

TEACHERS AS STRATEGIC CLASSROOM LEADERS:  
THE RELATIONSHIP OF THEIR COGNITIVE AND BEHAVIORAL AGILITY TO  
STUDENT OUTCOMES AND PERFORMANCE EVALUATIONS

by

Michael Warkentien

A Dissertation Submitted to the Faculty of  
The College of Education  
In Partial Fulfillment of the Requirements for the Degree of  
Doctor of Philosophy

Florida Atlantic University

Boca Raton, FL

December 2016

Copyright 2016 by Michael Warkentien

TEACHERS AS STRATEGIC CLASSROOM LEADERS:  
THE RELATIONSHIP OF THEIR COGNITIVE AND BEHAVIORAL AGILITY TO  
STUDENT OUTCOMES AND PERFORMANCE EVALUATIONS

by

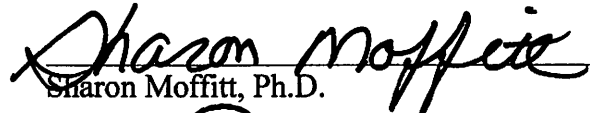
Michael Warkentien

This dissertation was prepared under the direction of the candidate's dissertation advisor, Dr. John Pisapia, Department of Educational Leadership and Research Methodology, and has been approved by the members of his supervisory committee. It was submitted to the faculty of the College of Education and was accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

SUPERVISORY COMMITTEE:



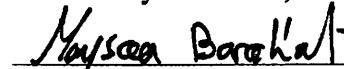
John Pisapia, Ed.D.  
Dissertation Advisor



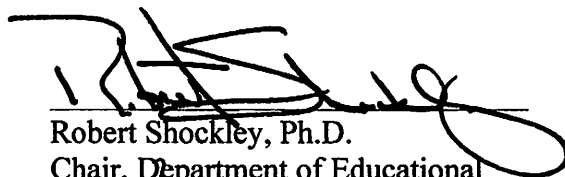
Sharon Moffitt, Ph.D.



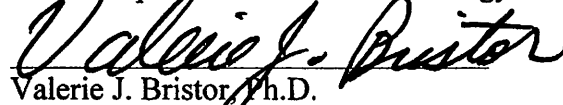
Daniel Reyes-Guerra, Ph.D.



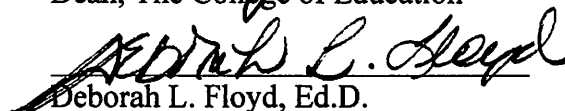
Maysaa Barakat, Ph.D.



Robert Shockley, Ph.D.  
Chair, Department of Educational  
Leadership and Research Methodology



Valerie J. Bristol, Ph.D.  
Dean, The College of Education



Deborah L. Floyd, Ed.D.  
Dean, Graduate College

November 21, 2016  
Date

## ACKNOWLEDGEMENTS

I want to thank my distinguished committee, the Bull, my fantastic editor, and fellow SLers who provided support, guidance, and commiseration throughout this journey.

## ABSTRACT

Author: Michael Warkentien

Title: Teachers as Strategic Classroom Leaders: The Relationship of Their Cognitive and Behavioral Agility to Student Outcomes and Performance Evaluations

Institution: Florida Atlantic University

Dissertation Advisor: Dr. John Pisapia

Degree: Doctor of Philosophy

Year: 2016

The purpose of this non-experimental study was to determine whether teacher cognitive and behavioral agility relates to student achievement as measured by their value-added model (VAM) score and their performance evaluation measured through the Marzano instructional practice (IP) framework, and whether that relationship is moderated by contextual variables. Cognitive agility, measured through the Strategic Thinking Questionnaire for Teachers (STQ<sup>T™</sup>), refers to the leader's ability to use their repertoire of thinking skills. Behavioral agility, measured with the Strategic Leadership Questionnaire for Teachers (SLQ<sup>T™</sup>), relates to the leader's ability to use a wide array of leader influencing actions. Teacher VAM score is the percent of the teacher's students that met or exceeded a statistically predicted score on the end of year assessment. Teacher IP scores were also collected and were based on classroom walkthroughs, and other factors, conducted by their respective school-based administrator(s).

The study included 75 teacher participants at the middle and high school levels and used correlational, linear regression, moderator, and mediation statistical analyses. The research findings indicate that cognitive agility continues to be a significant predictor of behavioral agility and that both cognitive and behavioral agility were significantly related to VAM or IP in teachers over the age of 50. Additionally, VAM scores significantly increased through the use of reframing and IP scores increased when utilizing bridging leader actions. However, it was also found that VAM scores were negatively correlated to the managing leader actions in the total population.

## DEDICATION

To God, my wife Krystyna, and my parents and siblings, without whom I would not have had the strength and focus to finish. To my mentors and sponsors throughout my time at FAU, Doctors Pisapia and Reyes-Guerra, thank you for believing in my ability and encouraging me to continue moving forward.

TEACHERS AS STRATEGIC CLASSROOM LEADERS:  
THE RELATIONSHIP OF THEIR COGNITIVE AND BEHAVIORAL AGILITY TO  
STUDENT OUTCOMES AND PERFORMANCE EVALUATIONS

List of Tables .....	x
List of Figures .....	xii
Chapter 1. Introduction .....	1
Background .....	7
Statement of the Problem .....	10
Purpose of the Study .....	12
Significance of the Study .....	13
Theoretical Considerations .....	14
Relationship of Complexity and Agility .....	15
Cognitive Complexity/Agility .....	15
Behavioral Complexity/Agility .....	22
Educational Leadership Preparation .....	25
Value-added Modeling .....	26
Research Model .....	28
Methodology .....	29
Definitions .....	32
Chapter 2. Literature Review .....	35
Leadership .....	35



Leadership Theory Development.....	35
Leadership Theory in Education.....	53
Teacher Leadership/Classroom Leadership.....	60
Leadership and Teacher Evaluation.....	73
Cognitive and Behavioral Complexity.....	76
Educational Measurement History.....	84
Value-added Modeling (VAM).....	87
Conclusion .....	95
Chapter 3. Methodology .....	99
Purpose.....	99
Research Design.....	101
Variables .....	101
Research Setting.....	103
Unit of Analysis .....	103
Participant Selection .....	103
Sampling Plan .....	104
Instruments.....	104
Data Collection Plan .....	113
Data Analysis Plan.....	113
Role of the Researcher .....	117
Limitations .....	117
Delimitations.....	118
Summary .....	119

Chapter 4. Data Analysis and Results.....	120
Instruments.....	120
Study Sample .....	121
Summary Statistics.....	122
Hypothesis Testing.....	127
Chapter Summary .....	136
Chapter 5. Discussion, Conclusions, and Recommendations .....	142
Restatement of the Problem .....	142
Review of Purpose .....	144
Review of Methodology .....	144
Summary of the Major Findings .....	145
Finding 1 .....	146
Finding 2 .....	153
Finding 3 .....	154
Finding 4 .....	157
Finding 5 .....	159
Conclusions.....	160
Recommendations for Practitioners.....	163
Recommendations for Future Research.....	164
Limitations .....	167
References.....	169

## TABLES

Table 1. Strategic Leader Actions in the Classroom.....	70
Table 2. Teacher Leadership (York-Barr & Duke, 2004) Versus Teacher Classroom Leadership.....	72
Table 3. Summary Proposition Table .....	98
Table 4. Research Variables .....	102
Table 5. Survey Response Coding.....	112
Table 6. Relationship Between the Research Questions, Hypotheses, and Instruments .....	115
Table 7. Intercorrelation Matrix Between Dependent, Independent, and Moderating Variables.....	124
Table 8. Linear Regression Analysis of Significant Correlations.....	126
Table 9. Moderator Analysis of the Relation Between Cognitive agility with Product Terms on VAM and IP .....	130
Table 10. Moderator Analysis of the Relation Between Behavioral agility with Product Terms on VAM and IP .....	133
Table 11. Split-case Correlation Analysis of Behavioral agility on VAM and IP (Moderated by Age).....	133
Table 12. Analysis of Mediating Effects of Cognitive Agility Through Behavioral Agility on Outcome Variables .....	136
Table 13. Hypotheses Tested .....	141

Table 14. Major Research Findings .....	146
Table 15. Teacher's Use of Strategic Thinking Skills and Leader Influence Actions (N = 75) .....	147
Table 16. Influence of Age on Uni- and Multidimensional Correlations with Criterion Variables.....	150
Table 17. Effective Classroom Leadership Predictor Models (Age > 50, N = 33) .....	152
Table 18. Leadership Profiles by Age.....	156

## FIGURES

Figure 1. The Research Model That Guided This Study .....	28
Figure 2. Pisapia's (2009) Leadership Wheel.....	51
Figure 3. Diagram of Mediation Analyses Performed in This Study .....	135

## CHAPTER 1. INTRODUCTION

Merriam-Webster's Learner's Dictionary (n.d.) defines leadership in a few basic ways: being in the office or position of leadership, having a capacity to lead, and actually leading. In essence, to be called a leader a person must meet one of the three listed criteria. This is in contrast to Pisapia (2009) who defined leaders as those "who can define and then move individuals, groups, and/or organizations from A to Z" (p. 1), and Bennis and Biederman (1997) who claimed that, "leaders are people who believe so passionately that they can seduce other people into sharing their dream" (p. 25). Pisapia's definition requires followers. Bennis and Biederman's definition involves a goal and influencing others towards it. There are a myriad of different definitions of leadership, which speaks to the complexity and sophistication of this concept. Teachers are leaders based on all of these definitions, specifically the Merriam-Webster definition, because they have a position of responsibility over students and must use influence to reach established educational goals.

Conversely, leadership literature has called for leaders to be teachers because they are charged with "building organizations where people are continually expanding their capabilities to shape their future—that is, leaders are responsible for learning" (Senge, 1990b, p. 9). Senge (1990b) wrote that the role of the leader in learning organizations demands new skills; they must be able to "challenge mental models" (p. 9) and "foster more systemic patterns of thinking" (p. 9). Novicevic et al. (2013) wrote that the teacher-student relationship fits well with leadership theory, such as the constructive-

developmental theory of leadership. A history teacher challenges students' mental models, for example, by taking a well-known, significant historical event, introducing a new minority perspective, and then relating that to a similar current event that the children are living through. A math teacher nurtures systemic patterns of thinking when she or he teaches the concept of addition, relates that to multiplication—as repeated addition—through the finding of the area of rectangles, and closes the lesson cross-curricularly by asking students to estimate the area of Colorado in their Geography books. Also, Novicevic et al. (2013) argued that the “relationship between the teacher and his or her students as learners is valuable for leadership development as teachers enable and facilitate sensemaking of learners” (p. 1).

Teachers are leaders for another very important reason that can be found in the word educate itself. The word educate comes from two Latin root words, *educare*, meaning to train, and *educere*, meaning to lead out. Bass and Good (2004) argued that the meaning of education has focused primarily on the former, in the form of molding citizens to fit the majority population's norms and give them the skills to be productive citizens. They continue to write that in an increasingly complex society that is evolving quicker than ever before, the need for *educere* is critical to deal with new challenges. Those whom embody the concept of *educere* create citizens that question assumptions and think creatively. Bass and Good point to Bill Gates' failure to complete college as evidence that these “creative geniuses” who think and perceive reality differently have struggled in a system that requires conformity. *Educere* requires leadership in the classroom by teachers who encourage independent thought, creativity, and questioning of assumptions. Heifetz and Laurie (2003) echoed this thought when they cautioned that

increasingly complex situations require leaders to forgo their reliance on technical proficiency and cultivate followers that are problem solvers. It is more than mere coincidence that leadership literature and thought can be easily transposed to a classroom situation and the word leader switched to teacher.

Although the similarities are clear, “the relationship between teaching and leadership has not been addressed yet in a comprehensive manner” and only a few studies have broached this issue (Novicevic et al., 2013, p. 424). Some of the earliest examples include Mary Parker Follett’s address delivered at Boston University in 1928, unpublished until 1970. In the address she related businessmen and teachers, in that both attempt to find the most fruitful way to interact with people and are willing to experiment, both possessing leadership. Teachers, she continued, express this leadership, not by coercion, but by the freeing of students to act and think within the laws of group activity and control. Therefore, it is necessary for teachers to relate the curriculum to life and to train students to think inter-individually. “The teacher, as every leader, should know the spirit of the age, should know the deeper trend in our spiritual evolution,” (Follett, 1970, p. 3).

The evaluation of effective teaching has also lent itself to teaching and leadership similarities. Deshpande, Webb, and Marks (1970) found that certain characteristics of engineering professors corresponded to findings from major studies of elementary and secondary teachers. The characteristics were friendly, responsible (business-like), and stimulating (imaginative). These characteristics are conceptually similar to those that came out of earlier Ohio State and Michigan leadership studies; (a) support; (b) interaction facilitation; (c) goal emphasis; and (d) work facilitation (Norr & Crittenden,



1975). Norr and Crittenden in studying teacher evaluation data through cluster and factor analysis, found many conceptual and perceptual similarities between effective teaching characteristics and those characteristics found in major leadership studies of their time. They proposed, “that teaching can be fruitfully viewed as the performance of a leadership role in a group” (Norr & Crittenden, 1975, p. 337). One interesting limitation they noted, that corresponds to teaching as leadership as defined by M.P. Follett, is that the concept of leadership becomes limited the more the teacher is working to support the goals of each individual student as opposed to group goals. Norr and Crittenden are credited with being the first to measure teacher effectiveness using a leadership model (Chermesh & Tzelgov, 1979).

Other work can be found that reinforces the idea that teacher actions are similar to actions of leaders as in the Ohio State and Michigan studies, specifically those of initiating structure and consideration. Meredith (1976) used student evaluations of teachers and found that the factors divided into two categories, management of information and management of intrapersonal relations. Additionally, the results from Chermesh and Tzelgov (1979) suggest that using a leadership lens to evaluate faculty members is useful. More importantly Chermesh and Tzelgov purported that leadership theory is more relevant for evaluating academic institutions that emphasize creativity and thought over technically oriented schools, much like the differences between *educere* and *educare*. More recently, Barber (2012) added to the literature that teaching is an opportunity for leadership when the teacher/leader is imparting knowledge and experiences that allow the student to solve problems outside of the classroom environment. Barber further stated that the teacher/leader should, from time to time,

follow the lead of his or her students. Hattie and Yates (2014) would agree with the teacher taking a follower role to students and cited their research and findings from studies of reciprocal teaching.

One of the most important goals, if not the main goal, of the teacher in the classroom is to increase the level of their students' achievement in the discipline they teach, which coincides with the shift towards student achievement as the central focus of decision-making and educational policy (Harris & Rutledge, 2010). The process by which this occurs has been studied from multiple disciplines (economics, psychology, sociology, etc.), perspectives (student, teacher, administrator, etc.), and methodologies (qualitative, quantitative, mixed, etc.). Brophy (1979) wrote that at the onset of this research in the 1950s correlating teacher actions with student learning was troublesome because of deficiencies in methodology. He argued that much progress was made in the early 1970s and at the time he published, classroom research was expanding. "These studies varied in the types of teachers and students included and the kinds of variables addressed and methods used" (Brophy, 1979, p. 17). Later studies included research on the effects of different teacher demographics such as years of experience, training, and undergraduate degree (Polikoff, 2013).

The teacher assumes the leadership role in the classroom as they facilitate the learning process and influence their students towards the goal of increasing their knowledge and mastery of concepts, which are then used in complex, real world situations. One important component of reaching this goal is cognitive agility, which is the ability of the leader to use their repertoire of thinking schemata, scripts, and structures in practice. It relates to how they interpret, process, and think in various ways than does

a less cognitively agile person. The second component, behavioral agility, is the ability to act in multiple, even contradictory, ways, such as implementing change and stability, or maintaining relationships while enforcing rules and procedures. Pisapia's (2009) strategic leadership framework marries these two concepts (the leader's cognitive agility and behavioral agility) and in this study, the framework will be used as the leadership lens and measurement instrument through which the teacher as classroom leader will be examined. Pisapia's strategic leadership theory posits that the more agile the leader's thinking and acting are, the more effective the leader is in their role. Therefore, the aim of this study was to determine if effective teachers have higher levels of cognitive and behavioral agility and if the relationship between cognitive and behavior agility and leadership is moderated by any contextual variables.

This study also examined the relationship between teacher leadership and student achievement as measured through value-added modeling (VAM). Currently, there is debate in public education school districts, due to economic turmoil and budget cuts, as to whether teachers should receive additional compensation for advanced degrees. Some argue that there should be none at all, citing evidence that no correlation between advanced degrees and student achievement exists, while others would limit this to teachers with these degrees in their particular subject area discipline (Clotfelter, Ladd, & Vigdor, 2007). It is hypothesized in this study that the effects of a leadership graduate degree program for teachers positively manifests through increased student performance.

Based on the work and research of Dr. Robert Marzano, the Marzano teacher instructional practice framework (IP) is a research-based method of developing teachers (Marzano, 2007) and is also used in the school district as an evaluative instrument where

this study was conducted. Connections between effective teaching and leadership behaviors have been evidenced in research, but have received little attention (Novicevic et al., 2013). A second assumption of this study is that teachers with higher levels of cognitive and behavioral agility, the basis for Pisapia's (2009) strategic leadership theory, receive higher marks for effective instruction in the classroom demonstrated through annual teacher evaluation results. This assumption will be investigated using VAM.

## **Background**

“Education then, beyond all other devices of human origin, is a great equalizer of the conditions of men—the balance wheel of the social machinery” (Horace Mann, 1849, p. 59). This quote exhibits the importance and impact education has on society. The education of a person influences all facets of their life and the most overt and intentional way a nation goes about doing this is through its public education system. Because of the great importance education plays in our culture, recruiting, selecting, and developing the most effective teachers is critical to the success of the public education system. The reason for having the most qualified candidate in the classroom—as many studies have demonstrated—is that the single-greatest factor affecting student achievement is the teacher in the classroom (Wenglinsky, 2002).

Teachers have always been classroom leaders, as they are responsible for and accountable to their students; however, the concept of teacher as classroom leader is rarely found in research literature. One early, related example includes research from Lewin, Lippitt, and White (1939). In this study two clubs of 10-year old boys were created and headed by the same individual using a different leadership style for each group. One leadership style was autocratic and the other democratic, resulting in

noticeable differences in the behavior of the children. This describes the power a teacher and their leadership style can have on children, as children in the autocratic group were noticeably more aggressive and hostile towards each other.

The ways in which leaders think has also been proposed to influence their effectiveness. The use of reframing, reflecting, and systems thinking has been linked to leadership effectiveness through the work of notable researchers such as Schön (1975), Senge (1990a, 2000), and Bolman and Deal (2008). As a consortium of skills, Pisapia (2009) suggested that leaders who are successful think differently from less successful ones. Most importantly, he confirmed this suspicion using research from Pisapia, Reyes-Guerra, and Yasin (2006), Pang and Pisapia (2007), Zsiga (2008), Pisapia, Pang, Hee, Ying, and Morris (2009), and Pisapia and Pang (2012), that the ability to apply strategic thinking on the part of leaders was a significantly distinguishing factor between two groups of leaders. Additionally, effectiveness increased as leaders were able to use all three of these skills—reframing, reflecting, and systems thinking—concordantly.

Callahan (1962) wrote about the period from the early 19th century to the late 1950s and demonstrated how the rise of industrialism and the idea of scientific management dominated American culture and impacted public education. Callahan asserted that schools are especially vulnerable to social forces since they lay at the heart of any culture. Glass (2008) and Nelson, Palonsky, and McCarthy (2012) would agree that social forces have continued to impact schools today. As evidence, Callahan pointed to textbooks, such as one published in 1916, *“Public School Administration,”* by E. P. Cubberly, Stanford’s School of Education dean, and the entire chapter devoted to educational efficiency. Further proof from Callahan (1962) and other contemporary

public education trends includes the growth of teacher rating systems, standardized testing, per-pupil cost accounting, and platoon schools. In particular, teacher rating systems have grown from the simple use of tally marks to complex statistical modeling techniques that measure teacher effectiveness and student educational growth.

VAM is one such recent example of these statistical models and is increasingly being used across the nation (Schochet & Chiang, 2010; U.S. Department of Education, 2009). Although different models exist, a teacher's school year effects are measured in this system through the model's ability to control for student factors such as previous achievement, number of subject-relevant courses, disability status, language status, gifted status, mobility, retention, class size, and homogeneity of students in class (Scherrer, 2011). Although VAM is not a new concept, in the educational field it is a relatively recent and hotly debated topic. Many critics agree that relative to other teacher effectiveness models, through the use of static data (from high-stakes testing), student labeling (proficient versus non-proficient), and subjective criteria (single-rater evaluation), it is an improvement, yet issues still remain (AERA, 2015). These issues include concerns of some of the underlying assumptions of these models, validity and reliability problems, and possible "gaming" of the system. These are addressed more in depth in a later chapter.

Professional development has long been suggested as a method of improving teacher effectiveness. Darling-Hammond (2010) suggested that effective professional development "is sustained, ongoing, content-focused, and embedded in professional learning communities where teachers work over time on problems of practice with other teachers in their subject area or school" (p. 226). To this end, no known research has

been conducted on leadership preparation of classroom teachers and its effects on student achievement. The primary focus of professional development in education has been on curriculum, instructional strategies, classroom management, and assessment. Although these are components of how teachers lead in their classroom, there lacks a clear, overarching connection to classroom leadership practices. If a positive correlation were to be found between classroom leadership, student achievement, and teacher evaluation this study would allow for the analysis of a novel approach to professional development, open the door for further investigation into the specific factors related to the approach, and the design of new models of teacher professional development.

### **Statement of the Problem**

The landscape of education is changing with increased focus on accountability measures, competition, technology, communication, globalization, and diversity. This rapid change not only effects education as a whole, but impacts districts, schools, principals, and even works its way down to the teacher in the classroom. Schools have always been accountable for their performance, however the degree and force of enforcement has not always been the same over time. Accountability in education has grown exponentially. Evidence of this can be seen in education policy changes, the increased role of the federal government in education, and school reform efforts. Pressure has increasingly been mounted on schools. Beginning with the launch of Sputnik that led to curricular reform and teacher training efforts, and then the Civil Rights Movement with the Elementary and Secondary Education Act (ESEA) of 1965 as a part of the “war on poverty” focusing on equal access to education, increasing accountability can be seen as a series of historical events. This can also be evidenced in

the “Nation At Risk Report” and through the reauthorization of ESEA as the No Child Left Behind Act (NCLB) in 2001.

With the meteoric rise of accountability, new means for teachers to advance student learning and methods for developing and educating teachers to do so must be investigated. The relationship between how teachers think and the actions they take to influence student behavior, viewed through a leadership lens, has not been investigated. Teachers are confronted with many challenges. How they view these challenges, and the actions they take to combat them, has a significant impact on students. The different instructional strategies that a teacher can employ is just one of these challenges, however this has dominated teacher professional development. On top of presenting information to students, teachers must (a) inspire, challenge assumptions, (Walberg, 1999; Putney & Broughton, 2011; Stein, 2014); (b) manage their time, provide feedback, specify goals, (Haas, 2005; Marzano, 2007; Hattie & Yates, 2014); and (c) solve short-term, long-term, and bureaucratic problems (Driscoll & Pianta, 2010; Marzano, Marzano, & Pickering, 2003). As one may have already realized through this list of requirements, this could easily be the job description or attributes of any person in a leadership position, which shows how leadership as a concept transcends position, industry, and field of work.

Also, the landscape of education is evolving; schools are competing against private companies for students and their respective full time equivalent funding from the state. This competition has expanded into the virtual realm where online learning can occur in kindergarten all the way through graduate school. New models of teaching and learning are needed for public education. The integration of technology alone is cause for reevaluating the way teachers work. Virtual schools and courses are becoming the



new normal. Technology that makes education accessible any time of the day or night can quickly and accurately assess the performance of a child in a given subject and provide instruction and remediation where needed to meet mastery levels of content already exists. This level of educational specialization and differentiation is unprecedented and harkens back to the principles of Adam Smith. As the price for this technology decreases, consequently leading to more access and economic desirability for this model, the teacher will begin to fulfill a completely different role than has ever been seen before. This is especially true when taxpayers begin to contemplate the cost effectiveness of Internet access and teacher salaries. This puts the teacher into a more facilitative, leadership role that they are not properly trained or prepared to take on. This phenomenon is outlined more succinctly in, *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*, by Clayton Christensen (2008).

### **Purpose of Study**

The purpose of this study was to determine whether teacher cognitive and behavioral agility has a direct relationship with VAM and IP, and whether that relationship is moderated by contextual variables. The contextual variables in this study include alterable and unalterable moderating variables of age, gender, years of teaching experience, highest graduate degree, school level, highest leadership graduate degree received, teacher attendance, leadership position, and student behavior. The study took place at a large southeastern school district.

This study was guided by four research questions:

RQ1. Is there a relationship between behavioral/cognitive agility of the teachers and their VAM or IP scores?

RQ2. Do alterable variables (highest leadership graduate degree, school level, attendance, and leadership position) moderate the relationship between behavioral/cognitive agility of the teachers and VAM or IP scores?

RQ3. Do unalterable variables (age, gender, years of experience, student behavior, and highest graduate degree) moderate the relationship between behavioral/cognitive agility of the teachers and VAM or IP scores?

RQ4. Based on these variables, can a reliable predictor model of effective classroom leadership be developed?

### **Significance of the Study**

This study is significant in several ways. To begin, accountability measures of education are intensifying pressure for it to produce more and better results for student achievement. Accountability pressure, coupled with a changing educational environment that is becoming increasingly integrated with technology, means that new approaches to meet these demands must be explored. The current education system as a whole has been criticized for its lack of change. Education, with a teacher in a classroom full of desks carrying age/grade level students presenting information on a given topic for a specified amount of time, resembles much of the model that has been used since the inception of public education in the United States. Part of changing the system is changing how we view teachers. Leithwood, Louis, Anderson, and Wahlstrom (2004) presented findings from their examination of available evidence at the time of their research and stated that the strongest effects stemming from school factors are those from the classroom teacher. Darling-Hammond (2012) said that, “regardless of the efforts or initiative, teachers tip the scale toward success or failure” (p. 8). What teachers do in the classroom matters and

what districts and schools focus on for their professional development impacts how teachers perceive and act in the classroom (Darling-Hammond, 2010).

It is assumed in this study that effective teachers have always played a leadership role in the classroom and will increasingly do so as the growth of independent learning through new technologies as a medium of educating students grows. Determining if cognitive and behavioral agility impacts student achievement, and whether other variables moderate this relationship, could shape the future of teacher professional development initiatives. Additionally, if cognitive and behavioral agility affects teacher evaluations, then developing these abilities will assist teachers in improving their performance from an evaluative standpoint. The paradigm shift from teacher who lectures on a given subject and then measures student retention to classroom leader that facilitates the learning process both directly and indirectly begins with developing future and current teachers differently.

### **Theoretical Considerations**

In a post-modern world there is a consistent demand for organizations to change and adapt to their environments. This is true on a macro level, such as leading global corporations, and on a micro level, such as leading a classroom. Classrooms are dynamic environments that are ever changing. Forces, in the form of social policies, education policies, student demographics, and school culture are always acting and transforming the classroom environment. As the leader, the teacher must interpret information received from all of these sources and make decisions or act upon them in order to create a positive environment where students can learn. This perspective, teacher as classroom leader, has not received research attention. The assumption that the leader uses her or his

cognitive and behavioral complexity and agility to educate students and that this approach can be used to predict student achievement, as well as performance evaluations, has gone untested in the field of education.

**The relationship of complexity and agility.** The degree to which a leader possesses a wide array of thinking and behaving actions refers to their cognitive and behavioral complexity. Hence, in their simplest forms, cognitive and behavioral complexity signifies the possession of a wide repertoire of thinking and influencing structures, tactics, and habits. The degree to which a leader uses a wide array of thinking and behaving actions refers to their cognitive and behavioral agility. Cognitive and behavioral agility is the ability of the leader to use their repertoire of thinking and influencing structures in practice. Thus, in the strategic leader framework developed by Pisapia (2009), which guides this study, the most important characteristic of effective leaders is not whether they possess complex cognitive and behavioral repertoires, but whether the leader can use them in their practice. The assumption that a person with high cognitive and behavioral agility (i.e., able to engage in a wider array of thinking skills and behaviors) will be more effective than a person with lower cognitive and behavioral agility has some support in the work of Denison, Hoojiberg, and Quinn (1995) and Zaccaro (2001).

**Cognitive complexity/agility.** Underpinning all methods of reasoning is the concept of cognitive complexity. Cognitive complexity is a psychological characteristic describing the breadth of a person's framing or perceptual skills which may enable them to perceive opportunities and make better decisions. Although definitions of cognitive complexity differ, there is general agreement that it involves the possession of multiple

constructs, schemata, and scripts to perceive and evaluate situations. Cognitive properties play an important role in the discovery of emerging trends emanating from the environment. For example, Zhang, Xin, and Lin (2012) characterized cognitively complex people as those who are more open to new information, who can draw inferences, and who make predictions from the world around them. They integrate ideas by finding commonalities among seemingly diverse people, objects, and other constructs (Satish, 1997); rely more on prior knowledge and decision heuristics; tend to frame information more positively; and absorb information and derive meaning in multiple ways by applying more categories and dimensions to it (Baron, 1998; Shane, 2000; Shepherd & DeTienne, 2005).

Beginning with James Bieri (1955), cognitive complexity refers to a person's ability to differentiate among constructs. This was derived from George Kelly's (1955) personal construct theory where, according to Kelly, a person develops their own personal constructs that allow them to be more receptive to novel information, which they use to draw inferences and make predictions from the world around them (Zhang et al., 2012). Later, more dimensions of complexity were added, such as integration where, according to Satish (1997), a person is able to find commonalities among seemingly diverse people, objects, and other constructs allowing them to observe and retain more information, leading to a deeper understanding of a situation. The amount and kind of processes that a person can bring to bear in the process of interpreting information determines the level of cognitive complexity they can apply.

Therefore, a highly cognitively complex person can absorb information and derive meaning in multiple ways by applying more categories and dimensions. Several

definitions for cognitive complexity exist; however, there is consensus that it comprises a psychological process using varying mental constructs to perceive and assess information. From a leadership theory perspective, leaders who must navigate their organizations in current conditions—ambiguous and dynamic as they are due to increased access to information, faster communication, and global competition—must possess higher levels of cognitive complexity to be successful. However, possessing these skills is only the prerequisite condition; leaders must also be capable of utilizing them.

Cognitive agility stems from cognitive complexity. It is the ability to use schemata, scripts, and strategic thinking skills to interpret, understand, search for alternatives, and make decisions about means and ends in real world situations. Leaders with cognitive agility process information differently and perform certain tasks better than less cognitively agile individuals because they use more constructs, categories, or dimensions to discriminate among information and see more relationships among them (Pisapia, 2009). As will be shown below, research has evidenced that cognitively agile leaders can execute these attributes in their constant search for meaning through interpreting information in their environment.

Cognitively agile leaders spend more time interpreting information (Dollinger, 1984): Information processing was found to be an especially important skill for a business leader engaged in boundary spanning as a strategic action. This was seen even more so when the action was tied to performance. Similarly, Sieber and Lanzetta (1964) found that persons with high cognitive complexity search for more information as situations become more complex. Those studied analyzed more choice alternatives and

were cognizant of ambiguity, resulting in being more open to new information. The classroom is a perfect example where these abilities must be employed. School districts record, compile, and disaggregate data concerning students and disseminate that to teachers who must then use it to guide their instruction. Teachers must be able to analyze and synthesize this data to make decisions that will positively impact student achievement. Students also present information individually and as a whole. Social cues, language, and demeanor are all sources of information that teachers must note when interacting with children and must use when reflecting on individual effort and group dynamics. Classrooms are socially complex environments and individuals that can manage ambiguity and search for more information will have the ability to navigate that environment more effectively.

Boundary spanning is also a strategic function of the teacher since they must interact with different groups and fill different roles on a daily basis. This involves interacting with children and adolescents, parents, community stakeholders, and colleagues; each group presenting information from their respective positions and identities. Other desirable traits of a teacher or classroom leader are included in the cognitive complexity/agility literature. Fisher, Merron, and Torbert (1987) presented research that has shown that those who are in the later stages of adult development are more cognitively complex, allowing them more capacity for empathy, social understanding, and tolerance for diversity and ambiguity. They suggest that these later stages of adult development are related to managerial effectiveness.

Later leadership literature has also identified these effective thinking habits of leaders. In a review of literature, Pisapia, Reyes-Guerra, and Coukos-Semmel (2005)

identified three cognitive skills that lead to successful leadership: systems thinking, reframing, and reflection. The Strategic Thinking Questionnaire (STQ<sup>T™</sup>), designed to measure these leadership thinking constructs, has been used in several studies (Pang & Pisapia, 2007; Pisapia et al., 2006; Pisapia et al., 2009; Zsiga, 2008) that have found that cognitive agility differentiates between leaders that are more and less successful, that leaders are more effective when the three skills are used in concert, and that effectiveness of these skills is cross-cultural. These studies correspond with the other studies within the cognitive tradition that demonstrate that effective leaders think differently (Baron, 1998; Busenitz & Barney, 1997; Cools & Van Den Broeck, 2007; Grégoire, Corbett, & McMullen, 2011; Haynie, Shepherd, & McMullen, 2009; Kickul & Krueger, 2004; Nuntamanop, Kauranen, & Igel, 2013; Nutt, 1990; Palich & Bagby 1995).

Pisapia (2009) defined reflection as the “ability to use perceptions, experience, and information to make judgments as to what has happened in the past and is happening in the present to help guide your future decisions” (p. 64). Within the skill of reflecting, leaders should be able to recognize why one decision is more effective than another, as well as analyze the validity of their own assumptions, experiences, and knowledge and compare this with that of others to interpret situations. Reflection has history in both education and leadership literature. Dewey (1933) believed that reflection was distinct from other cognitive processes in that it involved two aspects, doubting one’s own understanding and the active pursuit of information that would either confirm or resolve that doubt. Schön (1975) alluded to reflection as a learning process by writing that learning occurs when an individual is confronted with a conflict to their operating assumptions, forcing the individual to reevaluate them. Senge (1990a) distinguished



between three levels of reflection, the first being technical or a concern with first-order changes. The second level is practical and begins questioning assumptions and ends. Finally, the last level examines any moral and ethical concerns, based on the previous two levels.

Reframing is defined as “the ability to look at your reality using multiple perspectives, differing frameworks, different mental models, and different paradigms in order to generate new insights and options for actions” (Pisapia, 2009, p. 64). Similarly, Bolman and Deal (2008) described the essence of reframing as viewing a situation from multiple lenses and that by doing so offers leaders new possibilities, with new advantages and disadvantages. They continued to write that the complexity in which leaders and organizations must operate requires the leader and organization to use this skill.

Pisapia (2009) proffered that systems thinking is “the ability to see systems holistically by understanding the properties, forces, patterns, and interrelationships that shape how a system works and provides you with options for action” (p. 64). Capra (1985) and Pisapia believe this to be a radical shift from the linear and rational thinking of the past to an understanding that organizations exist in webbed relationships much like that within an organism or ecosystem. Where once it was understood that to know the whole you had to analyze each part, Capra believed that observing the relationships or connections amongst the parts and how they interact is the key to comprehending the whole.

Seeing one’s self as a part of a system or attempting to identify patterns and relationships helps the leader understand multiple courses of action and the possible consequences of each action, much like a ripple effect (Pisapia, 2009). Senge (2000)

related all three of these principles and applied them to schools. He wrote that our school system is predicated on 17th century principles and that leaders must reframe the problem using a systems-thinking lens. In the article he describes the school system as a living system that must continually regenerate or replace itself and that the only method of improving is through reframing how we envision schools by critically reflecting and questioning our assumptions.

Cognitively agile leaders are also capable of “anticipating the future” (Pisapia, 2009, p. 73) through their nature and character; that they are information junkies (Pisapia). Pisapia wrote that those that are successful in the current fluctuating environment use a look, listen, and learn process. Cognitively agile leaders “look outside and listen, look inside, and listen; from these activities learn and envision necessary changes” (Pisapia, 2009, p. 76). During this entire process they are simultaneously collecting and interpreting information, a necessity in post-modernity. Empirical research that supports the notion of cognitively agile leaders being more capable of exploiting new opportunities exists, such as that of Busenitz and Barney (1997). They found that entrepreneurs and managers think differently in that entrepreneurs use heuristics and biases to effectively and efficiently make decisions, which is also correlated with creativity. This is due to the lack of all necessary information in many situations when a decision is needed. Notable authors, such as Bolman and Deal (2008), have suggested that cognitively agile leaders frame information differently and more positively, and Senge (1990b) proffered that these same leaders connect seemingly unrelated information by thinking holistically, leading them into the future. It is evident, especially from the works of Capra (1985), Senge, and Pisapia that ineffective leaders

focus on past notions of linear change and that this contradicts the current reality we face. Cognitively agile leaders are those that can apply information and concepts to practice.

**Behavioral complexity/agility.** Denison et al. (1995) stated:

cognitive complexity, may well be a necessary condition for the effective practice of leadership. Behavioral complexity, however, must certainly be the sufficient condition. Leadership must inevitably be performed through action, not cognition, and it would thus appear to be time for leadership researchers to begin to develop theories of behavioral as well as cognitive complexity. (p. 524)

They continued to write that effective leaders are able to tap into a wide repertoire of actions or behaviors, for instance simultaneously promoting change and stability or relationship and hierarchy. Additionally, they argue that while many leadership theories lay on a two-dimensional continuum, the reality of complex environments does not allow for this and that leaders must react to situations that present paradox and contradiction.

This idea is an expansion of previous leadership models, such as Hersey and Blanchard's (1969) situational leadership model that dictates that a leader's actions are based upon the task at hand, the relationship with the subordinate, and the subordinate's readiness for the assigned task. Another example is leader-member exchange theory, where those within different groups relative to the leader are treated differently based upon their known relationships and other such factors (Dansereau, Graen, & Haga, 1975). These examples lend evidence and support to the notion that behavioral complexity is an important component of leadership. It "...provides an integrative theoretical framework of previous leadership theories (such as traits theory, behavioral theory, and contingency theory" (Jawadi, Daassi, Favier, & Kalika, 2013, p. 201). They also wrote that

behavioral complexity theory focuses on the dynamics and interactions in diverse contexts and is well suited for studying ambiguous environments.

Behavioral agility stems from behavioral complexity. Praxis, or the practical application of a theory, is an important distinction; simply knowing that effective leaders behave in multiple and contradictory ways or possessing the ability to do so is insufficient. To bridge this gap, the term behavioral agility is used to signify leaders acting in a behaviorally complex manner. Behavioral agility is the ability to exhibit contrary or opposing behaviors (as appropriate or necessary) (Pisapia, 2009). As Bass (1990) suggested, leaders must do more of all behaviors. Complex conditions are consistently found laid in the lap of the classroom teacher. Examples include the need to move along the curriculum while ensuring that students are not left behind, maintaining high standards and expectations while making accommodations for exceptional students, and developing close relationships with their students while remaining professional and maintaining the respective roles of teacher and student. All of these actions are expectations of classroom teachers and yet can result in competing behaviors. It is assumed that these actions influence the performance of students.

Pisapia (2009) wrote: “One of the common errors leaders make is to use a limited set of leadership actions when influencing followers to join in a common cause. Such leaders are effective only when conditions match their one-dimensional set of actions” (p. 30). Being that two of the underlying principles of Pisapia’s work are that leadership exists at all levels of an organization and that leadership actions are tools for anyone wanting to create a high performing team, this study uses his strategic leadership framework to understand the different actions taken by the leader. According to Pisapia,

there are five types of actions available to the leader.

Managing actions are those taken to make product improvements, become more efficient, streamline processes, or other decisions needed to maintain smooth operations and reach goals. Specific examples of this include establishing policies, clarifying goals, instituting accountability measures, and providing necessary resources to accomplish projects. In a classroom setting, this could include establishing beginning of the year procedures with students, explaining curricular goals and grading policies, and pointing students to extra resources they can access to better master curriculum content.

Actions that use vision to motivate change and development are transformational behaviors. Leader actions that fall into this category include communicating vision, challenging mental models, and establishing an agreed upon, common set of values and priorities amongst colleagues. Teachers can apply these principles in situations that require inspiring students, providing motivational incentives to achieve goals, and creating a positive, collaborative classroom culture between students and teacher.

When teachers display the values of the organization, demonstrate fortitude during moral dilemmas, and promote the common good, they are acting in a bonding manner. Bonding actions are clearly important for school environments, as part of the education process includes the formation of contributing citizens to society. Teachers and leaders take these actions and communicate the connection they have with the commonly shared beliefs of the organization. Teachers model this behavior through simple gestures such as greeting students upon their arrival, picking up trash that they did not create as they walk the halls, and holding those accountable for making unethical decisions. These actions are taken to pass on and instill universal principles of human

dignity.

Bridging and bartering are actions undertaken to create alliances that further the organization's goals. These pragmatic approaches create networks with people who wield power and influence, in and out of the organization, for the purpose of resource attainment and allocation. Examples include exchanging goods and services to strengthen relationships, making friends with stakeholders through personality and genuine interest, and reaching out to others to create mutually supportive structures. These illustrations can easily be placed within the context of a classroom, school, and district, all within which the teacher must interact to accomplish organizational goals. Highly effective teachers that use bridging and bartering could be found collaborating with their administrator to better manage behavioral concerns with their students, connecting with their department head to gain necessary materials for an upcoming project, or creating friendships with nearby teachers to establish a second room to send students who may need additional time on a test.

**Educational leadership preparation.** One of the moderating variables in this study that is hypothesized to impact the relationship between cognitive/behavioral complexity and student achievement is whether or not the teacher has undergone a leadership graduate degree program (leadership education). Fisher et al. (1987) related theories of decision making, one of which being cognitive complexity, to the concept of development. In doing so, they made explicit that post-secondary education and development can impact cognitive complexity. This is important for several reasons; public education is in critical need of leaders, there lacks motivation to take on these roles on the part of teachers, fewer qualified applicants exist than in the past, and formalized

recruitment and selection strategies are almost non-existent (Myung, Loeb, & Horng, 2011). As stated previously, if a link between cognitive/behavioral complexity and student achievement is found and is moderated by leadership education, then creating professional development that creates classroom leaders will be a step closer to solving some of the challenges education is facing through leadership.

Normore (2006) wrote that in the past recruiting candidates for the principalship was much easier, as it was regularly viewed as the normal progression of a teacher's career. More recently, teachers' perceptions of the role of a school administrator have negatively changed to include harassing teachers, dealing with irate parents, handling disciplinary issues, and managing paperwork, leading to a diminished appeal for the position and lower levels of qualified candidates. Quinn (2002) asserted that many school districts are reporting shortfalls in qualified applicants, as well as a large number of personnel in leadership positions reaching retirement age. Quoting a recent Harvard poll, Quinn shows that an astonishing 30% of districts reported doing "nothing" about this critical shortage. Myung et al. (2011) concurred with this analysis, showing that few districts have a formalized recruitment process and adding that a skill shortage may also be to blame for the shortfall.

**Value-added modeling.** VAM is a statistical method for analyzing teacher effects on student performance. It is growing in popularity among states' educational systems (Scherrer, 2011). For this study, the particular VAM that is used is referred to as the covariate adjustment model (McCaffrey, Lockwood, Koretz, Louis, & Hamilton, 2004) and is not used exclusively to determine teacher effectiveness ratings in the state. For a particular student, value added is the difference between their statistically predicted

performance and their actual performance as a consequence of the teacher's instruction.

The predicted performance represents the level of performance the student is expected to demonstrate after statistically accounting for factors through the model.

This controlling for student factors that are outside of the purview of the teacher is the distinctive advantage of this model (Scherrer, 2011). The model claims to control for factors by accounting for previous test scores, attendance, mobility, disability or language status, and whether or not the student has been previously retained. It also accounts for classroom characteristics such as size and heterogeneity of students' entering test scores. Finally, the particular VAM used for this study includes 50% of the school component, which encompasses principal leadership, neighborhood effects, etc. However, as reported by Scherrer, issues of reliability exist (Koedel & Betts, 2005; Schochet & Chiang, 2010) and Campbell's Law remains relevant. Campbell's Law (Campbell, 1976) states that the more weight you place on one outcome the more it will be subject to corruption. This has been true since the inception of high-stakes, standardized testing, seen under the implementation of NCLB in 2001.



## Research Model

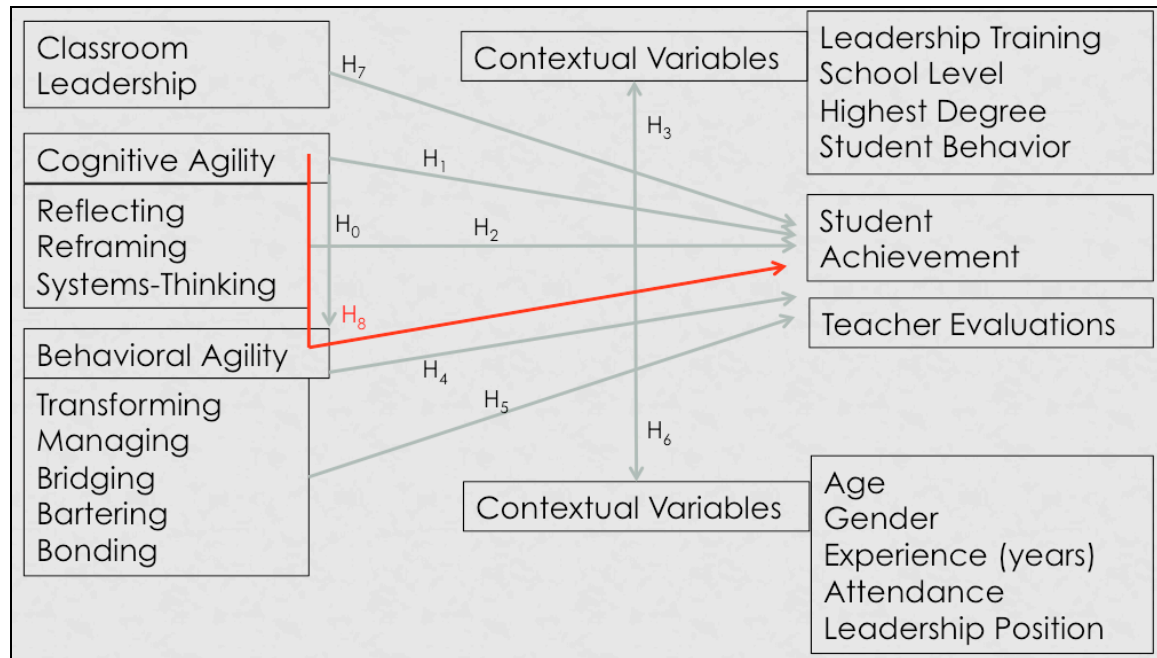


Figure 1. The research model that guided this study.

Figure 1 above suggests that a teacher's cognitive and behavioral agility, individually and together, are variables that impact student achievement and teacher performance evaluations and that the degree to which they do so is moderated by other alterable and unalterable variables. Alterable variables are those that the participant had a choice in, such as teacher attendance and being involved in a leadership education program (leadership education) that would lead to an advanced degree in educational leadership. Unalterable variables include gender, age, years of teaching, highest graduate degree, student behavior, and school type (middle or high school). The following hypotheses, based on the background knowledge, were examined in this study:

H<sub>0</sub>: Teacher cognitive agility predicts teacher behavioral agility.

H<sub>1</sub>: Teacher cognitive agility (unidimensional effect) predicts VAM and IP scores.

H<sub>2</sub>: Teacher use of systems thinking, reframing, and reflecting (multidimensional effect) predicts VAM and IP scores.

H<sub>3</sub>: Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderates the relationship between cognitive agility and VAM and IP scores.

H<sub>4</sub>: Teacher behavioral agility (unidimensional effect) predicts VAM and IP scores.

H<sub>5</sub>: Teacher's use of transforming, managing, bonding, bridging, and bartering (multidimensional effect) predicts VAM and IP scores.

H<sub>6</sub>: Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderates the relationship between behavioral agility and VAM and IP scores.

H<sub>7</sub>: Teacher combined cognitive and behavioral agility (uni- and multidimensional effect) predicts VAM and IP scores.

H<sub>8</sub>: The relationship between cognitive agility and VAM and IP scores is mediated through behavioral agility.

## **Methodology**

The study took place in a large, southeastern school district in the United States and utilized a non-experimental, quantitative approach using several instruments: the Strategic Leadership Questionnaire for Teachers (SLQ<sup>T</sup><sup>TM</sup>) and the Strategic Thinking Questionnaire for Teachers (STQ<sup>T</sup><sup>TM</sup>) developed by Pisapia and the researcher for this study (based upon Pisapia & Reyes-Guerra, 2007); VAM; and IP to analyze participant levels of cognitive agility, behavioral agility, student achievement, and teacher

performance, respectively. The nine hypotheses were tested using these same instruments. The study investigated the independent variables of cognitive and behavioral agility of teachers and their respective student achievement and end of year evaluation results (dependent variables), with particular attention to moderating variables (alterable and unalterable), such as participation in a leadership education program (leadership education), demographic data, and highest degree, to name a few.

Teachers were drawn from the population using a variety sampling techniques, such as snowball and purposeful sampling, for investigation. The participant pool was specifically designed to gain insight and explore the possible relationships in order to address and answer the guiding research questions of this study. Participant referrals (snowball sampling) was specifically utilized to assist with recruiting other potential teachers for the study to expand the sample size. This is a common method for hard to reach populations and was used due to the overall lack of time teachers have to be involved in voluntary studies.

In order to measure the relationship between the noted variables, the researcher identified teachers with VAM (as defined by the state's Department of Education) and IP scores earned in the 2013-2014 school year and inquired with the district to access those scores. Inferential statistical analyses, such as correlation and regression, were run to determine the relationship between the participants' cognitive/behavioral agility as measured through the administration of the STQ<sup>T TM</sup> and the SLQ<sup>T TM</sup> and their corresponding VAM and IP scores. The STQ<sup>T TM</sup> measured the leaders' ability to use systems thinking, reframing, and reflection or strategic thinking skills and the SLQ<sup>T TM</sup>

determined the leaders use of influencing actions in the form of transforming, managing, bonding, bridging, and bartering.

End of year evaluations were derived from the Marzano teacher IP framework mandated by the county. This evaluation model measures teacher performance and classroom behaviors within four separate domains; planning, teacher reflection; professionalism; and collegiality. It is based on research by Dr. Marzano and his analysis of previous effective instruction research. IP is an observational, web-based instrument that the participants' respective school-based administrators utilized to provide their evaluation scores for this study. The IP scores were derived from classroom walkthroughs of different lengths, but also included evidence and ratings from other areas such as lesson plans and meetings between the teacher and administrative rater.

Student achievement was measured by the participant's VAM scores, which were calculated by their students' performance on annual standardized state assessments. VAM scores measure the teacher's impact on student learning, taking into account several factors that research has shown to impact student learning. The VAM factors include: 1) student characteristics such as attendance, mobility, previous years standardized test performance, and special education status; 2) classroom characteristics such as class size and homogeneity of students; and 3) school characteristics.

In general, the VAM score takes these variables into account and predicts where the student should be at the end of the year on the state standardized test. The overall VAM score is calculated by averaging the number of students that met or exceeded their predicted test score on the end of year standardized test across all of the teacher's students that were eligible to receive a score. Efforts were taken during the study to only

draw on teachers within the sample that instruct students in courses that provide direct teacher VAM scores.

## **Definitions**

For clarity of reading and understanding, the following definitions are provided.

*Bartering*: “The grease that lubricates relationships” (Pisapia, 2009, p. 147). Actions such as, making deals, exchanging goods and services, rewarding assistance, and compromising are used “to strengthen the effectiveness of their relationships and alliance building efforts” (Pisapia, 2009, p. 147).

*Behavioral agility*: The ability to use a wide set of influence actions (e.g., transforming, managing, bonding, bridging, and bartering) to increase their effectiveness (Pisapia, 2009).

*Behavioral complexity*: The possession of a wide repertoire of leader influence actions.

*Bonding*: To “connect with followers, and connect followers to the organization” (Pisapia, 2009, p. 133). Subordinates that witness these actions perceive the leader to be honest, respectful, and committed to following policies, procedures, and principles in decision-making.

*Bridging*: “A tactic used by strategic leaders to develop alliances with people of power and influence from outside and inside the organization” through the use of “social influence and available resources to advance his/her agenda” (Pisapia, 2009, p. 141). Specific examples include, developing alliances, associating with people of influence, and allocating resources to further their agenda.

*Classroom leader*: A teacher who uses a wide array of influencing actions in the classroom to influence students towards a common goal (Pisapia, 2009).

*Cognitive agility:* The ability to use multiple mental processes and skills (e.g., systems thinking, reframing, and reflecting skills) to differentiate and integrate among constructs, discern meaning, and establish relationships among events and information that appear to be discrete and unrelated, as well as search for alternative solutions (Pisapia, 2009).

*Cognitive complexity:* A person's possession of multiple mental schema, scripts, and structures.

*Instructional practice (IP):* A part of the state's teacher performance evaluation system that utilizes Dr. Robert Marzano's teacher instructional practice framework and research. Overall score is calculated by taking the average rating (0-4) across all individual elements within the four domains (Marzano, 2007).

*Managing:* Actions concerned with maintaining smooth operations, improvements in product and processes, and incorporate "planning, organizing, allocating and monitoring to accomplish these objectives" (Pisapia, 2009, p. 34).

*Reflecting:* The "ability to use perceptions, experience and information to make judgments as to what has happened in the past and is happening in the present to help guide your future decisions" (Pisapia, 2009, p. 64).

*Reframing:* "The ability to look at your reality using multiple perspectives, differing frameworks, different mental models, and different paradigms in order to generate new insights and options for actions" (Pisapia, 2009, p. 64).

*Systems thinking:* "The ability to see systems holistically by understanding the properties, forces, patterns and interrelationships that shape how a system works and provide you with options for action" (Pisapia, 2009, p. 64).

*Transforming*: Actions that are “change and development oriented” (Pisapia, 2009, p.

33). Specific actions include communicating vision, challenging mental models, motivating followers to action, and providing positive and realistic future goals.

*Value-added model (VAM) score*: A part of the state’s teacher effectiveness rating system that measures the difference between the predicted student score based on a statistical model that takes student, classroom, and school characteristics into account, and their actual outcome. Overall VAM score is the proportion of students that met or exceeded the statistically predicted score (Florida Department of Education [FLDOE], 2016).

## CHAPTER 2. LITERATURE REVIEW

The purpose of the study was to determine whether teacher cognitive and behavioral agility is related student achievement in the classroom as measured by their VAM score and their end of year evaluations as measured by the Marzano teacher IP framework, and whether that relationship is moderated by alterable and unalterable contextual variables. The cognitive and behavioral agility of the teachers were measured using the strategic leadership framework (Pisapia, 2009) that has married these two concepts in the execution of leadership. This chapter reviews the extant literature that supports the purpose of this dissertation. It is organized by first reviewing the history of the development of leadership theory in general, and educational leadership specifically. Early parts of this section are descriptive in nature and are followed by empirical literature that supports the main theoretical models presented. The section on cognitive and behavioral agility defines the terms and highlights the empirical literature associating the concepts with leadership theory. The final section discusses the history of methods used to measure student achievement and examines the current use of value-added approaches and the empirical work supporting their use. Propositions that can be tested are extracted from this examination of the literature.

### **Leadership**

**Leadership theory development.** There have been leaders as far back as humans have organized into groups. The phenomenon of leadership traces its lineage back to the origins of civilization. History is replete with individuals who have



influenced others towards a goal. Leadership is also a cross-cultural reality with examples such as the emperors of China, Egyptian pharaohs, Jewish tribal patriarchs, and Native-American chiefs. It has also been chronicled since mankind gained the ability to communicate in writing. This includes Sun Tzu's, *Art of War*, many passages found in biblical texts from the books of Proverbs and Psalms, and Plato's, *Republic*. These have all been extremely influential to how leaders, rulers, kings, emperors, chiefs, and pharaohs have exerted their influence and power. As can be noted in the exemplars above, the earliest conceptions of leadership were confined to individuals at the highest levels of their organizations and not considered to be a quality of the everyday person (Yammarino, 2013).

Leadership is difficult to define. Northouse (2007) points out that there are many definitions of leadership, each slightly different from the other based on how the author is trying to conceptualize it. Some of the different forms are based on different perspectives of the concept such as group processes, personalities, perspectives, behaviors, and power relationships. Each of these different dimensions impacts its definition. For the purposes of this study, the researcher will use Northouse's (2007) definition; "leadership is a process whereby an individual influences a group of individuals to achieve a common goal" (p. 3). This definition includes the term process that emphasizes the two-way interaction between leader and followers, opening the definition to everyone not just the person carrying the formal title. Northouse continues to defend this through insisting that there must be influence, a cause for change within a group, and attention to achieving a goal together. Communal goal achievement is an important concept in this study as both M. P. Follett (1970) and Norr and Crittendon (1975) believed that the teacher is acting as

a leader to the extent that they are attempting to achieve a common goal (inter-individually) and not focused on the individual interests of each student.

As a field of research, the study of leadership is relatively young. The discipline began in the early 20th century (Northouse, 2007), but burgeoned in the middle to late 20th century primarily in the United States (Burns, 2005). Many studies of leadership have been conducted in the past few decades (Bass & Bass, 2009). The growth and popularity of leadership research is primarily due to the fact that it draws on so many other disciplines and invigorates them (Burns) and because of how multifaceted and versatile it has become (Yammarino, 2013). Leadership is cross-cultural, can occur in broad contexts, can be emergent or formal, and is a social phenomenon that everyone has experienced. In what Yammarino referred to as the “past,” from the beginning of recorded history until the start of the twentieth century, leadership was focused solely on those in the highest positions of major organizations (political, religious, etc.). Those living outside of these positions received little attention and “studied” leadership by reading the stories and biographies or listening to the myths/legends/oral traditions of leaders. Even in considering “present” times Yammarino proffered that the majority of leadership research prior to the 1970s focused primarily on the leader.

One of the first approaches to studying leadership that was of scholarly interest begun in the early twentieth century was the trait approach. Theories that were generated from this approach are commonly referred to as “great man” theories. The emphasis was on specifying which traits, characteristics, and qualities noted leaders exhibited (Northouse, 2007). This body of research was dominant until the 1940s and attempted to differentiate leaders from followers. Some of the traits that were identified through this

research were intelligence, appearance, aggressiveness, and sociability (Jago, 1982). One of the major figures to study this concept of leadership in two major reviews was Stogdill (1948, 1974).

In his first survey of research, Stogdill (1948) found that five factors were most closely associated with leadership and that they could be generalized under the categories of capacity (intelligence, alertness, verbal facility), achievement (scholarship, athletic accomplishments), responsibility (dependability, initiative), participation (activity, cooperation, sociability), and status (popularity, socio-economic position). However, Stogdill also asserted that possessing these traits did not necessarily mean a person was a leader, but if so, only to the degree to which those traits fit a given situation. The second survey (Stogdill, 1974) had similar findings to the first. More recently, moderate findings concerning personality dimensions, the “big five” (extraversion, agreeableness, conscientiousness, emotional adjustment, and openness to experience), have been found to predict leadership (Bono & Judge, 2004; Ones, Dilchert, Viswesvaran, & Judge, 2007). From 200 organizations, 14 samples were gathered and results showed that transformational leadership behaviors can be predicted from several personality traits (Bono & Judge, 2004).

There have been many critiques on this body of research, such as those put forth by Jago (1982) and Northouse (2007). First, relationships between traits and leadership are not always strong, for instance, there are “too many exceptions to the general rule that effective leaders possess superior intelligence for this relationship to exhibit much practical utility” (Jago, 1982, p. 318). Second, there has been too much variation on which factors are most important, failing to account for situational effects (Jago;

Northouse; Stogdill, 1974; Yukl & Van Fleet, 1982). Finally, research has failed to make the connection between possession of traits and leadership outcomes, in part due to the elusive definition of leadership effectiveness (Jago).

A response to studying leadership traits was to look at leader skills. Whereas leadership traits are mostly inherited or static, the thought and hopes for those not genetically predisposed was that leadership skills may be developed (Katz, 1955). Katz proposed a three-skill approach to leadership; technical, human, and conceptual. In his article, Katz suggested from observation and experience that all three are important at every level to varying degrees. At the top of the leadership ladder, technical skill such as playing an instrument, making widgets, etc., is not as important. Reasons such as lack of practice/routine and evidence from successful organizations that hire chief executive officers (CEO) from completely different occupations make the need for an executive to have great technical skill practically unnecessary. Additionally, human skills, such as effectively interacting with others, was also not found as important since this is much more limited at the upper echelons of management. The most important skill that was identified for a potential CEO was conceptual skill.

For middle managers, all three were important. They must be seen as technically competent, since most rise from amongst the lower echelons of the organization, effective in their interactions as they span all levels of management in their daily routines, and be able and mentally prepared to make sound decisions. At the lowest levels of management the conceptual skills, such as being able to see the organization as a whole, and human skills—influencing the work of others—are far less important. What really matters at this level is the technical skill of the employee. One of the biggest advances in

leadership that came from this theory was that leaders could be developed and it was not an inherited trait. This opened the door for those that did not fit the perceived model of an effective leader such as women, minorities, and immigrants.

More recent studies of leadership skills have further developed this theory. Mumford, Campion, and Morgeson (2007) re-conceptualized the skills into cognitive, interpersonal, business, and strategic; however, they reinforced previous research that the importance of skills change according to the level of the organization a leader serves. They also concluded that across all levels of hierarchy, cognitive skills were the most in demand, followed by interpersonal. Their study was conducted with over 1,000 participants who worked in over 100 countries.

Lord and Hall (2005) also proposed a model of leadership development based on the acquisition of skills, however they added that those skills become inextricably related to the leader's perception of self. Again, the cognitive process is at the forefront of their model. Martam, Leritz, and Mumford (2005) explicated that there has been an emphasis on the development of cognitive skills, such as planning, problem-solving, etc., as important, however they emphasized these must be integrated with behavioral skills such as consideration and initiating structure. Northouse (2007) provided criticisms of this approach as being too general and failing to express exactly how specific skills increase leadership effectiveness. Moving forward, leadership literature attempted to investigate and explain more specifically which leadership behaviors were most effective.

The next set of studies that greatly impacted leadership research came from The Ohio State University and the University of Michigan (Northouse, 2007). This two-dimensional theory dominated research in leadership until the introduction of

transformation leadership (Judge, Piccolo, & Ilies, 2004). Both studies looked at leadership behavior and had similar findings. The Ohio State studies viewed leadership through a subordinate lens and measured leader behavior using a questionnaire given to followers. Responses in the study grouped around two distinct behaviors termed “initiating structure” and “consideration” (Halpin, 1954). Although the University of Michigan studies had similar findings, dubbed “employee orientation” and “production orientation,” they originally viewed these constructs on the same continuum not allowing both to work in concert. This body of research expanded the idea of leadership to consider what leaders do (behaviors), instead of who they are (traits) or what skills they have learned.

The concept of initiating structure encompasses behaviors such as defining work roles, establishes lines of communication, and orienting all stakeholders towards goal attainment. Consideration is the extent to which a leader provides moral support; appreciation for subordinates, and is concerned with their overall wellbeing (Judge et al., 2004). One of the most well-known leadership behavior models is the managerial grid developed by Blake and Mouton (1964). The two variables, concern for production and concern for people, are translated into two axes, vertical and horizontal. The further along the axis the more the leader exhibits the given variable, creating five distinct leadership styles with the inherent assumption that high concern for people and high concern for production is optimal for all managers, which could be considered as a universal approach for effective management.

This brand of leadership was not only criticized for its lack of consideration for situational factors (Korman, 1966; Stogdill, 1974), but concerns as to the internal validity

of leader behavior questionnaires were also raised (Rush, Thomas, & Lord, 1977). In an effort to find a universal approach to leadership the “results from this massive research effort have been mostly contradictory and inconclusive” (Yukl, 1994, p. 75). With the assumption that there exists one best method of leadership, high consideration and high initiating structure, much research has shown different results. For instance, Lowin and Craig (1968) observed that a leader’s behavior did not shape subordinate performance, but rather the level of employee competence determined the level of support (initiating structure) and consideration. They found that the more competent the subordinate was the more likely the leader was to be considerate, less supportive, and supervise less closely. This research provided support and confirmed findings from other researchers such as Farris and Lim (1969) who cited many studies correlating leader behavior to subordinate performance, but showed in their own research that previous subordinate performance also impacts leaders’ behaviors of consideration and initiating structure.

As the study of leadership progressed, leadership style fell short in explaining how different situations and subordinate characteristics impacted leader behavior. This gap in research led to the development of theories that could be categorized as situational in nature. One of the earliest versions came from Reddin (1967) that took the two-variable managerial grid and developed a three-dimensional version adding “effectiveness” to relationship and task. The degree of effectiveness that differentiates similar styles is explained as “the extent to which a manager’s style, his combination of task and relationships orientation, fits the style demands of the situation he is in” (Reddin, 1967, p. 15). Examples of style demands that effect a situation are the styles of the leader and subordinates, organizational philosophy, and expectations of subordinates.

Hersey and Blanchard (1969) are most widely recognized for their situational approach to leadership, based in part on Reddin's (1967) theory. Situational leadership emphasizes the importance of task and relationship in leadership adapted to a given situation. In order to best utilize the theory, the leader must thoroughly assess his or her employees' commitment and competence to complete an assignment. Based on the leader's evaluation of their employee, the leader will provide the structure and encouragement the subordinate needs to accomplish a given goal (Northouse, 2007).

In Hersey and Blanchard's (1969) situational leadership model, each situation begins with the leader understanding a given task and where her or his employees fall in development levels. For example, if the employee has low competence and motivation for their assignment this corresponds with the quadrant labeled "coaching." Coaching would encompass high directive behavior (structure) and high supportive behavior to match the needs of the employee. This approach to leadership has been a staple in leadership training for a very long time, "adapted worldwide by more than 400 of the Fortune 500 companies" (Hersey & Blanchard, 1996, back cover). Another strength of the model is that it is easily understood and is prescriptive, versus descriptive, in nature (Northouse, 2007). Graeff (1983) wrote that, "perhaps most important is their focus on the truly situation nature of leadership and their recognition of the need for behavior flexibility on the part of the leader" (p. 290). This approach also emphasizes the need to approach individuals differently and to develop their skills as employees. Fernandez and Vecchio (1997) expressed it this way, leaders should "be aware of opportunities to build subordinate skills and confidence, rather than assume that a given subordinate, lacking skills or motivation, must always remain a 'problem employee'" (p. 82).



This theory does not exist without its detractors. One of the biggest criticisms of the approach is that it lacks a strong foundational support from research conclusions (Fernandez & Vecchio, 1997). This is a criticism also asserted by Graeff (1997) who also exerted that there are conceptual concerns with commitment and competence that define the subordinate's development level. For instance, employees can still remain uncommitted even though they could potentially have the ability to complete a task. Another related critique of the model that flows from the lack of conceptual clarity in the developmental stages of employees and empirical research are from studies that have shown that the prescriptive leadership style found in the model is not always a proper match. An example of this is Fernandez and Vecchio, whose research studied leader behavior and follower maturity from over 330 university employees and 30 supervisors and found that job level was a greater predictor of positive impact on subordinate behavior than maturity level. This also supports findings from Vecchio and Boatwright (2002) that determined other variables of subordinates, such as age, gender, and experience, have an impact on leadership behavior.

During the 1970s a theory derived from previous research on motivation, known as expectancy theory (Vroom, 1964), influenced the discipline of leadership studies. The basic tenants of expectancy theory are that a person's effort towards accomplishing a goal is a function of the value that they believe they would derive from the outcome of completing the task, and their perceived ability or the probability that they can complete the task (Galbraith & Cummings, 1967; Vroom, 1964). The major theory that came out of this era was path-goal theory (Northouse, 2007). This approach was markedly different in that the leader's goal was to match her or his style to the needs of the

employee, provide rewards or incentives, and make clear (by removing obstacles) a path to reach the reward. Beginning with the leader's behavior, the theory suggests that the leader must match their behavior to what is lacking in the subordinate (House, 1996). House and Mitchell (1974) investigated four types of leadership: directive—leader provides a clear set of instructions and expectations; supportive—leader attempts to encourage employees and show they are valued; achievement-oriented—leader inspires others by setting challenging goals and having high expectations of his or her employees; and participative—leader gathers information and opinions from others to include them in decision-making. Effective leaders look at the characteristics of their subordinates and the nature of the task that is being asked of them and matches the behavior. For instance, work that is unclear and/or ambiguous would benefit from directive leadership. Empirical research with over 300 participants on this theory by Schriesheim and DeNisi (1981) found that leader behavior and subordinate satisfaction was positively correlated when there was a greater variety of tasks and interactions with others were limited. Further research conducted by Malik, Aziz, and Hassan (2014) in Pakistan with 60 middle and 140 lower managers in mobile phone companies found that the relationship between the leader and subordinate (leader acceptance) was significantly related to leader behavior.

One of the criticisms of this theoretical approach to leadership is that the theory is too complex and that it lacks full empirical research support (Northouse, 2007).

Schriesheim and Von Glinow (1977) wrote that literature reviews show mixed results for the theory and investigated whether or not there is a difficulty in operationalizing some of the leader behaviors associated with the theory. This criticism can also be found in Jago

(1982), although the author claims that the theory is still undergoing scrutiny. House (1996) cited Yukl (1994) in that the theory has been inadequately tested and that this is due in large part to a failure in measurement instruments being utilized.

The last major theory of considerable influence in the discipline of leadership is transformational leadership. This theory has its roots in the work of James MacGregor Burns,' *Leadership* (1978). In this work he described leaders as those who understand the motives of followers and use them to reach the goals of both leaders and followers. Burns' initial work conceptualized two different types of leadership: transactional, which describes the majority of previous leadership models as exchanges or *quid pro quo*; and transformational, where a relationship is formed between leader and follower that increases the levels of morality and motivation in both. The transformational leadership approach focuses on follower needs and develops them to reach their full potential.

Bass (1985) later developed the theory further by placing both transactional and transformation leadership styles on the same continuum and adding laissez-faire leadership. Transformational leadership as conceptualized by Bass impacts performance as the leader moves from a transactional approach to a transformational one. The four factors that add to the transactional level of contingent reward and management-by-exception (leader correcting mistakes) are; idealized influence—leader influences followers by strongly modeling high standards of personal and professional performance, inspirational motivation—leader communicates high expectations and uses motivational techniques, intellectual stimulation—leaders encourage followers to be creative and use innovative approaches, individualized consideration—leaders are characterized as coaches or mentors to individual employees.

This broad-based approach has several strengths: It is the basis for a large body of research and considerable evidence of its effectiveness (Lowe & Gardner, 2001; Yukl, 1999), it provides attention to follower needs for growth (Northouse, 2007), it contains an inherent appeal to leaders who desire to influence followers to transcend personal self-interest and respond to organizational goals (Yammarino, Dionne, Uk, & Dansereau, 2005), and it is strongly rooted in ethical/moral behavior (Bass & Steidlmeier, 1999; Burns, 1978; Northouse). Transformational leadership has been correlated to personal outcomes, such as through the use of vision and change in subordinate self-set goals (Kirkpatrick & Locke, 1996), organizational outcomes such as increasing performance through encouraging organizational citizenship behavior (Boerner, Eisenbeiss, & Griesser, 2007), and increasing follower commitment (Barling, Weber, & Kelloway, 1996).

However, many scholars have pointed to some of transformational leadership theory's shortfalls. One major criticism is that the four factors are conceptually vague (Tracey & Hinkin, 1998), perhaps due to the large scope of leadership theory that transformational leadership covers, such as power, traits, behavior, and situational factors (Yukl, 1989). Further evidence of this is research that has demonstrated that the four factors correlate highly with one another (Tejeda, Scandura, & Pillai, 2001). Another criticism is that transformational leadership has a heroic bias where the leader is primarily responsible—because of their vision and actions—for the success or failure of the group (Conger & Hunt, 1999; Yukl, 1999).

The next wave of leadership theories has focused more on the cognitive aspects of leadership than has been seen as of yet. One of the main reasons this shift has occurred is

due to the rate of change and the interconnectedness in global society (Pisapia, 2009; Reyes-Guerra, 2009). The environment that any organization exists in is increasingly interwoven because of the need for exchange between groups and societies and the ability to communicate instantly with, or travel to, the most remote parts of the world. Leaders of organizations must be able to foresee trends and patterns both within and without their organizations, as well as react quickly to change. Whereas previously leaders could reflect and contemplate on strategic actions, currently they must be able to respond immediately to events, even those that would go unnoticed 20 years ago, such as flippant and quasi-racist tweets by their employees (Southall, 2013) or when controversial comments are made about homosexuality and the plight of African-Americans (Carter, 2013). Further evidence of the shift towards cognitive leadership is the proliferation of literature and research on managing change. As of December 27, 2013 a Google search for “leadership” and “change” generates over 600 million hits. The same search in *Google Scholar* (n.d.) and the Florida Atlantic University Libraries research engine, *SearchWISE* (2016), will provide roughly 2.5 million and 3 million hits respectively.

This line of leadership theory is rooted in works such as Argyris and Schön’s (1974) theory of action, which asserts that people have mental maps they use when taking action and that these maps often differ from theories or beliefs they espouse to have. The authors continued down this theoretical path with single- and double-loop learning (1978) that deals with how organizations resolve errors. Single-loop learning is the process of looking for a new strategy that fits into the already agreed upon set of variables that govern decision-making to handle problems, which externalizes the source of issues in the organization. At the double-loop level organizations investigate the governing

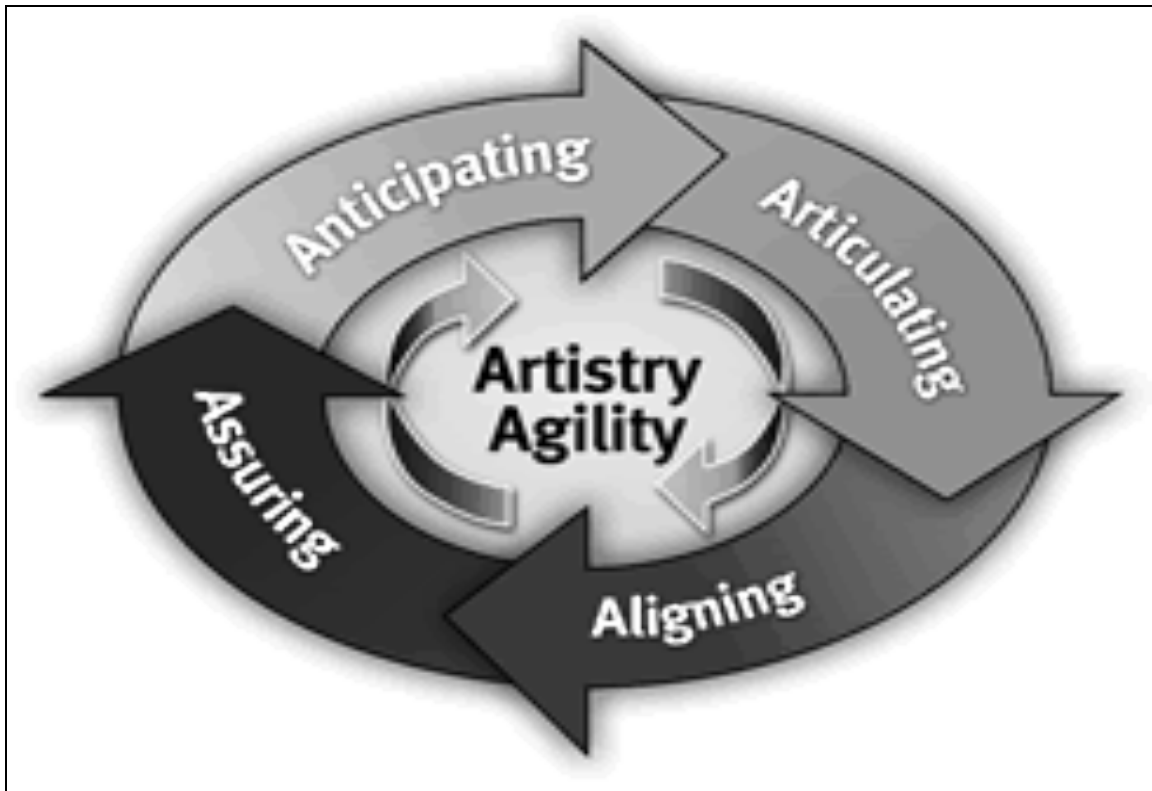
variables themselves as possible sources of conflict. Double-loop learning is much deeper in that organizations must question their mental models, processes, and protocols which strikes at the heart of their culture and values.

Another important person that has contributed to the cognitive turn in leadership theory is Fritjof Capra. Capra (1974, 1982, 1985) has developed research concerning the differences between what he considers the western view of the world as mechanistic and the eastern view of the world as holistic. He argued that ecologists and biologists beginning in the 1920s began realizing the benefits of looking at the system or whole as eastern thought had for thousands of years. He continued by writing that reducing the world to its parts via mechanistic thought has led to many great advances, but to the neglect of envisioning how those parts function together in the greater whole. Systems-thinking, as it is currently known, has been picked up by the likes of Peter Senge (1990b).

Other examples of the slow cognitive shift in leadership theory include Bolman and Deal's work starting in 1984 and more popularly known through *Reframing Organizations: Artistry, choice, and leadership* (1991). They illustrate the need for leaders to consider issues that arise in organizations from four basic frames; structural, human resource, political, and symbolic—although some, such as Dr. Ira Bogotch at Florida Atlantic University (FAU), argue that there exists an endless set of frames that problems can be viewed from, such as a social justice frame (personal communication, summer, 2010). Bolman and Deal's work incorporates the work of other great writers that have also contributed to the cognitive shift in leadership theory. Examples include “satisficing,” (Simon, 1955), emotional intelligence (Goleman, 1995), the concept and utilization of power (French & Raven, 1959), and the impact of culture on work

(Hofstede, 1984). All of these works have contributed to a deeper understanding of the critical nature of how leaders think and the relationship that it has with being effective in that role.

“Pisapia (2009) points out that this new theoretical base pushes transformational leadership to both a behavioral and cognitive approach” (Reyes-Guerra, 2009, p. 109). Reyes-Guerra continued to write that Pisapia’s model of leadership bridges the gap between older theories of leadership and newer conceptions that include the cognitive component. One way in which he does this is by combining leadership theories (Yasin, 2006) with his experience in management and work with other leaders. To begin, Pisapia (2009) described leaders as “people who can define direction and then move individuals, groups, and/or organizations from A to Z” (p. 1). Although this may seem relatively simple, the challenge is in identifying where the organization is and where it needs to go, as well as influencing others to this end. This is historically terribly complicated, especially when the path to “Z” is constantly in flux. Pisapia (2009) proposed that the best way to navigate this terrain is to use what he calls strategic leadership, defined as “the ability (as well as the wisdom) to make consequential decisions about ends, actions and tactics in ambiguous environments” and is “dependent on how proficiently the organization responds and readapts to its ever-evolving context and how effective the leader is in continually renewing the systems of learning within the organization” (p. 7).



*Figure 2.* Pisapia's (2009) leadership wheel. Used with permission of the author.

Pisapia's (2009) strategic leadership theory is best summarized in the Leadership Wheel shown in Figure 2 above. The core of the wheel is comprised of two habits, artistry and agility. Artistry, in essence behavioral agility, is the ability of the leader to utilize a wide set of influencing behaviors, such as through the use of (a) authority; (b) appealing to emotion, morality, or reason; (c) bargaining; and/or (d) motivational incentives. The actions decided upon by the leader are balanced between two sets of factors, transforming versus managing and take into consideration the political and ethical consequences of decisions.

The second component of the core is agility, specifically cognitive agility, which distinguishes strategic from traditional leaders. Agility is the development, practice, and use of three cognitive skills; reflection (contemplating the reasons behind decisions and



their outcomes, such as the value system currently in place in the organization), reframing (use of different mental models/paradigms interchangeably), and systems thinking (envisioning the whole of the organization, the environment it exists within, and the interrelationships between and throughout the organism). Cultivating this type of mindset is a prerequisite for success during turbulent, chaotic, and dynamic times.

The other four habits are secondary and flow from utilizing the first two properly, albeit they are still important. The third habit is anticipating, which involves scanning the environment, both internal and external to the organization, for factors that may influence how the organization moves forward or shifts positions. Once the landscape is determined, the organization must determine its values and proceed with the fourth habit of articulating them. The fifth habit is aligning the actions within the organization towards the articulated intent. This is done through several tactics, bonding, bridging, and bartering. Bonding is a leader action that develops relationships and when combined with bridging (creating and maintaining alliances), it creates a trusting environment. The last tactic of bartering also develops trust, but is more oriented towards being open to compromise with others for advancing the interests of the organization. The last habit, assuring, involves the use of what Pisapia (2009) termed *levers*. These include, but are not limited to, clarifying outcome expectations, creating performance targets, ensuring that colleagues are learning and being empowered, making strategic hiring decisions, and rewarding positive performance.

Proposition 1: Leadership theory has developed with a strong and continuous emphasis on the cognitive and behavioral aspects for effective leadership throughout its history.

**Leadership theory in education.** The role of the principal has continuously changed since its inception (Lashway, 2003). Citing Beck and Murphy (1993), the position has moved through distinct phases where priorities have ranged from “bureaucratic executive,” “humanistic facilitator,” and “instructional leader.” Callahan (1962) wrote about the period from the early 19th century to the late 1950s and demonstrated how the rise of industrialism and the idea of scientific management dominated American culture and impacted public education. Callahan asserted that schools are especially vulnerable to social forces since they lay at the heart of any culture. As evidence, Callahan pointed to textbooks, such as one published in 1916, “*Public School Administration*,” by E. P. Cubberly, Stanford’s School of Education dean, and the entire chapter devoted to educational efficiency. Further proof includes the growth of teacher rating systems, standardized testing, per-pupil cost accounting, and the platoon school. The platoon school was a model for operating a school that suggested 100% efficiency in the form of full occupancy in every classroom and utilizing the school facilities at all times, every day of the week. This gave rise to other cost-cutting measures, such as enlarging classes, increasing the number of classes each teacher taught, and creating larger districts to consolidate spending and resources.

Tyack and Hansot (1981) described the period from the 1950s up until the early 1970s, as a tumultuous time. Again, being susceptible to social forces (Callahan, 1962), the Civil Rights Movement had a profound impact on education. Administrators were ill prepared to navigate these political challenges. At the time, schools were attempting to manage racial integration, implement massive federal programs to combat poverty, cope with national school reform efforts after the launching of Sputnik, accommodate the post-

World War II baby boom, and negotiate the rise of teachers unions. Hallinger (1992) put forth that beginning with the 1960s and lasting until the 1990s there have been three unique phases. During the 1960s the principal role was that of program manager, due to many of the programs described above and the need for the principal to manage the funds, resources, and paperwork inherent in the programs. Hallinger described this role as manager because change initiatives were imposed from outside of the local school from the federal level, leaving principals with little decision-making authority. As the federal government began taking a larger interest in education, the principal managed the increasing number of federally funded programs aimed at improving education for disadvantaged student populations.

The principal's role continued to change during the 1980s (Stewart, 2012). Citing Ron Edmund's seminal work in 1979 relating strong leadership and effective schools. Hallinger (1992) introduced this second phase as the Era of Instructional Leadership. The rise of instructional leadership is attributable to the, *A Nation at Risk*, report in 1983 (Marks & Printy, 2003). Hallinger (1992) purported that the principal was viewed as the "primary source of knowledge" (p. 38) and was "expected to be knowledgeable about curriculum and instruction and able to intervene directly with teachers in making instructional improvements" (p. 38). Subsequently, Hallinger (2003) made the claim that instructional leadership existed prior to this time, although it had never been conceptualized. He identified this type of leadership as "strong, directive leadership focused on curriculum and instruction" (Hallinger, 2003, p. 329).

There has been a large amount of empirical research conducted on instructional leadership (Hallinger, 2003). Bamburg and Andrews (1991) found that high achieving

schools had principals that emphasized and were directly involved in activities concerning instruction, much more so than lower achieving schools. Hallinger and Heck (1996) found that aligning school structures through instructional leadership influenced the quality of school outcomes. Heck, Larsen, and Marcoulides (1990) found that principal's involvement in classroom instruction affected teacher effectiveness and student achievement. Bendikson, Robinson, and Hattie (2012) wrote that although leadership styles change as schools develop, instructional leadership is the bedrock of any school.

Criticisms of instructional leadership theory include Dimmock (1995) who proffered that schools are characterized as loosely coupled and autonomous, which do not lend well to a highly prescriptive type of top-down leadership and suggests a bottom-up approach as a more effective vehicle for change. Cuban (1983) criticized this brand of leadership from the district level by pointing to a lack of research concluding how to create an effective school and how top-down, system-wide decision making cannot account for specific school factors that may be unique to the setting. Furthermore, Cuban argued that the definition of an effective school changes according to the author, but is normally confined to test scores, which inhibits the full purpose of education.

Further criticism comes from Barth (1986) who described how the effective schools movement rests on several false assumptions such as; schools do not have the ability to improve themselves, student achievement is accurately measured with standardized tests, and that improvements can be made by imitating what is deemed effective at other school sites. Also, reducing the role of the principal to a list of effective practices is not only restricting to what can be measured quantitatively, but is an

impossibility because of the sheer size of schools, faculty, and students (Hallinger, 2003). A further limitation of instructional leadership, as cited by Hallinger, includes how the context of the school dictates the methods of instructional leadership employed. A school situated in a rural setting will not face the same challenges as one in a larger urban location, meaning that the Instructional Leader role will be very different at these two settings. Finally, Reynolds and Teddlie (2000) add, “it is probably impossible for a secondary principal to be an expert in all instructional areas covered by a secondary curriculum” (p. 180).

Transformational leadership is the last and most recent major approach to leadership, catching hold in schools during the 1990s (Hallinger, 2003). Although this type of leadership had been in the literature since the mid 1970s brought about by Burns (1978) and later expanded upon by Bass (1985), it was adopted by education mainly as a reaction to the negative consequences of the hierarchical orientation of instructional leadership theory. Reform efforts at the time emphasized decentralized decision-making in schools, such as the Kentucky Education Reform Act that created school-based decision-making councils in 1990 Kentucky Department of Education (2016); therefore, there was a need for a theory that emphasized change within current reform efforts (Marks & Printy, 2003).

Leithwood and Jantzi (1999) framed transformational leadership in the context of school settings to include 10 dimensions; six pertaining to leadership and four pertaining to management. These dimensions include holding high expectations, providing individualized support, and facilitating collaboration. In their study, Leithwood and Jantzi found that transformational leadership had “strong direct effects on school

conditions which, in turn, had strong direct effects on classroom conditions” (p. 467).

Bogler (2001) found that principals who used transformational leadership directly and indirectly impacted teacher job satisfaction. Another example of positive results from the execution of transformational leadership is found in Day’s (2001) research that demonstrated that transformational leadership is effective through its ability to encourage school change from the bottom up and not the top down.

Much like instructional leadership, transformation leadership does not exist without its critics. Yukl (1999) has criticized this concept of leadership for its lack of clarification in the influencing process and the weak construct validity of the transforming behaviors that the style touts. One of the most vital criticisms Yukl makes is that it mirrors heroic leadership assumptions of past models, being that the model shows that leadership influence is unidirectional; that is, top-down. Similarly, Fullan (2007) claimed that: “We are beginning to realize that the answer does not lie in locating ad hoc charismatic leaders-as-saviors—they are too few in number, their contributions do not have lasting effects, nor do they always do good” (p. xvii).

Hallinger and Leithwood (1998) have noted that transformational leadership is more concerned with managing power relations and increasing the schools innovative capability, than with the school’s purpose of improving curriculum and instruction. Similarly, Marks and Printy (2003) have concluded that transformational leadership alone cannot achieve high quality teaching and learning. Although not specifically addressing transformational leadership, Fullan (2007) stated that society and organizations are growing more and more complex and that the only way forward is the recognition of broad-based leadership, which agrees with the assertions put forth by Marks and Printy.

The two major conceptions of leadership that have dominated public education for the past 25 years are instructional and transformational leadership (Hallinger, 2003). Hallinger referenced several distinctions between the two models; instructional leadership uses a top-down approach to make first-order changes specifically to curriculum and instruction while transformational leadership uses a decentralized approach to indirectly improve performance by increasing the motivation and capacity to improve conditions by organizational members. Marks and Printy (2003) attempt to reconcile these seemingly opposing leadership models using shared instructional leadership, which “involves the active collaboration of principal and teachers on curriculum, instruction, and assessment” (p. 371).

In essence, transformational leadership is a necessary, but insufficient, precondition for shared instructional leadership. With mounting pressure from accountability measurements, principals cannot escape the requirement to move student achievement and to do so requires some form of instructional leadership. Thus, there is almost unanimous agreement on the importance of instructional leadership and at its core is a strong foundation of pedagogy (Lashway, 2003). Jamentz (2002) also made this conclusion and described the educational leader as a teacher first and foremost. In a study conducted by Southworth (2002) on instructional leadership, three strategies came out as most effective in improving the quality of teaching and learning; modeling, monitoring, and professional dialogue and conversation. Specifically modeling and professional dialogue stand out as necessitating a strong instructional background since they included tactics such as working alongside teachers in the classroom, using their teaching as example, and promoting ideas to classroom teachers.

Hallinger (2011) offered a comparable model of leadership to that of shared instructional leadership based on the findings of the past 40 years of research. Labeling it Leadership for Learning, Hallinger integrated the best of both transformational and instructional leadership. Looking at the criticisms of instructional leadership, Hallinger suggested that effective leadership can only be achieved in collaboration with others. In a similar vein, noted criticisms of transformational leadership are that it conceptually relies on a unidirectional influence of leadership from the top and that it lacks a focus on the core competency of schools, curriculum, and instruction. Taking on both of these critiques, Hallinger (2011) proposed a model where reciprocal influence exists: “school leadership both influences and is influenced by these school level conditions,” (p. 127) and “effective leadership for learning is adaptive and responsive to the changing conditions of the school over time” (p. 129). Finally, Hallinger (2011) wrote that, “successful leadership in schools must incorporate an educational focus that is lacking from the transformational leadership model” (p. 131).

There is still disagreement, however, about what type of leadership is preferable in schools, as The Broad Foundations claim (Meyer & Feistritzer, 2003) that instructional expertise is not a prerequisite for leadership in schools. Meyer and Feistritzer stated that traditional methods of producing leaders have failed, in part because of the specific job requirements of a principal to have several years of teaching experience and completed education courses such as those covering pedagogy. As recent as 2011, a report released by The Broad Foundations (2011) exhibits that they seek out leaders from both in and out of the education field. Lashway (2003) posited that The Broad Foundations is vociferously skeptical about school leadership certification programs for their emphasis



on a deep understanding of instruction and continued that they would have difficulty proving this assumption since few districts put credence into this claim, resulting in few successful examples.

Leadership too, as a general construct, also has its own detractors. Currie and Lockett (2007) stated that leadership has recently been cited as the panacea of government ills, but that the effectiveness of leadership models transferred from the private to the public sector, such as transformational leadership, and their effectiveness, are a matter of much debate. For instance, recently Kouzes and Posner (2010) claimed that regardless of the context, their research over the past 30 years has made them conclude that there are 10 enduring principles of leadership, meaning this type of leadership could be applied in both the public and private sectors. With a lack of consistency in findings, it becomes difficult to argue how one model may be more effective than another.

Proposition 2: Educational leadership theory has mirrored the general leadership literature through the similarities found in directive style and skills approach in instructional leadership, and more obviously in transformational leadership.

**Teacher leadership/classroom leadership.** Perceiving the teacher as a leader in the classroom is not a familiar concept, even to those within education. However, when viewing different definitions of leadership such as from the Merriam-Webster's Learner's Dictionary (n.d.) or from notable leadership theory authors such as Drucker (1996), Bennis and Biederman (1997), and Northouse (2007) it becomes clear that the teacher is acting in a leadership role within the classroom. Several definitions exist in the Merriam-Webster's Learner's Dictionary; (a) being in the office or position of leadership; (b)

having a capacity to lead; and (c) actually leading. Teachers meet all three of these definitions. For Peter Drucker leaders are those who have followers. All teachers have followers. Bennis and Biederman (1997) expressed their definition this way; “leaders are people who believe so passionately that they can seduce other people into sharing their dream” (p. 25). Bennis and Biederman’s definition includes a vision and communication and all effective teachers use these techniques to engage their followers/students.

Definitions of leadership abound, which supports the notion that there are many facets and perspectives within leadership (Northouse, 2007); however, as has been noted, a teacher is considered a leader because their duties and responsibilities fit all of these definitions, including Pisapia’s (2009) definition, because they have a position of responsibility over others and must use influence to reach established educational goals. Stein (2014), who wrote that teacher leadership has gained notoriety in educational literature and has focused on aspects of leadership outside of the classroom, quoted Kurtz as having stated that, “current teacher leadership roles involve teachers as mentors, team leaders, department chairs, curriculum developers, staff development providers, grade-level chairs, and designers of new assessment processes, to name a few” (p. 13).

Since the concept of teacher leadership has not been thoroughly defined (Mangin & Stoelinga, 2008; Neumerski, 2013) and has focused on teacher roles external to the classroom as a part of the overall school improvement literature, the term classroom leader is used for this study. Moreover, Stein (2014) wrote that managing classrooms is no longer sufficient; that teachers must “lead” students: “We need to stop asking what leadership will do for the teachers and ask what leadership will do for the students,” (p. 162). Stein’s (2014) definition of a true teacher leader sheds light onto how this study

uses the term classroom leadership, as “one who can create a classroom environment that fosters high achievement among the students. Teachers that can influence and gain the respect of their students are in essence bona fide leaders” (p. 162).

Thus, the term classroom leadership has been chosen for conceptual clarity. Teacher as leader has received little attention in leadership and education literature. Johnson et al. (2014) agreed, “most of the available research on leadership exercised at the school level focuses on those holding formal positions as principal or teacher leader” and that “we need to know much more about how leadership emerges when the principal’s formal, bureaucratic authority interacts with the less predictable, more dynamic exercise of leadership among teachers and administrators throughout the school” (p. 1). Two recent models of teacher as leader have emerged from Stein (2014) and Teach For America, Inc. (2009).

Stein’s (2014) model provides five ways that teachers lead classrooms. The first is to know their students on a personal level, showing a deeper care for who and how they are. Creating a positive classroom environment is the second and includes teachers that take the time to create a welcoming environment, are well groomed, and are enthusiastic about good instruction and learning. Teachers who take a leadership role in the classroom take responsibility for the achievement of their students and do not look to make excuses is the third way teachers lead classrooms. The fourth way to lead a classroom is to understand how to motivate students. Finally, the last factor is for the teacher to have a mission and vision for themselves and their students. This includes collective and individual perspectives for success.

Teacher For America, Inc. (2009) has also created the “teaching as leadership” framework that includes six components. Setting big goals is the first factor and are designed by considering four questions: what achievement progress should students make, what opportunities are available to students, what mindsets should students have, and what interests and inspirations could motivate students toward this goal. The second component is to invest in students and their families. This includes sub-factors such as convincing students they can and want to achieve, reinforcing efforts, creating welcoming environments, and using positive influencers. Planning purposefully by having the end in mind and going backwards constitutes the third component. Planning the end and creating a pathway to that end through curriculum, assessment, activities, rules, and procedures are ways teachers exhibit this component in the leadership framework. Executing effectively is the fourth element and involves managing student practice, communicating high expectations for behavior, and evaluating and monitoring progress. The penultimate element is to continually increase effectiveness by reflecting on performance and adjusting actions. Finally, to work relentlessly is the last component of the framework. This includes teachers being persistent in the face of challenges, influencing those outside of the classroom to access necessary time and materials, and caring for themselves and their students’ wellbeing to maintain their energy and commitment for the entire school year.

Both of these teacher as leader models provide valuable insight into what classroom leadership as used in this study means. Additionally, there are many similarities between the two leadership models and Pisapia’s (2009) strategic leadership framework. Between the two classroom models, both describe creating a positive

classroom environment, having a personal relationship with their students by understanding who they are and what they are capable of, and using incentives and motivation to work towards common goals. Similarities to Pisapia's strategic leadership framework include having a vision, effective planning, creating trust, clearly communicating, establishing goals and measurements, understanding subordinate motivation, and developing incentives.

The converse of viewing the teacher as leader is where the leadership literature calls for leaders to be teachers. Leaders are teachers because they are responsible for “building organizations where people are continually expanding their capabilities to shape their future—that is, leaders are responsible for learning” (Senge, 1990b, p. 9). Senge (1990b) wrote that the cognitive aspect of leadership is more in demand than ever before, stating that leaders must “challenge mental models” (p. 9) and “foster more systemic patterns of thinking” (p. 9). Dincer, Gencer, Orhan, and Sahinbas (2011) proffered that innovative work ideas defined as, “the intentional creation, introduction and application of new ideas with a work role, group or organization” (p. 910) are needed to benefit the organization as a whole. Teachers continuously challenge the mental models of students; for instance, when a math teacher takes a real-life event and depicts it graphically to demonstrate the relationship between two variables. Systemic thinking is also encouraged. A history teacher stimulates systemic thinking in students when he or she takes a historic event and makes connections to events that were related to it before and after. Novicevic et al. (2013) sums up the teacher-leader, student-follower relationship this way, the “relationship between the teacher and his or her students as

learners is valuable for leadership development as teachers enable and facilitate sensemaking of learners” (p. 1).

Bass and Good (2004) wrote that the purpose of education is located within the word itself. Looking at the etymology of the word educate, it stems from two Latin root words, *educare* and *educere*. *Educare* means to train, which has been used to mold productive citizens within the society. This takes the form of learning the morality, ethics, and cultural norms of the society. *Educere* on the other hand denotes leading out. In order for this to occur, teachers must create opportunities for students to think critically and challenge deeply held assumptions. Bass and Good argued that education today focuses on the latter, *educare*, with rigid rules, conformity, and acceptance being the reason why historically many creative individuals such as Albert Einstein and Bill Gates have struggled in school. In a post-modern world, where society is becoming more complex, a better balance between these two components of education must be found. It is clear that *educere* requires leadership in the classroom. Heifetz and Laurie (2003) confirm this as they warned that increasingly complex situations force leaders to cultivate followers that are problem solvers and not automatons. It is not a coincidence that leadership literature and theory, especially cognitive and behavioral agility, can be easily transposed to a classroom setting and the word leader switched to teacher.

Additionally, the evolution of educational leadership has paralleled that of the broad body of leadership theory that supports Callahan’s (1962) assertion that schools lay at the heart of any culture and are therefore necessarily impacted by it. The rise of accountability and efficiency coincides with that of scientific management. The inclusion of human factors in leadership is evident in the increase of programs in the 1960s.

Obviously the adoption of transformational leadership theory into the school setting is a great example of this point. Taking both of these trends, the lack of leadership theory at the teacher classroom level and the shift in leadership thought towards cognitive approaches into consideration, it seems that measuring teachers' leadership capabilities and their impact on objective measures of their performance is a logical avenue down which to venture.

As can be noted from the above section on educational leadership, there has not been a comprehensive investigation of the teacher in the classroom being viewed through the lens of leadership. The focus of leadership at the school level has predominantly been at the principal and other supporting administrator level. One concept of leadership by teachers within schools that is similar and must be discussed to clarify the difference is teacher leadership. York-Barr and Duke (2004) conducted an exhaustive review of literature from the past two decades on the subject and concluded that although it has been circulating for quite some time, it has yet to be defined. They wrote that what teacher leaders do is directed towards school improvement by taking on formal roles outside of the classroom, contributing to the professional knowledge of the staff, and collaborating with colleagues. This concept of teacher-as-leader outside of the classroom is markedly different than what is being proposed in this research.

Silva, Gimbert, and Nolan (2000) claimed that there have been three waves of the teacher leadership concept throughout its development, moving from formal, hierarchical positions for the implementation of curriculum, to less formal roles that span many boundaries. The last and current understanding of teacher leadership is the third wave and "is a label reserved for those teachers who improve a school's educational climate by

engaging colleagues in various activities designed to enhance the educational process” (Pounder, 2006, p. 534). Pounder argued, and Silva et al. and Wasley (1991) would agree, that the current understanding of the procedural nature of teacher leadership is as a set of actions outside of the classroom that make positive impacts at the school level, but not at the classroom level. This conception of teacher leadership, as a process and not as a position, makes articulation much more difficult. Snell and Swanson (2000) wrote that examining a teacher leader’s classroom behaviors with the use of a transformational leadership framework could help explain why effective teacher leaders regularly come from excellent teachers. Beyond becoming teacher leaders, developing effective classroom leaders to fill the ever-increasing gap at the school-based administrative level is a possibility as well. Therefore, not only does this lend further evidence of the lack of literature on the teacher as classroom leader, “the limited research on the influence of leadership in the classroom generally indicates that effective classroom leadership can have a positive influence on student attitude in class and student achievement,” (Pounder, 2006, p. 639), but also helps distinguish teacher leadership from classroom leadership.

This distinction is necessary for the main reason that not all teachers have the personal time to invest in teacher mentoring, facilitating professional development, etcetera, which are distinguishing features of teacher leader roles. Creating a notion of classroom leadership would demonstrate that all teachers are leaders. Both York-Barr and Duke (2004) and Mangin and Stoelinga (2008) stated that teacher leadership is ill defined, perceptually and conceptually; breaking classroom leadership apart from the teacher leadership construct would help researchers define it perceptually and



conceptually, investigate the construct more clearly, and further develop it to inform pedagogy and increase student outcomes.

Pounder (2006) put forth that the fourth wave of teacher leadership is the use of transformational leadership within the classroom to influence students towards a common goal. This particular component and its definition of teacher leadership will be termed classroom leadership and used in this study to specify the phenomenon being investigated and the role of the participant in the research. Ertesvag (2009) found that there is a dichotomy in the teacher leadership literature; some research is more influenced from the school improvement research and asserts that only so-called “good” and “effective” teachers can be leaders, whereas other research would agree with Pounder and views all teachers as leaders, at least in their classroom. This conclusion is supported by Cheng (1994) who studied leadership in the classroom in 190 primary schools in Hong Kong. Cheng argued that the classroom could be conceptualized as a small social organization, a premise that would later be supported by Luechauer and Shulman (2002), and adapted the Leader Behavior Description Questionnaire to measure teacher/leader behavior. The results indicated that classroom leadership impacted the social climate and student affective performance.

This study used Pisapia’s (2009) strategic leadership theory as a framework for leadership thinking and behaving. From a strategic leadership perspective, Pisapia proffered that strategic leader actions can be categorized into transforming, managing, bonding, bridging, and bartering. Table 1 below, an expanded upon version of the subset of actions from Pisapia (2009; see pp. 33 and 131), demonstrates how strategic leadership

actions transcend into the classroom and can impact student achievement (Hattie & Yates 2014; Marzano, 2007).

Teacher leadership, as it is currently understood, is seen mostly as leader actions outside of the classroom. Harrison and Killian (2007) put forth that the 10 roles of a teacher leader are; resource provider to colleagues, instructional specialist to colleagues, curriculum specialist, classroom supporter of colleagues, learning facilitator, mentor, school leader, data coach, catalyst for change, and learner—none of which refer specifically to classroom leader actions. The National Education Association (2015) has also published a set of Teacher Leader Model Standards that also lacks classroom leader actions. To better illustrate the differences between teacher leadership and the subset concept of classroom leadership, dimensions of practice for a teacher leader from York-Barr and Duke (2004) are listed and re-interpreted in light of teacher versus classroom leadership, which is much narrower scope (see Tables 1 and 2). Teacher leader dimensions of practice are emphasized here because there lacks a conceptual clarity and definition of teacher leadership (York-Barr & Duke) and because of the procedural nature versus the positional nature of teacher leadership (Pounder, 2006).

As has been explicated above, “teaching and leadership has not been addressed yet in a comprehensive manner” (Novicevic et al., 2013, p. 1) as only a handful of studies have confronted this in the educational literature. At this point what has been written of classroom leadership will be addressed. One of the earliest examples of classroom leadership includes Mary Parker Follett’s address at Boston University in 1928 (Eberly & Smith, 1970). In the address she urges that teachers, much like leaders, should express leadership by allowing students to think and act freely within the bounds of socially

acceptable behaviors, relate classroom academics to real life, and encourage students to work inter-individually. Inter-individually is Follett's expression for the way leaders match personal goals to that of the group and model the effectiveness of group efforts to realize these goals.

Table 1

*Strategic Leader Actions in the Classroom*

Strategic Leader Actions	Action	Classroom Leader Actions	Research
Challenge the mental models of all members of the organization	Transforming	Generating and Testing Hypotheses, Cognitive Dissonance, Discussion	Hattie, Biggs, & Purdie (1996); Ross (1988); Walberg (1999)
Interpret events and shape meaning for followers	Transforming	Advance Organizers, Cues, Summarizing, Concept Maps	Hattie (1992); Hattie et al. (1996); Marzano, Gnad, & Jesse (1990); Nesbit & Adescope (2006); Walberg (1999)
Communicate a compelling vision which significantly affects the behaviors of followers	Transforming	Intra-Individually, Collective Classroom Efficacy	Follett (1970), Putney & Broughton (2011), Stein (2014)
Present an optimistic and reachable view of the future	Transforming	Demonstrating intensity and enthusiasm, stimulate positive emotions	Anderman & Woters (2006); Good & Brophy (2003); Perry, Turner, & Meyer (2006)
Excite followers' emotional acceptance of challenges and changes	Transforming	Tracking student progress and celebrating success	Cameron & Pierce (1994); Deci, Ryan, & Koestner (2001), Marzano et al. (2003); Wilkinson (1981)
Take quick corrective action when mistakes are made	Managing	Feedback	Bloom (1976); Haas (2005); Kumar (1991); Tennenbaum & Goldring (1989)
Specify the goals followers need to accomplish	Managing	Goal setting	Lipsey & Wilson (1993); Marzano (2007); Walberg (1999); Wise & Okey (1983)
Provide the resources necessary so a project can be properly implemented	Managing	Practice, Homework, Cooperative Learning	Cooper, Robinson, & Patall (2006); Hattie (1992); Kumar (1991); Ross (1988)
Determine how things are to be done	Managing	Manage activities, response rates, wait time, response cards	Engelmann, Becker, Carnine, & Gersten (1988); Narayan, Heward, Gardner, Courson, & Omness (1990); Stahl (1994)

*continues*

Table 1 continued

Strategic Leader Actions	Action	Classroom Leader Actions	Research
Makes decisions by following policy	Bonding	Identify expectations and equitable execution	Emmer, Everston, & Worsham (2003); Evertson, Emmer, & Worsham (2003); Good & Brophy (2003); Hattie & Yates (2014); Marzano et al. (2003)
Does the right thing	Bonding	Maintenance of rules and procedures	Edwards & Mullis (2003); Marzano (2007); Sorsdahl & Sanche (1985)
Strengthens his/her position by gaining the allegiance of others inside the organization	Bridging	Maintaining positive student-teacher relationships	Good & Brophy (1995); Marzano et al. (2003); O'Connor, Dearings, & Collins (2011); Sheets & Gay (1996); Wubbels, Brekelmans, den Brok, & van Tartwijk (2006)
Allocates resources to influence his/her purposes	Bridging	Allocate teacher time, attention, and location in a positive manner	Allington (1980); Babad, Inbar, & Rosenthal (1982), Chaikin, Sigler, & Derlega. (1974); Cooper (1979); Driscoll & Pianta (2010); Rist (1970);
Has access to people who have influence over getting things done	Bridging	Parental involvement; School Counselor	Fan & Chen (2001); Jeynes (2005); Miller, Ferguson, & Simpson (1998); Slicker (1998); Villares, Frain, Brigman, Webb, & Peluso (2012)
Gives rewards when s/he is helped	Bartering	Implementing positive consequences for following classroom rules and procedures	Curwin & Mendler (1988); Miller et al. (1998); Stage & Quiroz (1997)
Promises rewards to get what s/he wants	Bartering	Token economy	Kaufman & O'Leary (1972); Reitz (1994)
Compromises to make deals	Bartering	Group contingency, Home Contingency, Cooperation	Harrop & Williams (1992); Litow & Pumroy (1975); Marzano et al. (2003); Merrett & Tang (1994); Wubbels, Brekelmans, van Tartwijk, & Admiral (1999)

Table 2

*Teacher Leadership (York-Barr & Duke, 2004) Versus Teacher Classroom Leadership*

Teacher Leader Domains	Teacher Leader Actions	Classroom Leader Actions
Coordination, management	<ul style="list-style-type: none"> <li>• Coordinate daily schedules and events</li> <li>• Participate in administrative meetings and tasks</li> <li>• Monitoring improvement efforts; handling disturbances</li> </ul>	<ul style="list-style-type: none"> <li>• Coordinate daily schedules and events</li> <li>• Monitor student performance, handle classroom discipline</li> </ul>
School or district curriculum work	<ul style="list-style-type: none"> <li>• Defining outcomes and standards</li> <li>• Selecting and developing curriculum</li> </ul>	<ul style="list-style-type: none"> <li>• Clarify student learning objectives</li> <li>• Select student learning activities</li> </ul>
Professional development of colleagues	<ul style="list-style-type: none"> <li>• Mentoring other teachers</li> <li>• Leading workshops</li> <li>• Engaging in peer coaching</li> <li>• Modeling, encouraging professional growth</li> </ul>	<ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>
Participation in school change/improvement	<ul style="list-style-type: none"> <li>• Taking part in school-wide decisions</li> <li>• Working with peers for school change</li> <li>• Facilitating communities of teacher learning</li> <li>• Participating in research, action research</li> <li>• Confronting barriers and challenging the status quo in school culture and structure</li> </ul>	<ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>
Parent and community involvement	<ul style="list-style-type: none"> <li>• Becoming involved with parents; encouraging participation</li> <li>• Creating partnerships with community businesses</li> <li>• Working with the community and organizations</li> </ul>	<ul style="list-style-type: none"> <li>• Becoming involved with parents; encouraging participation</li> <li>• Working with the community and organizations</li> </ul>
Contributions to the profession	<ul style="list-style-type: none"> <li>• Participating in professional organizations</li> </ul>	<ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>
Pre-service teacher education	<ul style="list-style-type: none"> <li>• Building partnerships with colleges and universities to prepare future teachers</li> </ul>	<ul style="list-style-type: none"> <li>• Not Applicable</li> </ul>

Putney and Broughton (2011) took Follett's (1970) concept of inter-individually and labeled it *collective classroom efficacy*. Using Vygotsky's (trans., 1997) theory of individual and collective development, they observed a fifth grade classroom and noted that the teacher was able to nurture a sense of collective efficacy with the students. Collective efficacy is concerned with group goals and the ability of the group to work towards them. Collective efficacy has been linked to group resilience and persistence in goal attainment (Putney & Broughton). In Putney and Broughton's study, teachers fostered classroom collective efficacy through what can clearly be seen as leader actions. Examples of these actions include setting expectations and norms for social interaction, encouraging intelligent risk-taking and self-direction, and fostering inter-dependence and self-reflection. Putney and Broughton's findings help delineate classroom leadership from teacher leadership in that leader actions are focused on the students. Another early example of classroom leadership is found in Lewin et al. (1939). In their study they noted the effects that changing leadership styles had on a group of students and their behavior in the classroom. Other examples of studies of teacher as classroom leader include Thelen (1952), Morrison (1975), Newman and Licata (1986), Barbuto (2000), and others already listed in this review.

**Leadership and teacher evaluation.** Literature from the fields of teacher evaluation and effective teaching also reinforce the classroom leadership model. Through their study of engineering professors, Deshpande et al. (1970) found that certain characteristics such as being friendly, responsible and business-like, and stimulating and imaginative, were found to be more effective by student rating instruments. As illustrated earlier, the Ohio State and Michigan leadership studies found conceptually

similar characteristics when measuring effective leaders including support, interaction facilitation, goal emphasis, and work facilitation (Norr & Crittenden, 1975). Through factor and cluster analysis Norr and Crittenden (1975) realized that effective teaching characteristics and characteristics of effective leadership studies were similar and wrote, “that teaching can be fruitfully viewed as the performance of a leadership role in a group” (p. 337). Norr and Crittenden have been recognized as leading the way in using a leadership instrument to measure teacher effectiveness. Baba and Ace (1989) made similar conclusions and noted that teachers are leaders, however the authors noted that teachers are limited when they work to support the goals of the individual student over those of the group.

More examples of conceptual similarities between the findings of the Ohio State and Michigan studies of initiating structure and consideration and effective teaching include Meredith (1976). In this study student evaluations of teachers were reviewed and two categories of effective characteristics were found; management of information and management of intrapersonal relations. Additionally, results from Chermesh and Tzelgov (1979) suggest that using a leadership lens to evaluate faculty members is useful, especially when evaluating education that goes beyond technical proficiency and stimulates the use of creativity and free thought. Going further, relaying knowledge and building experiences for students to take learning outside of the classroom is true education (Barber, 2012). Additionally, Barber wrote that students at times should lead the class, changing the paradigm of teacher as all-knowing expert.

The latest studies that have used the leadership frame to view teacher behavior have focused on transformational leadership. Ojode, Walumbwa, and Kuchinke (1999)

and Walumbwa, Wu, and Ojode (2004) examined the effects of transformational leadership in a college setting and found that the leadership dimensions were significantly correlated with student outcomes, such as extra effort and student satisfaction. Wilson (2004) found correlations between teacher leadership style and teacher effectiveness, specifically, evidence of transformational leadership style was the single greatest predictor of teacher effectiveness. Bolkan and Goodboy (2011) classified specific behaviors of teachers that were associated with student perceptions of transformational leadership. All of these studies have found a positive impact of leadership type behaviors on the part of the teacher on student outcomes. However, more studies are needed to confirm if transformational leadership impacts student performance (Pounder, 2006).

Several conclusions reached thus far lead to the next logical step of measuring the impact of teacher behavior with Pisapia's (2009) strategic leadership instruments:

- a. Research has shown that the evaluation of teaching and leadership practices have many commonalities;
- b. Leadership theory is moving beyond transformational leadership to cognitive theories of leadership;
- c. Pisapia's theory of leadership includes, but extends, transformational leadership with cognitive leadership theory; and
- d. Schools are at the heart of culture and impact it—are impacted by it—which connects why traces of leadership theory have been found throughout the history of education in the United States.

It has already been argued and shown that; leadership has impacted education thought and practice, teachers have been viewed as leaders as early as 1928, teachers'



leadership actions impact student outcomes, the execution of transformational leadership by teachers has had positive results on students in the classroom, and that leadership theory is moving towards more cognitive approaches. Two themes that go beyond transformational leadership theory that are found in Pisapia's (2009) *The Strategic Leader: New Tactics for a Globalizing World*, fit well with the classroom environment that teachers face. The two themes are the mega habits artistry and agility, or behavioral and cognitive agility. Artistry (behavioral agility) is the ability of the leader to use a wide set of actions making them more effective. Pisapia (2009) claimed that, "as we have seen, the spokes of past leader wheels—leadership and management—present a limiting set of leader actions in postmodern times" (p. 31). Agility (cognitive agility) is the ability "to rapidly and cost efficiently adapt mentally to changes in your environment" (Pisapia, 2009, p. 46). This includes reframing, reflecting, and systems thinking already outlined above, which enables leaders to challenge their mental models, world views, and assumptions, interpret patterns in the environment, adapt quickly, and create new paths to progress.

Proposition 3: The teacher in the classroom can be conceptually viewed as the leader (classroom leader).

Proposition 4: The teacher's leadership has an impact on student outcomes.

### **Cognitive and Behavioral Complexity**

Beginning with George Kelly's (1955) personal construct theory, cognitive complexity began as a social theory where a person is able to understand, anticipate, and even manipulate events as they construct frames of reference with which to make sense of their environment. Using Kelly's theory, Bieri (1955) originally hypothesized

cognitive complexity as “a system of constructs which differentiates highly among persons,” and was understood “that each individual possesses a system of constructs for perceiving his social world” (p. 263). A person with highly developed cognitive complexity could differentiate among different persons and predict behavior. It was further hypothesized that abilities such as social perception, empathy, and social sensitivity are operationalized within the individual’s cognitive complexity. As this literature review will reveal, cognitive complexity would continue to expand into numerous other areas of life (Satish, 1997).

Cognitive complexity was later expanded upon by Sieber and Lanzetta (1964) when they examined the interaction of cognitive complexity and decision-making. They hypothesized that those with higher levels of cognitive complexity use more complex structures and perceive more information from their environment than low cognitively complex persons. They defined cognitive complexity using Harvey, Hunt, and Schroder (1961), “as a function of (1) the number of dimensions along which stimuli are ordered, and (2) the complexity and number of different schemata with which the perceived dimensions of information are organized” (p. 623). The result of the experiment was that conceptual structure proved to be a strong factor in decision-making. Those with more complex structures were more receptive to environmental ambiguity and information, which led to the analysis of more choice alternatives, wider evaluation of those individual choices, use of more information, and were more prone to be open to new and ambiguous information after the decision was made. It was also found that those with more complex structures showed an increase in inquisitiveness and information search as uncertainty in decision-making grew.

This expansion of cognitive complexity is also seen in Streufert et al. (1965) who investigated information processing in complex environments and decision-making. Although, Streufert et al. (1965) used a similar, yet somewhat different definition of the individual's conceptual structures, "Here emphasis is placed on dimensional discrimination, differentiation between dimensions (or concepts), and flexible integration of differentiated dimensions" (p. 724). Streufert et al. proposed a game that could be used to measure the cognitive complexity of individuals. Being that most of the participants would be male, a war scenario was used. Decisions by players would be monitored and analyzed by investigators as to the reasons behind them, the result, and what information was used to arrive at them. Streufert et al. explicated that this game would measure the amount of information integration a player would have to use in a war scenario leading to learning more about how conceptual structures impact decision-making.

Later studies, such as Dollinger (1984), researched small business owners. Small business owners were chosen because they operate as strategic leaders and their ability to gather information, consider different strategic possibilities, and then act made them an effective unit of analysis for the investigation of how information processing and decision-making are related. This research is especially relevant being that their environment was characterized "in terms of complexity, change, heterogeneity, and uncertainty" (Dollinger, 1984, p. 353). Using Schroder, Driver, and Streufert's (1967) definition of cognitive complexity of "Individuals who can discriminate among a wide variety of stimuli possess a larger potential for information processing" (as paraphrased in Dollinger, 1984, p. 354), and assuming that boundary spanning is a complex task

positively related to performance, he hypothesized that there is a direct relationship between integrative complexity and boundary spanning activity and financial performance.

Dollinger (1984) also hypothesized that those with higher levels of integrative complexity have a higher tolerance for ambiguity which is necessary for the complex environments small business owners compete in. The results of the study showed that “the boundary spanning activity in the high integrative complexity group and the low intolerance of ambiguity group is strongly related to personal economic gain” (Dollinger, 1984, p. 365). However, the results also found only minimal evidence of the effects of variables associated with information processing with boundary spanning and performance. Dollinger’s research relates to earlier studies that show that highly cognitively complex people process more information and that they are more adept at utilizing it (Hogarth, Michaud, & Mery, 1980).

Expanding the concept of cognitive complexity even further, Fisher et al. (1987) incorporated it as a factor of leadership. Taking leadership theories that have subordinate development as one of its goals, such as transformational leadership, Fisher et al. (1987) wrote, “individuals holding more evolved worldviews tend to have developed greater cognitive abilities and conceptual complexity than those holding earlier worldviews” (p. 6). They asserted that the leader’s worldview has implications for decision-making and leading as it shapes their beliefs about power, behavior, conflict resolution, etc. Not only that, but Fisher et al. suggested that having a more developed worldview is critical to understanding the worldviews of subordinates and key to the developmental process inherent in these particular leadership styles.

More recently, Karney and Gauer (2010) have investigated cognitive complexity's role in resolving problems in relationships. Using Schroder's (1971) explanation of differentiation and integration of stimuli, Karney and Gauer explained that these factors of processing information are crucial to problem resolution. As mentioned earlier, differentiation is the extent to which a person can use different categories or labels to interpret stimuli, meaning that less differentiation leads to either/or outcomes. Integration refers to the relationships and connections that can be found among different characteristics; therefore, a person with a high degree of integration can acknowledge a difference of opinion and go further by finding the common ground where resolutions lay. The consequences of higher levels of cognitive complexity are noticeable when differences arise. For instance, more complex individuals understand differing points of view, leading to the ability of disagreeing and retaining an overall positive view of the other. Additionally, "in negotiation contexts, recognizing the validity of opposing viewpoints has been associated with more cooperative behavior" (Karney & Gauer, 2010, p. 183). In general, those with more complexity respect differences of opinion, are more adept at identifying possibilities for compromise, and are less defensive, as well as being able to act in more complex ways.

Cognitive complexity and interpreting the world play a large role in Pisapia's (2009) conception of strategic leadership. As noted earlier, strategic leadership rests heavily on the use of what Pisapia refers to as agility. Cognitive agility has three main components; reframing, reflection, and systems thinking, all of which have a deep, rich theoretical and research history. As research shows, using all three of these in tandem have been proven to lead to effective leadership performance (Brennan, 2010; Pisapia &

Pang, 2012; Zsiga, 2008). When all three cognitive abilities are used it creates a synergy that reaches the level of cognitive agility necessary to differentiate and integrate the various stimuli in a fluctuating environment, thereby leading to sound strategy and decision-making.

As noted, complexity theories have an impact on many and diverse areas of life and study. Streufert (1997) wrote that as the scientific world has combatted challenges in theory, thought, and application, the only way that these challenges have been overcome is through changes in thinking and that this is the unifying element among the vast array of sciences. The use of additional conceptual structures, which is the way in which we interpret the world, are those changes in thinking that have led to scientific advancement. As has been made evident in this literature review, the inclusion and movement towards leadership theories that contain cognitive elements—that is, how effective leaders think—is where leadership theory is heading. Finally, there is agreement in the literature that the possession of cognitive complexity and the ability to apply it in real world situations, cognitive agility, are necessary for effective leadership (Denison et al., 1995).

Proposition 5: Leaders with higher levels of cognitive agility are more effective than those with lower levels.

Cognitive agility and behavioral agility are two interrelated concepts, however definite distinctions can and should be made. Cognitive complexity, Denison et al. (1995) argue, “may well be a necessary condition for the effective practice of leadership. Behavioral complexity, however, must certainly be the sufficient condition. Leadership must inevitably be performed through action, not cognition” (p. 524). Behavioral agility is the ability to “act out a cognitively complex strategy by playing multiple, even

competing roles in a highly integrated and complementary way” (Hart & Quinn, 1993, p. 164). In order for a person to have behavioral agility in an effective manner they must first have the commensurate cognitive agility to interpret information and reason which of the many alternative actions best fits a given scenario. However, Satish (1997) reasoned that although cognitive and behavioral complexity/agility have traveled down different research streams, they should not be seen as separate, but as two aspects of the same phenomenon.

An early and significant study in leadership literature that exemplifies leaders performing competing roles is that of Hemphill and Coons (1957) that identified two factors associated with effective leadership; initiation of structure and consideration. Originally hypothesized as dichotomous and uncorrelated, these two factors were positively correlated in Schriesheim, House, and Kerr (1976) and the integration of these two variables spawned several leadership models such as the managerial grid by Blake and Mouton (1964). As it applies to leadership, behavioral complexity is the leader’s capacity to use a wide variety of influencing actions (Pisapia & Pang, 2012). This wide variety of influencing behaviors must involve managing paradox and contradictory thoughts and actions. For example, a focus on production can be inconsistent with a concern for people, however effective leaders manage this well enough to retain credibility.

The leader’s ability to perform multiple and even contradictory roles, or more of everything, has been promoted in leadership literature for some time. Blake and Mouton (1964) asserted that “team management” is the ability to have a focus on both people and results. Hersey and Blanchard’s (1969) situational leadership model expanded on this,

but insisted that the leader be able to act accordingly with respect to each subordinate's level of maturity or development. Bass (1981) observed that leaders do more of everything. Hart and Quinn (1993) noted that boundary spanning and social intelligence are characteristics of effective leaders. This is the rationale and history behind the assertion that effective leaders must possess a "wide repertoire" of behavior, even if seemingly incongruous to one another (Lawrence, Lenk, & Quinn, 2009).

Denison et al. (1995) have identified leadership theories that are consistent with the assertion that both cognitive and behavioral complexity must be used in unison, such as Mintzberg (1973) and Bass (1981). These leadership theories fit newer models that are less bipolar, categorical, dichotomous, etcetera, such as autocratic-democratic, formal-informal, Theory X and Theory Y, among others (Hart & Quinn, 1993). Recent research from Pisapia and Pang (2012) also had results that supported the interrelationship of cognitive and behavioral complexity. Their research showed that high cognitive complexity predicted higher levels of behavioral complexity, and that more cognitively complex individuals were found to display more behaviorally complex actions.

Pisapia (2009) illustrated the intersection of cognitive and behavioral agility by laying out the age-old argument of leadership versus management. What he described is an evolution for post-modern times; people who can manage organizational change through an ambiguous and chaotic environment with stability and control. What he referred to as old science—linear thinking, direct causal relationships, and command and control hierarchy—is no longer viable and must be replaced with adaptability, flexible thinking, and relationships. Pisapia used the labyrinth metaphor to demonstrate that



increased levels of cognitive and behavioral agility are needed to navigate today's current reality. Labyrinth is a game where the player must take a steel ball from one side of the game board to another through a complicated maze littered with pitfalls. The player must create a strategy to traverse the board and manipulate the knobs on the side that alter the surface of the board. The maze and pitfalls symbolize the environmental disorder that can only be overcome with vision and creativity and the knobs represent the leader actions that influence the path and direction of the steel ball. Both are necessary to be successful.

Proposition 6: Cognitive agility predicts behavioral agility.

Proposition 7: Teachers with higher levels of behavioral agility will produce greater student outcomes than those with lower levels.

Proposition 8: Teachers with higher levels of both cognitive and behavioral agility will produce greater student outcomes than those with lower levels.

### **Educational Measurement History**

Accountability is an important component of the public sector since most citizens have a vested interest in the spending of trillions of tax dollars. Public education is no exception, with an estimated \$1.1 trillion spent for education during the 2009-2010 school year. \$1.1 trillion dollars becomes a troubling figure when considered with a 2010 report from the National Academy of Science that stated that this generation of students is less well educated than their parents, which would be the first time in recorded history (Scherrer, 2011). Within the United States, accountability has grown tremendously from the inception of public education. What began as a way to evaluate the effectiveness of employees with simple checklists matured to include increased financial scrutiny during

the scientific management era with platoon schools, to the incorporation of educational objectives and assessments (Callahan, 1962).

Ali and Ali (2010) wrote that to thoroughly grasp educational measurement, its functions, and its limitations, one must look to its history and how it came into existence. Other than the Chinese who had written examinations as far back as 2,357 BC, oral examinations were the standard for officials that would inspect schools. Oral examinations would dominate educational measurement up through the renaissance period. According to the New York State Department of Education (n.d.), one of the earliest examples of written examinations for educational measurement were the 1865 “Preliminary” Regents exams in New York. This was instituted based on an 1864 ordinance pass by the Board of Regents of the State of New York and were given to those completing preliminary studies.

Callahan (1962) wrote that one of the pioneers of educational testing was Joseph M. Rice who created assessments for spelling and arithmetic. His results were published in the *Forum* from 1895 to 1903 and he harshly criticized public education. After some review it was noted that his results were inaccurate and that many of his conclusions were not supported in the data. By 1913 several tests had been developed and used in public schools, such as the handwriting scales by E. L. Thorndike. In 1926, one of the most commonly recognized measures of education, the Scholastic Aptitude Test (SAT), was developed by Carl Brigham and used as a college entrance exam. For public elementary and secondary schools, the National Assessment of Educational Progress (NAEP) “is the largest nationally representative and continuing assessment of what America’s student know and can do in various subject areas” (National Center for Education Statistics

[NCES], n.d., para. 1). As early as the 1960s the NCES (n.d.) began planning to administer this assessment, the first being in 1969. This has continued to the present day.

For the past 40 years the emphasis on educational change has been in test-based accountability and according to Whitehurst (2014) began in the 1970s with minimum competency tests. As it relates to this study, state standardized testing became dominant with the re-authorizations of the Elementary and Secondary Education Act as the No Child Left Behind Act in 2001, although 44 states already had some form of high-stakes assessment prior to this (Hanushek, 2009). NCLB mandated that states receiving federal funding must conduct these types of assessments and penalized those states that did not meet adequate yearly progress (AYP). States were allowed to generate their own educational standards and assessments of those standards, as well as create benchmarks for proficiency on those exams. AYP rates were the percentages of students and subgroups of students who were deemed proficient on these exams. Federally mandated rates of proficient students raised every year until all students (100%) were expected to be proficient in 2014.

There were both positive and negative outcomes of NCLB (Hanushek, 2009). Examples of positive outcomes are that states who initiated these types of accountability measures earlier on showed larger gains in student achievement on the NAEP. Further, there was a particular emphasis on the growth and development of minority and disadvantaged students on these assessments. Lastly, schools facing accountability measures performed better on internationally benchmarked assessments. Hanushek noted that critics of this type of accountability point to the emphasis on lower-level skills that are assessed on these types of exams and an emphasis on proficiency that many critics

argue should be on student growth. With the integration of computerized testing Hanushek suggested that computer adaptive testing, like the Graduate Record Exam (GRE), ought to be used.

The next wave of educational measures began towards the end of the 1990s, which still focused on student outcomes and not teacher inputs (Gleason, 2014). Ravitch (2010b) claimed that schools were having difficulties keeping pace with proficiency score raises from NCLB and scrambled to acquire a “growth” model to help avoid performance penalties. William Sanders, a statistician who already had experience with VAM within other economic sectors, created a model that not only tracked student growth, but also individual teacher contributions. Ravitch continued to write that all politicians were excited about using these measures, but for various reasons. President Barack Obama’s key educational initiative, Race To The Top, made VAM one of its central pieces.

**Value-added modeling (VAM).** As can be noted above, the next generation of teacher evaluation that has been proposed is VAM, which controls for variables that impact student achievement laying outside of the teacher’s influence (Scherrer, 2011). The use of VAM as at least one component in the decision-making process that includes retention and promotion has spread rapidly across many states (Yeh, 2012) and as one piece of the overall evaluation system, is accepted by many researchers (Scherrer). Although different models exist, several of the models currently being implemented across many states have numerous characteristics in common. The vast majority of models take in to account factors stemming from the student’s family and community, identify where each student begins and ends that academic year, and measures their

growth by the end of that school year using high-stakes testing. These factors have been shown to impact student performance and are regularly noted concerns when measuring teacher performance (Scherrer).

As with any major initiative, the use of VAM as an educational measurement is hotly debated (AERA, 2015). On one side the argument follows that since teachers have a large effect on student outcomes (Aaronson, Barrow, & Sander, 2007) they should be held accountable for student learning. On the other side of the argument, much of what impacts student achievement is out of the control of teachers, cited by significant studies in education such as the Coleman Report (Coleman et al., 1966) and that VAM only exacerbates problems associated with the heightened focus on unreliable, high-stakes testing. This second criticism is known as “Campbell’s Law,” which predicts that the more emphasis placed on one quantitative variable, the more it is susceptible to manipulation and therefore perverting the actual outcome and behavior of those affected by it (Campbell, 1976).

Several challenges arising from the use of VAM have been identified in the literature. Harris (2009) illustrated that previous achievement is much more difficult to measure than is assumed in the model. For instance, it is impossible for the model to capture learning that occurs in more advantaged homes, such as trips to museums, zoos, etcetera. Additionally, more advantaged students are less susceptible to summer loss than disadvantaged ones (Alexander, Entwisle, & Olson, 2007). From a teaching perspective, it would seem as though this would incentivize teachers to request courses and work at schools that attract more advantaged students to earn better results on evaluations. However, the authors mentioned above do not address the likelihood or extent to which

teachers would benefit from instructing advantaged students using current subjective administrative evaluations, such as observations. Therefore, using the traditional classroom observation already created biased evaluations in favor of those teaching more privileged students.

Scherrer (2011) also pointed out that advantaged students tend to end up in schools with other advantaged students, and similarly disadvantaged students find themselves attending schools with other disadvantaged peers. This homogeneity introduces complex factors that are difficult to control for. For instance, a basic criteria for a student to be assigned a low socioeconomic status label is participating in the free/reduced lunch program, however this has not proven to be the most accurate measure of “disadvantageness.” Ishii & Rivkin (2009) noted that distortions in measures of teacher quality occur when differences in families are not reported. Rothstein (2010) also reported that VAM assumes a random assignment of students within schools, which complicates the modeling effects.

Other assumptions of most VAM models have also been detailed, such as score increases and differences. Scherrer (2011) wrote that no distinction is made in VAM models between gains. For example, if a student makes a 5-point gain from 30 to 35, is that the same difficulty as a student moving from an 80 to an 85? Or is a 5-point gain in 5th grade the same as one in 10th grade? Further concerns and questions come about when considering the universality of VAM when discussing teacher effectiveness. VAM assumes that teachers would have the same effect across grade levels, schools, and student characteristics (Schafer, Lissitz, Zhu, Hou, & Li, 2012). Previous measures of teacher effectiveness also have this universality assumption; however, some research

suggests otherwise, such as Hanushek, Kain, O'Brien, and Rivkin (2005) who purported that many teachers have been shown to be more effective when they educate students that match their own race.

Issues with reliability have been detailed in the literature. Research by Koedel and Betts (2005) exhibited that using VAM for novice teachers within the first year or two may not be a reliable indicator; however, overall, the use of this instrument may be beneficial to determine effectiveness of teachers. This unreliability in classifying teachers was also noted by the work of Schochet and Chiang (2010) that showed that over a 3-year period a significant portion of teachers were misclassified for their effectiveness with students. Contrarily, Scherrer (2011) wrote that using status models, such as those from NCLB that only determine proficiency, are even less reliable than VAM models and better measure who teachers teach, and not how well they do so. He continued that VAM is useful when determining a specific teacher's contribution to a student's achievement compared to the average.

Validity concerns have also been documented in the VAM literature. First and foremost is labeling a teacher as "effective" when the data used to arrive at this conclusion only derives from scores relating to mathematics and English language arts. Of course, there is more to being an "effective" teacher than language arts and mathematics (Scherrer, 2011). Further, the assessments that are used to gather this data have documented validity concerns as well (Braun, Chudowsky, & Koenig, 2010). Scherrer proffered that claiming there is calculated "growth" when baseline data from one end-of-year grade-level test does not utilize the exact same skills and knowledge base as the upcoming end-of-year assessment is problematic. Fuller (2014) also brought forth

the argument that standardized tests were never designed with the intent to evaluate teachers, especially considering the variability between tests, curriculum, and what is taught. This variability means that student learning is not necessarily reflected in test scores (Goe, 2007). Brady, Heiser, McCormick, and Forgan (2014) also mentioned that isolating the effects of a single teacher becomes extremely difficult, if not impossible, when considering that many students experience co-teaching models in the classroom, pull-out support (individualized attention during the school day), after school academic support programs, and other confounding inputs to their academic progress. Finally, McCaffrey, Sass, Lockwood, and Mihaly (2009) reported that when comparing the value-added results from one teacher to the other that 30-50% of the variation is attributable to sampling error. Although many in the educational research community have asserted that value-added modeling should not be used (Darling-Hammond, 2011; Ravitch 2010a), many would argue that when used with other factors to measure teacher effectiveness (Scherrer) or compared to other alternatives (Harris, 2009), VAM scores are an improvement.

Recently, the American Educational Research Association (AERA) (2014) highlighted a study from Polikoff and Porter (2014) as a sub-study of the Measures of Effective Teaching (MET) study through the Bill and Melinda Gates Foundation that had some troubling findings. Their study measured the relationship between instructional alignment and teacher observations, student measures of effective teaching, and VAM and found very weak to zero relationships. Although they mention that VAM provides useful information and predicts long-term outcomes, state tests are not sensitive to what other research has shown to be quality instruction; therefore, it makes utilizing these



measures to improve teacher performance complicated. These and other findings when studying the use of VAM on educational outcomes have led the American Statistical Association (ASA) (2014) to make several recommendations.

The ASA (2014) suggested that VAM should always be paired with other measures. The association reiterated that VAM does not measure causation, but correlation, and that not all factors that impact student achievement can be captured in the model. The ASA (2014) closed with several other important facts concerning VAM; that the use of different models can alter rankings and scores substantially, that most VAM studies have found that only 1-14% of test score variability can be attributed to the teacher, and system-level changes have much greater opportunities for quality improvement. Another suggestion is to use a propensity score matching model (Everson, Feinauer, & Sudweeks, 2013). Everson et al. (2013) claimed that propensity score matching provides a better teacher evaluation method that more closely fits the purpose and intent of accountability, which is “how well employees perform in the job to which they are assigned” (p. 349). They claimed that VAM scores compare teacher performance on a large population of students rather than the average teacher effect on those actually taught. For instance, measuring a teacher that teaches mostly low socioeconomic students in a rural area against those that teach a diverse set of students in an urban environment is not justified. This method is noted to be much more limited in scope and is based on finding students that are similar, which creates other complications by deciding which variables are included in finding similar students. This method is also less stable in smaller populations (Everson et al.).

However, several distinct advantages of using VAM also exist in the literature that address many of the concerns previously raised, one of which is to allow for better comparisons from one teacher to the next (Gordon, Kane, & Staiger, 2006; Schafer et al., 2012). For instance, Gordon et al. cited research showing that teacher characteristics, such as experience and educational attainment, do not predict teacher effectiveness (Hanushek & Rivkin, 2006). Previous concerns about misclassifying teachers and using unreliable VAM results to direct important decisions are mitigated when one considers that these decisions are already being made using only observations and status model test results.

A recent study from the Brown Center on Educational Policy at The Brookings Institution (Whitehurst, Chingos, & Lindquist, 2014) found that teacher classroom observations carry the most weight when evaluating teachers and their study found a significant bias in favor of teachers that lead high performing students. Therefore, using these qualifications, along with subjective administrative evaluations, are less reliable than if they included VAM scores. McCaffrey et al. (2009) wrote that measurement error diminishes greatly when multiple years and large numbers of students are used. Most importantly, the extent to which VAM estimates should be used must generate great discussion, however, what is not debatable is that VAM estimates of teacher effectiveness are much more reliable predictors of student achievement than are teacher characteristics, such as age, experience, and educational attainment (Goldhaber, Goldschmidt, & Tseng, 2013). Furthermore, VAM estimates are significantly more rigorous than current and previous evaluation systems (Toch & Rothman, 2008).

Several major studies that exhibit the positive aspects of VAM have already been conducted and the convergence of findings has been remarkable (Kane, 2014); two of which are the MET study from the Gates Foundation (2013) and a Harvard study from Chetty, Friedman, and Rockoff (2012). The MET study was a longitudinal study over three years where VAM was used as one measure of effective teaching. VAM was used to identify the individual contribution of teachers in over 3,000 classrooms. VAM scores were assigned after the first year and followed by a random assignment of students in the following year, which confirmed that previously identified more effective teachers were again more effective after random assignment of students. They also found a significantly strong correlation between students scoring well on a basic skills test and a second higher-order thinking test, evidencing that VAM does not emphasize basic-level teaching.

Chetty et al. (2012) studied data from 2.5 million students grades three through 10 and linked that to those same students' young adult outcomes and parental characteristics. They found that VAM scores do accurately predict teachers' effect on student test scores and that teachers with high VAM scores had students that were: "more likely to attend college, attend higher-quality colleges, earn more, live in higher socioeconomic status (SES) neighborhoods, and save more for retirement (Chetty et al., 2012, p. 59)." These same students were also less likely to become pregnant in their teenage years. These two studies show that not only do value-added scores accurately identify effective teachers, but also have a great impact on many other student outcomes.

Additional studies that have had similar findings as to the predictive power of VAM are Kane and Staiger (2008), Kane, McCaffrey, Miller, and Staiger (2013), Chetty,

Friedman and Rockoff (2014), Rothstein (2015), Bacher-Hicks, Kane, and Staiger (2014), and Glazerman et al. (2013). Kane and Staiger, Kane et al., Chetty et al. (2014), and Glazerman et al. all conducted studies where teachers' VAM scores were calculated and then were either moved to another school and grade level or provided with a random assignment of students. In all four of these studies, previous VAM scores were able to reliably predict teacher performance in the following randomized year. Rothstein replicated the Chetty et al. (2014) study and had similar results.

Proposition 9: Value-added modeling is the most accurate method for measuring the individual contribution of a teacher on student achievement.

Proposition 10: Value-added modeling is the most accurate method for distinguishing effective teachers from less effective ones.

## **Conclusion**

This literature review has identified the most relevant and significant elements necessary to examine the impact of a teacher's leadership ability on objective measures of teacher performance, VAM and IP. The literature review has analyzed and synthesized the historical, theoretical, and research foundations for leadership, school leadership, teacher/classroom leadership, leadership and teacher evaluation, cognitive agility, behavioral agility, and achievement measurement in education. Several important themes have emerged in the literature that has guided the literature review:

- a. Leadership theory has developed from a single man atop a hierarchical pyramid to pushing leadership functions down to the lowest level possible. Any person at any level influencing a group towards an identified goal is a leader.

- b. Leadership theory has developed and embraced other factors beyond a focus on increasing efficiency to include an emphasis on people, relationships, psychology, cognition, and actions, while still building on past models.
- c. School leadership theory has mirrored broader leadership thought because schools lay at the heart of every culture and share the same basic realities of any other organization.
- d. The teacher in the classroom has been perceived as filling a leadership role and is an extension of the larger school leadership, but this role has not been thoroughly investigated using a leadership lens.
- e. Contemporary leadership thought has identified chaos and change as the normal operating condition and proposed that cognitive and behavioral agility are the means of becoming successful in this environment.
- f. Pisapia's (2009) strategic leadership theory and measurement instruments incorporate the most current thoughts on leadership and are suitable to explore the relationship between a classroom teacher's leadership habits, performance evaluation, and their students' academic performance and achievement.

Classroom teacher as leader has been underrepresented in leadership and education literature, especially at the secondary public school level. Even when addressed, it has not been investigated using newer conceptions of leadership that emphasize cognitive processes such as the strategic leadership model proposed by Pisapia (2009). The classroom environment fits the characteristics of other organizations with identified leaders in that they are constantly in flux and that leaders must incorporate a wide repertoire of thinking and behaving to be deemed effective. With the advent of

VAM incorporated into teacher evaluation, two distinct advantages appear that make this research timely and relevant. VAM is currently the most precise way to measure a specific teacher's impact on a student's achievement and also enables better comparison between the effectiveness of different teachers (AERA, 2015). Both education and leadership literature would benefit from this study considering the lack of knowledge in this area of cognitive leadership and the newfound abilities to more precisely measure teacher impact on student performance.

The philosophical end game of leadership is to develop and empower subordinates to become leaders themselves, think independently and creatively, solve problems, and act in moral and ethical ways. These are some of the very same qualities that public education—specifically via teachers—attempts to instill in their pupils. If a positive relationship is found between the leadership abilities of teachers and the academic achievement of their students, it could lead to a shift in professional development that may better prepare teachers to develop critical thought, problem-solving, and moral/ethical foundations in their students, as well as create a new frame from which to analyze teacher performance in the classroom. Below is a summary of all 10 propositions that have been discovered through the literature review (see Table 3).

Table 3

*Summary Proposition Table*

#	Proposition Description
1.	Leadership theory has developed with a strong and continuous emphasis on the cognitive and behavioral aspects for effective leadership throughout its history.
2.	Educational leadership theory has mirrored the general leadership literature through the similarities found in directive style and skills approach in instructional leadership, and more obviously in transformational leadership.
3.	The teacher in the classroom can be conceptually viewed as the leader (classroom leader).
4.	The teacher's classroom leadership has an impact on student outcomes.
5.	Leaders with higher levels of cognitive agility are more effective than those with lower levels.
6.	Cognitive agility predicts behavioral agility.
7.	Teachers with higher levels of behavioral agility are more effective than those with lower levels.
8.	Teachers that exhibit the use of both cognitive and behavioral agility are more effective than those who do so to a lesser degree.
9.	Value-added modeling is the most accurate method for measuring the individual contribution of a teacher on student achievement.
10	Value-added modeling is the most accurate method for distinguishing effective teachers from less effective ones.

## CHAPTER 3. METHODOLOGY

This chapter explicates the methods that were utilized to examine the purpose of the study and research questions. Specifically, it describes the research design, population and sampling plan, research instruments, and detailed plans for data collection and thorough statistical analysis that tested the study's hypotheses.

### **Purpose**

The purpose of the study was to determine whether teacher cognitive and behavioral agility is related to student achievement in the classroom as measured by teacher's VAM score and their end of year evaluation as measured by the Marzano IP framework, and whether that relationship was moderated by alterable and unalterable variables. The study was guided by four research questions and nine hypotheses.

RQ1. Is there a relationship between behavioral/cognitive agility of the teachers and their VAM or IP scores?

RQ2. Do alterable variables (highest leadership graduate degree, school level, attendance, and leadership position) moderate the relationship between behavioral/cognitive agility of the teachers and VAM or IP scores?

RQ3. Do unalterable variables (age, gender, years of experience, student behavior, and highest graduate degree) moderate the relationship between behavioral/cognitive agility of the teachers and VAM or IP scores?



RQ4. Based on these variables, can a reliable predictor model of effective classroom leadership be developed?

The following hypotheses have been developed through an in-depth study of leadership theory, educational leadership theory, teacher leadership theory, cognitive and behavioral agility, and educational measurement and were employed to answer the research questions:

H<sub>0</sub>: Teacher cognitive agility predicts teacher behavioral agility.

H<sub>1</sub>: Teacher cognitive agility (unidimensional effect) predicts VAM and IP scores.

H<sub>2</sub>: Teacher's use of systems thinking, reframing, and reflecting (multidimensional effect) predicts VAM and IP scores.

H<sub>3</sub>: Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderates the relationship between cognitive agility and VAM and IP scores.

H<sub>4</sub>: Teacher behavioral agility (unidimensional effect) predicts VAM and IP scores.

H<sub>5</sub>: Teacher's use of transforming, managing, bonding, bridging, and bartering (multidimensional effect) predicts VAM and IP scores.

H<sub>6</sub>: Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderates the relationship between behavioral agility and VAM and IP scores.

H<sub>7</sub>: Teacher combined cognitive and behavioral agility (uni- and multidimensional effect) predicts VAM and IP scores.

H<sub>8</sub>: The relationship between cognitive agility and VAM and IP scores is mediated through behavioral agility.

### **Research Design**

This study employed a quantitative, non-experimental research design using linear regression, correlational, and mediator statistical analysis to determine the possible relationships amongst the explored variables. It examined the relationship between the classroom leader's cognitive and behavioral agility and resulting VAM and IP scores. Being non-experimental in form, the cognitive and behavioral agility of the classroom leader were considered the predictor variables and VAM and IP the criterion variables. The overall design for the research was displayed in Figure 1 in Chapter 1, including the predictor and moderating variables.

### **Variables**

Table 4 below outlines the variables considered in this study. Specifically, the type, description, source, and the measurement instrument used to gauge them.

Table 4

*Research Variables*

Type of Variable	Description	Source
Dependent	VAM	Florida Department of Education (FLDOE) Database
Dependent	IP	Teacher participant reported scores on survey
Independent	Cognitive Agility	STQ <sup>T</sup> ™ Results from teacher participant
Independent	Reflection	STQ <sup>T</sup> ™ Results from teacher participant
Independent	Reframing	STQ <sup>T</sup> ™ Results from teacher participant
Independent	Systems-Thinking	STQ <sup>T</sup> ™ Results from teacher participant
Independent	Behavioral Agility	SLQ <sup>T</sup> ™ Results from teacher participant
Independent	Managing	SLQ <sup>T</sup> ™ Results from teacher participant
Independent	Transforming	SLQ <sup>T</sup> ™ Results from teacher participant
Independent	Bridging	SLQ <sup>T</sup> ™ Results from teacher participant
Independent	Bartering	SLQ <sup>T</sup> ™ Results from teacher participant
Independent	Bonding	SLQ <sup>T</sup> ™ Results from teacher participant
Moderator	Leadership Education	Teacher participant reported highest leadership graduate degree received on survey
Moderator	Leadership Position	Whether or not a teacher participant also held a leadership position outside of the classroom as reported on survey
Moderator	Teacher Attendance	The amount of days, when students were present in school, during school year 2013-2014, the teacher reported missing on survey
Moderator	Age	The teacher participant reported age in years on survey
Moderator	Gender	Teacher participant reported gender on survey
Moderator	Years of Experience	Teacher participant reported years of teaching experience reported on survey
Moderator	Highest Degree	Teacher participant reported highest degree on survey
Moderator	Student Behavior	Teacher participant reported number of behavioral referrals written in school year 2013-2014 on survey
Moderator	School Level	Teacher participant reported school level (middle or high school) during school year 2013-2014 on survey

## **Research Setting**

The setting for the research is one of the largest school districts in the United States, located in the southeast region. According to the district's website it encompasses over 300 schools, covers more than 400 square miles, and educates a population north of 250,00 students. The district is also demographically diverse. According to school year 2013-2014 demographic data, the district is racially comprised of 50% White and 40% Black, as well as 4% Asian, 3% Multi-racial, and 1.5% Native-American students. Additionally, approximately 30% of those students identify as ethnically Hispanic. Also, 10% of students are English language learners, 12% are exceptional students, and 60% participate in the free or reduced-price lunch program.

## **Unit of Analysis**

This study explored whether there was a relationship between the leadership ability of the teacher in the classroom, measured as their cognitive and behavioral agility, and the VAM and IP. Thus, the unit of analysis for this study was the teacher in the classroom working to improve the achievement levels of their students on the end of the year assessments produced by state department of education and their own annual performance evaluations.

## **Participant Selection**

The teachers that generate an individual VAM score from their classroom performance were the participants for this study. Teachers of English language arts and reading grades 4–10, mathematics grades 4–8, and Algebra 1 grades 8–9, generate individual VAM scores. These participants were drawn from a large, urban school district and consist of teachers that educate students whose end of the year assessments can be directly tied to their instruction. An example of a teacher that does not meet the

criteria is a kindergarten teacher whose students do not participate in a cumulative, high stakes test at the end of their school year. Another example would be an 11th grade English language arts teacher as these students in this grade level have no end of year standardized tests for this particular subject area.

### **Sampling Plan**

Based on the research design, for a test of a Beta in a model with a total of eight predictor variables and an effect size estimate using Cohen type  $f^2$  of .15, which is a medium effect size (Cohen, 1988), a power analysis of a two-tailed, t-test, multiple linear regression, revealed that a sample size of 74 participants would be needed for statistical significance. Teachers were invited to participate in the study via the school district's email system as well as through snowball/chain sampling; due to the lack of overall time teachers have to complete surveys and other voluntary tasks. All teachers were asked to complete the Strategic Thinking Questionnaire for Teachers (STQ<sup>T</sup>™) and Strategic Leadership Questionnaire for Teachers (SLQ<sup>T</sup>™), which included the gathering of demographic/background data such as age, gender, years of experience, and highest graduate degree.

### **Instruments**

As outlined in the variable table above, the criterion variable VAM was measured using the state's value-added modeling score for student performance on the end of year, high-stakes assessment given to students in grades 4–10. VAM scores are a recent phenomenon in education and are beginning to replace previous static models that were based on whether or not a student was deemed proficient in a subject area. A student's VAM score is calculated as the difference between a student's predicted level of

performance and their actual performance on the end of year assessment. An expected growth score is established for each student, based on prior data and represents the growth that is typical within students with similar test scores and other characteristics. For this particular state where the study was conducted, a covariate adjustment model is used. A teacher's VAM score is the overall proportion of students they taught who met or exceeded their predicted score, (for example, 20 out of 30 of a teacher's students met or exceeded their predicted VAM score earning that teacher a VAM score of .67).

This model uses longitudinal data where the current test scores are used in linear regression as the outcome and previous student performance as the conditioning variable. An assumption of the model is that the effectiveness of an average teacher will result in a student score similar to other students with matching characteristics and previous scores. Predicted scores are derived from two prior test scores as predictors (with the exception of fourth grade where only one year is used), a set of student characteristics, and random effects from teacher and school variables. Student-relevant characteristics include the number of subject-relevant courses enrolled in, disability status, English language learner status, gifted status, attendance, student mobility, retention, class size, and homogeneity of class test scores.

The teacher's value-added score was comprised as the sum of two factors. One factor, the teacher component, is generated as the average growth of the teacher's students relative to similar students within the school and is based on each of their students' value-added scores described above. The second factor is the school component or the average growth of the school's students compared to similar students across the entire state. A teacher's value-added score is based 50% on the school

component and the other 50% on their unique teacher component. The researcher only utilized the 50% VAM score directly attributable to the teacher and not the 50% school component. One potential concern for using VAM to correlate with another classroom variable is that the model already accounts for many other variables that account for student achievement, leaving little variance to explain. VAM is a recent phenomenon in education and a great body of research does not yet exist. However, one dissertation study correlated a teacher performance appraisal instrument with VAM and found a small to moderate statistically significant relationship with correlation coefficients from .089 to .218 (Mela, 2013).

In its most general form, the model employed in this study can be represented as:

$$y_{ti} = \mathbf{X}_i \boldsymbol{\beta} + \sum_{r=1}^L y_{t-r,i} \gamma_{t-r} + \sum_{q=1}^Q \mathbf{Z}_{qi} \boldsymbol{\theta}_q + e_i$$

where  $y_{ti}$  is the observed score at time  $t$  for student  $i$ ,  $\mathbf{X}_i$  is the model matrix for the student and school level demographic variables,  $\boldsymbol{\beta}$  is a vector of coefficients capturing the effect of any demographics included in the model,  $y_{t-r,i}$  is the observed lag score at time  $t-r$  ( $r \in \{1, 2, \dots, L\}$ ),  $\gamma$  is the coefficient vector capturing the effects of lagged scores,  $\mathbf{Z}_{qi}$  is a design matrix with one column for each unit in  $q$  ( $q \in \{1, 2, \dots, Q\}$ ) and one row for each student record in the database. The entries in the matrix indicate the association between the test represented in the row and the unit (e.g., school, teacher) represented in the column. We often concatenate the sub-matrices such that  $\mathbf{Z} = [\mathbf{Z}_1, \dots, \mathbf{Z}_Q]$ .  $\boldsymbol{\theta}_q$  is the vector of effects for the units within a level. For example, it might be the vector of school or teacher effects which may be estimated as random or fixed

effects. When the vector of effects is treated as random, then we assume

$\theta_{ij} \sim N(0, \sigma_{\theta_{ij}}^2)$  for each level of  $q$ . (Florida Department of Education [FLDOE], 2016, p. 6)

Validity and reliability are major concepts that account for the rigor of scientific research. The extent to which a social phenomenon is captured is referred to as validity or the truth (Creswell, 2007; Hammersley, 1992). The consistency of findings, or the replicability of findings, is known as reliability. Both of these attributes are well documented with the STQ<sup>TM</sup> and SLQ<sup>TM</sup> as will be shown. The cognitive agility of the classroom leader, or the extent to which a person can discriminate (differentiate/integrate) among a wide variety of stimuli using different schemata, is the first predictor variable. The Strategic Thinking Questionnaire for Teachers (STQ<sup>T TM</sup>) was used to measure this variable and was derived from the STQ<sup>TM</sup>. The STQ<sup>TM</sup> is a 20-question self-report instrument that measures the respondent's use of three cognitive abilities; reframing, reflecting, and systems thinking. Respondents that score well are considered to have the capability to be strategic thinkers and to have a strong command of the three thinking skills. According to Pisapia (n.d.), the STQ<sup>TM</sup> was generated using an iterative process to find latent factors, and means and standard deviations were revised throughout the process. Common factors were derived using a principal axis factor analysis with an oblimin rotation to allow for sub-scale correlations. Criteria used to substantiate factors were eigenvalues greater than 1 and factor loading on items had to be significant and evident on two or more items. Coefficient alpha reliabilities for the three sub-scales were as follows: reflection, .917; systems thinking, .773; and reframing, .735. Additionally, a previous study in 2011 by Pisapia, Morris, Cavanaugh, and Ellington used a confirmatory



factor analysis and resulted in a three-factor solution with acceptable sub-scale coefficient alphas. This study of the STQ<sup>TM</sup> also produced a “Comparative Fit Index (CFI) > .90, Root Mean Square Error of Approximation (RMSEA)  $\leq$  .10, and Standardized Root Mean Squared Residual (SRMR)  $\leq$  .08 which demonstrated a good fit to the data” (Pisapia et al., 2011, p. 11).

As with any self-report instrument, there are concerns with the validity of the data being reported as human nature leads us to hide our weaknesses or give the response that we believe is best in any given situation regardless if that is a true reflection of our own ability. The STQ<sup>TM</sup> has imbedded mechanisms to overcome this concern. The first mechanism is an inconsistency index. Within the questionnaire, item #22 “I am honest with students” is paired with the same question in item #32 and these paired items measure the same factor. When scores from paired items diverge more than one point, the case is eliminated. This mechanism aids in identifying surveys where respondents were potentially being misleading or were not fully engaged in the process.

The other mechanism included in the STQ<sup>TM</sup> is the use of reverse scored items. There are three of these items that are written negatively instead of positively. This means that instead of a direct correlation where the higher the score on the item the more that ability is present in the participant, the item is inversely related so that the lower the score the more the factor being measured is present. As for specific forms of validity, the STQ<sup>TM</sup> has strong external validity as it has been used in multiple settings and contexts such as; in six different countries, with various levels of leadership, and with for-profit and nonprofit organizations. Evidence for interval validity also exists (Pisapia et al., 2009). One concern for this instrument is that there is evidence of an age bias.

The second predictor variable is behavioral agility, described as the capacity to act in multiple and different, even contradictory, influencing ways through the use of a wide repertoire of actions. This variable was measured with the Strategic Leadership Questionnaire for Teachers (SLQ<sup>T</sup>™) derived from the Strategic Leadership Questionnaire (SLQ™) which was first developed by Pisapia et al. (2006) using Pisapia's (2009) theory of strategic leadership. The 2006 version was comprised of 44 questions and, similar to the STQ™, it uses a 5-point Likert-type scale; however, there are additional versions of the SLQ™ beyond the self-report version, including an observer version and a supervisor version.

Yasin (2006) studied the SLQ™ for reliability and found that “alphas for the transformation, managerial, ethical, and political actions sets at .92, .92, .96, and .89 respectively” (p. 94). Yasin also found that the SLQ™ met the criteria for face validity as items were developed using a panel of leadership theory experts. The SLQ™ has also been validated psychometrically in the U.S. (Reyes-Guerra, 2009; Pisapia, 2009), as well as in China (Pisapia & Pang, 2012). The current version of the SLQ™, developed by Pisapia and Reyes-Guerra in 2008 and annually refined by Pisapia thereafter, was adapted as the SLQ<sup>T</sup>™ and used in this study. In the U.S., influencing actions of managing, transforming, bonding, and bridging were found to have high levels of internal consistency;  $\alpha = .84, .97, .95$ , and  $.88$  respectively. In China, the only action found to have low internal consistency was bartering, which was later improved ( $\alpha = .81$ ) through adjusting the items (Pisapia & Pang, 2012).

The Marzano teacher IP framework is a research-based framework used by school-based administrators in the school district where the research took place.

Marzano and Toth (2013) and Marzano (2012) have purported that it effectively measures performance of teachers in and out of the classroom, and is also designed to develop their pedagogical skills via coaching and self-reflection (Marzano & Simms, 2013). This web-based evaluation model is used by school-based administrators as an observation instrument and has four domains: Domain 1—classroom strategies and behaviors, with 41 individual elements upon which teachers can be rated; Domain 2—planning and preparing with eight individual elements teachers are scored upon; Domain 3—reflecting on teaching which has five elements for rating teachers; and Domain 4—collegiality and professionalism has six elements upon which teachers can be rated. With a total of 60 elements, teachers in this district must receive a minimum of 25 marks in Domain 1 and 10 marks in Domains 2, 3, and 4 combined; however, teachers must receive a minimum of 45 marks overall within the school year.

School-based administrators must conduct at least one of each of the following observations using Domain 1 classroom strategies and behaviors: walkthrough, informal, and a formal classroom observation. The formal evaluation conducted each year is required to include a 30-minute classroom observation and a post-conference where findings are discussed. It may also include a pre-conference meeting between the teacher and administrator. Each element a teacher can be rated on has the same scale: Not Using (1 Point), where a specific element was called for and not exhibited; Beginning (2 Points), where an element was attempted, but was done incorrectly or pieces were missing; Developing (2.5 Points), where an element was used correctly, but the desired effect or monitoring of the effect was not evident in the majority of the students; Applying (3 Points) where the element is being used correctly and the desired effect and

monitoring is evident for the majority of students; and Innovating (4 Points), where the teacher is using an element correctly and the desired effect is seen in all students, even if the teacher has to make adaptations for specific students. These ratings are used to develop each teacher's IP scale score at the end of the year: 3.450 -4.0 is highly effective, 2.5-3.449 is effective, 2.0-2.499 is needs improvement, and 1.0-1.999 is unsatisfactory. Weighing elements from Domain 1 at 68% and Domains 2, 3, and 4 at 32% calculates the final IP score for each teacher. Marzano (2011) cited that the model is the product of over five decades of research and includes the findings from thousands of meta-analytic, experimental/control, correlational, and technology studies. However, although the development of the instrument used independent studies, no independent study was found for the evaluation instrument itself.

The data collection of alterable and unalterable moderating variables of highest leadership graduate degree, age, gender, years of experience, teacher attendance, leadership position, school level, student behavior, and highest graduate degree was done through survey questions at the end of the STQ<sup>T</sup>™/SLQ<sup>T</sup>™ combination survey, as these instruments also gather this type of information (see Table 5). Specifically, for the moderating variables of highest leadership graduate degree, ordinal coding was used. For leadership education, numerical values were assigned: 1 = no leadership education, 2 = some leadership education that would lead to a degree in educational leadership, 3 = completed a master's degree in educational leadership, and 4 = completed a doctoral degree in educational leadership. Similar coding was used for degree: 1 = bachelor's degree, 2 = master's degree, 3 = specialist degree, 4 = doctoral degree. To clarify other moderator variables, school level was coded 0 = middle school and 1 = high school.

Student behavior represents the number of behavior referrals written by the teacher during the 2013-2014 school year. Referable offenses by students are classroom behavioral incidents that are serious enough to warrant official documentation, such as disruptive behavior, insubordination, profanity, etc. Leadership position was coded 0 = classroom teacher and 1 = department head/team leader. Experience is the number in years the teacher has worked in education. Teacher attendance equals the number of days teachers were absent, for any reason, while students were present in the 2013-2014 school year. For example, a teacher work day, such as a teacher planning day, where the students are not present, but the teacher is required to work, do not count. Gender for this study was coded 0 = female and 1 = male.

Table 5

*Survey Response Coding*

	Coding Scale				
	0	1	2	3	4
Leadership Graduate Degree	N/A	No Leadership Education	Some Leadership Education	Completed Master's Degree in Educational Leadership	Completed a Doctoral Degree in Educational Leadership
Highest Graduate Degree	N/A	Bachelor's Degree	Master's Degree	Specialist Degree	Doctoral Degree
School Level	Middle School	High School	N/A	N/A	N/A
Leadership Position	Classroom Teacher	Department Head/ Team Leader	N/A	N/A	N/A
Gender	Female	Male	N/A	N/A	N/A

## **Data Collection Plan**

The data collection process commenced immediately after the Institutional Review Board (IRB) approval was received from both FAU and the local school board of the large, southeastern school district in which the study took place. All data were collected strictly from the two survey instruments, the STQ<sup>TM</sup> and the SLQ<sup>TM</sup>, as well as archived VAM scores. All participants were gathered by contacting the principals of a pre-approved school list from the school district's IRB office. Principals then decided whether or not to allow their school to participate in the study. If the principals allowed the research to proceed, all principal-identified teachers with VAM scores from school year 2013-2014 were contacted via email through the local school district's email system explaining that all pertinent aspects of the study using recommended recruitment messaging based on exemplars located on the FAU IRB website. This included a request for referrals to potential teachers who might also meet the criteria of this study.

VAM scores were gathered through a public information request submitted to the state and the IP scores were collected through the STQ<sup>T TM</sup> and SLQ<sup>T TM</sup>. Outreach to potential teachers and data collection began in the fall of 2015. Participants had the option of completing the surveys electronically or using a paper-based process, with results recorded electronically.

## **Data Analysis Plan**

This study, and the research questions that framed it, explored whether a relationship exists between the cognitive and behavior agility of the classroom leader and their VAM and IP scores and whether or not that relationship is moderated by the alterable and unalterable variables. The nine hypotheses generated from the research

questions narrowed the focus of the research questions and provided greater insight to the proposed relationships.

The data collected using the collection plan previously described were entered into the Statistical Package for the Social Sciences (SPSS) v.20 and used to generate descriptive and analytical statistics in order to test the nine hypotheses and four research questions. Statistical analyses including linear and multiple regression analysis, bivariate correlations, and mediator and moderator analysis were run to find answers to the posed research questions, all of which were run at a 95% confidence level.

Table 6 displays the sub-factors that constructed the variables and which operationalized the study's theoretical framework.

Table 6

*Relationship Between the Research Questions, Hypotheses, and Instruments*

Research Question	Hypothesis	Instrument
Is there a relationship between behavioral/cognitive agility of the teachers and their VAM and IP score?	Teacher's cognitive agility predicts teacher behavioral agility	STQ <sup>T</sup> ™ & SLQ <sup>T</sup> ™
	Teacher's cognitive agility predicts VAM and IP	STQ <sup>T</sup> ™, VAM, & IP
	Teacher's use of systems-thinking, reframing, and reflecting predicts VAM and IP score	STQ <sup>T</sup> ™, VAM, & IP
	Teacher's with higher cognitive agility produce greater VAM results and earn higher IP scores than teachers with lower cognitive agility	STQ <sup>T</sup> ™, VAM, & IP
	Teacher's behavioral agility predicts VAM and IP scores	SLQ <sup>T</sup> ™, VAM, & IP
	Teacher's use of transforming, managing, bonding, bridging, and bartering predicts VAM and IP score	SLQ <sup>T</sup> ™, VAM, & IP
	Teachers with higher behavioral agility produce greater VAM results and earn higher IP scores than teachers with lower cognitive agility	SLQ <sup>T</sup> ™, VAM, & IP
Do alterable variables (highest leadership graduate degree received, teacher attendance, leadership position, and school level) affect the relationship between behavioral/cognitive agility of the teachers and their VAM and IP scores?	Teacher's highest leadership graduate degree received, leadership position, attendance, age, gender, years of experience, school level, highest graduate degree, and student behavior moderates the relationship of cognitive agility and VAM and IP scores	STQ <sup>T</sup> ™, VAM, & IP
	Teacher's highest leadership graduate degree received, leadership position, attendance, age, gender, years of experience, school level, highest graduate degree, and student behavior moderates the relationship of cognitive agility and VAM and IP scores	SLQ <sup>T</sup> ™, VAM, & IP

*continues*



Table 6 continued

Research Question	Hypothesis	Instrument
Do unalterable variables (age, gender, years of experience, student behavior, and highest graduate degree) affect the relationship between behavioral/cognitive agility of the teachers and their VAM and IP scores?	Teacher's highest leadership graduate degree received, leadership position, attendance, age, gender, years of experience, school level, highest graduate degree, and student behavior moderates the relationship of cognitive agility and VAM and IP scores	STQ <sup>T TM</sup> , VAM, & IP
	Teacher's highest leadership graduate degree, leadership position, attendance, age, gender, years of experience, school level, highest graduate degree, and student behavior moderates the relationship of cognitive agility and VAM and IP scores	SLQ <sup>T TM</sup> , VAM, & IP
Based on these variables, can a reliable predictor model of effective classroom leadership be developed?	All hypotheses combined to determine if classroom leadership does impact VAM and IP scores and what variables have the greatest impact	STQ <sup>T TM</sup> , SLQ <sup>T TM</sup> , VAM, & IP

Inferential statistical analysis was utilized for each of the hypotheses that consisted of correlation, regression, moderation, and mediation analysis. Taking the cognitive agility score from the STQ<sup>T TM</sup> and correlating that to the behavioral agility scale from the SLQ<sup>T TM</sup> tested H<sub>0</sub>. Cognitive agility, taken from the STQ<sup>T TM</sup> scale and correlating it to the teacher VAM and IP scores tested the second hypothesis (H<sub>1</sub>). The third hypothesis (H<sub>2</sub>) was analyzed by correlating each cognitive agility sub-scale (systems-thinking, reframing, and reflecting) with the VAM scale and IP scores. The fourth hypothesis, H<sub>3</sub>, was tested through multiplying the centered cognitive agility score with centered or dichotomous moderator variables. When significant moderators were evident, additional analysis was completed using split-case correlational analysis.

H<sub>4</sub>, similar to H<sub>1</sub>, required a correlational analysis between behavioral agility scores and VAM and IP. H<sub>5</sub> used the same analysis as H<sub>2</sub>, correlating individual

behavioral agility sub-scale scores with VAM and IP. For H<sub>6</sub>, the same analysis was conducted as in H<sub>3</sub>. Multiple linear regressions were used to determine whether a leadership predictor model could be created for cognitive and behavioral agility with VAM and IP. Finally, Hayes' PROCESS macro for SPSS (Hayes, 2013) was used for the mediation analysis to test H<sub>8</sub>, whether behavioral agility mediates the relationship between cognitive agility and VAM and IP.

### **Role of the Researcher**

The researcher was a graduate student in the doctoral educational leadership program and unobtrusive collector and interpreter of existing VAM and IP data and teacher characteristics. Specifically, the researcher gathered, analyzed, and interpreted the data within the restraints required of the FAU IRB and the IRB of the local school board of the large, southeastern school district in which the study took place. As a student of FAU and an employee of said school district, the researcher was fully aware of the potential bias inherent in the research and took several measures, such as using FAU protocol documents and frequent correspondence with dissertation committee, to address it.

### **Limitations**

After reviewing the research design of this study, several limitations were apparent. The first limitation was the number of relevant participants. Several limiting factors in gathering participants existed. First only pre-determined district schools provided by the cooperating district were allowed to participate. After the district provided the predetermined list of schools, the principals of each school had to then volunteer for the study. Additionally, only teacher participants that taught a reading or

math relevant course in grades 4-10 generated the necessary VAM scores. These factors limited the number of potential teachers from which to draw. The second limitation was the lack of literature on the teacher as leader concept being addressed and correlated between leadership to VAM and IP from which to draw upon to establish a solid conceptual foundation. The ability of participants to comprehend the questions on the STQ<sup>T</sup>™ and SLQ<sup>T</sup>™ and provide an accurate self-reflection of the strategic thinking and leadership ability was another limitation.

The next limitation is related to the reliability of self-rater measurements. Self-report data is not independently verified and contains several potential sources of bias. These biases include selective memory of events that occurred in the past, telescoping events that occurred, attributing positive outcomes to one's own self and externalizing negative ones, and exaggerating one's impact or action. The number of previous years of VAM data that existed was also a limitation. VAM as a state accountability measure began with a district Race To The Top grant from the United States Department of Education and was only recently implemented at the end of the 2012-2013 school year. Having only existed for two years, longitudinal data was therefore limited. Limitations for the researcher included lack of time to perceive longitudinal effects, cultural bias when interpreting data and results, and access to personnel records in the form of VAM or IP results.

### **Delimitations**

This study was delimited to teachers working in only one public school district in the Southeast region of the United States using only one measure each for VAM and IP.

Teachers included in the study were delimited to those that had taught a reading or math relevant course in grades 4-10 in school year 2013-2014.

### **Summary**

This chapter outlined all of the aspects of this study including the research design and sampling, data collection, and data analysis plans. This study employed a non-experimental design to investigate whether a relationship between classroom a teacher's leadership ability and their yearly teacher evaluation and their students' academic achievement existed. Leadership ability was demonstrated by the teacher's use of strategic thinking and strategic leader actions based upon the leadership theory proposed by Dr. John Pisapia, termed strategic leadership. Strategic thinking was defined as leader cognitive agility as measured by the STQ<sup>T</sup><sup>TM</sup> and strategic leader actions were defined as leader behavioral agility as measured by the SLQ<sup>T</sup><sup>TM</sup>. Relevant variables were identified and described, and measurement tools were explicated. Validity and reliability concerns were addressed through the use of variables with strong theoretical and empirical foundations, as well as through the use of survey instruments that have been psychometrically validated. Results of the data analysis are provided in the proceeding chapter.

## CHAPTER 4. DATA ANALYSIS AND RESULTS

The purpose of this study was to determine whether a teacher's cognitive and behavioral agility had a relationship with their VAM and IP scores and to explore whether that link was moderated by and/or mediated through other variables. This chapter will present the results of the study as found through the statistical analysis of the data collected. The statistical analysis was used to answer the four research questions and nine hypotheses stemming from extant literature and consequential propositions. The analysis was conducted over various stages.

### **Instruments**

To begin, the research team made adjustments to the STQ<sup>TM</sup> and SLQ<sup>TM</sup> to make the instruments more applicable to the relevant environment of the teacher and created the STQ<sup>T TM</sup> and SLQ<sup>T TM</sup>, with the added "T" for teachers. These adjustments included parsing down items from the original STQ<sup>TM</sup> and SLQ<sup>TM</sup> so that there were 20 items and 30 items respectively, as well as linguistic adjustments. For example, an item in the managing sub-scale, "I monitor people's work," was adjusted to: "I monitor the work of students." It was also decided to combine the two separate instruments into one for ease of application in the study. Once the unified survey measuring classroom leadership was given and data were collected, a confirmatory factor analysis was conducted to parse the instrument even further and strengthen Cronbach's alphas. This resulted in 18 items for the SLQ<sup>T TM</sup> with a Cronbach's alpha of .77 and sub-scale alphas of bridging (four items) at .81,

bonding (four items) at .75, Bartering (two items) at .79, managing (four items) at .77, and transforming (four items) at .69. For the STQ<sup>TM</sup>, the instrument was reduced to 16 items with a Cronbach's alpha of .79 and sub-scale alphas of reframing (five items) at .63, reflecting (five items) at .75, and systems-thinking (six items) at .73.

### **Study Sample**

The study sample included 32 schools in a Southeastern United States school district with a breakdown of 12 elementary, nine middle, and 11 high schools. Out of the 32 identified schools, only 19 responded that they would participate in the study for a 59% school participation rate. The 19 schools were comprised of eight elementary, four middle, and seven high schools. Based on the VAM scores released by the state and the current faculty lists provided by each individual school's principal that met the criteria of having received VAM scores in school year 2013-2014 with a corresponding Marzano IP score, there were approximately 364 potential teachers. Out of the potential sample, there were 86 respondents for a participation rate of 23.6%.

All respondent data were analyzed using the inconsistency index, where any difference between responses for items #22 and #32 ("I am honest with students") greater than 1 resulted in removal of the participant from the data set. Only one case did not meet the provided criteria, E3SSMH, as this participant replied "5-Always" on item #22 and "3-Sometimes" for item #32, and was therefore removed from the data. Additionally, due to the small response size of the elementary school participants, five altogether, and the potential for discrepancies in leadership styles at different levels leading to differential results in VAM and IP, they were eliminated from the data.

Additional analysis was conducted to identify potential outliers within the participants by generating scatterplots by pairing the study's main variables; VAM, IP, and cognitive and behavioral agility. Five participants were identified as having positions outside the visual pattern: cases C3TRRH and E3BMMH had two of the highest cognitive agility scores (4.73 and 4.94 respectively) with two of the lowest VAM scores (31.25 and 34.6 respectively); case E3SKMH received one of the highest VAM scores (71.6) and one of the lowest cognitive agility scores (3.26); J3PJRH scored an above average cognitive agility score (4.39) and received the lowest IP score (2.513); and D3YLRH scored a near perfect behavioral agility score (4.95) and one of the lowest VAM scores (40.9).

The remaining sample that was used for analysis consisted of 75 participants, 31 from middle schools and 44 from high schools. Two of the participants did not answer the survey question concerning age and an estimate based on years of teacher experience was used where it was added to 24, a potential starting point for a teaching career. Four participants did not list their VAM score on the survey; no estimate was used, so these participants were excluded from any analyses including VAM. The researcher surmised that these participants did not answer these questions for concerns over how the information could potentially be used even though the researcher was explicit as to the security measures in place to maintain participant anonymity.

### **Summary Statistics**

The sample for this study consisted of 86 teachers currently working in the selected district; 75 remained after inconsistencies, elementary level, and outliers were removed. The school level breakdown from the sample was 41.3% (31) middle school

and 58.6% (44) high school; with 17.3% (13) describing their position as lead teacher/department head and the remaining 82.7% (62) as teacher. The majority of the sample, 56% (42) had a master's degree, followed by 34.7% (26) with a bachelor's degree, 8% (6) with a specialist's degree, and 1.3% (1) with a doctoral degree. As to their educational leadership education, most participants, 64% (48) had no courses, with some, 16% (12), having some courses. 14.7% (11) had completed a master's in educational leadership, and the remainder, 5.3% (4), completed a doctoral or specialist's degree in educational leadership. The sample's ethnic diversity was 58.7% (44) White, non-Hispanic; 17.3% (13) Black, non-Hispanic; 22.7% (17) Hispanic; with one missing data point. The majority of the sample was female at 82.7% (62), and 17.3% (13) of the sample was male.

The statistical analysis for this study included correlational analysis to test the direct effects between variables, both unidimensionally and multidimensionally for STQ<sup>T</sup> and SLQ<sup>T</sup>; linear regressions to determine the percent of variance explained between variables and if any moderation exists; and finally Hayes' (2013) PROCESS macro for SPSS was used for mediation analysis. Descriptive statistics, means, standard deviations, and bivariate correlations of dependent, independent, and contextual variables for the study are presented in Table 7. The N for all correlations was 75, with the exception of any correlations including VAM where the N became 71 after using a pairwise strategy to eliminate those respondents missing VAM scores from the analysis. There were four teachers who did not submit this information on the survey, potentially due to not being familiar with the score or concerns over how the information would be used



Table 7

*Intercorrelation Matrix Between Dependent, Independent, and Moderating Variables*

Variable	#	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
VAM Score	1	53.9	9.22	1																			
IP Score	2	3.23	0.305	.26	1																		
Cog_Ag	3	3.986	0.434	.06	-.08	1																	
Reflect	4	4.101	0.622	.01	-.11	.79	1																
Reframe	5	3.78	0.611	.23	.01	.70	.26	1															
Sys_Thnk	6	4.07	0.5	-.14	-.09	.75	.50	.27	1														
Beh_Ag	7	4.3	0.372	-.06	.13	.26	.27	-.04	.39	1													
Barter	8	3.59	0.892	-.03	-.01	.06	.06	-.08	.20	.66	1												
Bond	9	4.85	0.285	.02	-.13	.03	.02	.01	.03	.35	.15	1											
Bridge	10	3.8	0.978	-.02	.20	.25	.28	.00	.30	.74	.19	.06	1										
Manage	11	4.72	0.395	-.23	.11	.04	.07	-.14	.20	.45	.08	.25*	.19	1									
Transform	12	4.56	0.457	.04	.13	.36	.31	.14	.37	.57	.17	.16	.30	.28	1								
School_Lvl	13	N/A	N/A	-.41	-.39	.27	.27	.13	.21	.10	.09	.06	-.02	.10	.14	1							
Lead_Pos	14	N/A	N/A	.09	.15	.20	.21	.06	.19	.14	.07	-.22	.23	-.14	.19	.03	1						
Experience	15	17.23	9.27	-.03	.14	.31	.22	.27	.20	.17	.13	.16	.03	.13	.14	.09	.01	1					
Behavior	16	3.99	5.04	-.11	-.06	.14	.06	.15	.11	-.06	-.12	.09	-.08	.03	.06	.12	-.13	.10	1				
Attendance	17	5.76	4.07	.15	-.17	-.06	-.14	.05	-.05	-.02	.01	-.04	.01	-.10	-.03	-.08	-.07	-.13	.05	1			
High_Degr.	18	N/A	N/A	-.08	.23	-.18	-.14	-.13	-.15	.12	.02	-.22	.20	.06	.11	-.14	.22	.01	-.06	.08	1		
Lead_Degr.	19	N/A	N/A	.02	.04	.05	.05	.02	.05	.03	.01	-.40	.14	-.14	.17	.00	.38	-.03	.01	.06	.40	1	
Gender	20	N/A	N/A	-.21	-.04	-.11	-.09	-.13	-.03	.06	.15	.02	-.04	.04	.00	.03	-.12	.01	.02	-.05	.01	-.04	1
Age	21	47.925	10.958	-.15	.08	.22	.21	.19	.10	.12	.16	.16	-.05	.10	.12	.17	-.06	.59	.10	-.23	.05	-.08	.13

All agility response items were scored on a Likert-type scale ranging from 1 to 5, with “Almost never” being 1 and “Almost always” being 5. Mean scores were calculated for both cognitive and behavioral agility using the grand mean of the average sub-scales score considered as a unidimensional effect. A Multidimensional effect for both cognitive and behavioral agility—or the individual sub-scale averages—were also considered. A score higher than a 3.73 on the cognitive agility scale indicates higher cognitive functioning and a score above 4 on the behavioral agility scale shows stronger skills for leadership action (Pisapia & Reyes-Guerra, 2008). Means for the cognitive agility scale for the sample was 3.99 and for the behavior agility scale for the sample was 4.3, demonstrating greater than average ability for both leadership domains. This would lend credence to Proposition 3, that teachers can be viewed as leaders. This may be due to the fact that the sample on average had approximately 17 years of experience leading classrooms.

Correlational analysis amongst the different variables was also conducted. Important findings include that between and within the two instruments measured unidimensionally and multidimensionally, significant correlations existed. Within the STQ<sup>T TM</sup>, all sub-scales had positive and significant correlations with the overall STQ<sup>T TM</sup> score and amongst the sub-scales. Between the two instruments, STQ<sup>T TM</sup> and SLQ<sup>T TM</sup>, the relationship was positive and significant with a medium effect size (Cohen, 1988). Within the SLQ<sup>T TM</sup>, all sub-scales were significantly and positively correlated to the overall instrument. Between the sub-scales of SLQ<sup>T TM</sup>, several significantly positive correlations existed; bonding and managing ( $r = .255$ ), bridging and transforming ( $r = .307$ ), and managing and transforming ( $r = .282$ ).

Table 8 below provides additional information for each of the significant relationships between the variables, specifically  $r^2$  and adjusted  $r^2$  from the linear regression analysis. The inclusion of  $r^2$  provides insight into the percentage of variance in the dependent variable explained by the independent variable. The adjusted  $r^2$  provides understanding when generalizing to the population.

Table 8

*Linear Regression Analysis of Significant Correlations*

Dependent Variable	Independent Variable	$r^2$	Adjusted $r^2$
VAM	IP	0.071	0.058
VAM	Reframe	0.055	0.041
VAM	Sch_Lvl	0.175	0.163
IP	Sch_Lvl	0.155	0.144
IP	Highest Degree	0.056	0.043

VAM was significantly ( $p < .05$ ) correlated with IP ( $r = .267$ ). The linear regression analysis identified that IP explained 7.1% of the variance within VAM. VAM also had a small effect size with reframing ( $r = .235$ ) and a medium to large effect size with school level ( $r = -.418$ ). Reframing and school level explained 5.5% and 17.5% of the variance, respectively, in VAM scores.

Several significant correlations were also evident with IP. Teacher IP score was significantly, negatively correlated with school Level ( $r = -.394$ ,  $r^2 = .155$ , and  $p < .001$ ). The negative correlation would point to a higher IP for teachers at the middle school level when compared to those at a higher level in high school. Highest degree also significantly predicted IP score ( $r = .237$ ,  $r^2 = .056$ , and  $p < .05$ ). Based on the correlation

and linear regression analysis, teachers with higher degrees were more likely to receive higher IP scores, as degree predicted 5.6% of the variance in IP score.

Other notable correlations include the relationship between school level and cognitive agility. Teachers in high school, on average, were more likely to score higher on cognitive agility  $r = .276$ . Additionally, teachers in leadership positions at their schools, such as lead teacher or department head, scored higher on the bridging sub-scale ( $r = .239$ ). Years of teaching experience also had several significant correlations, such as with cognitive agility ( $r = .318$ ) and with two of the cognitive agility sub-scales, reflecting ( $r = .229$ ) and reframing ( $r = .277$ ). It would appear that cognitive agility increases with work experience or perhaps those without strong cognitive skills leave the teaching field after some time. The bonding sub-scale demonstrated a negative and significant correlation with both highest degree ( $r = -.232$ ) and leadership education ( $r = -.401$ ). Leadership education also had significant correlations with leadership position ( $r = .383$ ) and highest degree ( $r = .401$ ). Finally, age was significantly correlated with several variables including cognitive agility ( $r = .275$ ), reflecting ( $r = .265$ ), experience ( $r = .607$ ), and attendance ( $r = -.237$ ).

### **Hypothesis Testing**

$H_0$  = Teacher's cognitive agility predicts teacher's behavioral agility.  $H_0$  posited that cognitive agility has a direct effect on behavioral agility; that cognitive agility is a precursor to behavioral agility in that in order to act in various ways one must be able to process information in that manner first. Bivariate correlational analysis was conducted to test this hypothesis and the results of the analysis are listed above in Table 7. The results indicate that there is indeed a significant relationship ( $r = .266$ ,  $p = .021$ ). Further

analysis using linear regression demonstrates that cognitive agility explained 7.1% of the variance in behavioral agility. Moreover, using the adjusted  $r^2$  at 5.8% there is minimal loss when generalizing the effects to greater population sizes. It should also be noted that  $r = .266$  indicates a medium effect size (Cohen, 1988) and that cognitive agility has a moderate, direct relationship with behavioral agility. The teacher profile in the sample may have aided this correlation as the average cognitive agility score was 3.99 and the average behavioral agility score was 4.3, both above average, as well as having approximately 17 years of teaching experience, 65% (49) having advanced degrees beyond a bachelor's degree, and an average age of approximately 48 years old. The hypothesis can be empirically concluded as a true statement.

$H_1$  = Teacher's cognitive agility predicts VAM and IP (unidimensional effect).  $H_1$  proposed that cognitive agility has a direct relationship with VAM and IP. In order to test this hypothesis bivariate correlation analyses were performed on the three variables. The results are listed in Table 7. The outcome of the analysis between cognitive agility and VAM indicates that no significant relationship exists between the two variables ( $r = .057$ ,  $p = .636$ ). Of particular note, the relationship between the two variables was positive. Although the results were not significant, the data shows a slightly positive and direct relationship between the two variables. This indicates as cognitive agility increases, so does VAM. The results between cognitive agility and IP were very similar, no significant relationship was seen ( $r = -.080$ ,  $p = .496$ ); therefore, the researcher failed to reject the null hypothesis.

$H_2$  = Teacher's use of systems thinking, reframing, and reflecting predicts VAM and IP score (multidimensional effect).  $H_2$  posited that a direct relationship exists

between the cognitive agility sub-scales of systems thinking, reframing, and reflecting and VAM and IP score. Both bivariate correlation analyses and linear regressions were conducted with the corresponding results listed in Tables 7 and 8. The bivariate correlation analyses of cognitive agility (multidimensional effect) had no significant relationship on VAM, with the exception of reframing ( $r = .235$ ,  $p = .049$ ). The beta for this relationship was positive, meaning that the more teachers used reframing, the higher the VAM results would be. Additionally, the linear regression analysis showed that reframing explained 5.5% of the variance in VAM and had a small effect size (Cohen, 1988). For IP, no significant correlation with cognitive agility sub-scales was found. The researcher therefore rejects the null hypothesis.

H<sub>3</sub> = Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderate the relationship of cognitive agility with VAM and IP score. The hypothesis proposed that the relationship between cognitive agility and VAM is moderated by contextual factors that change or alter the relationship when taken into consideration. It also proposes the same for the relationship between cognitive agility and IP. To test this hypothesis a multiple regression moderator analysis was used with the results displayed in Table 9. New variables were created by centering all existing continuous variables, such as agility scores, age, and years of experience, by subtracting the mean in each case. This acted to zero all means of continuous variables. For categorical variables, such as for highest graduate degree and leadership education degree, dummy coded variables were created. In the case of highest graduate degree, the cases were dichotomized into two groups 0 = bachelor's degree and 1 = advanced degree (master's, specialist, and

doctoral). The same was done for highest leadership graduate degree; either a participant had at least some leadership education, 1, or they did not, 0. For each case, the model included 1) centered cognitive agility, 2) centered or dichotomous contextual variables, and 3) the product terms of centered cognitive agility and the centered or dichotomous contextual variables to determine the existence of moderation. Additionally, just as before in the intercorrelation matrix in Table 7, the N for IP was 75 (all cases); however, a pairwise strategy was used to eliminate cases without reported VAM scores. Therefore, the N for the VAM moderator analysis was 71 as four teachers failed to report VAM scores.

Table 9

*Moderator Analysis of the Relation Between Cognitive agility with Product Terms on VAM and IP*

DV		Exper.	Attend.	Behav.	Age	Gender	Ld Educ.	Degree	Level	Ld. Pos.
VAM	B	-0.04	0.05	0.12	1.02	0.08	-0.27	-0.16	-0.28	0.03
	P	0.80	0.69	0.48	0.88	0.57	0.07	0.44	0.13	0.86
IP	$\beta$	-0.19	0.10	0.14	0.03	-0.09	-0.13	-0.08	0.08	-0.09
	p	0.15	0.42	0.40	0.83	0.50	0.37	0.70	0.65	0.53

The results for moderator analysis, presented in Table 9 suggest that no contextual variables had a significant moderating effect on the relationship between cognitive agility and VAM or between cognitive agility and IP.

H<sub>4</sub> = Teacher's behavioral agility predicts VAM and IP score (unidimensional effect). The hypothesis proposed that behavioral agility has a direct and significant relationship with both VAM and IP. As in H<sub>1</sub>, the method of scoring the SLQ<sup>TM</sup> for

behavioral agility using a unidimensional effect was calculated by averaging the sub-scale averages of bartering, bonding, bridging, managing, and transforming. To test the hypothesis regression and bivariate correlational analysis were conducted. The statistical analysis revealed that behavioral agility did not predict VAM ( $r = -.057$ ,  $p = .636$ ) or IP ( $r = .135$ ,  $p = .249$ ). The researcher failed to reject the null hypothesis.

$H_5$  = Teacher's use of transforming, managing, bonding, bridging, and bartering predicts VAM and IP score (multidimensional effect). Similar to  $H_2$ , the hypothesis posited that using the sub-scales of behavioral agility with a multidimensional approach will demonstrate a strong direct relationship with both VAM and IP. As with  $H_2$ , regression and bivariate analysis were used to conduct the test of the hypothesis for each individual sub-scale; bartering, bonding, bridging, managing, and transforming. Similar to the results of  $H_4$  listed in Table 7, analysis indicates that none of the individual sub-scales were significant with VAM: bartering ( $r = -.028$ ,  $p = .818$ ), bonding ( $r = .018$ ,  $p = .878$ ), bridging ( $r = -.015$ ,  $p = .901$ ), Managing ( $r = -.23$ ,  $p = .055$ ), and transforming ( $r = .042$ ,  $p = .728$ ).

Observing the results for the multidimensional effects of behavioral agility on IP were not significant either; bartering ( $r = -.008$ ,  $p = .945$ ), bonding ( $r = -.133$ ,  $p = .255$ ), bridging ( $r = .199$ ,  $p = .088$ ), managing ( $r = .105$ ,  $p = .370$ ), and transforming ( $r = .132$ ,  $p = .258$ ). Although the researchers failed to reject the null hypothesis these findings will be discussed further in Chapter 5.

$H_6$  = Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderate the relationship of behavioral agility with VAM and IP score. The hypothesis



predicted that the relationship between behavioral agility and VAM is moderated by other variables that alter the relationship when introduced. Additionally, it also proposes a similar relationship between behavioral agility and IP. To test this hypothesis a multiple regression moderator analysis was used with the results displayed in Table 10. As was done in H<sub>4</sub>, centering  $SLQ^{T\text{TM}}$  and all continuous, contextual variables resulted in new variables. Subtracting the mean of each variable from the individual cases was the process used. The result was to zero all means of continuous variables, therefore minimizing multicollinearity concerns. For categorical variables, such as for highest graduate degree and highest leadership graduate degree (leadership education), dichotomized, dummy coded variables were created using 0 and 1 for the two categories. Finally, product terms were created through multiplying centered or dichotomized categorical variables with  $SLQ^{T\text{TM}}$  (behavioral agility). All possible product terms for contextual variables on behavioral agility were computed for both VAM and IP. Therefore, the model included centered behavioral agility, centered or dichotomous contextual variables, and the product terms of centered behavioral agility multiplied with the centered or dichotomous contextual variables. As was the case in H<sub>3</sub>, the N for this analysis was 75 (all cases) for IP, and 71 for VAM, as a pairwise strategy was used for the four missing VAM values. Table 10 below presents the results of the moderator analysis including beta weights and significance testing for each product term with the study's dependent variables, VAM and IP.

Table 10

*Moderator Analysis of the Relation Between Behavioral agility with Product Terms on VAM and IP*

DV		Exper.	Attend.	Behav.	Age	Gender	Ld. Train.	Degree	Level	Ld. Pos.
VAM	$\beta$	0.05	0.23	0.03	0.26	0.12	0.13	-0.01	0.12	0.14
	p	0.68	0.06	0.83	0.03	0.37	0.38	0.98	0.48	0.32
IP	$\beta$	0.12	-0.08	0.10	0.23	0.16	-0.08	-0.05	-0.03	-0.07
	p	0.33	0.47	0.38	0.05	0.23	0.55	0.81	0.87	0.58

The results presented in Table 10 above indicate that age was the only significant moderator ( $p < .05$ ) and specifically for the relationship between behavioral agility and VAM. The beta for the relationship was positive (Age  $\beta = .263$ ), demonstrating that for older participant teachers, the relationship between behavioral agility and VAM was stronger. A split-case analysis was conducted for the moderating effect of age on the relationship between behavioral agility and VAM and IP. The results are listed in Table 11 below.

Table 11

*Split-case Correlation Analysis of Behavioral agility on VAM and IP (Moderated by Age)*

DV	Group	N	r	p
VAM	Age < 50	37	-0.33	0.04
VAM	Age $\geq$ 50	34	0.32	0.05
IP	Age < 50	39	-0.12	0.43
IP	Age $\geq$ 50	36	0.42	0.01

The split-case analysis for age was facilitated through finding the mean age, 47.76 years, of the sample and selecting an age near the mean. The age of 50 was determined to be a significant turning point for the relationship between behavioral agility on VAM and IP. As can be noted in Table 11, for older participants, as behavioral agility increased, so do VAM scores. The relationship was positive and approaching significance at  $p = .059$ . The correlation for participants below the age of 50 shows that behavioral agility was negatively correlated to VAM ( $r = -.336$ ) and significant ( $p = .042$ ). The results further explain the moderation effects.

The second split-case analysis for age investigated the moderating effect between behavioral agility and IP. The same two groups as before were selected, participants 50 years of age and older and those less than 50 years of age. Similar to the first split-case analysis between behavioral agility and VAM, the results demonstrate that among older participants, there is a positive correlation between behavioral agility and IP ( $r = .42$ ,  $p = .01$ ). Also, just as in the relationship between behavioral agility and VAM for younger teachers, the relationship between behavioral agility and IP became negative for those below 50 years of age. Based on the findings for both VAM and IP, the researcher rejects the null hypotheses.

$H_7$  = Teacher's combined cognitive and behavioral agility predicts VAM and IP.  $H_7$  put forth that when cognitive and behavioral agility scores are combined that they will have a positive, direct relationship with VAM and IP. In order to investigate this claim a new variable was created, one that averages the two mean scores for  $STQ^{TM}$  and  $SLQ^{TM}$  for an overall classroom leadership score. The combined cognitive and behavioral agility score was derived from the statistical mean of behavioral and cognitive agility.

Cognitive  
agility

a Behavioral  
agility b

VAM/IP

Bivariate correlational analysis was conducted and results were not significant, as the correlation between the combined cognitive and behavioral agility score with VAM was  $r = 0.005$ . The same was true for the combined score with IP ( $r = 0.024$ ). The researcher fails to reject the null hypotheses.

$H_8$  = The relationship between cognitive agility with VAM and IP is mediated by behavioral agility.  $H_8$  posited this proposition, that behavioral agility mediates the relationship of cognitive agility and VAM and IP. This hypothesis was tested using Hayes' (2013) PROCESS Macro. Two separate mediation analyses were conducted, modeled in Figure 3 below; cognitive agility mediated through behavioral agility on VAM, and cognitive agility mediated through behavioral agility on IP.

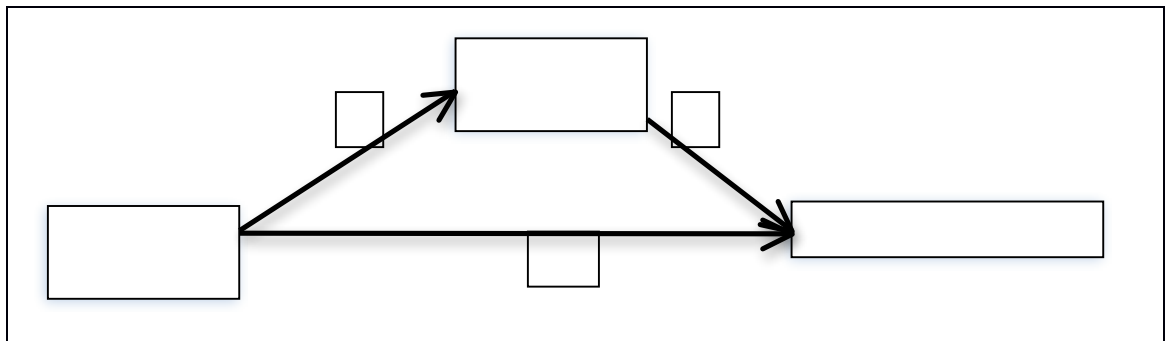


Figure 3. Diagram of mediation analyses performed in this study.

As can be seen in Figure 3 above, “a” represents the effect of cognitive agility on behavioral agility, “b” is the effect of behavioral agility on either VAM or IP, and “c’ ” is the effect of cognitive agility on VAM or IP while controlling for cognitive agility. It should be noted the c’ is the direct effect, ab is the indirect effect, and “c” is the sum of direct and indirect effects. BootLLCI and BooULCI are the Lower and Upper Limits of the Confidence Interval, respectively, which for Hayes’ (2013) PROCESS Macro for

SPSS uses a 5% Confidence Interval. Table 12 below presents the results of the mediation analysis where 10,000 bootstrap samples were run.

Table 12

*Analysis of Mediating Effects of Cognitive Agility Through Behavioral Agility on Outcome Variables*

Outcome Variable	c'	ab	c	BootLLCI	BootULCI
VAM	1.5763	-.3469	1.2294	-1.8038	1.5334
IP	-.0877	.0315	-.0562	-.0059	.1032

As the results indicate, the mediation effect was not significant for either behavioral agility as a mediator between cognitive agility and VAM or cognitive agility and IP, since the range between BootLLCI and BootULCI included zero. Since the mediation of cognitive agility through behavioral agility to either VAM or IP was not significant, the researcher fails to reject the null hypotheses.

### Chapter Summary

This study was undertaken to determine whether teacher cognitive and behavioral agility has a relationship with VAM and IP. The study also incorporated the relationship of contextual factors to determine if any moderating relationships existed. From the extant literature, a conceptual framework and nine hypotheses were generated. The nine hypotheses were tested through multiple statistical analyses including bivariate correlations and linear regressions of variables, moderator analysis of product terms through multiple regressions, split-case bivariate analysis based on moderator analysis results, and mediation analysis using Hayes' (2013) PROCESS Macro for SPSS.

H<sub>0</sub> posited that cognitive agility would be a significant predictor of behavioral agility. Moreover, those with higher cognitive agility would also show greater behavioral agility. Using bivariate correlational analysis of the scales, it was determined that cognitive agility did indeed predict behavioral agility. This was true of both effects, unidimensional and multidimensional, as even sub-scales from different instruments, STQ<sup>T™</sup> and SLQ<sup>T™</sup>, were significantly related to one another. This served to reinforce what the leadership literature claimed, which is that those who are able to process more and varied information, identify patterns, similarities, and differences, and seek out new knowledge are able to use that ability to then act in different manners depending on situational factors and information present. Based on the statistical analysis, the researcher rejected the null hypotheses for H<sub>0</sub>.

H<sub>1</sub> proposed that cognitive agility predicted scores on VAM and IP scores. It was hypothesized that the bivariate correlational analysis between the cognitive agility scale, with unidimensional effect, would exhibit a significant relationship ( $p < .05$ ) with VAM and IP. The unidimensional effect was calculated by taking the average of all three of the cognitive agility sub-scales to include reflecting (five items), reframing (five items), and systems-thinking (six items). This method was chosen over taking the average across all response items as may be noted that taking the overall average response across all items, regardless of sub-scale, allows for the largest scale in questions, systems-thinking, to add more weight to the overall effect of the cognitive agility score. Based on the analysis, the researcher failed to reject the null hypotheses. The direct relationship between cognitive agility and VAM or IP was not significant.

H<sub>2</sub> posited that using cognitive agility, with a multidimensional effect, would significantly predict both VAM and IP. The multidimensional effect for the cognitive agility scale was calculated by using bivariate correlational analysis with each sub-scale of cognitive agility with VAM or IP. It was observed that reframing had a positive and significant relationship with VAM, and after linear regression analysis it was determined that reframing explained 5.5% of the variance in VAM and had minimal loss when generalized to larger populations (Adjusted  $r^2 = .041$ ). The researcher rejected the null hypothesis that cognitive agility with a multidimensional effect does not predict increases in VAM. However, for IP, the researcher failed to reject the null hypothesis.

H<sub>3</sub> proposed that contextual factors, such as whether or not a participant had at least some leadership education, participant attendance level while students were in school, age, gender, years of teaching experience, highest degree, school level (middle or high school), serving in a leadership position, and student classroom behavior moderated the relationship between cognitive agility and VAM or IP. In order to test these hypotheses a moderator analysis was used. All contextual variables were either centered or dichotomized to run multiple linear regressions. Where significant results were identified, such as for cognitive agility\*leadership education, a split-case bivariate analysis was conducted. The researcher failed to reject the null hypothesis, as although leadership education was close to significance ( $p = .063$ ) it did not significantly moderate the relationship between cognitive agility and VAM. With no significant results, the researcher failed to reject the null hypothesis.

H<sub>4</sub>, similar to H<sub>1</sub>, posited that increased behavioral agility significantly predicts increased VAM and IP scores. Again, this hypothesis was limited to a unidimensional

effect, explained above. A bivariate correlational analysis and regression analysis were used to test these hypotheses. The results indicate that behavioral agility did not significantly predict VAM or IP. The researcher failed to reject the null hypothesis.

H<sub>5</sub>, similar to H<sub>2</sub>, posited that using a multidimensional calculation for the relationship of behavioral agility on VAM or IP would generate a result exhibiting that behavioral agility significantly predicts these two variables. The bivariate correlational and regression analyses did not yield significant results for the hypothesis and therefore the researcher failed to reject the null hypotheses.

H<sub>6</sub>, similar to H<sub>3</sub>, posited that contextual factors, in the form of teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderated the relationship between behavioral agility with VAM and IP. Out of all the product terms that were investigated, one had significant findings. Age moderated the relationship between behavioral agility and VAM. A split-case correlational analysis using 50 years of age as a segregator resulted in the following; the relationship between behavioral agility and VAM were positive for older participants and significantly more negative for those less than 50 years of age.

Another finding was that age was close to significantly moderating the relationship between behavioral agility and IP ( $r = .228$ ,  $p = .053$ ). Again, using 50 years of age as a line of demarcation, the split-case correlational analysis found that for older participants, the stronger the positive relationship between behavioral agility and IP score. Considering the near significant result, the researcher rejected the null hypothesis.



H<sub>7</sub> posited that the more the participant used cognitive and behavioral agility in tandem, the higher the VAM and IP results would be. Using an average score of cognitive agility and behavioral agility scores in correlational and regression analysis, the statistical tests indicated that the combined score did not predict an increase in VAM or IP.

H<sub>8</sub> proposed that the relationship between cognitive agility with VAM or IP is mediated through behavioral agility. Hayes' (2013) PROCESS macro for SPSS was used for both analyses. The researcher failed to reject the null hypothesis as no mediation was found for cognitive agility through behavioral agility on either outcome variable.

Table 13 below lists the hypotheses tested in this study.

Table 13

*Hypotheses Tested*

#	Description	Null Hypothesis Result
H <sub>0</sub>	Teacher cognitive agility predicts teacher behavioral agility.	Rejected
H <sub>1</sub>	Teacher cognitive agility (unidimensional effect) predicts VAM and IP.	Failed to reject
H <sub>2</sub>	Teacher use of systems-thinking, reframing, and reflecting (multidimensional effect) predicts VAM and IP.	Rejected
H <sub>3</sub>	Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderates the relationship between Cognitive agility with VAM and IP.	Failed to reject
H <sub>4</sub>	Teacher behavioral agility (unidimensional effect) predicts VAM and IP.	Failed to reject
H <sub>5</sub>	Teacher's use of transforming, managing, bonding, bridging, and bartering (multidimensional effect) predicts VAM and IP.	Failed to reject
H <sub>6</sub>	Teacher's amount of leadership education, attendance, age, gender, years of experience, highest degree, student behavior, school level, and leadership position moderates the relationship between behavioral agility with VAM and IP.	Rejected
H <sub>7</sub>	Teacher's combined cognitive and behavioral agility (uni- and multidimensional effect) predicts VAM and IP.	Failed to reject
H <sub>8</sub>	The relationship between cognitive agility with VAM and IP is mediated through Behavioral agility.	Failed to reject

## CHAPTER 5. DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

This concluding chapter will summarize and review the problem, purpose, and methodology for this study. In addition, this final chapter will present a summary and analysis of findings, conclusions based on the literature and findings, and recommendations for forthcoming research.

### **Restatement of the Problem**

From a practical standpoint, schools are facing mounting pressures from all angles. To begin, Harris and Chapman (2002) wrote that schools are operating in conditions where success depends on “rapid and deep change” (p. 12). This requirement for rapid and deep change is seen globally, and since schools lay at the heart of every nation’s culture (Callahan, 1962), as the rest of society continues to become more complex and fast, so has the environment within which they function. Beyond the need to continuously adapt, the stakes for those that do not are mounting with increasingly stringent and rigorous accountability measures. From the launch of Sputnik, rapid developments in educational legislation, programs, and societal needs have forced schools and school districts to work on the edge of chaos. This is reflected in the current pressures faced through extreme accountability measures, decreasing enrollments through competition from charter schools, fully accredited online K-12 institutions, and the diversified needs of 21st century learners. Developing the concept of teacher as leader in the classroom is one way that traditional public education can combat these pressures.

Research on teachers as classroom leaders is an avenue, which has not been travelled. The closest model is teacher leadership, yet it is ill defined (York-Barr & Duke, 2004; Mangin & Stoelinga, 2008) and is beginning its “fourth wave” in the form of transformation leadership within the classroom (Pounder, 2006). From a theoretical standpoint, teachers are leaders based on the multitude of definitions that exist for leadership (Merriam-Webster’s Learner’s Dictionary, n.d.; Northouse, 2007; Pisapia, 2009), and although perceiving the teacher as leader is not a new concept, exploration and growth are necessary. Pounder (2006) wrote that “the limited research on the influence of leadership in the classroom generally indicates that effective classroom leadership can have a positive influence on student attitude in class and student achievement,” (p. 639). Johnson et al. (2014) agreed that the focus of leadership within an educational setting has focused on the top levels of formal and positional leadership within district and school site administration with little research into the effects of effective leadership within the classroom. Stein (2014) stated that a teacher attempting to manage students in a classroom is no longer sufficient and that teachers are responsible for leading them. Snell and Swanson (2000) wrote that using a transformational leadership framework for understanding effective instruction is beneficial. This corresponds to previous literature that linked effective instruction with leadership measurement instruments.

Out of the many leadership theories, which one is most suitable for current educational and classroom conditions? This exploratory study attempted to investigate the claims that leadership within the classroom would show a statistically significant relationship on the achievement of students, with the additional benefit of preparing

teachers to become leaders outside of the classroom at the site administrator level to overcome the critical leadership shortage within education (Quinn, 2002; Snell & Swanson, 2000).

### **Review of Purpose**

The purpose of this non-experimental, exploratory study was to determine whether teacher cognitive and behavioral agility related to their VAM and IP scores and whether those potential relationships are moderated by contextual variables. The study was guided by 4 research questions:

RQ1. Is there a relationship between behavioral/cognitive agility of the teachers and their VAM or IP scores?

RQ2. Do alterable variables (highest leadership graduate degree, school level, attendance, and leadership position) moderate the relationship between behavioral/cognitive agility of the teachers and VAM or IP scores?

RQ3. Do unalterable variables (age, gender, years of experience, student behavior, and highest graduate degree) moderate the relationship between behavioral/cognitive agility of the teachers and VAM or IP scores?

RQ4. Based on these variables, can a reliable predictor model of effective classroom leadership be developed?

### **Review of Methodology**

The Strategic Leadership Questionnaire for Teachers (SLQ<sup>T</sup>™) which measures behavioral agility and the Strategic Thinking Questionnaire for Teachers (STQ<sup>T</sup>™) which measured cognitive agility were used to collect the data necessary to address the research questions and test the nine hypotheses regarding the relationship of teacher

cognitive and behavioral agility and VAM and IP scores. Since both instruments were aimed at organizationally identified leaders, the language was modified from the original questions to make them relevant to teachers. Data on moderator variables, such as age, gender, highest degree, years of experience, leadership education, and holding a leadership position, and criterion variables, VAM and IP scores, were also collected using the instrument. However, teacher VAM scores were verified by accessing public records at the FLDOE.

The data were analyzed using bivariate correlational analysis to determine the relationship between all variables. Then, linear regressions were conducted to understand the percent of variance explained generalizing to larger populations. Multiple linear regressions were analyzed to understand any moderating effects product terms may have had on the relationship between the independent and dependent variables. Finally, mediator multiple regression analysis was executed through Hayes' (2013) PROCESS Macro to test whether cognitive agility was working through other variables to impact VAM or IP scores. Although the response rate was low, 23.6%, the survey was voluntary for teachers whom already have limited time during work hours and only two requests were sent out.

### **Summary of the Major Findings**

Table 14 below presents the major research findings. Expanded discussion and further details for each finding are also addressed.

Table 14

*Major Research Findings*

Finding	Summary Description
1.	Teacher cognitive agility was positively, significantly related to and predicted teacher behavioral agility. Both teacher cognitive and behavioral agility were related to VAM or IP scores in teachers over the age of 55.
2.	Teacher VAM scores significantly increased when teacher use of reframing increased.
3.	Teacher VAM scores were negatively correlated with the teacher's use of managing influence actions.
4.	Teacher IP scores significantly increased as their bridging leader actions and college degrees increased.
5.	Teacher VAM and IP scores decreased as school level increased from middle to high schools

**Finding 1.** Teacher cognitive agility was positively, significantly related to and predicted teacher behavioral agility. Both teacher cognitive and behavioral agility were related to VAM or IP scores in teachers over the age of 55.

The relationship between cognitive and behavioral agility is clearly established in the extant literature. Cognitive and behavioral agility are thought to be two sides of the same coin (Satish, 1997). Denison et al. (1995), as well as Hart and Quinn (1993), stated that although cognitive complexity is the necessary condition, behavioral complexity is the sufficient condition. In other words, cognition by itself cannot bring about change in an organization; it must be enacted through behavioral agility. Pisapia (2009) illustrated this relationship when he wrote that leadership is much like a game of *Labyrinth* where the player must cognitively figure out the right path the ball must travel down, but

behaviorally manipulate the knobs on the board so that the ball does not fall through one of the holes on its way to the goal.

As seen on Table 15 that summarizes key descriptive data from the study, the teacher thinking profile is reflecting, systems thinking, and reframing. Their overall cognitive agility score was a mean of 3.99. This suggests that the teachers in this study presented an average capability to think strategically. This conclusion was drawn by applying Pisapia's (2009) rule of thumb that scores of 4.1 and higher suggest strong ability in using thinking skills and scores between 3.1 and 3.9 suggest average ability.

Also as seen on Table 15, the teacher leadership profile of participants in this study was managing, transforming, and bonding. Again applying Pisapia's (2009) rule of thumb, that these teachers use these three leader actions is commendable. However, overall behavioral agility, and therefore strategic leader capability, was muted due to the relatively average scores on bridging and bartering. The high standard deviation for these two leader actions indicates a wide dispersion of how teachers answered these items (see Table 15).

Table 15

*Teacher's Use of Strategic Thinking Skills and Leader Influence Actions (N = 75)*

	Cognitive Agility M = 3.99, SD = .43			Behavioral Agility M = 4.30, SD = .37				
	Systems Thinking	Reframing	Reflecting	Managing	Transforming	Bonding	Bridging	Bartering
Mean	4.07	3.78	4.10	4.72	4.56	4.85	3.80	3.59
SD	.50	.61	.62	.40	.46	.29	.97	.90

Using the moderator variables, such as school level, leadership position, leadership education, highest degree, and gender to divide the study's population into two



distinct categories for each variable, mean scores on the leadership sub-scales were compared through independent samples t-tests to determine if any statistical differences were evident. The independent samples t-tests revealed a statistically significant ( $p = .016$ ) difference for school level; high school participants had significantly higher scores in the reflecting subscale with a mean score of 4.25 and standard deviation of .60 compared to that of middle school participants with a mean of 3.90 and standard deviation of .59. The same groups had significant results,  $p = .016$ , for cognitive agility ( $M = 4.09$  and  $SD = .43$  for high school,  $M = 3.84$  and  $SD = .39$  for middle school). Speculatively, the difference may be attributable to differences in student populations, curricula, or the characteristics of teachers that prefer to teach at the high school level. Empirically, however, previous research suggests that cognitive agility skills improve with age (Penney, 2010; Pisapia et al., 2009) and high school participants were older on average (45.61 for middle and 49.27 for high school).

Both leadership position and leadership education also demonstrated significant results in behavioral influence actions. Teachers that were also department heads or team leaders at their school used bridging at statistically significant higher rates ( $M = 4.30$ ,  $SD = .42$ ) than teachers ( $M = 3.69$ ,  $SD = 1.02$ ) whose assignment was classroom based ( $p = .039$ ). Bridging refers to leader influence actions that create networks and alliances with others to obtain resources or other support structures. This is a skill that department heads, as leaders in the school, have learned and are clearly translating into the classroom setting, which shows that development and experience can sharpen leadership skills.

Teachers whose assignments were only classroom based had an advantage with bonding as a leader influence action. Bonding is the leader influence action that

establishes trusting relationships with others within their organization. The data suggest that teachers holding leadership positions in the school use bonding actions differently than those teachers not in leadership positions. For example, teachers who were not also department heads or team leaders used bonding at a higher rate that was close to significance ( $p = .053$ ,  $M = 4.87$ ,  $SD = .22$ ) compared to those who also held leadership positions in the school ( $M = 4.71$ ,  $SD = .46$ ). Additionally, teachers who had not completed a leadership education program used bonding actions significantly more frequently ( $p = .042$ ,  $M = 4.88$ ,  $SD = .22$ ), compared to those teachers that had ( $M = 4.71$ ,  $SD = .43$ ). Finally, no statistical differences were found within the sub-scales for gender or highest degree.

Contrary to previous research (Pisapia & Pang, 2012) that demonstrated leadership has a relationship to objective measures of leadership performance, both cognitive and behavioral agility from a unidimensional effect did not predict increased scores on VAM or IP. Perhaps, the exploratory nature of the study and newly formed measurement instrument dulled the results. Additionally, as noted in Table 16, teachers, on average, were not using the agility scales at higher levels than these previous studies of individuals in organizational leadership positions showed they might, and were also not using them in a balanced way. However, both cognitive and behavioral agility had sub-scales that were shown to be significant, as well as age playing an important role in relating leadership agility to VAM and IP. Table 16 below shows the relationship between cognitive and behavioral agility and VAM and IP when looking at all participants, participants 50 years of age and below, and participants over the age of 50.

Table 16

*Influence of Age on Uni- and Multidimensional Correlations with Criterion Variables*

		All Participants		Age $\leq 50$		Age > 50	
		VAM Score N=71	IP Score N=75	VAM Score N=40	IP Score N=42	VAM Score N=31	IP Score N=33
Reflection	r	.006	-.105	.008	-.105	.165	-.123
	p	.960	.368	.962	.509	.376	.495
Reframing	r	.235*	.011	.239	-.032	.359*	.062
	p	.049	.927	.138	.843	.047	.733
Sys_Thinking	r	-.139	-.090	-.295	-.244	.150	.081
	p	.249	.444	.065	.119	.421	.653
Cog_Ag	r	.057	-.080	-.005	-.163	.304	.010
	p	.636	.496	.974	.303	.096	.956
Bartering	r	-.028	-.008	-.233	-.056	.335	.043
	p	.818	.945	.148	.725	.066	.812
Bonding	r	.018	-.133	-.201	-.488**	.362*	.286
	p	.878	.255	.213	.001	.045	.107
Bridging	r	-.015	.199	-.210	.079	.138	.343
	p	.901	.088	.194	.618	.460	.051
Managing	r	-.228	.105	-.315*	-.089	.047	.407*
	p	.055	.370	.048	.573	.803	.019
Transforming	r	.042	.132	-.153	-.104	.270	.379*
	p	.728	.258	.345	.513	.142	.030
Beh_Ag	r	-.057	.135	-.341*	-.105	.377*	.420*
	p	.636	.249	.031	.507	.036	.015

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

As can be seen above in Table 16, when comparing the correlations across age groups for both agility and sub-scale scores and objective measures of teacher performance, almost all became positive or their correlations grew in a positive direction, some even significantly so, such as for bonding, transforming, and behavioral agility when comparing all participants, or those 50 years of age and younger to those over 50. Perhaps, those over the age of 50 are better able to transfer their leadership skills they have learned into positive results on objective measures of student and teacher performance. However, the population of those over 50 in the study was only 33 which is small, and this may have limited the likelihood of the correlational analysis to identify significant relationships, such as in the case of cognitive agility and bartering with VAM whose correlations were substantial and near significant.

Continuing the comparison between total population and age groups, a predictor model was generated for the older age group. Although in the total or younger population no significant predictor models could be generated with the agility scores, either with a unidimensional (cognitive agility and behavioral agility) or multidimensional (reframing, reflecting, systems thinking, bonding, bridging, bartering, managing, and transforming) approach, using participants over the age of 50 resulted in significant predictor models for IP and one model (unidimensional) close to significant for VAM. Table 17 below exhibits the results of the predictor models for participants over the age of 50.

Table 17

*Effective Classroom Leadership Predictor Models (Age > 50, N = 33)*

	Unidimensional		Multidimensional	
	VAM	IP	VAM	IP
r	0.414	0.453	0.594	0.703
R <sup>2</sup>	0.171	0.205	0.353	0.494
p	0.072	0.032	0.214	0.02

Table 17 illustrates that both uni- and multidimensional models significantly predicted IP and explained 21% and 49% of the variance in IP ratings respectively for participants over the age of 50. For VAM, the unidimensional model was near significant ( $p = .072$ ). It must be reiterated that the model only included 33 participants which is small and limits the interpretation of the data.

These findings are not surprising, as teachers must work to consistently interpret their surroundings, process the information, and then disseminate that information, all the while continuously adapting to their ever-changing surroundings (Mumford et al., 2007). Also, Fisher et al. (1987) conducted research that showed that those who are in the later stages of adult development are more cognitively complex, allowing them more capacity for empathy, social understanding, and tolerance for diversity and ambiguity, which suggests that this is related to managerial effectiveness. Additionally, Zhang et al. (2012) described those with these attributes as able to draw inferences and predict the future. This finding has also been shown in previous STQ<sup>TM</sup> research, as Pisapia and Pang (2012) also found that cognitive agility significantly predicted behavioral agility.

**Finding 2.** Teacher VAM scores significantly increased when teacher use of reframing increased.

The second major finding flows directly from the first. Having found that cognitive agility predicts behavioral agility and hypothesizing that effective teaching requires cognitive agility, it would follow that one of the sub-scales would directly correlate with the main goal of education; improving student achievement. Pisapia (2009) wrote that reframing is “the ability to look at your reality using multiple perspectives, differing frameworks, different mental models, and different paradigms in order to generate new insights and options for actions” (p. 64). This study’s sample included middle and high school general education teachers that most likely teach five to six classes of approximately 20 to 25 students at a time. A typical teacher in this study could interact with as many as 150 students on a given day, each student bringing with them a unique perspective and background to the learning environment.

Bolman and Deal (2008) put forth that reframing is a required leadership skill when complexity within the environment increases. Educating this many students, each with individual identities, certainly can be viewed as complex. Teachers understand that when there is a problem in the classroom, such as disruptive behavior, using the same tactic or tool for each instance will not work. A teacher confronted with attention seeking behavior from a student or a student failing to comprehend an educational concept must reframe and address the issue with an approach that takes into account the nature of the problem, the allotted time in class, the subject area background and interests of the student, and many other variables to re-present this information successfully to that student. As the results showed, educators who understand that individuality and

perspective must be tapped into to truly grasp the curriculum and material being presented are more likely to achieve higher VAM results.

Another related finding of this study was that out of the three cognitive leadership skills, reframing was utilized the least by the teachers in this study (see Table 15) when compared to reflecting and systems-thinking. This is an important finding because it is an area where teachers can improve their ability in the classroom. It suggests that with focused development on cognitive skills, teachers could use reframing to enhance student achievement scores measured by VAM. Additionally, in previous studies, such as Pisapia and Pang (2012), Pisapia et al. (2006), and Zsiga (2008), the use of the three thinking skills has been significantly correlated with both self-reported and objective measures of leader effectiveness. This potential increase in reframing ability through education or development would also impact teacher's overall cognitive agility score, which likely would move their score from a 3.99 to a 4.1, which Pisapia's (2009) rule of thumb indicates as strong ability and assists in better distinguishing more successful classroom leaders from less successful ones. The fact that it can be trained as, demonstrated by Reyes-Guerra, Pisapia, and Mick (2016), who found that participants in a principal preparation program trained in strategic thinking skills were shown to be more cognitively agile than those not trained, shows promise.

**Finding 3.** Teacher VAM scores were negatively correlated with teachers' use of managing influence actions.

Managing influence actions are those that are needed to maintain smooth operating conditions and meet outlined goals. These may include establishing policies and procedures, creating accountability measures, and providing necessary resources.

For this particular study, the SLQ<sup>T</sup>™ questions included language such as, “I hold students accountable,” “I enforce rules and policies,” and “I stand firm.” Managing influence actions when taken into a classroom setting can be perceived as more applicable to classroom and behavior management than the full range of managing influence actions as intended by Pisapia’s (2009) strategic leadership model. Based on this assumption, it is not surprising that when teachers focus more of their attention on behavior and classroom management than on facilitating the learning of curriculum concepts, the limited range of managing would have a negative relationship with VAM.

Looking back at Table 16, as might have been expected, teachers over the age of 50 were better able to use managing, as reflected in the direct and significant relationship between managing and their IP scores. Additionally, the negative and significant correlation between VAM and the managing sub-scale seen with teachers 50 years of age and under disappeared when only focusing on teachers over 50 years of age. Also, the leadership profile of the participant teachers, with special attention to their leadership actions, the overall mean for managing (4.72) was the second highest out of the five possible actions, with bonding being first (4.85). When discriminating by age, those participants over the age of 50 years had higher scores across all leadership actions with the exception of bridging, which shows stronger and more balanced use of behavioral agility. This is illustrated in Table 18 below.



Table 18

*Leadership Profiles by Age*

	Age > 50			Age ≤ 50		
	N	Mn	SD	N	Mn	SD
Cog_Ag	33	4.10	.38	42	3.89	.45
Reflection	33	4.26	.49	42	3.98	.69
Reframing	33	3.93	.55	42	3.67	.64
Systems_Thinking	33	4.13	.47	42	4.03	.52
Beh_Ag	33	4.31	.34	42	4.30	.40
Bartering	33	3.70	.87	42	3.51	.91
Bonding	33	4.87	.26	42	4.83	.31
Bridging	33	3.62	.92	42	3.94	1.01
Managing	33	4.77	.31	42	4.67	.45
Transforming	33	4.59	.45	42	4.54	.46

The leadership profile difference—or better balance—among older teachers may account for the difference in objective measures in that results for older participants showed a positive, although not significant, relationship with VAM, and a positive significant relationship with IP. This was the case even though the mean score for managing was higher for older rather than younger teachers. Although more research must be done to understand the difference, the researcher hypothesizes that younger teachers may focus on using managing as a punitive tool instead of as a disciplinary instrument where students learn from their mistakes. This would correspond with previous research that showed leader actions were influenced by role and context (Miron,

2014; Reyes-Guerra, 2009; Pisapia & Pang, 2012; Yasin, 2006), meaning that managing has a slightly different meaning in the classroom setting where behavior management is much more important as compared to leading adults outside of an educational setting. This also reinforces previous research that showed leader actions are influenced by experience (Miron; Reyes-Guerra), where age was a distinguishing factor in the use of managing, and age and experience were highly correlated.

**Finding 4.** Teacher IP scores significantly increased as their bridging leader actions and college degrees increased.

IP score is each participant's annual teacher evaluation score or rating based on the Marzano instructional practice framework. Site administrators conduct these yearly evaluations through classroom walkthroughs of various lengths. Bridging leadership actions are those that are undertaken with the specific purpose of creating alliances, networks, and relationships with others that have influence. The bridging actions used by the teachers in this study were positively related to IP scores ( $r = .20$ ,  $p = .08$ ). It suggests that those teachers that are making connections with others would have greater scores on their annual evaluations for several reasons. First, associating with the person or people that will conduct these observations is critical to understanding what they are looking for so that they can be incorporated into a repertoire of pedagogical skills. An additional benefit of these actions is making it clear to the rater that you are seeking improvement, counsel, and advice to better the results of the evaluation and the school, while acknowledging the rater's expertise in the classroom.

With respect to building relationships with other teachers, this is a clear method for tapping into the experience and expertise of other colleagues that are showing mastery

in the classroom. Through relationships, expertise in delivering curriculum, managing the classroom, and other aspects of teaching, can be transferred and built upon. Also, constructing relationships with students moves from ritual compliance or fear of punishment that are characteristics of transactional relationships, into bonds that are transformational, in that both parties are seeking to improve the outcomes for the other. According to the teacher leadership profile bridging had the second lowest mean (3.80) and provides another area for improvement through education or development that could be used to improve overall behavioral agility scores, as managing, transforming, and bonding were the dominant leader actions used within the framework.

As has been seen in other findings, age is a discriminating variable for the act of bridging. Table 16 demonstrated that older participants were far more adept at bridging ( $r = .343$ ,  $p = .051$ ) than younger participants ( $r = -.210$ ,  $p = .08$ ). Both correlations for IP and bridging were close to significance, however younger teacher scores were negative and older teacher scores were positive. Again, leader actions are influenced by contextual factors and based on the results of the study, age is apparently one of them.

Highest degree was also shown to correlate with IP scores. This may be due to a variety of factors within the population; although, it would logically follow that a participant with professional development and education would be able to differentiate their practice from others without this support, and notably so by a trained observer rating them in the classroom. However, it cannot be discounted that classroom observers assume they know more and are biased in their judgment.

**Finding 5.** Teacher VAM and IP scores decreased as school level increased from middle to high school.

The final finding is less clear than all the previous findings. As a moderator variable relating to both VAM and IP it can only be hypothesized that this may be due to organizational factors, such as characteristics of teachers that are drawn to teach at the middle school level, other factors such as curriculum that lends to increased IP and VAM scores, or even the characteristics of the students themselves that require more emphasis on elements found in the Marzano IP framework that are leading to increases in VAM and IP. This last suggestion may shed insight into this relationship, as VAM and IP were directly and significantly related in the study ( $r = .267$  and  $p = .024$ ); therefore, it would make sense that one factor may drive an increase in IP scores, which in turn is driving VAM scores.

It may also be true that the rationale for the direct relationship between school level and VAM and IP are different. In this case, middle school curriculum, easier state assessments, or middle school students' propensity to learn may be reasons for increases in VAM at the middle school level. With respect to IP, one or all of the factors listed for VAM could impact IP. It could also be that middle schools have a culture that pressures site administrators to rate their teachers higher on IP or even the professional development received by middle school site administrators may lend itself to higher teacher IP ratings. Finally, it cannot be neglected that the finding may be a result of sampling. Only four middle schools responded to the survey request and actually had teachers respond; therefore, the result could be attributed to the small sample size when compared to the seven high schools that participated.

## **Conclusions**

This study was undertaken to explore whether a relationship between the leadership actions of teachers and their scores from student achievement and personnel evaluations existed. The impetus for this study stems from the life experience of the researcher, as well the leadership literature the researcher encountered throughout his educational leadership doctoral program. It was hypothesized that the more the teachers in this study used leadership influence actions in the classroom, the higher their student achievement and annual personnel evaluation results would be. This study's conceptual framework provided additional context, such as the existence of moderating factors including age, gender, years of experience, amount of leadership education, having a formal leadership position within the school, and school level. It was also theorized that influence of cognitive agility would be mediated through behavioral agility on both student achievement results and teacher evaluations. The final hypothesis was that a predictor model of effective classroom leadership could be established. This study's exploratory nature precludes the researcher from establishing absolute conclusions, but provides future researchers a foundation from which to begin digging deeper.

The execution of leadership actions, behavioral agility, was predicted by the use of leadership thinking, cognitive agility. Moreover, cognitive agility explained 7.1% of the variance in behavioral agility and it is predicted that an increase of 1 point in cognitive agility results in a .266 increase in behavioral agility. This supports previous research and is an important finding, as teachers must continually use different lenses to perceive situations that arise, understand how different data points they encounter fit into a larger picture, and take the time to ponder why and how the decisions they made impact

their work. Doing so provides sufficient information to then act deliberately and accordingly to influence the outcomes of a situation.

Overall, teacher cognitive agility among the participants in this study falls below acceptable standards. One important aspect or sub-scale of cognitive agility for teachers was reframing, as it was shown to be positively and significantly correlated to VAM scores. Reframing alone predicted 5.5% of the variance in VAM scores. The results suggest that teachers who have the ability to view problems and situations from multiple angles and perspectives are more likely to increase student achievement, as evidenced by state end-of-year assessments, than teachers who do not possess this skill. This finding is important as it impacts what it means for teachers to be effective in the classroom. A 1-point increase in reframing would result in a .235 increase in VAM.

Beyond reframing, IP scores were also shown to predict VAM scores. Although not the crux of the study, this finding suggests that the actions and strategies teachers employ in the classroom, as noted through site administrator classroom observations, explained 7.1% of the variance in VAM scores. This is an avenue for future research as the classroom observation instrument may contain items that can be clearly seen as leadership actions.

Teacher age is a moderator of teacher success. Age has been a significant moderator in previous strategic leadership studies using STQ<sup>TM</sup> and SLQ<sup>TM</sup>. Older participants have been shown to possess higher levels and more developed cognitive and behavioral agility skills than younger ones. As in previous research, age was significantly correlated to cognitive agility, and in particular reflecting. Age also significantly moderated the relationship between behavioral agility and VAM. When the

population was dichotomized at the age of 50, the correlation between behavioral agility and VAM became positive for the older group and negative for the younger group. Although only approaching significance, age had the same moderating effect on the relationship between behavioral agility and IP. It can be concluded that cognitive agility predicts behavioral agility and after years of experience in teaching and in life, older teachers were able to translate their behavioral agility into increased scores on both the student achievement variable, VAM, and the teacher evaluation variable, IP. This finding is important for the field of public education, as previous empirical research has noted that after five years of teaching no significant difference in teacher performance exists (Clotfelter et al., 2007).

Managing was a second aspect of leadership influence actions that played a role in the objective measures of teacher performance. As managing increased, VAM decreased. At first glance this was a shocking finding, as the teacher leadership profile demonstrated that managing was one of the higher scoring leader actions and previous research showed that the increased use of all leader actions, in tandem, differentiated successful leaders from others. Upon further investigation it was shown that age moderated the relationship between managing and VAM. Older participants used managing more frequently ( $M = 4.72$ ) than those 50 years old and below (4.67): The relationship between VAM and managing was actually positive and significantly positive with IP ( $r = .407$  and  $p = .019$ ). Therefore, it can be concluded that it was not the degree of the use of managing, but rather the kind of managing that made the difference. Older participants were able to use managing influence actions in a way that led to positive results on objective measures; younger teachers were not.

## **Recommendations for Practitioners**

The purpose of this study was to investigate whether there was a relationship between the leadership of teachers in the classroom and their student achievement results and teacher evaluation scores. Research into effective instruction has a long history, however, the focus has not incorporated a leadership perspective into the actions that have the greatest influence on student achievement. Hence, based on the results of the analysis, the researcher offers several recommendations for practitioners.

At the district level, it is recommended that a greater focus be placed on research initiatives. School districts collect and house millions of data on teachers, students, schools, communities, etcetera, and little to no research is published by school districts which could provide greater insight into how their specific district is operating and where resources could be used most effectively. Districts should provide low-cost incentives for credible researchers, as well as assistance in overcoming barriers in the form of necessary precautions to protect research participants.

School districts should also investigate the impact of teacher's use of cognitive and behavioral complexity in the classroom, with special emphasis on improving teacher use of reframing skills. Additionally, school districts should study why and how older teachers use managing actions differently and incorporate those lessons into professional development for all teachers. After teachers have acquired the basic skills of managing a classroom, additional professional development should be devoted to developing the leadership skills of all teachers and create incentives to retain those that show the most promise. Developing all teachers as leaders provides a plethora of benefits, such as filling the gaps of leadership in both formal and informal positions and increasing both



student achievement and teacher evaluation scores. Finally, school districts, state policy makers, and educators should examine their biases regarding the value of older teachers. This study clearly points to potential student achievement benefits from retaining teachers into their sixth decade.

At the school level, it is recommended that schools incorporate professional development on the cognitive skill of reframing, along with other underused leadership skills identified in the teacher leadership profile in Table 15. Beyond the potential to move student achievement, other areas for positive impact include improving student behavior and improving personal relations with students, parents, and fellow staff members. Having the ability to perceive problems through multiple frames means that teachers would be able to better understand the behavior of students, the complaints of parents, and disagreements among fellow colleagues at the school, as well as finding alternative means to present curriculum concepts to students not grasping the material in the first attempt. It would also behoove schools to tap into the tremendous resource that older teachers have to provide in the form of mentoring or coaching roles, especially with regard to the best use of managing as a leader influence action that results in a positive relationship with VAM and IP. Suggestions include classroom observations by younger teachers into the classrooms of older teachers with follow up dialogue. Younger teachers observing classrooms could also be accompanied by site administrators or even be video-recorded for faculty-wide professional development.

### **Recommendations for Future Research**

Being an exploratory study, improving the survey instrument is a potential area for advancement in future studies. To begin, the results of this study could be used to

further refine the STQ<sup>T™</sup> and SLQ<sup>T™</sup>. All STQ<sup>T™</sup> and SLQ<sup>T™</sup> item alphas and contributions to the overall variable, whether as a sub-scale or to the overall agility score, should be investigated for possible modification or removal. Marzano's IP framework could be drawn upon for the modification of said instruments. Furthermore, continued refinement into the language used to illustrate each sub-scale in the classroom should be undertaken. One such area, noted above, was in the managing sub-scale questions. Item language was limited to behavior management in the classroom setting and should incorporate more aspects of management such as providing students with necessary support to complete assignments and providing meaningful feedback on specified goals and assignments. Additionally, as several outliers were identified through the results, a secondary inconsistency index should be included for the STQ<sup>T™</sup> to better identify the validity of each participant's responses and the seriousness with which they took the survey. This could be accomplished with repeated questions. Finally, reverse-scored items (three) were concentrated in the reframing sub-scale and future researchers should consider spreading those across other sub-scales.

Future researchers should also focus on obtaining more participants, a greater number of contextual variables, and increased access to participant data. Given the small sample size, there were limitations in the statistical power. After identifying age as a moderator, a secondary correlational analysis was conducted with all study variables similar to the intercorrelation matrix in Table 7, but only with participants aged 50 years or greater. The results were significantly more positive with strong correlations; however, p values were not significant due to the low number of participants that met the age criteria within the population. The low number of participants aged 50 years or

greater leads the researcher to also suggest a greater number of participants for future research. Also, much of the data was self-reported which creates at least some semblance of doubt as to validity, even though statistical procedures required in use of the instruments were applied. The study would be strengthened if greater access to personnel data were allowed by the state or district.

With respect to the results of the study, future researchers should focus on the key findings. However, additional focus could be spent on other results of the study, such as that VAM was predicted by IP. IP scores are the result of classroom observations witnessed by site administrators and captured on the Marzano IP framework. The findings suggest that teacher use of the Marzano IP framework is associated with greater VAM scores. This finding needs replication.

Furthermore, researchers should investigate if there is any crossover between the IP instrument and cognitive and behavioral agility. This could be used to both strengthen the STQ<sup>T™</sup> and SLQ<sup>T™</sup>, as well as to enhance the validity of the IP instrument. It is also suggested that researchers replicate the analysis done within this study to further confirm the results or provide more light into this complex study.

Regarding variables that had significant relationships with either of the two dependent variables, further exploration into the nature of the relationships and what particular aspects of the variables drive those relationships is recommended. For instance, reframing had a positive relationship with VAM and can be applied in multiple ways across every scenario imaginable within the classroom setting. Reframing is thought to be associated with open-mindedness, which is significantly related to leadership effectiveness (Pisapia, 2009). Future researchers should focus on how

reframing impacts various aspects of teaching such as classroom management, curriculum planning, relationship building, and so on. Further investigation should also be undertaken for findings that were close to significance, such as behavioral agility's multidimensional relationship with VAM and IP. The p value of managing was approaching significance at  $p = .055$ , however the relationship was negative ( $r = -.228$ ). This changed when age was taken into consideration. Additionally, managing had an  $r^2 = .052$ , meaning that managing explained 5.2% of the variance in VAM scores. For IP, the bridging sub-scale of the SLQ<sup>T</sup>™ was approaching significance at  $r = .199$ ,  $r^2 = .039$ , and  $p = .088$ . Results in these areas may have been significant with a slightly different or even older population and are worth the investment in research time.

### **Limitations**

The proceeding is the set of limitations of this study and should be taken into consideration by the reader and future researchers as they extract conclusions and design further study:

- small, non-random sample limited generalizability;
- lack of prior research studies on the topic from which to draw upon;
- ability of participants to accurately interpret questions on the STQ<sup>T</sup>™ and SLQ<sup>T</sup>™ and provide an honest self-evaluation of strategic thinking and leadership ability;
- reliability of self-rater measurements—selective memory, telescoping, attribution, exaggeration;
- researcher access to personnel records;
- time—no longitudinal effects available;

- cultural bias when interpreting data and results.

## REFERENCES

- Aaronson, D., Barrow, L., & Sander, W. (2007). Teacher and student achievement in the Chicago public high schools. *Journal of Labor Economics*, 25(1), 95–135.
- Alexander, K., Entwisle, D., & Olson, L. (2007). Lasting consequences of the summer learning gap. *American Sociological Review*, 72(2), 167–180.
- Ali, A., & Ali, U. (2010). Educational measurement and testing: Historical perspectives. *Journal of Educational Research*, 113(2), 216-221.
- Allington, R. (1980). Teacher interruption behaviors during primary-grade oral reading. *Journal of Educational Psychology*, 72(3), 371–377.
- American Educational Research Association (AERA). (2014, May 13). *Study: State value-added performance measures do not reflect the content or quality of teachers' instruction* [Press release]. Washington, DC: Author. Retrieved from <http://www.aera.net/Newsroom/News-Releases-and-Statements/Study-State-Value-Added-Performance-Measures-Do-Not-Reflect-the-Content-or-Quality-of-Teachers-Instruction>
- American Educational Research Association (AERA). (2015, June). *AERA statement on use of value-added models (VAM) for the evaluation of educators and educator preparation programs*. Washington, DC: Author. Retrieved from <http://www.aera.net/Newsroom/News-Releases-and-Statements/AERA-Issues-Statement-on-the-Use-of-Value-Added-Models-in-Evaluation-of-Educators-and-Educator-Preparation-Programs>

- American Statistical Association (ASA). (2014, April 8). *ASA statement on using value-added models for educational assessment*. Alexandria, VA: Author. Retrieved from [https://www.amstat.org/policy/pdfs/ASA\\_VAM\\_Statement.pdf](https://www.amstat.org/policy/pdfs/ASA_VAM_Statement.pdf)
- Anderman, E., & Woters, C. (2006). Goals, values, and effects: Influences on student motivation. In P. Alexander & P. Winne (Eds.), *Handbook of educational psychology* (pp. 369–389). Mahwah, NJ: Erlbaum.
- Argyris, C., & Schön, D. (1974). *Theory in practice: Increasing professional effectiveness*. San Francisco, CA: Jossey-Bass.
- Baba, V., & Ace, M. (1989). Serendipity in leadership: Initiating structure and consideration in the classroom. *Human Relations*, 42(6), 509–525.
- Babad, E., Inbar, J., & Rosenthal, R. (1982). Pygmalion, Galatea, and the Golem: Investigations in biased and unbiased teachers. *Journal of Educational Psychology*, 74(4), 459–474.
- Bacher-Hicks, A., Kane, T., & Staiger, D. (2014). *Validating teacher effect estimates using changes in teacher assignments in Los Angeles*. Cambridge, MA: National Bureau of Economic Research.
- Bamburg, J., & Andrews, R. (1991). School goals, principals, and achievement. *School Effectiveness and School Improvement*, 2(3), 175–191.
- Barber, J. (2012). Teaching is an opportunity for leadership. *FMA Informative*, 1(2), 2.
- Barbuto, J. (2000). Developing a leadership perspective in the classroom. *Journal of Adult Development*, 7(3), 161–169.

- Barling, J., Weber, T., & Kelloway, E. (1996). Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment. *Journal of Applied Psychology, 81*(6), 827–832.
- Baron, R. (1998). Cognitive mechanisms in entrepreneurship. *Journal of Business Venturing, 13*(4), 275–294.
- Barth, R. (1986). On sheep and goats and school reform. *Phi Delta Kappan, 68*(4), 293–296.
- Bass, B. (1981). *Stogdill's handbook of leadership: A survey of theory in research*. New York, NY: Free Press.
- Bass, B. (1985). *Leadership and performance beyond expectations*. New York, NY: Free Press.
- Bass, B. (1990). From transactional to transformational leadership: Learning to share the vision. *Organizational Dynamics, 18*(3), 19–31.
- Bass, B., & Bass, R. (2009). *Bass handbook of leadership: Theory, research, and managerial applications* (4th ed.). New York, NY: Free Press.
- Bass, B., & Steidlmeier, P. (1999). Ethics, character, and authentic transformational leadership behavior. *The Leadership Quarterly, 19*(2), 181–217.
- Bass, R. V., & Good, J. W. (2004). Educare and educere: Is a balance possible in the educational system. *The Educational Forum, 68*(2), 161–168.
- Beck, L., & Murphy, J. (1993). *Understanding the Principalship: Metaphorical Themes of the 1920s-1990s*. New York, NY: Teachers College Press.
- Bendikson, L., Robinson, V., & Hattie, J. (2012). Principal instructional leadership and secondary school performance. *Set: Research Information for Teachers, 1*, 2–8.



- Bennis, W., & Biederman, P. (1997). *Organizing genius: The secrets of creative collaboration*. New York, NY: Basic Books.
- Bieri, J. (1955). Cognitive complexity-simplicity and predictive behavior. *The Journal of Abnormal and Social Psychology*, 51(2), 263–268.
- Blake, R., & Mouton, J. (1964). Breakthrough in organization development. *Harvard Business Review*, 42(6), 133–155.
- Boerner, S., Eisenbeiss, S., & Griesser, D. (2007). Follower behavior and organizational performance: The impact of transformational leaders. *Journal of Leadership and Organizational Studies*, 13(3), 15–26.
- Bogler, R. (2001). The influence of leadership style on teacher job satisfaction. *Educational Administration Quarterly*, 37(5), 662–683.
- Bloom, B. (1976). *Human characteristics and school learning*. New York, NY: McGraw-Hill.
- Bolman, L. G., & Deal, T. E. (1991). *Reframing organizations: Artistry, choice, and leadership*. San Francisco, CA: Jossey-Bass.
- Bolman, L. G., & Deal, T. E. (2008). *Reframing organizations: Artistry, choice, and leadership* (4th ed.). San Francisco, CA: Jossey-Bass.
- Bolkan, S., & Goodboy, A. (2011). Behavioral indicators of transformational leadership in the college classroom. *Qualitative Research Reports in Communication*, 12(1), 10–18.
- Bono, J., & Judge, T. (2004). Personality and transformational and transactional leadership: A meta-analysis. *Journal of Applied Psychology*, 89(5), 901–910.

- Brady, M., Heiser, L., McCormick, J., & Forgan, J. (2014). Value-added models to teacher preparation programs: Validity and reliability threats, and a manageable alternative. *The Educational Forum*, 80(3), 339–352.
- Braun, H., Chudowsky, N., Koenig, J. (2010). *Getting value out of value-added: Report of a workshop*. Washington, DC: National Academies Press.
- Brennan, P. (2010). *Pursuing success without scandal: Exploring the relationship between transformational and authentic leadership* (Doctoral dissertation). Retrieved from ProQuest Dissertations and Theses. (UMI 3404602)
- The Broad Foundations. (2011). *2011-12 report*. Los Angeles, CA: Author. Retrieved from <http://broadfoundation.org/reports/2011-12foundationrreportseport.pdf>
- Brophy, J. (1979). Advances in teacher effectiveness research. *Journal of Classroom Interaction*, 15(1), 17–24.
- Burns, J. (1978). *Leadership*. New York, NY: Harper & Row.
- Burns, J. (2005). Leadership. *Leadership*, 1(1), 11–12.
- Busenitz, L., & Barney, J. (1997). Differences between entrepreneurs and managers in large organizations: Biases and heuristics in strategic decision-making. *Journal of Business Venturing*, 12(1), 9–30.
- Callahan, R. (1962). *Education and the cult of efficiency*. Chicago, IL: University of Chicago Press.
- Cameron, J., & Pierce, W. (1994). Reinforcement, reward, and intrinsic motivation: A meta-analysis. *Review of Educational Research*, 64(3), 363–423.

- Campbell, D. (1976). *Assessing the impact of planned social change* (Occasional paper series No. 8). Kalamazoo, MI: Kalamazoo Evaluation Center, Western Michigan University.
- Capra, F. (1974). Bootstrap and Buddhism. *American Journal of Physics*, 42(1), 15–19.
- Capra, F. (1982). The turning point: A new vision of reality. *Futurist*, 16(6), 19–24.
- Capra, F. (1985). Criteria of systems thinking. *Futures*, 17(5), 475–478.
- Carter, B. (2013, December 18). Phil Robertson suspended from ‘Duck Dynasty.’ *The New York Times*. Retrieved from <http://www.nytimes.com/>
- Chaikin, A., Sigler, E., & Derlega, V. (1974). Nonverbal mediators of teacher expectancy effects. *Journal of Personality and Social Psychology*, 30(1), 144–149.
- Cheng, Y. (1994). Teacher leadership style: A classroom-level study. *Journal of Educational Administration*, 32(3), 54–71.
- Chermesh, R., & Tzelgov, J. (1979). The college instructor as leader: Some theoretical derivations from a generalization of a causal model of students’ evaluation of their instructors. *The Journal of Educational Research*, 73(2), 109–115.
- Chetty, R., Friedman, J., & Rockoff, J. (2012). The long-term impacts of teachers: Teacher value-added and student outcomes in adulthood (Working paper No. 17699). Cambridge, MA: National Bureau of Economic Research.
- Chetty, R., Friedman, J., & Rockoff, J. (2014). Measuring the impacts of teachers II: Teacher value-added and student outcomes in adulthood. *American Economic Review*, 104(9), 2,633–2,679.

- Clotfelter, C., Ladd, H., & Vigdor, J. (2007). Teacher credentials and student achievement: Longitudinal analysis with student fixed effects. *Economics of Education Review*, 26(6), 673–682.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Coleman, J., Campbell, E., Hobson, C., McPartland, J., Mood, A., Weinfeld, F., & York, R. (1966). *Equality of educational opportunity*. Washington, DC: U.S. Government Printing Office.
- Conger, J., & Hunt, J. (1999). Overview: Charismatic and transformational leadership: Taking stock of the present and future (Special issue part I). *The Leadership Quarterly*, 10(2), 121–127.
- Cools, E., & Van den Broeck, H. (2007). *A comparison of healthcare managers and entrepreneurs: Investigating the change profile of two different sectors* (Vlerick Leuven Gent Management School Working Paper Series 2007/23). Gent, Belgium: Vlerick Leuven Gent Management School. Retrieved from <https://public.vlerick.com/Publications/bdcf3931-6aa9-e011-8a89-005056a635ed.pdf>
- Cooper, H. (1979). Pygmalion grows up: A model for teacher expectation communication and performance influence. *Review of Educational Research*, 49(3), 389–410.
- Cooper, H., Robinson, J., & Patall, E. (2006). Does homework improve academic achievement? A synthesis of research, 1987-2003. *Review of Educational Research*, 76(1), 1–62.

- Creswell, J. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (3rd ed.). Los Angeles, CA: Sage.
- Cuban, L. (1983). *Transforming the frog into the prince: Effective schools research, policy, and practice at the district level*. Washington, DC: National Institute of Education. Retrieved from <http://files.eric.ed.gov/fulltext/ED245359.pdf>
- Cubberly, E. (1916). *Public school administration: A statement of the fundamental principles underlying the organization and administration of public education*. Boston, MA: Houghton Mifflin Company.
- Currie, G., & Lockett, A. (2007). A critique of transformational leadership: Moral, professional and contingent dimensions of leadership within public services organizations. *Human Relations*, 60(2), 341–370.
- Curwin, R., & Mendler, A. (1988). *Discipline with dignity*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Dansereau, F., Graen, G., & Haga, W. (1975). A Vertical dyad linkage approach to leadership within formal organizations. *Organizational Behavior and Human Performance*, 13(1), 46–48.
- Darling-Hammond, L. (2010). *The flat world and education: How America's commitment to equity will determine our future*. New York, NY: Teachers College, Columbia University.
- Darling-Hammond, L. (2011, May 24). Value-added assessment is too unreliable to be useful. *The New York Times*. Retrieved from <http://www.nytimes.com/roomfordebate/2010/09/06/assessing-a-teachers-value/value-added-assessment-is-too-unreliable-to-be-useful>

- Darling-Hammond, L. (2012). The right start: Creating a strong foundation for the teaching career. *Phi Delta Kappan*, 94(3), 8–13.
- Deci, E., Ryan, R., & Koestner, R. (2001). The pervasive effects of rewards on intrinsic motivation: Response to Cameron. *Review of Educational Research*, 71(1), 43–51.
- Denison, D., Hooijberg, R., & Quinn, R. (1995). Paradox and performance: Toward a theory of behavioral complexity in managerial leadership. *Organization Science*, 6(5), 524–540.
- Deshpande, A., Webb, S., & Marks, E. (1970). Student perceptions of engineering instructor behaviors and their relationships to evaluation of instructors and courses. *American Educational Research Journal*, 7(3), 289–305.
- Dewey, J. (1933). *How we think* (Revised ed.). Boston, MA: Houghton Mifflin.
- Dimmock, C. (1995). Restructuring for school effectiveness: Leading, organizing and teaching for effective learning. *Educational Management Administration and Leadership*, 23(1), 5–18.
- Dincer, H., Gencer, G., Orhan, N., & Sahinbas, K. (2011). The significance of emotional intelligence on the innovative work behavior of managers as strategic decision-makers. *Procedia–Social and Behavioral Sciences*, 24, 909–919.
- Dollinger, M. (1984). Environmental boundary spanning and information processing effects on organizational performance. *The Academy of Management Journal*, 27(2), 351–368.

- Driscoll, K., & Pianta, R. (2010). Banking time in Head Start: Early efficacy of an intervention designed to promote supportive teacher-child relationships. *Early Education and Development, 21*(1), 38–64.
- Drucker, P. (1996). Your leadership is unique. *Christianity Today International Leadership Journal, 7*(4), 54.
- Edwards, D., & Mullis, F. (2003). Classroom meetings: Encouraging a climate of cooperation. *Professional School Counseling, 7*(1), 20–28.
- Eberly, C. G., & Smith, D. C. (1970). Preface to “the teacher-student relation.” *Administrative Science Quarterly, 15*(2), 135–136.
- Elementary and Secondary Education Act of 1965, 20 U.S.C. § 6301 (1965).
- Emmer, E., Everston, C., & Worsham, M. (2003). *Classroom management for secondary teachers* (6th ed.). Boston, MA: Allyn & Bacon.
- Engelmann, S., Becker, W., Carnine, D. & Gersten, R. (1988). The direct instruction follow through model: Design and outcomes. *Education and Treatment of Children, 11*(4), 303–317.
- Ertesvag, S. (2009). Classroom leadership: The effect of a school development programme. *Educational Psychology, 29*(5), 515–539.
- Everson, K., Feinauer, E., & Sudweeks, R. (2013). Rethinking teacher evaluation: A conversation about statistical inferences and value-added models. *Harvard Educational Review, 83*(2), 349–370.
- Evertson, C., Emmer, E., & Worsham, M. (2003). *Classroom management for elementary teachers* (6th ed.). Boston, MA: Allyn & Bacon.

- Fan, X., & Chen, M. (2001). Parental involvement in student's academic achievement: A meta-analysis. *Educational Psychology Review*, 13(1), 1–22.
- Farris, G., & Lim, F. (1969). Effects of performance on leadership, cohesiveness, influence, satisfaction, and subsequent performance. *Journal of Applied Psychology*, 53(6), 490–497.
- Fernandez, C., & Vecchio, R. (1997). Situational leadership theory revisited: A test of an across-jobs perspective. *The Leadership Quarterly*, 8(1), 67–84.
- Fisher, D., Merron, K., & Torbert, W. (1987). Human development and managerial effectiveness. *Group and Organization Studies*, 12(3), 257–269.
- Florida Atlantic University Libraries. (2016). *SearchWISE*. Retrieved from <http://www.fau.edu/library/>
- Florida Department of Education (FLDOE). (2016). *12-13 VAM technical report*. Retrieved from <http://www.fldoe.org/teaching/performance-evaluation/student-growth.shtml>
- Follett, M. (1970). The teacher-student relation. *Administrative Science Quarterly*, 15(2), 137–148.
- French, J., & Raven, B. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in Social Power* (pp. 150–167). Ann Arbor, MI: Institute for Social Research.
- Fullan, M. (2007). *The Jossey-Bass reader on educational leadership*. San Francisco, CA: Jossey-Bass.
- Galbraith, J., & Cummings, L. (1967). An empirical investigation of the motivational determinants of task performance: Interactive effects between instrumentality-



- valence and motivation-ability. *Organizational Behavior and Human Performance*, 2(3), 237–257.
- Gates Foundation (2013). *Ensuring fair and reliable measures of effective teaching: Culminating findings from the Met Project's three-year study*. Seattle, WA: Measures of Effective Teaching (MET).
- Glass, G. (2008). *Fertilizers, pills, and magnetic strips: The fate of public education in America*. Charlotte, NC: Information Age Publishing.
- Glazerman, S., Protik, A., Teh, B., Bruch, J., Max, J., & National Center for Education Evaluation and Regional Assistance (Eds.). (2013). *Transfer incentives for high-performing teachers: Final results from a multisite randomized experiment* (NCEE 2014-4003). Washington, DC: National Center for Education Evaluation and Regional Assistance.
- Gleason, D. (2014). Reformers, batting averages, and malpractice: The case for caution in value-added use. *The Educational Forum*, 78(2), 128–141.
- Goe, L. (2007, October). *The link between teacher quality and student outcomes: A research synthesis*. Washington, DC: National Comprehensive Center for Teacher Quality.
- Goldhaber, D., Goldschmidt, P., & Tseng, F. (2013). Teacher value-added at the high-school level: Different models, different answers? *Educational Evaluation and Policy Analysis*, 35(2), 220–236.
- Goleman, D. (1995). *Emotional intelligence*. New York, NY: Bantam Books.
- Good, T., & Brophy, J. (1995). *Contemporary educational psychology* (5th ed.). New York, NY: Harper Collins.

- Good, T., & Brophy, J. (2003). *Looking in classrooms* (9th ed.). Boston, MA: Allyn & Bacon.
- Google scholar. (n.d.). Mountain View, CA: Google. Retrieved from <https://scholar.google.com>
- Gordon, R., Kane, T., & Staiger, D. (2006, April). *Identifying effective teachers using performance on the job* (The Hamilton Project, Paper 2006-01). Washington, DC: The Brookings Institution. Retrieved from [http://www.brookings.edu/views/papers/200604hamilton\\_1.pdf](http://www.brookings.edu/views/papers/200604hamilton_1.pdf)
- Graeff, C. (1983). The situational leadership theory: A critical view. *The Academy of Management Review*, 8(2), 285–291.
- Graeff, C. (1997). Evolution of situational leadership theory: A critical review. *The Leadership Quarterly*, 8(2), 153–170.
- Grégoire, D., Corbett, A., & McMullen, J. (2011). The cognitive perspective in entrepreneurship: An agenda for future research. *Journal of Management Studies*, 48(6), 1,443–1,477.
- Haas, M. (2005). Teaching methods for secondary algebra: A meta-analysis of findings. *NASSP Bulletin*, 89(642), 24–46.
- Hallinger, P. (1992). School leadership development: An introduction. *Education and Urban Society*, 24(3), 300–316.
- Hallinger, P. (2003). Leading educational change: Reflections on the practice of instructional and transformational leadership. *Cambridge Journal of Education*, 33(3), 329–352.

- Hallinger, P. (2011). Leadership for learning: Lessons from 40 years of empirical research. *Journal of Educational Administration*, 49(2), 125–142.
- Hallinger, P., & Heck, R. (1996). Reassessing the principal's role in school effectiveness: A review of empirical research, 1980-1995. *Educational Administration Quarterly*, 32(1), 5–44.
- Hallinger, P., & Leithwood, K. (1998). Unseen forces: The impact of social culture on school leadership. *Peabody Journal of Education*, 73(2), 126–151.
- Halpin, A. (1954). The leadership behavior and combat performance of airplane commanders. *Journal of Abnormal and Social Psychology*, 49(1), 19–22.
- Hammersley, M. (1992). Some reflections on ethnography and validity. *Qualitative Studies in Education*, 5(3), 195–203.
- Hanushek, E. (2009). Education: Building on No Child Left Behind. *Science*, 326(5954), 802–803.
- Hanushek, E., Kain, J., O'Brien, D., & Rivkin, S. (2005, February). *The market for teacher quality* (NBER Working Paper No. 11154). Cambridge, MA: National Bureau of Economic Research.
- Hanushek, E., & Rivkin, S. (2006). Teacher quality. In E. Hanushek & F. Welch (Eds.), *Handbook of the economics of education*. (pp. 1,052–1,075). Amsterdam, Netherlands: North-Holland.
- Harris, A., & Chapman, C. (2002). Leadership in schools facing challenging circumstances. *Management In Education*, 16(1), 10–12.

- Harris, D. (2009). Would accountability based on teacher value added be smart policy? An examination of the statistical properties and policy alternatives. *Education Finance and Policy*, 4(4), 319–351.
- Harris, D., & Rutledge, S. (2010). Models and predictors of teacher effectiveness: A comparison of research about teaching and other occupations. *Teachers College Record*, 112(3), 914–960.
- Harrison, C., & Killian, J. (2007). Ten roles for teacher leaders. *Educational Leadership (ASCD)*, 65(1), 74–77.
- Harrop, A., & Williams, T. (1992). Rewards and punishments in the primary school: People's perceptions and teacher's usage. *Educational Psychology in Practice*, 7(4), 211–215.
- Hart, S., & Quinn, R. (1993). Roles executives play: CEOs, behavioral complexity, and firm performance. *Human Relations*, 46(5), 543–575.
- Harvey, O., Hunt, D., & Schroder, H. (1961). *Conceptual systems and personality organization*. New York, NY: John Wiley & Sons.
- Hattie, J. (1992). *Self-concept*. New York, NY: Psychology Press.
- Hattie, J., Biggs, J., & Purdie, N. (1996). Effects of learning skills interventions on student learning: A meta-analysis. *Review of Educational Research*, 66(2), 99–136.
- Hattie, J., & Yates, G. (2014). *Visible learning and the science of how we learn*. New York, NY: Routledge.
- Hayes, A. (2013). *Introduction to mediation, moderation, and conditional process analysis*. New York, NY: The Guilford Press.

- Haynie, J., Shepherd, D., & McMullen, J. (2009). An opportunity for me? The role of resources in opportunity evaluation decisions. *Journal of Management Studies*, 46(3), 337–361.
- Heck, R., Larsen, T., & Marcoulides, G. (1990). Instructional leadership and school achievement: Validation of a causal model. *Educational Administration Quarterly*, 26(2), 94–125.
- Heifetz, R. & Laurie, D. (2003). The leader as teacher: Creating the learning organization. *Ivey Business Journal*, January/February(1). Retrieved from <http://iveybusinessjournal.com/publication/the-leader-as-teacher-creating-the-learning-organization/>
- Hemphill, J., & Coons, A. (1957). Development of the leader behavior description questionnaire. In R. Stogdill & A. Coons (Eds.), *Leader behavior: Its description and measurement* (pp. 6–38). Columbus: Bureau for Business Research.
- Hersey, P., & Blanchard, K. (1969). Management of organizational behavior: Utilizing human resources. *Academy of Management Journal*, 12(4), 526.
- Hersey, P., & Blanchard, K. (1996). *Management of organizational behavior: Leading resources*. Upper Saddle River, NJ: Prentice-Hall.
- Hofstede, G. (1984). National cultures revisited. *Asia Pacific Journal of Management*, 2(1), 22–28.
- Hogarth, R., Michaud, C, & Mery, J. (1980). Decision behavior in urban development: A methodological approach and substantive considerations. *Acta Psychologica*, 45(1), 95–117.

- House, R. (1996). Path-goal theory of leadership: Lessons, legacy, and a reformulated theory. *The Leadership Quarterly*, 7(3), 323–352.
- House, R., & Mitchell, T. (1974). Path-goal theory of leadership. *Journal of Contemporary Business*, 3, 81–97.
- Ishii, J., & Rivkin, S. (2009). Impediments to the estimation of teacher value added. *Education Finance and Policy*, 4(4), 520–537.
- Jago, A. (1982). Leadership: Perspectives in theory and research. *Management Science*, 28(3), 315–336.
- Jamentz, K. (2002). *Isolation is the enemy of improvement: Instructional leadership to improve standards-based practice*. Washington, DC: Office of Educational Research and Improvement. Retrieved from [https://ia601304.us.archive.org/14/items/ERIC\\_ED469944/ERIC\\_ED469944.pdf](https://ia601304.us.archive.org/14/items/ERIC_ED469944/ERIC_ED469944.pdf)
- Jawadi, N., Daassi, M., Favier, M., & Kalika, M. (2013). Relationship building in virtual teams: A leadership behavioral complexity perspective. *Human Systems Management*, 32(3), 199–211.
- Jeynes, W. (2005). A meta-analysis of the relation of parental involvement to urban elementary school student academic achievement. *Urban Education*, 40(3), 237–269.
- Johnson, S., Reinhorn, S., Charner-Laird, M., Kraft, M., Ng, M., & Papay, J. (2014). Ready to lead, but how? Teachers' experiences in high-poverty urban schools. *Teachers College Record*, 116(10), 1–50. Retrieved from <http://www.tcrecord.org/Content.asp?ContentId=17601>

- Judge, T., Piccolo, R., & Ilies, R. (2004). The forgotten ones? The validity of consideration and initiating structure in leadership research. *Journal of Applied Psychology, 89*(1), 36–51.
- Kane, T. (2014). *Do value-added estimates identify causal effects of teachers and schools?* (Working paper). *SERIES: The Brown Center Chalkboard, 86 of 93*. Washington, DC: The Brookings Institution.
- Kane, T., McCaffrey, D., Miller, T., & Staiger, D. (2013). *Have we identified effective teachers? Validating measures of effective teaching using random assignment*. Seattle, WA: Bill and Melinda Gates Foundation.
- Kane, T., & Staiger, D. (2008). *Are teacher value added estimates biased? An experimental validation of non-experimental estimates* (Working paper No. 14607). Cambridge, MA: National Bureau of Economic Research.
- Karney, B., & Gauer, B. (2010). Cognitive complexity and marital interaction in newlyweds. *Personal Relationships, 17*(2), 181–200.
- Katz, R. L. (1955). Skills of an effective administrator. *Harvard Business Review, 33*(1), 33–42.
- Kaufman, K., & O’Leary, K. (1972). Reward, cost, and self-evaluation procedures for disruptive adolescents in a psychiatric hospital at school. *Journal of Applied Behavioral Analysis, 5*(3), 293–309.
- Kelly, G. (1955). *The psychology of personal constructs*. New York, NY: Norton.
- Kentucky Department of Education. (2016). *School-based decision making*. Retrieved from <http://education.ky.gov/districts/SBDM/Pages/default.aspx>

- Kickul, J., & Krueger, N. (2004). A cognitive processing model of entrepreneurial self-efficacy and intentionality. In S. A. Zahra, C. G. Brush, P. Davidsson, J. Fiet, P. G. Greene, R. T. Harrison, ... A. Zacharakis (Eds.), *Frontiers of entrepreneurship research 2004: Proceedings of the Twenty-fourth Annual Entrepreneurship Research Conference* (pp. 607–619). Wellesley, MA: Babson College.
- Koedel, C., & Betts, J. (2005). *Re-examining the role of teacher quality in the educational production function* (Working Paper No. 07-08). Columbia, MO: Department of Economics, University of Missouri.
- Korman, A. K. (1966). “Consideration,” “initiating structure,” and organizational criteria—a review. *Personnel Psychology*, 19(4), 349–361.
- Kouzes, J., & Posner, B. (2010). *The truth about leadership: The no-fads, heart-of-the-matter, facts you need to know*. San Francisco, CA: Jossey-Bass.
- Kumar, D. (1991). A meta-analysis of the relationship between science instruction and student engagement. *Education Review*, 43(1), 49–66.
- Lashway, L. (2003). *Role of the school leader: Trends and issues*. Washington, DC: Office of Educational Research and Improvement. Retrieved from <http://files.eric.ed.gov/fulltext/ED479933.pdf>
- Lawrence, K., Lenk, P., & Quinn, R. (2009). Behavioral complexity in leadership: The psychometric properties of a new instrument to measure behavioral repertoire. *The Leadership Quarterly*, 20(2), 87–102.
- Leithwood, K., & Jantzi, D. (1999). Transformational school leadership effects: A replication. *School Effectiveness and School Improvement*, 10(4), 451–479.



- Leithwood, K., Louis, K., Anderson, S., & Wahlstrom, K. (2004). *How leadership influences student learning*. Toronto, Canada: Center for Applied Research and Educational Improvement and Ontario Institute Studies in Education.
- Lewin, K., Lippitt, R., & White, R. (1939). Patterns of aggressive behavior in experimentally created “social climates.” *The Journal of Social Psychology*, 10(2), 271–299.
- Lipsey, M., & Wilson, D. (1993). The efficacy of psychological, educational, and behavioral treatment. *American Psychologist*, 48(12), 1,181–1,209.
- Litow, L., & Pumroy, D. (1975). A brief review of classroom group oriented contingencies. *Journal of Applied Behavior Analysis*, 8(3), 341–347.
- Lord, R., & Hall, R. (2005). Identity, deep structure and the development of leadership skill. *The Leadership Quarterly*, 16(4), 591–615.
- Lowe, K., & Gardner, W. (2001). Ten years of the leadership quarterly: Contributions and challenges for the future. *The Leadership Quarterly*, 11(4), 648–657.
- Lowin, A., & Craig, J. (1968). The influence of level of performance on managerial style: An experimental object-lesson in the ambiguity of correlational data. *Organizational Behavior and Human Performance*, 3(4), 440–458.
- Luechauer, D., & Shulman, G. (2002). Creating empowered learners: A decade trying to practice what we teach. *Organization Development Journal*, 20(3), 42–51.
- Malik, S., Aziz, S., & Hassan, H. (2014). Leadership behavior and acceptance of leaders by subordinates application of path goal theory in telecom sector. *International Journal of Trade, Economics and Finance*, 5(2), 170–175.

- Mangin, M., & Stoelinga, S. (2008). Teacher leadership: What it is and why it matters. In M. M. Mangin & S. R. Stoelinga (Eds.), *Effective teacher leadership: Using research to inform and reform* (pp. 1–9). New York, NY: Teachers College Press.
- Mann, H. (1849). *Annual report of the Board of Education, together with the twelfth annual report of the Secretary of the Board*. Boston, MA: Dutton and Wentworth, State Printers.
- Marks, H., & Printy, S. (2003). Principal leadership and school performance: An integration of transformational and instructional leadership. *Educational Administration Quarterly*, 39(3), 370–397.
- Martam S., Leritz, L., & Mumford, M. (2005). Leadership skills and the group performance: Situational demands, behavioral requirements, and planning. *The Leadership Quarterly*, 16(1), 97–120.
- Marzano, R. J. (2007). *The art and science of teaching: A comprehensive framework for effective instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R. J. (2011, April). *Research base and validation studies on the Marzano evaluation model*. Blairsville, PA: Learning Sciences International. Retrieved from [http://www.marzanoevaluation.com/files/Research\\_Base\\_and\\_Validation\\_Studies\\_Marzano\\_Evaluation\\_Model.pdf](http://www.marzanoevaluation.com/files/Research_Base_and_Validation_Studies_Marzano_Evaluation_Model.pdf)
- Marzano, R. J. (2012). *Becoming a reflective teacher*. Bloomington, IN: Marzano Research Laboratory.
- Marzano, R. J., Gnadet, J., & Jesse, D. M. (1990, January). *The effects of three types of*

- linguistic encoding strategies on the processing of information presented in lecture format.* Aurora, CO: Mid-Continent Regional Educational Lab.
- Marzano, R. J., Marzano, J. S., & Pickering, D. J. (2003). *Classroom management that works: Research-based strategies for every teacher.* Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R. J., & Simms, J. (2013). *Coaching classroom instruction.* Bloomington, IN: Marzano Research Laboratory.
- Marzano, R. J., & Toth, M. (2013). *Teacher evaluation that makes a difference.* Alexandria, VA: Association for Supervision and Curriculum Development.
- McCaffrey, D., Lockwood, J., Koretz, D., Louis, T., & Hamilton, L. (2004). Models for value-added modeling of teacher effects. *Journal of Educational and Behavioral Statistics*, 29(1), 6 –101.
- McCaffrey, D., Sass, T., Lockwood, J., & Mihaly, K. (2009). The intertemporal variability of teacher effect estimates. *Education Finance and Policy*, 4(4), 572–606.
- Meredith, G. (1976). Structure of the teaching analysis by students (TABS). *The Journal of Psychology*, 92(2), 235–242.
- Merrett, F., & Tang, W. (1994). The attitudes of British primary school pupils to praise, rewards, punishments and reprimands. *British Journal of Educational Psychology*, 64(1), 91–103.
- Merriam-Webster's Learner's Dictionary. (n.d.). *Leadership*. Retrieved from <http://www.merriam-webster.com/dictionary/leadership>

- Meyer, L., & Feistritzer, E. (2003). *Better leaders for America's schools: A manifesto*. Los Angeles, CA: The Broad Foundations. Retrieved from <http://files.eric.ed.gov/fulltext/ED479070.pdf>
- Miller, A., Ferguson, E., & Simpson, R. (1998). The perceived effectiveness of rewards and sanctions in primary schools: Adding in the parental perspective. *Educational Psychology, 18*(1), 55–64.
- Mintzberg, H. (1973). *The nature of managerial work*. New York, NY: Harper & Row.
- Miron, B. J. (2014). *School principal influence actions, climate, culture, and school performance* (Doctoral dissertation). Florida Atlantic University, Boca Raton, FL.
- Morrison, T. (1975). The Classroom Boundary Questionnaire: An instrument to measure one aspect of teacher leadership in the classroom. *Educational and Psychological Measurement, 35*(1), 119–134.
- Mumford, T., Campion, M., & Morgeson, F. (2007). The leadership skills strataplex: Leadership skill requirements across organizational levels. *The Leadership Quarterly, 18*(2), 154–166.
- Myung, J., Loeb, S., & Horng, E. (2011). Tapping the principal pipeline: Identifying talent for future school leadership in the absence of formal succession management programs. *Educational Administration Quarterly, 47*(5), 695–727.
- Narayan, J., Heward, W., Gardner, R., Courson, F., & Omness, C. (1990). Using response cards to increase student participation in an elementary classroom. *Journal of Applied Behavioral Analysis, 23*(4), 483–490.
- National Center for Education Statistics (NCES). (n.d.). *National assessment of education progress (NAEP)*. Retrieved from <http://nces.ed.gov/nationsreportcard/about/>

- National Education Association. (2015). *Teacher leader model standards*. Retrieved from <http://www.nea.org/home/43946.htm>
- Nelson, J., Palonsky, S., & McCarthy, M. (2012). *Critical issues in education: Dialogues and dialectics* (8th ed.). Boston, MA: McGraw Hill.
- Nesbit, J., & Adescope, O. (2006). Learning with concept and knowledge maps: A meta-analysis. *Review of Educational Research*, 76(3), 413–448.
- Neumerski, C. (2013). Rethinking instructional leadership, a review: What do we know about principal, teacher, and coach instructional leadership, and where should we go from here? *Educational Administration Quarterly*, 49(2), 310–347.
- New York State Department of Education. (n.d.). *History of Regents examinations: 1865 to 1987*. Albany, NY: Office of State Assessment, Author. Retrieved from <http://www.p12.nysed.gov/assessment/hsgen/archive/rehistory.htm>
- Newman, C., & Licata, J. (1986). Teacher leadership and classroom climate as predictors of student brinkmanship. *The High School Journal*, 70(2), 102–110.
- No Child Left Behind Act of 2001, 20 U.S.C. § 6319 (2001).
- Normore, A. (2006). Leadership recruitment and selection in school districts: Trends and issues. *Journal of Educational Thought*, 40(1), 41–73.
- Norr, J., & Crittenden, K. (1975). Evaluating college teaching as leadership. *Higher Education*, 4(3), 335–350.
- Northouse, P. (2007). *Leadership: Theory and practice*. Thousand Oaks, CA: Sage.
- Novicevic, M., Humphreys, J., Buckley, M., Roberts, F., Hebdon, A., and Kim, J. (2013). Teaching as constructive-developmental leadership: Insights from Mary Follet. *Journal of Management History*, 19(4), 1–32.

- Nuntamanop, P., Kauranen, I., & Igel, B. (2013). A new model of strategic thinking competency. *Journal of Strategy and Management*, 6(3), 242–264.
- Nutt, P. (1990). Strategic decisions made by top executives and middle managers with data and process dominant styles. *Journal of Management Studies*, 27(2), 173–194.
- O'Connor, E., Dearing, E., & Collins, B. (2011). Teacher-child relationship and behavior problem trajectories in elementary school. *American Educational Research Journal*, 48(1), 120–162.
- Ojode, L. A., Walumbwa, F. O., & Kuchinke, P. (1999, April). *Developing human capital for the evolving work environment: Transactional and transformational leadership within instructional setting*. Paper presented at the Midwest Academy of Management Annual Meeting, Lincoln, NE.
- Ones, D., Dilchert, S., Viswesvaran, C., & Judge, T. (2007). In support of personality assessment in organizational settings. *Personnel Psychology*, 60(4), 995–1,027.
- Palich, L., & Bagby, D. (1995). Using cognitive theory to explain entrepreneurial risk-taking: Challenging conventional wisdom. *Journal of Business Venturing*, 10(6), 425–438.
- Pang, S., & Pisapia, J. (2007, April). *The strategic thinking capabilities of school leaders in Hong Kong*. Presented at the American Educational Research Association Annual Meeting, Chicago, IL.
- Penney, G. (2010). *The use of strategic thinking skills and technology tools by fire chiefs* (Doctoral dissertation). Florida Atlantic University, Boca Raton, FL.

- Perry, N., Turner, J., & Meyer, D. (2006). Student engagement in the classroom. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (pp. 32 – 348). Mahwah, NJ: Erlbaum.
- Pisapia, J. (n.d.). Psychometric properties. *The Strategic Leader Network*. Retrieved from <http://thestrategicleader.org/content/psychometric-properties-0>
- Pisapia, J. (2009). *The strategic leader: New tactics for a globalizing world*. Charlotte, NC: Information Age Publishing.
- Pisapia, J., Morris, J., Cavanaugh, G., & Ellington, L. (2011, November). *The Strategic Thinking Questionnaire: Validation and confirmation of constructs*. Presented at the 31st Annual Strategic Management Society International Conference, Miami, FL.
- Pisapia, J., & Pang, N. (2012, December). *The Influence of cognitive complexity on Hong Kong school leader's ability to influence followers*. Paper presented at the World Educational Research Association, Sydney, Australia.
- Pisapia, J., Pang, N., Hee, T., Ying, L., & Morris, J. (2009). A comparison of the use of strategic thinking skills of aspiring school leaders in Hong Kong, Malaysia, Shanghai, and the United States: An exploratory study. *International Journal of Educational Studies*, 2(2), 48–58.
- Pisapia, J., & Reyes-Guerra, D. (2007, November). *Leadership assessment tools: The strategic thinking questionnaire*. Presented at the Annual Conference of the International Leadership Association, Vancouver, Canada.
- Pisapia, J., & Reyes-Guerra, D. (2008). *The Strategic Leadership Questionnaire*. Boca Raton, FL: Florida Atlantic University.

- Pisapia, J., Reyes-Guerra, D., & Coukos-Semmel, E. (2005). Developing a strategic mindset: Constructing the measures. *Leadership Review*, 5, 41–68. Retrieved from [http://www.leadershipreview.org/2005spring/article2\\_spring\\_2005.asp](http://www.leadershipreview.org/2005spring/article2_spring_2005.asp)
- Pisapia, J., Reyes-Guerra, D., & Yasin, M. (2006, Month). *Strategic thinking and leader success*. Paper presented at the Annual Meeting of the International Conference on Advances in Management, Lisbon, Portugal.
- Polikoff, M. (2013). Teacher education, experience, and the practice of aligned instruction. *Journal of Teacher Education*, 64(3), 212–225.
- Polikoff, M., & Porter, A. (2014). Instructional alignment as a measure of teaching quality. *Educational Evaluation and Policy Analysis*, 36(4), 399–416.
- Pounder, J. (2006). Transformational classroom leadership: The fourth wave of teacher leadership? *Educational Management Administration and Leadership*, 34(4), 533–545.
- Putney, L., & Broughton, S. (2011). Developing collective classroom efficacy: The teacher's role as community organizer. *Journal of Teacher Education*, 62(1), 93–105.
- Quinn, T. (2002). Succession planning: Start today. *Principal Leadership*, 3(2), 24–28.
- Ravitch, D. (2010a). A big margin for error: Assessing teachers by student scores is too error-ridden to be effective. *The New York Times*. Retrieved from <http://www.nytimes.com/>
- Ravitch, D. (2010b). *The death and life of the great American school system: How testing and choice are undermining education*. New York, NY: Basic Books.



- Reddin, W. (1967). The 3-D management style theory: A typology based on task and relationship orientations. *Training and Development Journal*, 21(4), 8–17.
- Reitz, A. (1994). Implementing comprehensive classroom-based programs for students with emotional and behavioral problems. *Education and Treatment of Children*, 17(3), 312–331.
- Reyes-Guerra, D. (2009). The relationship between principal leadership actions and business and social justice cultures in schools (Unpublished doctoral dissertation). Florida Atlantic University, Boca Raton, FL.
- Reyes-Guerra, D., Pisapia, J. & Mick, A. (2016). *The cognitive preparation of school leaders for turnaround schools*. Manuscript submitted for publication.
- Reynolds, D., & Teddlie, C. (2000). *The international handbook of school effectiveness research*. London, England: Falmer Press.
- Rist, R. (1970). Student social class and teacher expectations: The self-fulfilling prophecy in ghetto education. *Harvard Educational Review*, 40(3), 411–451.
- Ross, J. (1988). Controlling variables: A meta-analysis of training studies. *Review of Educational Research*, 58(4), 405–437.
- Rothstein, J. (2010). Teacher quality in educational production: Tracking, decay, and student achievement. *The Quarterly Journal of Economics*, 125(1), 17–214.
- Rothstein, J. (2015, October). *Revisiting the impacts of teachers*. Retrieved from [http://eml.berkeley.edu/~jrothst/workingpapers/rothstein\\_cfr\\_oct2015.pdf](http://eml.berkeley.edu/~jrothst/workingpapers/rothstein_cfr_oct2015.pdf)
- Rush, M., Thomas, J., & Lord, R. (1977). Implicit leadership theory: A potential threat to the internal validity of leader behavior questionnaires. *Organizational Behavior and Human Performance*, 20(1), 93–110.

- Satish, U. (1997). Behavioral complexity: A review. *Journal of Applied Social Psychology, 27*(23), 2,047–2,067.
- Schafer, W., Lissitz, R., Zhu, X., Hou, X., & Li, Y. (2012). Evaluating teachers and schools using student growth models. *Practical Assessment, Research and Evaluation, 17*(17). Retrieved from <http://pareonline.net/getvn.asp?v=17&n=17>
- Scherrer, J. (2011). Measuring teaching using value-added modeling: The imperfect panacea. *NASSP Bulletin, 95*(2), 122–140.
- Schochet, P., & Chiang, H. (2010). *Error rates in measuring teacher and school performance based on student test score gains*. Washington, DC: U.S. Department of Education.
- Schön, D. (1975). Deutero-learning in organizations: Learning for increased effectiveness. *Organizational Dynamics, 4*(1), 2–16.
- Schriesheim, C., & DeNisi, A. (1981). Task dimensions as moderators of the effects of instrumental leadership: A tow-sample replicated test of path-goal leadership theory. *Journal of Applied Psychology, 66*(5), 589–597.
- Schriesheim, C., House, R., & Kerr, S. (1976). Leader initiating structure: A reconciliation of discrepant research results and some empirical tests. *Organizational Behavior and Human Performance, 15*(2), 297–321.
- Schriesheim, C., & Von Glinow, M. (1977). The path-goal theory of leadership: A theoretical and empirical analysis. *The Academy of Management Journal, 20*(3), 398–405.

- Schroder, H. (1971). *Conceptual complexity and personality organization*. In H. M. Schroder & P. Suedfeld (Eds.), *Personality theory and information processing* (pp. 240–273). New York, NY: Ronald Press.
- Schroder, H., Driver, M., & Streufert, S. (1967). *Human information processing*. New York, NY: Holt.
- Senge, P. (1990a). *The fifth discipline*. New York, NY: Doubleday.
- Senge, P. (1990b). The leader's new work: Building learning organizations. *Sloan Management Review*, 32(1), 7–23.
- Senge, P. (2000). Systems change in education. *Reflections*, 1(3), 52–60.
- Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. *Organization Science*, 11(4), 448–469.
- Sheets, R., & Gay, G. (1996). Student perceptions of disciplinary conflict in ethnically classrooms. *NASSP Bulletin*, 80(580), 84–93.
- Shepherd, D., & DeTienne, D. (2005). Prior knowledge, potential financial reward, and opportunity identification. *Entrepreneurship Theory and Practice*, 29(1), 91–112.
- Sieber, J., & Lanzetta, J. (1964). Conflict and conceptual structure as determinants of decision making behavior. *Journal of Personality*, 32(4), 622–641.
- Silva, D., Gimbert, B., & Nolan, J. (2000). Sliding the doors: Locking and unlocking possibilities for teacher leadership. *Teachers College Record*, 102(4), 779–804.
- Simon, H. (1955). A behavioral model of rational choice. *The Quarterly Journal of Economics*, 69(1), 99–118.
- Slicker, E. (1998). Relationship of parenting style to behavioral adjustment in graduating high school seniors. *Journal of Youth and Adolescence*, 27(13), 345–372.

- Snell, J., & Swanson, J. (2000, April). *The essential knowledge and skills of teacher leaders: A search for a conceptual framework*. Paper presented at the Annual Meeting of the American Education Research Association, New Orleans, LA.
- Sorsdahl, S., & Sanche, R. (1985). The effects of classroom meetings on self-concept and behavior. *Elementary School Guidance and Counseling*, 20(1), 56–59.
- Southall, A. (2013, December 20). A twitter message about AIDS, followed by a firing and an apology. *The New York Times*. Retrieved from [http://thelede.blogs.nytimes.com/2013/12/20/a-twitter-message-about-aids-africa-and-race/?\\_php=true&\\_type=blogs&\\_r=0](http://thelede.blogs.nytimes.com/2013/12/20/a-twitter-message-about-aids-africa-and-race/?_php=true&_type=blogs&_r=0)
- Southworth, G. (2002). Instructional leadership in schools: Reflections and empirical evidence. *School Leadership and Management*, 22(1), 73–91.
- Stage, S., & Quiroz, D. (1997). A meta-analysis of interventions to decrease disruptive classroom behavior in public education settings. *School Psychology Review*, 26(3), 333–368.
- Stahl, R. (1994). Using “think-time” and “wait-time” skillfully in the classroom. *ERIC Digest*. Bloomington, IN: ERIC Clearinghouse for Social Studies/Social Science Education. (ERIC Reproduction Service No. ED370885)
- Stein, L. (2014). Leadership: The teacher’s imperative. *Journal of Leadership Education*, 13(2), 162–168.
- Stewart, T. (2012). Classroom teacher leadership: Service-learning for teacher sense of efficacy and servant leadership development. *School Leadership and Management*, 32(3), 233–259.

- Stogdill, R. (1948). Personal factors associated with leadership: A survey of literature. *The Journal of Psychology*, 25(1), 35–71.
- Stogdill, R. (1974). *Handbook of leadership: A survey of theory and research*. New York, NY: Free Press.
- Streufert, S. (1997). Complexity: An integration of theories. *Journal of Applied Social Psychology*, 27(23), 2,068–2,095.
- Streufert, S., Clardy, M. A., Driver, M. J., Karlins, M., Schroder, H. M., & Suedfeld, P. (1965). A tactical game for the analysis of complex decision making in individuals and groups. *Psychological Reports*, 17(3), 723–729.
- Teach For America, Inc. (2009). *Teaching as leadership: Explore distinguishing strategies of highly effective teachers*. Retrieved from <http://www.teachingasleadership.org>
- Tejeda, M., Scandura, T., & Pillai, R. (2001). The MLQ revisited: Psychometric properties and recommendations. *The Leadership Quarterly*, 12(1), 31–52.
- Tennenbaum, G., & Goldring, E. (1989). A meta-analysis of the effect of enhanced instruction: cues, participation, reinforcement, and feedback and correctives on motor skill learning. *Journal of Research and Development in Education*, 22(3), 53–64.
- Thelen, H. (1952). The experimental method in classroom leadership. *The Elementary School Journal*, 53(2), 76–85.
- Toch, T., & Rothman, R. (2008). *Rush to judgment: Teacher evaluation in public education*. Washington DC: Education Sector.

- Tracey, B., & Hinkin, T. (1998). Transformational leadership or effective managerial practices? *Group and Organization Management*, 23(3), 220–236.
- Tyack, D., & Hansot, E. (1981). Conflict and consensus in American public education. *Daedalus*, 110(3), 1–25.
- U.S. Department of Education. (2009). *Race to the Top fund executive summary: Notice of proposed priorities, requirements, definitions, and selection criteria*. Washington, DC: Author.
- Vecchio, R., & Boatwright, K. (2002). Preferences for idealized styles of supervision. *The Leadership Quarterly*, 13(4), 327–342.
- Villares, E., Frain, M., Brigman, G., Webb., & Peluso, P. (2012). The impact of student success skills on standardized test scores: A meta-analysis. *Counseling Outcome Research and Evaluation*, 3(1), 3–16.
- Vroom, V. (1964). *Work and motivation*. San Francisco, CA: John Wiley & Sons.
- Vygotsky, L. (1997). *Educational psychology* (R. Silverman, Trans.). Boca Raton, FL: St. Lucie Press.
- Walberg, H. (1999). Productive teaching. In H. C. Waxman & H. J. Walberg (Eds.), In M. D. Svinicki (Ed.), *New Directions for Teaching Practice Research* (pp. 75–104). San Francisco, CA: Jossey-Bass.
- Walumbwa, F., Wu, C., & Ojode, L. (2004). Gender and instructional outcomes: The mediating role of leadership style. *Journal of Management Development*, 23(2), 124–140.
- Wasley, P. (1991). *Teachers who lead*. New York, NY: Teachers College Press.

- Wenglinsky, H. (2002). How schools matter: The link between teacher classroom practices and student academic performance. *Education Policy Analysis Archives*, 10(12), 1–30.
- Whitehurst, G. J. (2014, July 18). The future of test-based accountability. *Education Next*. Retrieved from <http://educationnext.org/future-test-based-accountability/>
- Whitehurst, G. J., Chingos, M. M., & Lindquist, K. M. (2014, May). *Evaluating teachers with classroom observations: Lessons learned in four districts*. Washington, DC: Brown Center on Education Policy, The Brookings Institution. Retrieved from <http://www.brookings.edu/~media/research/files/reports/2014/05/13-teacher-evaluation/evaluating-teachers-with-classroom-observations.pdf>
- Wilkinson, S. S. (1981). *The relationship of teacher praise and student achievement: A meta-analysis of selected research* (Unpublished doctoral dissertation). University of Florida, Gainesville, FL.
- Wilson, P. W. (2004). *Transformational leadership theory and the effectiveness of the secondary classroom teacher: Correlations of the multifactor leadership questionnaire and the students' evaluation of educational quality questionnaire* (Unpublished doctoral dissertation). Our Lady of the Lake University, San Antonio, TX.
- Wise, K. C., & Okey, J. R. (1983). A meta-analysis of the effects of various science teaching strategies on achievement. *Journal of Research in Science Teaching*, 20(5), 419–435.
- Wubbels, T., Brekelmans, M., den Brok, P., & van Tartwijk, J. (2006). An interpersonal perspective on classroom management in secondary classrooms in the

- Netherlands. In C. Evertson & C. S. Weinstein (Eds.), *Handbook of Classroom Management: Research, practice, and contemporary issues* (pp. 1,161–1,191). Mahwah, NJ: Erlbaum.
- Wubbels, T., Brekelmans, M., van Tartwijk, J., & Admiral, W. (1999). Interpersonal relationships between teachers and students in the classroom. In H. C. Waxman & H. J. Walberg (Eds.), *New Directions for Teaching Practice and Research* (pp. 15–170). San Francisco, CA: Jossey-Bass.
- Yammarino, F. (2013). Leadership: Past, present, and future. *Journal of Leadership and Organizational Studies*, 20(2), 149–155.
- Yammarino, F., Dionne, S., Uk, C., & Dansereau, F. (2005). Leadership levels of analysis: A state-of-the-science review. *The Leadership Quarterly*, 16(6), 879–919.
- Yasin, M. (2006). *The use of strategic leadership actions by deans in Malaysian and American public universities* (Doctoral dissertation). Florida Atlantic University, Boca Raton, FL.
- Yeh, S. (2012). The reliability, impact, and cost-effectiveness of value-added teacher assessment methods. *Journal of Education Finance*, 37(4), 374–399.
- York-Barr, J., & Duke, K. (2004). What do we know about teacher leadership? Findings from two decades of scholarship. *Review of Educational Research*, 74(3), 255–316.
- Yukl, G. (1989). Managerial leadership: A review of theory and research. *Journal of Management*, 15(2), 251–289.



- Yukl, G. (1994). *Leadership in organizations* (3rd ed.). Englewood Cliffs, NJ: Prentice Hall.
- Yukl, G. (1999). An evaluation of conceptual weaknesses in transformational and charismatic leadership theories. *The Leadership Quarterly*, 10(2), 285–305.
- Yukl, G., & Van Fleet, D. (1982). Cross-situational, multimethod research on military leader effectiveness. *Organizational Behavior and Human Performance*, 30(1), 87–108.
- Zaccaro, S. (2001). *The nature of executive leadership: A conceptual and empirical analysis of success*. Washington, DC: American Psychological Association.
- Zhang, M., Xin, Z., & Lin, C. (2012). Measures of cognitive complexity and its development in Chinese adolescents. *Journal of Constructivist Psychology*, 25(2), 91–111.
- Zsiga, P. (2008). *Leader effectiveness from self-directed learning and strategic thinking*. *International Journal of Human Resources Development and Management*, 8(4), 306–317.