for scholarship athletes limited, the recruitment of talent with high potential becomes strategically more important. If schools make errors assessing potential in prospective student-athletes, two things may result: (a) the loss of a scholarship spot to a lower potential athlete, or (b) the loss of a high-

potential athlete to a competitor or rival team (Spieler et al., 2007). Therefore, accurately assessing potential talent is truly crucial to the success of collegiate sport.

Research Questions

A quantitative study explored the relationship between learning agility and student-athlete performance in collegiate men's basketball. The inquiry of this study was: Does the performance of higher learning agile student-athletes improve at greater rates than the performance of lower learning agile student-athletes? For the purpose of this study, performance was assessed through use of basketball game-related statistics specific to playing position. This focus was important because the demands upon different playing positions (i.e. guard, forward, and center) and the evaluations of coaches of players by positions vary, largely to characteristics associated to physique (Ackland et al., 1997) and proximity of major playing time in relation to the basket (Sampaio, Janeira et al., 2006).

Learning agility is the ability and willingness to apply learning to new situations (Eichinger et al., 2010). This study focused on addressing the research question through game-related performance statistics of collegiate basketball guards. Guards oftentimes run the offense and adopt a leadership role on the court (Wooten, 1992). They are good ball handlers and set up plays transitioning from offense to defense. Guards are expected to "have the intelligence to read the defenses and adjust the offense accordingly" (Wooten, 1992, p. 64). It is hypothesized:

> H_1: A composite game-related statistical performance measure will increase by greater amounts, over time, in guards with high learning agility than in guards with lower learning agility.

Data Collection

Twenty men's basketball programs were approached, in order to recruit approximately 40 guards from Division I men's collegiate basketball programs. Initial contact was made by phone, email, or text to coaches in the researcher's network of contacts. Contact was made with thirteen of the schools and eight of the schools agreed to participate. Seven of the schools returned informed consent forms and contributed to the study.

Nighty-six guards associated with the twenty programs were approached to participate in the study, in order to get the intended forty-guard sample size. Twenty-eight guards responded (a 29% response rate). Multiple circumstances caused the sample to be much smaller than hoped. The lower than expected response rate may be attributed to timing and priorities of the student-athletes. The study was conducted during the school playing season when players are focused on academics and athletics. Additionally during this time, a natural disaster, Superstorm Sandy, hit the eastern coast of the United States, where the majority of the teams were located. Despite providing extra time for players in storm-hit areas to complete the materials, a total of 28 responses were received.

Demographic data were requested from each guard using a one-page template which was sent and returned at the same time as the informed consent forms. Coach assessment data were collected via a single question survey sent to a member of each of the participants' coaching staff. This survey asked coaches to rate how much he or she thought each guard on their team had lived up to their potential. Many of the coaches were new in the role at their current school and did not have prior expectations of their

guard's potential. Insufficient data were gathered and the coach assessment data was not used for analysis.

Learning agility data were collected using an assessment called viaEDGE™. The viaEDGE™ is an online self-report measure published by Korn/Ferry International. The measurement is comprised of an overall learning agility score and five factors of learning agility. The five factors of the viaEDGE™ measured mental agility, people agility, change agility, results agility, and self-awareness (DeMeuse et al., 2010).

Once informed consent forms were return, participating guards were informed they had two weeks to complete the learning agility assessment. Email reminders to complete the assessment were sent to players seven days before it was due, three days before it was due, and on the day that it was due. Coaches were asked for support in reminding guards about completing the assessment.

Player performance data were collected online using archival data. Performance data were found on school athletic department websites and an independent sport statistical database website called Real GM Basketball (2013). Performance data were only collected for the participants who completed the learning agility assessment.

Overall learning agility scores were to be grouped into three categories: high (100-67), moderate (66-34), and lower (33-0) levels of learning agility. Averages were to be calculated within each category and then examined against composite game-related player performance scores by ANOVA analysis. However, all but one of the participants' scores fell into the low-learning agility range (0-33). To allow for comparisons between three levels of learning agility, the high, medium, and low ranges

were adjusted using sample-based percentiles. This resulted in a score range of 1-10 for low, 11-17 for medium, and 18-33 for high learning agility.

Although there were twenty-eight participants, cases were removed, resulting in a total sample size of twelve (Table 1). Cases were removed when viaEDGE™ confidence index was too low (indicating the assessment results were invalid), not enough playing time to collect performance data (consistently played less than 5 minutes per game), anomalies in player history (one player attended four different schools and was a twenty-four year old senior), or missing data prevented a player from providing game related statistics for a quarter of a season.

An initial analysis of subjects with four quarters of data revealed no significant differences but had too little statistical power to confidently rule out the existence of any such differences. The results of this analysis are presented below under the heading "Season 1 analysis." To enhance the study's power, the decision was made to include a second season of data for an additional analysis, the results of which are presented under the heading "Season 1&2 analysis." In addition to increased power, the second analysis allowed for an observation of the trend towards (or away from) rejecting the null hypothesis. That is to say, if the F-ratio is higher when more data were included in the analysis, it would suggest that if even more data were to be included, a significance difference would eventually be found. Likewise, if the F-ratio is lower after including more data, that additional data beyond this is likely to continue lowering the F-ratio until significant relationships can be confidently ruled out. After season 2 data were included, a total of nine subjects had data available for two full seasons (8 quarters), eleven

subjects had season-2 (2012-12) data only, and three subjects had season-1 (2011-12) data only.

A preliminary longitudinal analysis was performed using data from those subjects with two full years (8 quarters) available. This analysis revealed no significant findings. Hence the decision was made to carry forward with an analysis that treated the data longitudinally over quarters with a single season but cross-sectionally over years. This meant that subjects with only season-1 data were analyzed alongside subjects with only season-2 data. Furthermore, for subjects with two seasons of data, each season was treated as if it was independently sampled. That is, season-1 and season-2 data were entered into the data set as if each had been measured from a separate subject. This analysis allowed the sample size to effectively be increased from twenty-three to thirty-two, and provided the greatest likelihood of finding potential group differences. Table 1 shows a breakdown of the data available for each subject along with actual and effective sample sizes.

Table 1

Breakdown of Sample Size by Season and Analysis

Season	**n**	**Analysis**
Season 1	12	Season 1
Season 2	20	n/a
Combined	32	Season 1&2

There are difficulties associated with performing a cross-sectional analysis on longitudinal data. In particular, doing so can lead to bias in both the estimation of

parameters and the inference of statistical significance (Maxwell & Cole, 2007). However, both of these potential biases arise from changes unaccounted for in the independent variable. Because learning agility is a relatively stable (DeMeuse et al., 2010), it can be assumed that the learning agility of participants remained stable over the period of a single year. Under these conditions, it is reasonable to perform and interpret a time-series, cross-section analysis using standard repeated-measures ANOVA methods (Beck & Katz, 2004).

Demographics

All participants were male student-athletes participating in Division I basketball programs across five NCAA conferences (Big South, Colonial, Conference USA, Northeast, and Southern). African-Americans made up 60.9% of the sample, followed by Caucasians at 30.4%. One subject was Hispanic and another self-reported as "other;" no other ethnicities were present. Most subjects were aged 20-22 (52%), followed by 18-19 (30.4%), and, finally, 22+ (17.4%). Subjects were split roughly even across starting status, with starters making up 52% and non-starters 48% of the sample. Similarly, there was equivalent representation amongst the four levels of class status: Freshman (17.4%), Sophomore (26.1%), Junior (30.4%), and Senior (26.1%). See Table 2 for a summary of all demographic variables measured.

Presented in Table 3 are correlations between major study variables. In an analysis of the entire data set, three significant effect size correlations were found. Significant results were found between learning agility and sample demographics. Significant findings that have no relevance to the research question of this study are not discussed. A significant positive correlation was found between starting status and

overall learning agility, $r(21)=.62$, $p<.01$, as well as between starting status and self-awareness, $r(21)=.52$, $p<.05$. A negative relationship was discovered between scholarship status and people agility, $r(21)=-.47$, $p<.05$.

Table 2

Summary of Demographics

		Count	Table N %
Age	18-19	7	30.4%
	20-21	12	52.2%
	22+	4	17.4%
Ethnicity	African-American	14	60.9%
	Caucasian	7	30.4%
	Hispanic	1	4.3%
	Other	1	4.3%
Years of experience	1-5	7	30.4%
	6-10	1	4.3%
	11-15	12	52.2%
	16+	3	13.0%
Conference	Big South	5	21.7%
	Colonial Athletic	4	17.4%
	Conference USA	6	26.1%
	Northeast Conference	6	26.1%
	Southern Conference	2	8.7%
Class Status	Freshman	4	17.4%
	Sophomore	6	26.1%
	Junior	7	30.4%
	Senior	6	26.1%
Starting Status	Non-Starter	11	47.8%
	Starter	12	52.2%
Scholarship Status	Non	2	8.7%
	Full	21	91.3%

Table 3

Correlational Analysis of Demographic Data and Learning Agility

	Age	Years of experience	Starting Status	Class Status	Scholarship Status	Overall	Mental	People	Change	Results
Years of experience	-0.03									
Starting Status	0.33	0.02								
Class Status	.85**	0.07	.51*							
Scholarship Status	0.40	0.14	0.01	0.19						
Overall	0.23	0.06	.62**	0.38	-0.05					
Mental	-0.03	0.21	0.15	0.05	-0.25	.43*				
People	-0.12	0.05	0.37	0.19	-0.47	.58**	0.09			
Change	0.14	0.40	-0.05	0.09	0.06	-0.25	0.22	-0.29		
Results	0.01	-0.14	0.23	0.18	0.04	.45*	-0.13	.43*	-0.46	
Self-Awareness	0.23	-0.25	.52*	0.26	0.10	.60**	-0.12	0.29	-0.53	0.39

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Descriptive Statistics

Descriptive statistics for Season-1 analysis are presented in Table 4, and Season-1&2 analysis are presented in Table 5. Participants were grouped, based on their learning agility scores, into low (M=4.83, SD=3.81), medium (M=13.07, SD=1.64), and high (M=23.60, SD=5.10) learning agility groups. The sample size of each group is presented in Table 2. Means and standard deviations of Player Performance Scores (PPS) for each of these groups across four measurement periods are presented in Table 4.

Table 4

Descriptive Statistics for Season-1 Analysis

Learning Agility (Binned)		Mean	Std. Deviation	N
Q1_PPS	Low LA	0.87	0.65	4
	Med LA	0.74	0.11	5
	Hi LA	0.63	0.10	3
	Total	0.75	0.36	12
Q2_PPS	Low LA	0.56	0.44	4
	Med LA	0.68	0.14	5
	Hi LA	0.64	0.09	3
	Total	0.63	0.26	12
Q3_PPS	Low LA	0.57	0.17	4
	Med LA	0.67	0.16	5
	Hi LA	0.85	0.21	3
	Total	0.68	0.19	12
Q4_PPS	Low LA	0.63	0.22	4
	Med LA	0.70	0.13	5
	Hi LA	0.75	0.22	3
	Total	0.69	0.17	12
Overall LA	Low LA	6.50	3.87	4
	Med LA	14.80	3.27	5
	Hi LA	27.33	2.52	3
	Total	15.17	8.77	12

Table 5

Summary of Descriptive Statistics for Season 1&2 Analysis

Learning Agility (Binned)		Mean	Std. Deviation	N
Q1_PPS	Low LA	0.71	0.41	11
	Med LA	0.76	0.37	11
	Hi LA	0.69	0.14	10
	Total	0.72	0.32	32
Q2_PPS	Low LA	0.6	0.26	11
	Med LA	0.68	0.33	11
	Hi LA	0.73	0.33	10
	Total	0.67	0.31	32
Q3_PPS	Low LA	0.66	0.19	11
	Med LA	0.79	0.31	11
	Hi LA	0.74	0.16	10
	Total	0.73	0.23	32
Q4_PPS	Low LA	0.78	0.43	11
	Med LA	0.79	0.3	11
	Hi LA	0.71	0.3	10
	Total	0.76	0.3	32
Overall LA	Low LA	4.64	3.93	11
	Med LA	13.09	1.7	11
	Hi LA	23.6	5.1	10
	Total	13.47	8.62	32

Inferential Statistics

H_1: A composite game-related statistical performance measure will increase by greater amounts, over a season, in guards with high learning agility than in guards with lower learning agility.

Season-1 analysis. A one-way repeated-measured ANOVA was conducted to determine if learning agility (LA) influenced player performance score (PPS) improvement among Division I men's basketball players. The average performance of low LA (n=4), medium LA (n=5), and high LA (n=3) players was measured at four points throughout the season; each period corresponding to the calendar months of November, December, January, and February. Means and standard deviations for each group at each measurement period are provided in Table 4.

There were no significant between-subject effects, $F(2, 9)=.172$, $p > .05$, indicating there were no overall performance differences between players within different learning agility groups. The within-subjects effect of time (measurement period) was non-significant, $F(3, 27)=.69$, $p > .05$. The interaction of interest, Time x LA Group, was non-significant, $F(6, 27)=1.10$, $p > .05$. Therefore, no post-hoc tests were performed.

Season-1&2 analysis. A one-way repeated-measured ANOVA was conducted to determine if learning agility (LA) influenced player performance score (PPS) improvement among Division I men's basketball players. The average performance of low LA (n=12), medium LA (n=14), and high LA (n=10) players was measured at four points throughout the season; each period corresponding to the calendar months of November, December, January, and February. Means and standard deviations for each group at each measurement period are provided in Table 5.

There were no significant between-subject effects, $F(2, 29)=.374$, $p > .05$, indicating there were no overall performance differences between players within different learning agility groups. The within-subjects effect of time (measurement period) was non-significant, $F(3, 87)=.60$, $p > .05$. The interaction of interest, Time x LA Group, was

non-significant, $F(6, 87)=.36$, $p > .05$. Therefore, no post-hoc tests were performed. Thus, it was concluded Hypothesis H_1 was not supported. See Table 6 and Table 7 for a summary of these statistics. A means plot of the three learning agility groups over the four measurement periods is displayed in Figure 1.

Table 6

Test of Within-Subjects Effects

Season-1 Analysis	*df*	*F*	*p*
Time	3, 27	0.699	0.561
Time X LA interaction	6	1.098	0.389
Season-1&2 Analysis	*df*	*F*	*p*
Time	3, 87	0.6	0.617
Time X LA interaction	6	0.362	0.901

a. Computed using alpha = .05

Table 7

Test of Between-Subjects Effects

Analysis	*df*	*F*	*p*
Season 1	2, 9	.172	*ns*
Season 1&2	2, 29	.374	*ns*

a. Computed using alpha = .05

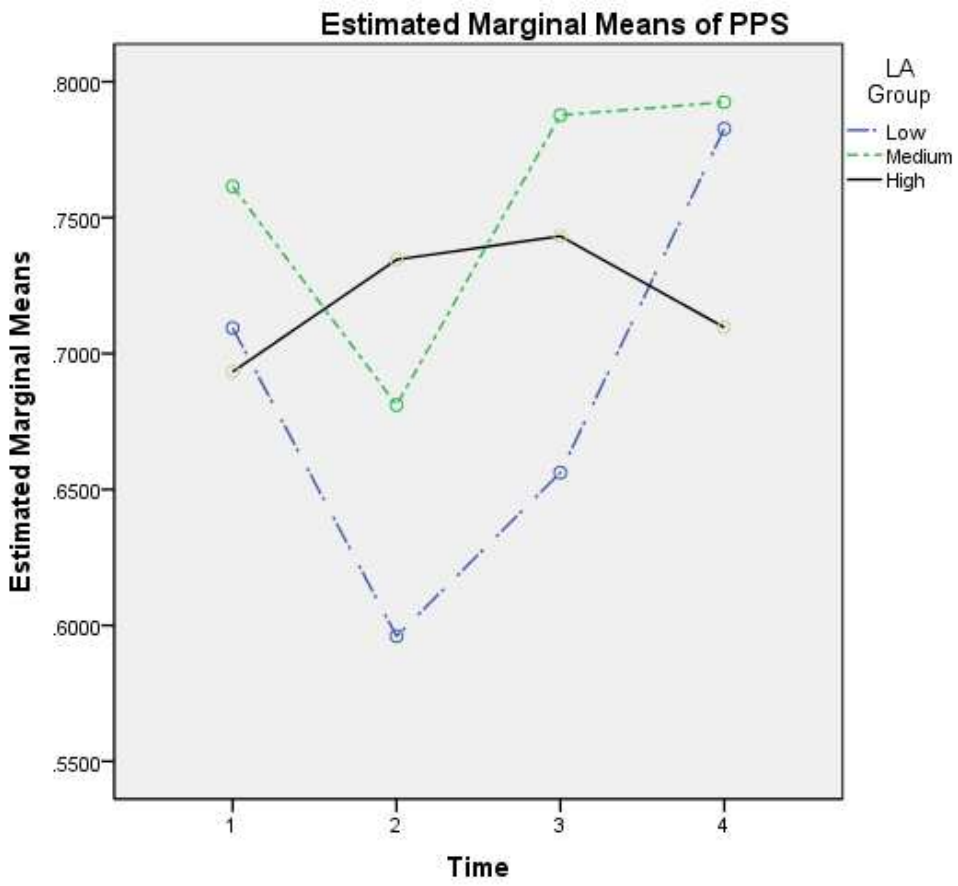

Figure 1. Estimated marginal means. This figure illustrates a means plot of the three learning agility groups over the four measurement periods.

Chapter 5: Summary, Conclusions, and Recommendations

The purpose of this study was to examine how learning agility may be used to assess potential successful performance in men's Division I collegiate basketball student-athletes. Potential was assessed by a measure of learning agility; the ability and willingness to apply learning to new situations (Eichinger et al., 2010). This study focused on collegiate basketball guards' performance through a measure of game-related statistics. This chapter is a presentation of results. Demographic, descriptive, and inferential statistics are presented and analyzed.

Purpose of the Study

The purpose of this study is to examine how learning agility may be used to assess potential successful performance in men's Division I collegiate basketball student-athletes.

Problem Statement

Evidence for successful prediction of potential has emerged in the organizational literature but has not yet been applied to collegiate athletics. Because collegiate athletics is a major financial industry, the need to predict potential performance in athletics has proportional financial implications (Robbins, 2010; Van-Yperen & Duda, 1999). Research shows as revenue sports, such as football and basketball, become successful and compete in the postseason, donations increase throughout the year and sometimes into the following year (Humphreys & Mondello, 2007).

Additionally, the NCAA has limited the number of scholarships schools can distribute each year, in an effort to maintain a subjectively equal level of talent among teams (NCAA, 2011). Therefore, with the spots for scholarship athletes limited, the

recruitment of talent with high potential becomes strategically more important. If schools make errors assessing potential in prospective student-athletes, two things may result: (a) the loss of a scholarship spot to a lower potential athlete, or (b) the loss of a high-potential athlete to a competitor or rival team (Spieler et al., 2007). Therefore, accurately assessing potential talent is truly crucial to the success of collegiate sport.

Research Questions

A quantitative study explored the relationship between learning agility and student-athlete performance in collegiate men's basketball. The inquiry of this study was: Does the performance of higher learning agile student-athletes improve at greater rates than the performance of lower learning agile student-athletes? For the purpose of this study, performance was assessed through use of basketball game-related statistics specific to playing position. This focus was important because the demands upon different playing positions (i.e. guard, forward, and center) and the coaches' evaluations of players by positions vary, largely in characteristics associated with physique (Ackland et al., 1997) and proximity of major playing time in relation to the basket (Sampaio, Janeira et al., 2006).

Learning agility is the ability and willingness to apply learning to new situations (Eichinger et al., 2010). This study focused on addressing the research question through game-related performance statistics of collegiate basketball guards. Guards oftentimes run the offense and adopt a leadership role on the court (Wooten, 1992). They are good ball handlers and set up plays transitioning from offense to defense. Guards are expected to "have the intelligence to read the defenses and adjust the offense accordingly" (Wooten, 1992, p. 64). It is hypothesized:

H_1: A composite game-related statistical performance measure will increase by greater amounts, over time, in guards with high learning agility than in guards with lower learning agility.

Summary of Findings

Learning agility is a construct used in the business industry to identify potential in future leaders. The intent of this study was to explore the feasibility of using learning agility to identify potential in future leaders in the sport industry. The results of this study did not support the hypothesis; however, there were several interesting findings.

One of the most interesting findings of this study was that all but one of the subjects scored within the parameters of lower learning agility. It was hypothesized that higher learning agility would be associated with high levels of game-related statistical performance. However, it does make sense that elite athletes, such as Division I men's basketball guards, would be lower learning agile. Learning agility identifies potential success in leaders, allowing for differentiated development planning, ranging from developing specialized knowledge to broad knowledge in leaders. Leaders who are high performers and lower learning agile are considered High Professionals. High Professionals are experts in a defined area and considered to have a track record of sustained consistent performance (Eichinger et al., 2010).

The playing position of guard in collegiate athletics is specialized**.** Basketball guards need to be good ball handlers and good passers (Wootten, 1992). Point guards, in particular, may need broader knowledge since they are, at times, an extension of the coaching staff on the court and need to read the defense and adjust the offense accordingly (Wootten, 1992). Therefore, there may be benefit from further research

exploring the differences between point guards and shooting guards as it relates to learning agility.

Another interested finding of this study was the significant results seen in the correlational analysis. The largest effect size of this study was found between starting status and overall learning agility. Students who were identified as starters scored higher on overall learning agility than their peers who were identified as non-starters. Many times coaches select players who they feel are their most successful players as starters (Wootten, 1992). In general, starters are characterized as better decision makers than their non-starter counterparts (Sampaio, Ibanez et al., 2006). Therefore, this correlation may provide evidence that there is a relationship between learning agility and successful performance in collegiate basketball guards. This finding warrants further exploration.

Continuing with the correlational analysis, there was a large effect size between starting status and self-awareness. This means that students who were starters scored higher on the learning agility dimension of self-awareness. If we continue the premise that starters are considered the more successful performers on the team, as stated above, then it is understandable that they are also more self-aware. Self-awareness is the ability to understand personal strengths and weaknesses and leverage this knowledge for development (Swisher, 2012; Orr, 2012). High self-aware individuals are willing to admit and take accountability for their mistakes, as well as gain greater insights and learn more from experience than lower self-aware individuals (Swisher, 2012). Therefore, individuals who leverage their strengths and are more honest about their development needs may be higher performers. It is therefore understandable how starters, who may be considered higher performers, would be more self-aware.

A significant negative result of the correlational analysis was found between scholarship status and people agility. Players who did not hold scholarships scored higher on people agility than their non-scholarship counterparts. Individuals who are high in people agility get things done through others in effective ways and adjust their approach in accordance to the situation (Swisher, 2012). These concepts have already been discussed as important in the position of basketball guard.

There was no empirical research that supported the findings between scholarship and people agility; however, it is thought-provoking to examine the similarities between people agility and the construct of mental toughness. A mentally tough athlete is essentially more consistent and better than others in "remaining determined, focused, confident, and in control under pressure" (Jones et al., 2007, p. 247). Because of their psychological skills, mentally tough athletes produce higher levels of performance and with higher consistency.

Mentally tough athletes adapt to any given situation and respond to specific environmental factors. Mentally tough athletes "learn from what happened and pick out the learning points to take forward for future performances" (Jones et al., 2007, p. 259). They learn from the experience and do not avoid failure; rather they use what failure has taught them to succeed in the future (Jones et al., 2007). Therefore, it is suggested that future research investigate the relationship between people agility (learning agility) and mental toughness.

In addition to the correlational analysis, an ANOVA analysis was conducted. However, because the data did not sufficiently produce three distinct groups to run a conventional ANOVA, the data in the lower learning agile group was divided into thirds

to produce three groups. This alternative analysis may be why the hypothesis did not test as significant.

Additionally, the ANOVA analysis only used subjects who had performance data (who had played at least two games in any given quarter). This contributed to the low sample size. Two ANOVA analyses were conducted, the second of the two adding participants from the prior year as additional data points. Neither was significant. Yet, the ANOVA that was run with the larger sample size was closer to significance than the one with a smaller sample size. This indicates the possibility of a trend, inferring that if replicated using a larger sample size, it may be expected a significant finding may be reached.

Figure 1 illustrates results found between the three groups produced within the lower learning agility guards. The subjects who improved at the greatest rate were the lower third of the lower learning agile guards. This means the most specialized players were the ones who had the greatest performance improvements over the testing period of two seasons. This suggests players who perfect skills they already possess improve performance more than the players who try to leverage new learning to improve performance.

Limitations

There were several limitations that impacted the study's ability to conclusively uncover relationships between the variables. The limitations were small sample size, viaEDGE™ never normed for undergraduate aged subjects, and range restriction in the learning agility variable. The following paragraphs will address each of these limitations.

The sample size was not sufficiently large enough to meet the recommended level of power. This led to the application of a cross-sectional analysis, treating subjects who played during seasons 2011-2012 and 2012-2013 with two years of data to be analyzed as two separate subjects. When this technique was applied to increase the sample size, the *p*-value decreased, indicating that if this study were replicated with a larger sample size, the relationships between learning agility groups may reach a level of significance. However, this assumption is additionally questionable because it relies on the assumption that the learning agility trait is stable over time.

Another limitation is the validity of the viaEDGE™. Because the viaEDGE™ has not been validated with undergraduate student age (18-23), it is unclear if is it a valid assessment of learning agility amongst individuals within this study. The validation study of the viaEDGE™ was conducted with MBA students as the youngest participants (DeMeuse et al., 2011). This concern is supported by the fact that all but one of the participants scored in the lower learning agility range. This could be due to the lack of experience undergraduate students may have and why they could answer questions in the viaEDGE™ that tests the application of experiential knowledge; however, this warrants future testing.

In addition, the viaEDGE™ is written with a business audience in mind. There are questions asked about a workplace scenario, in terms which may have been unfamiliar to the participants of this study. Hence, the appropriateness of the use of the viaEDGE™ amongst this population is questionable. According to DeMeuse et al. (2010), "Thus far, learning agility has remained relatively obscure in the academic world" (p. 126). Therefore, generalizations from business to sport could be a limitation.

Because all but one of the participants scored in lower learning agility, relationships across the entire range of the learning agility variable were not able to be observed. Had participants been able to be compared across the entire range, it is more likely that significant differences would be found. Combined, these four limitations severely limited the study's ability to uncover significant differences.

Recommendations for Future Study

As indicated earlier, a trend moving toward significance was revealed as more subjects were added. This pattern of conducting a similar study with a larger sample size to increase power warrants further investigation; in addition, the analysis of this study relied on the assumption that the learning agility trait is stable over time. Therefore, it is worthwhile to investigate the degree and extent to which the trait is stable among collegiate athletes. In addition, since potential is future focused, it may be beneficial to conduct a longitudinal study investigating the degree to which a lower, moderate, and higher learning agile athlete's performance changes over several years, rather than using archival data. It may also be interesting to investigate the effect of transitions out of sport with higher and lower learning agile individuals, assuming higher learning agile athletes make easier transitions as they may be able to better transfer skills to different careers.

Finally, this study only investigated collegiate athletes who played basketball in the position of guard. It would be interesting to replicate this study with different basketball positions. It would also be interesting to investigate the relationships in other sports; in particular, individual sports like golf which relies highly on the mental game.

Implications

If significant differences were found between learning agility and performance in basketball guards, the contributions span from coaches, to sport psychologists, and the test publishers. It has been thought that basketball has fewer specialists than other sports, and players should have a wide variety of skills to excel in the sport (Wootten, 1992). However, coaches could learn from this study that colligate basketball guards are specialists, indicated by their lower learning agile scores. Further investigation is recommended, but if true, this means coaches may be best served to develop specialist skills in their guards, rather than broader experiences by utilizing players in multiple positions such as playing a large bodied guard in the small forward position.

Sport psychologists could benefit by opening a new stream of research and tools to identify potential in future athletic performance. If generalizability could be proven between the leadership realms of business and sport, both research fields may be able to optimize research conducted in the other field's respective industry.

Another benefit could be the opening of a new stream of business for the test publisher specifically in sport. This would be a new way and place to apply their assessments and tools, thus leading to a greater scope of clientele.

Conclusion

Identifying potential in student-athletes is important. The results of this study did not show significant results but did suggest some relationship between learning agility and successful performance in Division I men's basketball guards. Based on this study, learning agility is associated with starting status and scholarship status. The results of this study showed that basketball guards are specialists and should be developed as such.

Overall, future research is suggested to further explore the relationship and applicability of learning agility to sport.

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Appendix A: Introductory Letter to Coaches

Dear <<Coach Name>>

My name is Armin Dastur and I am a Ph.D. candidate at The Chicago School of Professional Psychology in Organizational Leadership. This letter is to officially request the support of you and your team in my doctoral research. The purpose of this dissertation is to examine how "learning agility" (that is, learning from experience and applying that learning to new situations: http://www.learningagility.com) may be used to assess potential performance in men's Division I collegiate basketball student-athletes.

Specifically, male basketball guards will be the subjects of this study and your program's participation is vital for its success. Evidence for successful prediction of potential has emerged in the organizational literature, but has not yet been applied to collegiate athletics. A contribution of my research may be to assist collegiate coaches during the recruiting process by identifying potential in prospective student-athletes. All data collected in this study will be kept confidential. However, aggregate data will be available to you at the completion of the study as a benefit of your program's participation.

If you choose to participate in this study, please read and complete the enclosed "informed consent for coaches" form. Also, please complete the enclosed one-item questionnaire. Please complete one questionnaire for each of your guards.

After you have signed the informed consent and completed the survey(s), please email to the address below or fax them to 973-503-2317, as soon as possible. Also attached are materials for the guards on your team. Please forward the three documents (Intro letter to players, Informed Consent for players, and Player demographic Questionnaire) to all the guards on your team. Please copy me at **adastur@ego.thechicagoschool.edu** when you forward the materials, if you would. Their participation will be completely voluntary. They too will be required to sign an informed consent form, outlining their rights and freedom to decline or withdraw from participation. At no time will you know which of your guards have opted, or not, to participate. Their time commitment to the study will be approximately 30 minutes (25 minutes to take a learning agility assessment-ViaEDGE™ and 5 minutes to complete the demographics questionnaire).

Thank you in advance for your cooperation. Your assistance is very much appreciated. If you have any questions or concerns, please contact me with the information provided below.

Sincerely,
Armin Dastur
Master of Arts in Sport Psychology
Doctoral Candidate in Organizational Leadership
847-323-4105 **adastur@ego.thechicagoschool.edu**

Appendix B: Informed Consent for Coaches

Title: Exploring the Relationship between Learning Agility and College Basketball Performance
Investigator: Armin Dastur

We are asking you to participate in a research study. Please take your time to read the information below and feel free to ask any questions before signing this document.

Purpose: The purpose of this study is to examine how learning agility can be used to assess potential performance in men's Division I collegiate basketball student-athletes.

Procedures: In addition to the informed consent, participants will be required to complete a one-item survey (enclosed). Participants will have two weeks to complete the questionnaire. It should take approximately one minute to complete. When completed, please email the informed consent and the questionnaire to **adastur@ego.thechicagoschool.edu** or fax to 973-503-2317.

Risks to Participation: There are no known risks to participating in this study.

Benefits to Participants: At the conclusion of this study I will send aggregate data out to all the coaches who have agreed to participate in this study. This data will show the differences between groups of guards who are high, moderate, and lower learning agile and the relationship to performance. We hope the information learned from this study assists the collegiate recruiting process by providing a construct to aid in the identification of potential.

Alternatives to Participation: Participation in this study is voluntary. You may withdraw from study participation at any time without any penalty.

Confidentiality: Coaches will not know who has or who has not opted to participate in this study. Participants will be identified during the study with an ID number, rather than by name. Coaches will only receive aggregate information, not individual reports or information that may be traced back to any individual participant. In addition, materials will be kept for a minimum of five years, per American Psychological Association (APA) guidelines, and shredded thereafter.

Questions/Concerns: If you have any questions or if you would like further information pertaining to this study, please feel free to contact me at **adastur@ego.thechicagoschool.edu or at** 847-323-4105. Furthermore, if you have questions concerning your rights in this research study you may contact the Institutional Review Board (IRB), which is concerned with the protection of subjects in research project. You may reach the IRB office Monday-Friday by calling 312-467-2343 or writing: Institutional Review Board, The Chicago School of Professional Psychology, 325 N. Wells, Chicago, Illinois, 60654.

Consent

Subject ***(please read the statement below and sign on the next page)***
The research project and the procedures have been explained to me. I agree to participate in this study. My participation is voluntary and I do not have to sign this form if I do not want to be part of this research project. I will receive a copy of this consent form for my records.

Signature of Subject:

_____

Please Print Name:

_____

Date: _____

(If applicable)
Signature of the Person Obtaining Consent:

_____

Please Print Name:

_____

Date: _____

Appendix C: Coach Assessment Survey

Name of guard: _____

COACH ASSESSMENT QUESTION:

1. **Evaluating the performance of the player above, how well would you say they lived up to your expectations of their potential over the 2011-2012 season?**

   - ☐ Great improvement
   - ☐ No change
   - ☐ Great decline

Appendix D: Introductory Letter to Players

Dear prospective participant:

My name is Armin Dastur and I am a Ph.D. candidate at The Chicago School of Professional Psychology in Organizational Leadership. This letter is to officially request your support in my doctoral research. The purpose of this dissertation is to examine how "learning agility" (that is, learning from experience and applying that learning to new situations http://www.learningagility.com) can be used to assess potential performance in men's Division I collegiate basketball student-athletes. Evidence for successful prediction of potential has emerged in the organizational literature, but has not yet been applied to collegiate athletics. A contribution of my research, with your participation, may be to assist collegiate coaches during the recruiting process, by better identifying potential in prospective student-athletes. Your participation in this study is vital for its success.

All data collected in this study will be kept confidential. Your coaches will not know if you have opted to participate. When results of this study are shared with your coaches, it will be in a summary and aggregate format.

To initiate your voluntary participation in this research study, please read and sign the attached informed consent form. Please complete the informed consent and demographic questionnaire and return it me at **adastur@ego.thechicagoschool.edu or fax it back to me at 973-503-2317**.

After receipt of the enclosed documents, you will receive a link from **assessmentcenter@kornferry.com** and be asked to complete the assessment ViaEDGE™. This assessment should take approximately 25-35 minutes to complete. There will be some wording and reference in the assessment to "work-related behaviors". Please respond the best you can to these questions, as you may or may not have years of work experience. When possible, please think about your preferences, values, and behaviors when dealing with your basketball program and answer the questions accordingly.

Thank you in advance for your cooperation. Your assistance is very much appreciated. If you have any questions or concerns, please contact me at the number or email address provided below.

Sincerely,

Armin Dastur

Armin Dastur
Master of Arts in Sport Psychology
Doctoral Candidate in Organizational Leadership
847-323-4105 **adastur@ego.thechicagoschool.edu**

Appendix E: Informed Consent of Players

Title: Exploring the Relationship between Learning Agility and College Basketball Performance
Investigators: Armin Dastur

We are asking you to participate in a research study. Please take your time to read the information below and feel free to ask any questions before signing this document.

Purpose: The purpose of this study is to examine how learning agility can be used to assess potential performance in men's Division I collegiate basketball student-athletes.

Procedures: After informed consent has been provided, participants will receive a link to an assessment via email from **assessmentcenter@kornferry.com**. Participants will have two weeks to take the assessment, which will take approximately 25 to 35 minutes to complete. Players will have access to download a summary report after taking the assessment online.

Risks to Participation: There are no known risks to participating in this study.

Benefits to Participants: At the conclusion of this study I will send aggregate data out to all the coaches who have agreed to participate in this study. This data will show the differences between groups of guards who are high, moderate, and lower learning agile and the relationship to performance. We hope the information learned from this study assists the collegiate recruiting process by providing a construct to aid in the identification of potential.

Alternatives to Participation: Participation in this study is voluntary. You may withdraw from study participation at any time without any penalty.

Confidentiality: Coaches will not know who has or who has not opted to participate in this study. Participants will be identified during the study with an ID number, rather than by name. Coaches will only receive aggregate information, not individual reports or information that may be traced back to any individual participant. In addition, materials will be kept for a minimum of five years, per American Psychological Association (APA) guidelines, and shredded thereafter.

Questions/Concerns: If you have any questions or if you would like further information pertaining to this study, please feel free to contact me at **adastur@ego.thechicagoschool.edu or at** 847-323-4105. Furthermore, if you have questions concerning your rights in this research study you may contact the Institutional Review Board (IRB), which is concerned with the protection of subjects in research project. You may reach the IRB office Monday-Friday by calling 312-467-2343 or writing: Institutional Review Board, The Chicago School of Professional Psychology, 325 N. Wells, Chicago, Illinois, 60654.

Consent

Subject ***(please read the statement below and sign on the next page)***
The research project and the procedures have been explained to me. I agree to participate in this study. My participation is voluntary and I do not have to sign this form if I do not want to be part of this research project. I will receive a copy of this consent form for my records.

Signature of Subject:

_____

Please Print Name:

_____

Date: _____

(If applicable)
Signature of the Person Obtaining Consent:

_____

Please Print Name:

_____

Date: _____

Appendix F: Players' Demographic Information

Name of guard: _____ or Click here to enter text.

Email address: _____ or Click here to enter text.

1. **Age**
   - ☐ 18 to 19 years old
   - ☐ 20 to 21 years old
   - ☐ 22 or more years old

2. **Ethnicity**
   - ☐ Caucasian
   - ☐ African-American
   - ☐ Asian
   - ☐ Hispanic
   - ☐ Other

3. **Years of experience**
   - ☐ 1 to 5 years
   - ☐ 6 to 10 years
   - ☐ 11 to 15 years
   - ☐ 16 or more years

4. **Class status**
   - ☐ Freshman
   - ☐ Sophomore
   - ☐ Junior
   - ☐ Senior

5. **Starting status**
   - ☐ Starter
   - ☐ Non-starter

6. **Scholarship status**
   - ☐ Full scholarship
   - ☐ Partial scholarship
   - ☐ Non-scholarship