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TEACHING EFFICACY, INNOVATION, SCHOOL CULTURE
AND
TEACHER RISK TAKING

By

Margaret Elizabeth Taylor
A.B., Brown University, 1985
M.A., University of Cincinnati, 1989

A Dissertation
Submitted to the Faculty of the
Graduate School of the University of Louisville
in Partial Fulfillment of the Requirements
for the Degree of

Doctor of Philosophy

College of Education and Human Development
University of Louisville
Louisville Kentucky

May 2010

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A Dissertation Approved on

April 13, 2010

by the following Dissertation Committee:

Dissertation Director

DEDICATION

This dissertation is dedicated to my parents

Robert Fowler Taylor

and

Beth Bradley Taylor

whose life long drive to learn and explore have instilled
in me a desire to follow in their footsteps. I hope that
my children will do the same.

ACKNOWLEDGMENTS

Many wonderful people surrounded me during the several years of study that went into becoming a doctoral candidate and writing this dissertation. First, Dr. Joseph Petrosko, Dr. Tom Reio, Dr. Glenn Rodriguez, Dr. Sue Lasky, and Dr. Thaddeus Dumas spent many hours of their time working with me to analyze data and clarify ideas, inspiring me to continue working despite the real life commitments of raising two teenage boys and running a growing, successful business during a challenging recession.

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Finally, and most importantly, thanks to Andrew and Tyler, my wonderful boys, for understanding when I was working and not able to give my full attention. I am proud of you!

ABSTRACT

RISK TAKING, INNOVATION, AND TEACHING EFFICACY

Margaret E. Taylor

May 8, 2010

This dissertation is an exploratory study of teacher risk taking. The risk-taking literature in education and other types of organizations is lacking in studies exploring the concept of healthy risk taking and how that risk taking is related to other concepts such as organizational culture, innovation, and efficacy. The purpose of this study was to explore the concept of teacher risk taking as it relates to teaching efficacy, school culture, and organizational support for innovation.

The research design of this study utilized a five-section survey administered to 740 public and private school teachers from 53 schools in 9 Midwestern states. In addition, one open-ended question on teachers' own risk taking was examined to help inform and support the quantitative findings. Data were analyzed using

correlations, ANOVAs, hierarchical regression analysis, and hierarchical linear modeling.

Two results unique to the school level and HLM analyses pertained to average experience level of teachers in the school and proportion of non-white teachers in the school. Both had negative relationships with risk taking. Schools with relatively younger teachers had higher risk-taking scores. The inverse relationship between ethnicity and risk-taking at the school level meant that schools with more non-white teachers had relatively higher average scores in risk taking. The HLM analyses confirmed the results obtained in the OLS regression analyses at the school level.

The HLM analyses were consistent with the analyses of risk performed by OLS regression analyses. At the individual level, the teacher's perception of environment and efficacy were both positively associated with risk. At the school level, the means on efficacy and environment were both positively associated with risk. The school average in years teaching was inversely related to risk. In addition, schools with a relatively higher proportion of non-white teachers were those with higher mean scores on risk.

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CHAPTER I

INTRODUCTION

In modern western societies, the concept of risk pervades everyday life. Over the course of the twentieth century and into the early years of the twenty-first, there has been an intensification of discourses emerging from fields of expertise such as science, medicine, law, the social sciences and economics on the nature of risk and its effects upon ordinary people's lives.

(Tulloch & Lupton, 2003)

Risk-taking behavior and human motivation are "almost synonymous," (Cicchetti, Barnett, Rabideau, & Toth, 1991, p. 184). Most of the decisions we make every day involve a balance between anticipated reward and risk (Zuckerman & Kuhlman, 2000). Risk assessment and management are inherent components of the basic literature from many fields of study that impact our daily lives, including medicine, public health, engineering, economics, business, law and insurance (Stalker, 2003). In fact, some theorists propose that we are a "risk society," in which risk pervades every aspect of life, from individual acts throughout the day to

global issues such as the environment and world citizenship (Beck, 1992).

Arguably, the larger biological world can be included in the realm of risk and daily life; the very survival of animals in the wild involves a degree of innate biological risk taking, continued existence resulting from action (such as foraging for food) versus the stagnation, even death, resulting from inaction (Kamil & Roitblat, 1985). In other words, risk taking is a useful, instinctive, survival trait for animals as they find risky, innovative, and ultimately adaptive behaviors that address the challenges they encounter in every day life. It is this propensity to engage in risk taking that could make the difference between survival and death (Kamil & Roitblat, 1985).

As a nation, we are preoccupied, if not obsessed, with managing our risk taking. A look at the mainstream media, sports sites, business slogans, and other media shows how often our culture speaks of risk. For example, Livestrong.com, site dedicated to fighting cancer, urges people to become risk takers. A web site, www.risktakingforsuccess.com urges people to take risks in order to innovate and contribute more to an organization. To illustrate how common use of the word "risk" has become, a *Wall Street Journal* search for the word turned up 199

articles published in the seven days prior to the search, and 1000+ articles from the 90 days prior to the search (web site word search of www.wsj.com). In a similar vein, a word search of the *New York Times* on the same date resulted in over 10,000 appearances of the word in articles in the previous 30 days. A search of the *Journal of the American Medical Association* revealed 52 articles published from July 1, 2009 to September 8, 2009 with the word "risk" in the title or text. For all three publications, searches conducted over time revealed increasing appearances of the word "risk" in each search.

Risk taking has taken on heroic status in sports and other fields that prize innovation, creativity, and change because it fosters new solutions to old challenges (Stranger, 1999). For example, a snowboard competitor in the "half-pipe" (a structure built for freestyle skiing and snowboarding shaped like the bottom half of a pipe) who finds a way to turn three times rather than two while launched into the air from the edge of the half-pipe instantly becomes a cultural hero in the extreme sports world. In this extreme example, the risk of failure is quite high (the skier easily could be injured quite severely), but the innovation involved in performing the act is readily visible, and becomes the new standard for

excellence in the sport. In fact, a leading worldwide ad agency, JWT, recently proposed in a policy press release that "No risk is the new risk," implying that not taking a risk is now risky (JWT, July 1, 2005, B & T Weekly, Australia).

In the field of education, a handful of researchers have begun to study risk taking as it relates to human growth, learning, best practice, and school reform (Clifford, 1991; Ponticell, 2003; Robbins, Brown, Osburn, Patterson, Prouty, & Swicegood, 1991). Several researchers have called for a deeper understanding of the role risk taking offers in the classroom because it might be linked to academic achievement and intellectual performance (Clifford, 1991; Fullan, 1995; Ponticell, 2003). However, despite the societal importance of risk taking, and routine references to the assumed benefits of risk taking in education, we know little about risk taking in educational settings.

Background of the Problem

Research Focus

Historically, human perspective on risk taking has evolved from early perceptions of risk as something that simply happened to us, as fate or the work of God (Tulloch

& Lupton, 2003) to something that we might control. With the advent of the industrial age, risk taking has been viewed as a continually present factor that must be measured, managed, and minimized, almost always carrying a negative connotation (Coombs & Beardslee, 1954; Edwards, 1954, 1955; Slovic, 2000; Yates & Stone, 1992). Risk taking is often viewed as a sensation-seeking personality trait or an individual tendency to take risks to seek novel, varied, complex, and intense experiences (Zuckerman, 1994). Even the psychological literature on adolescent development, while acknowledging that risk taking is an important developmental step, assesses and discusses risk taking in terms of consequences and negative behaviors such as smoking, driving too fast, and drug or alcohol use (e.g. Lightfoot, 1997; Lipsett & Mitnick, 1992). Because of our historically negative perspective on risk taking, theoretical constructs intended to define and explain risk taking are only partial explanations of this complex and multi-faceted concept, as they define risk taking through loss and negative consequences (Edmondson, 1999; Edwards, 1954, 1955; Lipsett & Mitnick, 1992; Slovic, 2000). Whether in the field of business, medicine, adolescent growth, or law, to name a few, risk taking research surprisingly has focused on limiting exposure to negative consequences

rather than how healthy aspects of risk taking can maximize positive results.

The Positive View of Risk Taking

During the latter half of the 20th century and into the beginning of the 21st century, as economic markets have become more competitive and expectations for individual, organizational, and even societal successes rise ever higher, some researchers have begun to consider healthy risk taking to be a necessary component of human growth and innovative behavior (Csikszentmihalyi, 1996; Farley, 1991; Ponticell, 2003). As a result of our negative historical perspective, however, we know virtually nothing about the positive aspects of risk taking, and the innovation and growth that might result from a broadened understanding of the concept.

Viewing risk taking as a healthy and positive construct has value for assisting in understanding how it affects our personalities and growth. According to Hamburg (1991), the ability to determine how and when to take risks in social, academic, and professional situations is the key to individual success. In a study investigating the link between risk taking, new idea promotion, and innovation (as characteristics of learning organizations) and adaptation

to change (as an outcome), Kontoghiorghes, Awbrey, and Feurig (2005) found evidence supporting a link between risk taking and adaptation to change. In describing the role of the creative personality in creativity and invention, Csikszentmihalyi (1996, p. 72) asserted that "the willingness to take risks, to break with the safety of tradition," is a necessary ingredient of creativity and innovation. Thus, a better understanding of risk taking could help us find ways to harness the creativity, innovation, growth and positive change that results from healthy risk taking, whether in the classroom or corporation.

Risk Taking in Education

Risk taking in education has been viewed as a potential threat but also with curiosity. Ponticell (2003) asserted that schools traditionally have been highly resistant to risk taking and change, and that prescriptive, achievement-based curriculum, standardized testing, and other forms of accountability may not leave time or an atmosphere for students and teachers to take the possible healthy risk of wandering through new intellectual territory.

Nonetheless, educators have begun to write about and call for risk taking efforts in the classroom. Anderson (2002, p. 37) asserts that our "task is not to eliminate risk, but to attract and develop teachers who are willing and able to face the risks of teaching well." Clifford (1989) posited that we know little about academic risk taking, although risk taking has a long and convincing list of psychological attributes. The positive attributes that result from healthy and appropriate risk taking include maximized satisfaction (Atkinson, 1957), the enhancement of self-efficacy (Bandura, 1982, 1993), enhancement of perceived competence and control (Deci & Porac, 1978; Harter, 1978), and the enhancement of attention, concentration, persistence, and process-orientation (Csikszentimihalyi, 1990, 1996) for both teachers and students.

Indeed, some researchers have asserted that risk taking is an essential ingredient for teacher growth (Darling-Hammond & McLaughlin, 1996), and that effective teacher education and learning must involve learning how to effectively take risks (Cohen & Barnes, 1993; Fullan, 1995). Jambor (1995) described educational risk taking and learning to handle risk as a natural part of children's growth and development. However, despite the common use of

the term "risk taking" in general educational and school reform literature, little empirical research exists that can describe and define healthy academic risk taking and environments that might foster this type of risk taking (Ponticell, 2003).

Especially in the field of education, which is in the position to foster individuals' understanding of healthy risk taking and its concomitant growth, research on risk taking could lead to broad changes in how we approach learning and individual intellectual growth as well as broader school reform efforts. Ponticell (2003) proposed that further study of the risk-taking construct could enhance our understanding of teacher risk taking and related factors.

Risk taking may also be related to the creative process. Farley (1991, p. 372) claimed that risk taking is "at the core of human creativity," and that "creative and productive risk taking" is one of the great lessons teachers and parents should be giving children. Further, he posits that our future as a nation depends on fostering the healthy side of our risk taking, making the most of our national propensity to innovate by engaging in risk taking. Clifford (1991, p. 292) suggests, "links among academic risk taking, theories of educational psychology, and

educational practice need to be identified, explored, and empirically demonstrated, because learning through risk taking activities is likely to affect nearly every aspect of the educational process."

Definitional and Conceptual Problems

The definition of risk taking is highly contextual, grounded in history and culture (Tulloch & Lupton, 2003), resulting in several distinct and unique theoretical models of risk. A large sector of the scholarly work on risk taking defines risk as a hazard; for example, studies about exposure to environmental radioactivity, driving without seatbelts, alcohol abuse, and unprotected sex (Slovic, 2000). Related to theories of hazardous risk taking is the empirical research on adolescence, personality development, and risk taking (Lipsett & Mitnick, 1992). Another distinct sector of empirical research links personality traits and risk taking (Kogan & Wallach, 1964; Zuckerman, 1994), and thus defines risk taking through the lens of personality traits associated with risk taking. Yet another distinct body of empirical research links risk to decision-making, defining risk in terms of the probability distribution of outcomes (Shapira, 1995). Because risk taking is so highly contextual, no one conceptual model or measure of risk

taking seems appropriate for application across disciplines or psychological constructs. A common thread in defining risk taking, however, is through the attributes of loss, significance of loss, lack of certainty, and negative consequences (Kogan & Wallach, 1967; Ponticell, 2003; Yates & Stone, 1992). Research on positive risk taking has yet to directly empirically link the construct to the concepts of gain and positive outcomes.

Risk Taking and Innovation

Risk taking and innovative behavior have been indirectly empirically linked (Czikszentmihalyi, 1996; Goldsmith, 1984; Kontoghiorghes, Awbrey, & Feurig, 2005). In the creative process, risk taking, new idea promotion, and innovation also seem to be linked. For example, in a 2005 study conducted to assess the relationship between learning organization characteristics and change adaptation, innovation, and organizational performance, Kontoghiorghes, Awbrey and Feurig (2005) determined that the strongest predictors of change adaptation and organizational performance included an organizational orientation toward risk taking and new idea promotion. Risk taking is an important ingredient in the process of innovation, and if too many obstacles to risk taking and

exploration exist, motivation to engage in creative behavior is extinguished (Czikszentmihalyi, 1996). In the creative world, including fields such as science, business, and the arts, risk taking and innovation seem to be essential ingredients of the creative process. In a five-year study of 91 exemplary individuals from a variety of fields, including astronomy, literature, banking, and aircraft design, among others, Czikszentmihalyi (1996) asserted that allowing oneself to take risks and break with the comfort and safety of simply following tradition is a necessary component of innovation. In speaking about her own creative process, the writer Madeleine L'Engle attributed her success to her ability to take risks and an uncompromising determination not to play it safe (Czikszentmihalyi, 1996, p. 257).

The term "risk taking" is also commonly used in conjunction with school reform literature and concepts of change and innovation (Ponticell, 2003). In efforts to embrace school reform efforts that result in lasting and effective change, teachers, principals, and districts that understand how to promote healthy change (or school reform efforts) through the use of risk taking and innovation may ultimately be more effective educators despite the negative dissonance they experience at the beginning (McKinney,

Sexton, & Meyerson, 1999). However, the relationship between risk taking and innovative behavior in education, from district and school leadership to the classroom, remains unclear.

Risk Taking, Teaching-Efficacy, and Innovation

As stated above, risk taking behavior and human motivation are "almost synonymous," (Cicchetti, Barnett, Rabideau, & Toth, 1991, p. 184). The leading authority on the topic of self-efficacy, Bandura (1993, p. 128) stated that "self-beliefs of efficacy play a key role in the self-regulation of motivation." These concepts have similar aspects, suggesting that the three concepts of risk taking, motivation, and self-efficacy may be closely related constructs. Robbins, Brown, Osburn, Patterson, Prouty and Swicegood (1991) developed a model of collaborative teaching and learning that includes three interrelated and overlapping dimensions. The three links include instructional reflection, collaboration and decision making among colleagues, and spiraling, recursive cycles of increased risk taking by teachers and groups, suggesting that effective teachers are also effective risk takers. Although very little empirical evidence exists that links

teaching efficacy and risk taking, this existing evidence points to a relationship.

Because risk taking seems to be related to teaching efficacy, understanding how the concepts are related could provide insight into the teaching process and influence approaches to in-service training. Teachers who have high levels of instructional efficacy are more motivated and effective teachers, and they create more mastery experiences for their students (Bandura, 1993). McKinney, Sexton, & Meyerson (1999) asserted that teachers who experience high levels of efficacy in their teaching are often willing to persist at an innovation despite high levels of cognitive dissonance as they begin the process. These teachers tend to be more supportive of student development of intrinsic self-interests, and less oriented toward extrinsic reward systems and punitive, custodial methods. Ashton and Webb (1986) established a link between teaching efficacy and student achievement. Insight into the dynamics of this link could lead to a better understanding of how the teaching process might impact student achievement and learning, which, after all, is a main objective of teaching. It seems logical that teacher risk taking could be a component of teaching that moves teachers from the initial step of feeling a sense of teaching

efficacy to the final result of student achievement and learning.

Organizational Climate and Risk Taking

Organizations that promote and encourage an atmosphere of risk taking may be better risk takers and innovators. Kontoghiorghes, Awbrey, and Feurig (2005) found that the strongest predictors of rapid adaptation and quick product or service introduction included risk taking and new idea promotion, and also included open communication and information sharing, and resources that facilitate job performance. While the simple voicing of support for an organizational culture of risk taking and resultant innovation is a first step, however, several other practices must also be in place in order for the risk taking to succeed (Klein & Knight, 2005). These practices include sustained support on every level, from the initial steps of hardware and software development, for example, to an organization-wide understanding that cultural change and procedural change take time to implement. The decision to foster a culture of risk taking and innovation must be present from the managerial level to the execution level, where employees lower in the organization feel supported in every way to take healthy risks and try new methods. An

important element of the implementation of a risk taking culture is a sustained effort over time, and the understanding that organizations tend to cling to old ways of doing things. Often, Klein and Knight (2005) assert, efforts to take risks and innovate are abandoned too soon, before the results of the new ways of thinking produce results.

In the field of education, work climate plays an integral role in school success (Reames & Spencer, 1998). School culture has a unique and complicated connection with reform and improvement efforts (Boyd, 1992; Sarason, 1990). Reames and Spencer (1998) found that the organizational structures and work patterns of successful schools included "openness," that leaders share and participate in management decisions, they focus on the structures and processes that make their school operate well, they believe in the synergy of the group in attaining goals, and feel a sense of partnership with the environment outside their school. Interestingly, the encouragement of risk taking and innovative behavior was found to be one of the primary structures in the school environment that helped further school goals.

Demographic Variables

The purpose of this study was to contribute to an understanding of teacher risk taking. For the purposes of this study, age, gender, ethnicity, and length of teaching career were demographic variables that might impact risk taking (e.g. Byrnes, Miller & Schafer, 1999; Lightfoot, 1997; Streitmatter, 1997). Therefore, this investigation will control for these demographic variables. The demographic variables included in this study are age, gender, ethnicity, and length of teaching experience (Reames & Spencer, 1998).

Statement of the Problem

Risk taking pervades our lives, whether individually, in groups such as corporations, schools, or countries, or as a planet (Beck, 1992; Tulloch & Lupton, 2003). We speak of risk taking and managing risk in almost everything we do, from financial and medical decisions to sports performance.

We live under the assumption that effective and prudent risk taking is a crucial step in managing life, in generating innovative solutions to the problems and challenges individuals and groups face daily. Thus, an understanding of the construct of risk taking and its

relationship to self-efficacy, organizational climate and innovation could lead to a greater understanding of how to use risk taking as a tool to solve problems, to address challenges, to facilitate lasting, positive change, and to grow as an individual or an institution. If we can empirically link risk taking to intellectual growth and innovative behavior, we might be able to find more effective ways to motivate employees to find new solutions to the enormous challenges facing us today.

Especially in the field of education, where persistence in innovation is linked to successful reform efforts over time (Guskey, 1988; McKinney et al., 1999), understanding the role of risk taking and its relationship to innovation could generate best practices and in-service training that incorporate healthy and effective risk taking as a step in the teaching process, ultimately aiding in the design of better learning strategies and environments for children. As Anderson (2002, p. 40) puts it, "the task is not to eliminate risk, but to attract and develop teachers who are willing and able to face the risks of teaching well." An understanding of teacher risk taking will require empirical exploration of the construct in order to create a deeper sense of how the teacher risk taking works in the classroom. While research indicates that teaching efficacy,

risk taking, school climate, and innovation are vital components of effective teaching, the relationship among the variables remains unclear. A better understanding of the relationship among these variables has profound implications for educators' approach to fostering successful schools as well as broader school reform efforts. In a larger arena, an understanding of the relationship among the constructs of efficacy, innovation, and culture may have profound implications for theoretical approaches to implementing cultures of risk taking and innovation in all types of organizations.

For the purposes of this study, I propose the following model:

Figure 1. Relationship among the variables of teaching efficacy, innovation, and risk taking.

Purpose of the Study

Risk taking is considered to be an important determinant of motivation and human growth (Cicchetti, Barnett, Rabideau, & Toth, 1991), and a central concept in theories of motivation in the field of education (Clifford, Lan, Chou, & Qi, 1989). Arguably, one of the most important learning, and therefore motivational, experiences a student has is the classroom experience. Teachers throughout the world are prepared to teach through in-service training that takes a variety of forms, from college classrooms to continuing training for teaching professionals. Even the No Child Left Behind Act of 2001, Pub. L. No. 107-110, mandates high quality teacher training based on empirical evidence from studies conducted in high quality programs. A deeper understanding of how teacher training might incorporate theories of effective risk taking and innovation into classroom practice could provide new standards for best practice. In addition, teaching efficacy, which may be related to effective risk taking, has been firmly linked to student achievement and learning (Ashton & Webb, 1986). Accordingly, the purpose of this exploratory study was to systematically gain a better understanding of teacher risk taking by investigating the relationship among the following variables: teaching

efficacy, school culture, support for innovation, and teacher risk taking in schools.

Research Questions

The research questions were as follows:

- 1) How much variance in teacher risk taking can be predicted by the independent variables: years as a teacher, teaching efficacy, school climate, and perceived organizational support for innovation?
- 2) What is the relationship between teacher risk taking and:
 - a. Teaching efficacy
 - b. School climate, and
 - c. Perceived organizational support for innovation?

Limitations of the Study

This exploratory research will be conducted in school settings, using primarily self-reporting of data. Qualitative supervisor or peer observations of school culture and individual performance are not included in this study.

While schools are only one type of organization that could benefit from an understanding of positive, innovative risk taking, the results of this research should be

generalized only to similar school populations. However, it is hoped that the results of this study will stimulate further investigation into risk taking, innovation, and creativity in other types of organizations.

Delimitations of the Study

The main purpose of this study was to investigate the effects of teacher efficacy, school culture, and support for innovation on teacher risk taking. Thus, strategies to promote teacher risk taking, teaching efficacy, or organizational climate were not a part of this study.

Definition of Terms

Academic Risk Taking - Instructional decisions made with a level of uncertainty about the outcome, but undertaken to improve teaching and support student learning. This type of risk taking usually challenges the status quo or the norm, moving beyond personally comfortable teaching habits (Berg, Grisham, Jacobs, & Mathison, 2000).

Adolescent Risk Taking - Risk taking during adolescence, usually considered to be a normal part of identity development, but also potentially destructive (Irwin & Millstein, 1986).

Effective Risk Taking - Risk taking that results in a positive outcome or solution to a problem.

Healthy Risk Taking - Similar to effective risk taking, positive, prudent, and growth-inducing risk taking involving moving beyond one's comfort zone to experience growth.

Innovation - The extent to which an organization or individual can introduce new products, ideas or services quickly and easily (Kontoghiorghe, Awbrey, & Feurig, 2005). In the education setting, this definition would include introducing adaptive curriculum or teaching methods to increase student learning.

Innovative Behavior - Action or behavior that could result in innovation and productive change.

Organizational Climate - A set of values associated with practices, rules, and norms of behavior in an organization (Harvey, Erdos, Bolam, Cox, Kennedy, & Gregory, 2002).

Positive Risk Taking - Risk taking undertaken to produce a positive result.

Risk Taking - The overall term used to describe the act of entering into a situation where the individual or group may experience potential loss, potential gain, and unknown consequences or results (Kogan & Wallach, 1967).

School Climate - School environment or school-level learning environment. The social system of shared norms and expectations (Johnson & Stevens, 2006).

School Culture - A pattern of shared basic assumptions that the group learns as it solves problem... to be taught to new members as the correct way to perceive, think and feel (Schein, 1985).

Teaching Efficacy - The construct of teacher efficacy refers to teachers' beliefs about their ability to have a positive effect on student learning and achievement (Ashton, 1986). Previous research on teaching efficacy is related to teacher success in curriculum innovation (Berman & McLaughlin, 1977).

Significance of the Study

Risk taking is an essential ingredient for successful teacher growth, and substantial teacher education and learning must involve risk taking (Cohen & Barnes, 1993; Fullan, 1995; Grisham, et al., 2000). The classroom may be the most widely used forum for childhood and adult education around the world. Because the classroom arguably is one of the most important and primary learning environments, it is imperative that educators understand how to foster and maintain an atmosphere that allows for

positive risk taking and the experiential exploration and intellectual growth that results (Clifford, 1991; Farley, 1991; Ponticell, 2003).

Guskey (1988, p. 63) stated that "the vast majority of modern educational improvement efforts involve the implementation of new or alternative instructional practices," highlighting the critical nature of understanding how to foster these efforts. Further, teachers who experience high levels of teaching efficacy appear to be the most receptive to implementing new instructional practices, i.e. innovative approaches to teaching (Denzine, Cooney, & McKenzie, 2005; Guskey, 1988). It appears that risk taking might be the crucial link between teaching efficacy and lasting innovation in the classroom.

Accordingly, an understanding of teaching efficacy, school culture (environment), innovation, and risk taking, including the environments that foster teaching efficacy and teacher risk taking, will be central to school improvement efforts, and may lead to longer lasting and more effective school reform efforts. Further, establishing an empirical relationship between teacher risk taking and teaching efficacy, school culture (environment), and innovation could strengthen the case for fostering

environments that include understanding and encouraging positive risk taking as a useful and productive educational strategy.

Summary

The definition of risk taking is highly contextual, grounded in history and culture (Tulloch & Lupton, 2003), resulting in several distinct and unique theoretical models of risk. Although most of the risk taking literature views the construct through a negative lens, recently, we have come to view risk taking as a positive, healthy behavior that results in gain and growth (Csikszentmihalyi, 1990; Klein & Knight, 2005). Risk assessment and management are inherent components of the basic literature of many fields of study that impact our daily lives, including medicine, public health, engineering, economics, business, law and insurance, to name a few (Stalker, 2003).

Risk taking pervades our lives, whether individually, in groups such as corporations, schools, or countries, or as a planet (Beck, 1992; Tulloch & Lupton, 2003). Risk taking is considered to be an important determinant of motivation and human growth (Cicchetti, Barnett, Rabideau, & Toth, 1991). In fact, risk taking behavior and human

motivation are "almost synonymous," (Cicchetti et al., 1991, p. 184).

Risk taking is an important component of creativity and innovation (Czikszentmihalyi, 1996). The term "risk taking" is commonly used in conjunction with school reform literature and concepts of change and innovation (Ponticell, 2003). Many educators routinely call for the creation of an atmosphere of risk taking in school settings, from the top down, i.e. from the leadership to the teachers to the children (Clifford, 1989, 1991; Fullan, 1995; Ponticell, 2003; Stretimatter, 1997). However, little empirical evidence exists that might help us understand teacher risk taking in the classroom. A greater understanding of the role of positive risk taking in the classroom could have profound implications for understanding the components of effective classrooms and more effective school reform efforts.

CHAPTER II

LITERATURE REVIEW

I believe that risk taking is at the core of human creativity, and that creative and productive risk taking is one of the great lessons that education, and the family, should be giving children.

(Farley, 1991, p. 372)

Risk assessment and management are inherent components of the basic literature of many fields of study that impact our daily lives, including medicine, public health, engineering, economics, business, law and insurance, to name a few (Stalker, 2003). To emphasize the human importance of risk taking, some researchers assert that risk-taking behavior and human motivation are "almost synonymous," (Cicchetti, Barnett, Rabideau, & Toth, 1991, p. 184). Most of the daily decisions we act upon every day involve a balance between anticipated reward and the risk involved (Zuckerman & Kuhlman, 2000). Some theorists use an all-encompassing term, "risk society," to define the current state of our global society (Beck, 1992). Even the larger biological world can be included in the realm of

risk and gain; the very survival of animals in the wild involves a degree of innate biological risk taking, continued existence resulting from action (such as foraging for food or dominance to enhance reproductive fitness) versus the stagnation, even death, resulting from inaction (Kamil & Roitblat, 1985; Roy & Weisfeld, 2004).

A broad overview of the risk-taking literature reveals a generally negative perspective of risk taking, using key concepts of loss, significance of loss, and uncertainty to operationalize the construct (Yates & Stone, 1992). A large body of the risk taking research involves adolescent behavior and development, a temporary stage we all pass through to enter adulthood (e.g. Lightfoot, 1997; Lipsett & Mitnick, 1992). Researchers have established a clear link between certain personality traits and risk taking (e.g. Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005; Zuckerman & Kuhlman, 2000). Gradually, some theorists have grown to view risk taking also as a positive, healthy trait, both personally and in organizations, and are calling for a deeper understanding of the positive aspects of this construct and its role in fields of study such as education, as well as in entities such as business organizations or schools (e.g. Beedie, 1994; Clifford, Lan, Chou, & Qi 1989; Farley, 1991).

Theories of Risk Taking

Investigation into the risk taking literature reveals an evolutionary theoretical process. As stated above, the definition of risk taking is highly contextual, grounded in history and culture (Tulloch & Lupton, 2003), resulting in several unique theoretical models of risk. Individual differences, including biological bases of risk taking, also play a role (e.g. Zuckerman, 1994; Apter, 2001; Arnett, 2007), further complicating each risk-taking situation, whether individual or organizational. Several schools of thought about risk taking have developed in response to the need to develop an understanding of risk taking in varying contexts.

Risk-taking theories first originated as a way to measure and manage risk in business or investment (Coombs & Beardlsee, 1954; Edwards, 1954, 1955; Slovic, 2000; Yates & Stone, 1992). A large body of theoretical literature on risk taking can be found in the field of human development and adolescent risk taking (e.g. Lightfoot, 1997; Lipsett, 1992), which also views risk taking through the negative lens of destructive behavior, but is beginning to evolve into thinking of adolescent risk taking as normal transitional behaviors that are developmentally

strengthening. Sociocognitive theories include a risk-taking component in their bodies of literature in reference to optimal challenge (Bandura, 1993; Vygotsky, 1978). In the business literature, risk taking and innovation are often closely associated, sometimes even treated as one concept. The contemporary business world also includes risk taking as a significant part of its literature (e.g. Driver, 2001; Harvey, Erdos, Cox, Kennedy & Gregory, 2002; Kamalanabhan, 1999; Klein & Knight, 2005), and has moved toward thinking of risk taking also as a positive trait. Business leaders routinely mandate the need to take risks to grow and innovate as an organization, but the empirical research establishing a clear picture of the nature of the association between risk taking and the predictors and resulting benefits is virtually non-existent.

In the field of education, increasing numbers of researchers are calling for a deeper understanding of risk taking in the classroom. Clifford (1989, 1991), Fullan (1995) Isen (1983), and Ponticell (2003) have theorized that educators must understand risk taking. Theories of risk taking related to the field of education touch on curriculum innovation and lasting change, although the empirical research on risk taking in education is scant.

Risk Taking as Loss and Negative Consequences

Historically, loss and negative consequences have characterized risk-taking theory. Early risk-taking theorists such as Kogan and Wallach (1964) defined the construct as a decision-making process involving choice among alternatives, lack of certainty, and the prospect of loss or failure.

Similar to decision-making theory, economic decision making and expectancy-value models proposed by researchers such as Coombs & Beardslee (1954) and Edwards (1954) attempted to explain risk taking through decision making related to the expected or potential value of economic choices, all viewed through the lens of potential loss.

In response to an emerging consensus that risk cannot be defined in a manner applicable to all situations, Yates and Stone (1992) proposed a theory of risk taking that defined the construct using loss, significance of loss, and uncertainty as central concepts.

Slovic (2000) theorized about the *perception* of risk in relation to hazard in the public domain, including natural hazards such as earthquakes and floods, man-made hazards related to institutional (for example, seat belt use) and environmental safety (for example, nuclear waste disposal), and adolescent risk taking. Slovic asserted that

we experience a gap between the expert view of risk in each situation and public perception of risk, partly because the public is not fully informed about the true risks of each situation. Slovic viewed risk as an all-encompassing concept that dominates society and must be accurately assessed, communicated, and effectively controlled in every major realm that involves risk, from adolescent behavior to law to nuclear waste.

Risk Taking as Feelings

Several theorists view risk-taking behavior as a result of the emotions, including anticipated emotions, experienced by the individual at the time a decision is made. Loewenstein, Weber, Hsee, and Welch (2001) proposed a "risk-as-feelings" framework for understanding risk taking, drawing on research on risk taking drawn from clinical, physiological, and other subfields of psychology. In this framework, the individual is theorized to act based upon both present emotions and anticipated emotions that occur as a result of the behavior. This theoretical framework adds the dimension of emotion to risk taking, going beyond an understanding of risk taking as only cognitive and consequential (loss, significance of loss, and

uncertainty). Figure 2 shows the Risk-as-Feelings perspective.

Figure 2. *Risk-as-Feelings Perspective (Leowenstein, Weber, Hsee, & Welch, 2001).*

A comprehensive, biologically-based explanation of the integral role of emotion in risk taking lies in the work of Apter (2001). Reversal theory, defined as a structural-phenomenological theory of motivation, emotion, and personality, also helps explain risk taking using an emotions-based model. Reversal theory provides insight into risk taking behavior beyond simple intellectual calculations of loss and consequence, adding the complicated dimension of emotion to further explain risk taking and enhance our understanding of the construct. Using this theory, risk taking becomes less voluntary and

calculated, and more involuntary and biologically motivated. Psychological level of arousal and emotions-based frames for viewing decision-making (or risk taking) behavior, reversal theory helps explain why individuals avoid or seek risks, even finding risk appealing, pleasant, and satisfying. As Gerkovich (2001) explained in a chapter devoted to risk taking in Apter's book, *Motivational Styles in Everyday Life: A Guide to Reversal Theory*,

One of the strengths of reversal theory is its ability to address such paradoxical behavior as risk-taking. The explanation for why people not only do not avoid risks but also often seek them out is based on certain fundamental reversal theory constructs. (p. 215)

According to Apter's complex theory, "universal and essential" to the nature of an individual's experience are four domains, including means-end, rules, transactions, and relationships. Revolving around these four domains are reverse psychological states, or two opposite alternatives (or motivational attitudes) for experiencing each of the four states. An individual can quite suddenly switch from one attitude to its polar opposite, causing a reversal of perspective and motivation in a given situation. This reversal helps explain why an individual may behave in a risk-seeking manner in one instance, and in a risk-averse manner in what appears to be the same situation. Underlying the reversals are environmental and situational factors

very specific to the individual, for example feeling triumphant then guilty over winning a tennis match, proud then ashamed over convincing a friend to try a drink for the first time, aroused then bored or scared by skiing a particularly difficult trail, or relaxed and excited then anxious about asking someone out on a date. In total, there are 16 different emotions, half pleasant, and half unpleasant, that form the structure of emotional experience. All 16 can influence the motivation to engage in or avoid risk-taking behavior (Gerkovich, 2001).

Risk Taking as Positive

Lupton & Tulloch (2002), in *'Life would be pretty dull without risk': voluntary risk taking and its pleasures*, theorized that despite the negative aspects of risk taking, including emotions such as fear and dread, uncertainty, loss, and loss of control, "voluntary" risk taking could also result in clear psychological and emotional benefits. The researchers interviewed 74 Australians about voluntary risk taking and every day life, in 1997-1998, resulting in stories of personal growth, self-improvement, adventure, challenge, and excitement. Lupton and Tulloch suggested that risk taking is more complex than previously thought, and included dominant themes of self-improvement, emotional

engagement, and control, in addition to loss and uncertainty.

In a similar vein, Stalker (2003) proposed that although we are a risk society, we lack a social model of risk, which could help us practice more effectively in fields such as social work. In a review of European literature on risk taking, Stalker acknowledged that much of the risk-taking literature in fields such as gambling, adolescent development, and medicine focused on negative consequences and risk avoidance. In contrast, Stalker envisioned a continuum of risk for use in the management of social work, ranging from a damage control view of risk and a risk avoidance practice to a positive, empowering view of risk taking on the other pole. At the positive end of the continuum, social workers would encourage personal growth through healthy and productive risk taking. Confirming other researchers calls for further research on risk taking in fields related to sociology, such as education, Stalker called for a deeper empirical understanding of positive risk taking, asserting that the positive aspects of risk taking associated with personal empowerment could result in gain and growth for the individual. It is this theory of risk taking that most closely matches our definition of risk taking for the purposes of this study.

In education, risk taking is often theoretically linked to human growth and learning (e.g. Clifford, 1989, 1991; Ponticell, 2003). Especially in outdoor education, challenge and risk are inherent in theories that view risk taking as positive experience, as a behavior that can lead to personal growth, competence, increased self-efficacy, and optimal levels of arousal (Beedie, 1994). Priest (1993) proposed a risk-taking model for outdoor education that can be readily applied to a general education setting. Priest hypothesized that individuals can use ideas of personal competence to influence success or failure in adventure activities, using mental pathways and feedback loops. The model shows the potential impact on the individual's emotional and cognitive development, using concepts such as self-efficacy (Bandura, 1977) and flow and arousal (Csikszentmihalyi's 1990, 1996).

In this model, Priest (1993) theorized that positive feedback can lead to higher levels of self-efficacy, allowing the individual to take increased risks by breaking with his comfort zone, resulting in personal growth through experience. In contrast, negative feedback may lead to lower levels of self-efficacy, and thus, a lower level of risk taking as the individual reacts to the negative experience. When the levels of risk and competence match,

optimal arousal and a state of flow (Csikszentmihalyi, 1990, 1996) may result, and the individual will continue to seek appropriate and healthy levels of risk until the feedback changes. Priest (1993) asserted that the educator can facilitate an atmosphere of adventure and motivation, encouraging the individual to attribute success to his own efforts and abilities, resulting in feelings of joy, pleasure, and increased locus of control, all emotions associated with effective learning.

Risk Taking Research

Biological Bases of Risk Taking

Research shows that biological factors can produce strong risk taking tendencies based on levels of monoamine oxidase (MAO), a brain chemical enzyme associated with risk behavior (Buchsbaum & Haier, 1983). MAO levels are genetically determined, and dictate an individual's biological need for brain stimulation; individuals with low levels of MAO have a greater need for brain stimulation, thrilling experiences, and sensation-seeking activities that involve physical and psychological risks (Zuckerman, 1994). Individuals with high levels of MAO are less active and avoid stimulating activities or actions. They tend to be shy and more sedate (Jambor, 1995; Zuckerman, 1994).

Interestingly, MAO levels gradually increase with age in the human brain, platelets, and plasma, and women have higher MAO levels than men (Zuckerman, 1994).

Reversal theory (Apter, 2001; Gerkovich, 2001), defined as a structural phenomenological theory of motivation, emotion, and personality, helps explain risk taking and biological/psychological reasons for risk taking and why an individual will seek risk in some situations and not in others. As discussed above, viewing risk taking using reversal theory, risk taking becomes less voluntary and calculated, and more involuntary and biologically motivated. Using psychological level of arousal and emotions-based frames for viewing decision-making (or risk taking) behavior, reversal theory helps explain why individuals avoid or seek risks, even finding risk appealing, pleasant, and satisfying.

Risk Taking Research with Children and Adolescents

A large body of the risk-taking literature covers risk taking during childhood and adolescence. Several educational theorists believe that risk taking is an important of early childhood and adolescent development (e.g. Arnett, 2007; Lightfoot, 1997; Miller & Byrnes, 1997; Smith, 1998), and propose that taking risks and breaking

out of a comfort zone is inherent in exploring the world. For example, when a child reaches a higher rung on the playground equipment, she most likely feels a sense of exhilaration at the accomplishment, and also a feeling of increased self-efficacy and confidence after mastering the new challenge; this child has reached a new level of competence, a cycle she will repeat over and over as she expands her horizons throughout childhood, adolescence, and later adulthood. Arguably, risk-taking behavior was an essential part of this growth.

During adolescence, the individual is transitioning from child to adult, which, by definition, involves disequilibrium and disruption (Arnett, 2007; Baumrind, 1991). While much of the adolescent risk-taking literature focuses on negative consequences of teenage risk taking, viewing it as behavior or social problem that must be controlled and extinguished in the name of safety, some researchers have begun to view adolescent risk taking as a necessary step in becoming an adult. The work of Arnett (2002, 2007) illustrates that the period of emerging adulthood (ages 18-25) that occurs after late adolescence (ages 15-18), is the foremost period of identity exploration, and the period during which risk taking behaviors peak. The transition to marriage and parenthood

is seen as a protective factor that insulates against risk taking behavior (Kellam, Adams, Brown, & Ensminger, 1982). Research also indicates that when people reach age 30, they have greater impulse control (Gross, Cartensen, Pasupathi, & Tsai, 1997) and are more positive emotionally (Helson & Klohn 1998).

In another example, in a study of adolescent risk taking based on in-depth interviews of 41 teenagers, Lightfoot (1997) found that adolescents take risks to transform identity, to become the heroes of their own lives, taking risks for a positive purpose, testing limits to discover their own personal limits. Risk taking is a part of the exploration and identity formation that takes place during that transition (Lightfoot, 1997).

In a study illustrating the negative view of childhood risk taking, Miller & Byrnes (1997) conducted initial tests of a self-regulation model (SRM) of risk taking, which defines inappropriate risk taking as associated with overconfidence and falling prey to dysregulating influences (impulsivity, peer presence, etc.), and an insensitivity to outcomes. According to Byrnes (1997), self-regulation involves five tendencies that can increase goal attainment in risk taking: (a) knowledge of strategies for attaining specific goals, (b) the ability to coordinate multiple

goals, (c) a calibrated sense of uncertainty, (d) self-correcting strategies for overcoming dysregulating tendencies, biases, and limitations, and (e) a tendency to learn from experience. Self-regulation is important because an inability to implement these strategies could lead to dysregulated risk taking (Byrnes, 1997).

The researchers conducted two experiments to test the SRM. The first experiment assessed the effects of peer presence and four personal factors on the risk taking of 3rd, 5th, and 7th graders. The second experiment assessed the relationship between risk taking of 4th, 6th, and 8th graders and competitiveness, sensation-seeking, and peer nomination of risk takers. Results generally supported predictions that factors of the SRM were significantly correlated with risk taking in children and adolescents. In experiment one, results showed risk taking to be related to impulsivity, peer presence, overconfidence, and insensitivity to outcomes. In experiment two, results showed that five variables correlated with risk taking as predicted: ability beliefs, a preference for thrill seeking, peer nomination, competitiveness, and interest.

In summary, childhood and adolescent risk taking seems to be biologically driven, related to identity formation, finding limits, and engaging in personal growth (Baumrind,

1991; Lightfoot, 1997). This recent research shows that risk taking can be instrumental and positive in human development, and not necessarily something to be avoided at all costs. At the same time, research shows that childhood and adolescent risk taking is driven by similar motivations to adult risk taking, such as sensation seeking (Miller & Byrnes, 1997).

Risk Taking and Personality

Much of the research on risk taking involves general personality traits associated with risk taking. Interestingly, the findings seem to vary with a focus on the type of risk taking. For example, harmful and daredevil risk taking might be associated with antisocial personality traits such as impulsivity (Zegans, 1993), while athletic risk taking might be associated with prosocial personality traits such as heroism (Beedie, 1994; Priest, 1993), yet both types of risk taking could be associated with a sensation seeking personality trait (Zuckerman, 1994). The propensity to take risks varies from individual to individual as well; for example, a sensation seeking personality trait in one individual might foster risk taking on the ski hill, while in another individual it might foster intellectual risks that take the form of new

theories that run counter to conventional thought in a given subject, and in yet another individual, the same sensation seeking personality trait might lead to a propensity to gamble or take drugs. In this example, each individual possesses the same personality trait (in this case sensation seeking), but each seeks a different stimulus.

Viewed as a personality trait, risk taking is closely associated with a sensation-seeking personality (Zuckerman, 1994). Defined as a tendency to seek novel, varied, complex, and intense sensations and experiences, and the willingness to take risks for the sake of such experience, the sensation-seeking trait in personality is a subject of continuing research since the development of the Sensation Seeking Scale (SSS) by Zuckerman in the 1960s. Zuckerman closely associated sensation-seeking with risk taking, albeit through the negative lens, by studying smoking, drinking, drugs, sex, driving, and gambling (Zuckerman & Kuhlman, 2000). In a sample of 260 college students, using self-reports that measured risky behaviors and the Zuckerman-Kuhlman five-factor personality questionnaire, personality traits most closely associated with risk taking were impulsivity, aggression, and sociability. The researchers propose a biological basis for risk taking.

Missing in this research is the notion that risk taking can be beneficial and result in positive outcomes.

Plax and Rosenfeld (1976) studied personality correlates of risky decision-making. The purpose of the study was to identify predictors of risky behavior in a variety of decision-making situations. Using seven personality tests administered to 240 students enrolled at the University of New Mexico, the researchers performed correlational, factor analytic, and stepwise multiple regression analyses to identify risky decision making personality correlates, or a risky decision making personality pattern. The researchers found a risk-taking personality pattern characterized by persistence, effective communication, confidence, outgoing orientation, cleverness, imagination, aggression, efficiency, clear thought patterns, manipulation, and a tendency to be opportunistic in interactions. "High" risk takers were characterized as dynamic task-oriented leaders, aggressive and manipulative, independent and radical, and willing to place personal needs before group needs.

In response to a possible oversimplification of the risk taking construct, Levenson (1990) proposed that the tendency to create simple and reductionistic models to explain personality had resulted in an incomplete picture

of risk taking and personality, where risk taking was explained in terms of a single and consistent set of traits despite the differences in types of risk taking. In an effort to disprove this more simplified model of risk taking, the researcher compared personality traits of three types of risk takers: antisocial risk takers (drug unit residents), adventurous risk takers (highly skilled rock climbers), and pro-social risk takers (heroes) to represent different psychological types as well as different forms of risk taking. The antisocial risk takers scored higher on antisocial and psychopathological measures, including a higher tendency toward substance abuse, emotionality, depression, psychopathy, disinhibition, boredom susceptibility, and had lower scores on empathy. The adventurous risk takers scored higher than the heroes on thrill and experience seeking, while the heroes showed lower scores on sensation seeking, suggesting that their activities were not motivated by sensation seeking. Based on these findings, the researcher asserted that different types of risk taking appear to have very different antecedents and consequences, ranging from physical to social, premeditated to impulsive, and prosocial to antisocial, and called for further research to help define the differences among the types of risk taking.

Goldsmith (1984) studied the ability to adapt to new situations in relation to personality traits. Using the Kirton Adaption-Innovation Inventory (KAI) (Kirton, 1976) and scales measuring dogmatism, sensation seeking, risk taking, and innovation to correlate "adaption-innovation" with the personality characteristics of sensation seeking, risk taking, and innovation, the researcher found that "adaption-innovation" was positively correlated with sensation seeking, risk taking, and innovation, and negatively correlated with dogmatism. The KAI measures a cognitive style that leads to characteristic patterns of problem solving and decision-making. This research clearly linked innovators to risk taking in problem solving and decision-making situations.

In the process of developing a measure of risk taking, Zaleskiewicz (2001) developed a new way to categorize risk takers by introducing two types of risk taking: instrumental and stimulating. All risk taking activity, he asserted, would fall into instrumental or stimulating risk taking. The researcher found that instrumental risk taking is related to risk preference in financial investments and determined by personality traits connected with an orientation toward the future, including rational thinking, impulsivity, and sensation seeking. Stimulating risk taking

was found to be related to a preference for recreational, ethical, health, and gambling risk taking, and determined by personality traits connected with paratelic orientation, arousal seeking, impulsivity, and strong sensation seeking.

Nicholson, Soane, Fenton-O'Creevy, and Willman (2005) conducted a study to develop a new scale to assess overall risk propensity in six domains: recreation, health, career, finance, safety, and social. The researchers found that risk propensity has clear links with age and sex, and with objective measures of career-related risk taking. The researchers also found that risk taking is strongly related to personality, with a clear personality pattern (based on the NEO-PI) emerging that combined high extraversion and openness to experience with low neuroticism, agreeableness, and conscientiousness. Sensation seeking was also determined to be a key component of risk propensity. Researchers grouped risk takers into three categories: stimulation seekers, goal achievers, and risk adapters. Finally, the researchers made the distinction among three types of risk takers: stimulation seekers, goal achievers, and risk adapters. The stimulation seekers are truly risk seeking, while the goal achievers and risk adapters are more appropriately thought of as risk bearers.

Risk Taking and Emotion and Mood

As stated above, risk taking is highly contextual (Tulloch & Lupton, 2003) and can vary according to individual differences (e.g. Farley, 1991; Gerkovich, 2001; Lipsett & Mitnick, 1992). Emotion and mood can influence individual risk-taking behavior, further complicating the risk-taking construct. For example, a skier who has successfully navigated a chute between two cliffs might feel exhilarated and enthusiastic about doing the next chute, while the same skier may decide to quit for the day (or the year) after falling several hundred yards through the same chute and inadvertently starting an avalanche. The latter decision is driven by fear and dread, and any feelings of enthusiasm and euphoria are extinguished.

In an early risk taking/emotion study that used gambling and hypothetical situations to assess risk, Isen and Patrick (1983) conducted two concurrent studies, one involving an actual game of roulette, and one involving a questionnaire that involved hypothetical dilemmas. The researchers found that feelings of elation increased risk taking (participants were more daring) in the gambling situation, and that as the probability of success went up, participants engaged in higher levels of risk taking in low risk betting. However, in the hypothetical situations,

participants were less likely to take a risk as the level of risk went up, and were not affected by emotion. The complexity of the results illustrated the challenge in measuring and fully explaining the risk-taking construct.

Using existing data from clinical, physiological, and other psychology subfields, Loewenstein, Wever, Hsee, and Welch (2001) investigated an alternative theoretical framework for risk taking, the "risk-as-feelings" hypothesis, viewing risk taking through the feelings experienced at the time of risky decision making. Analysis of existing risk taking research showed that emotional reactions may play a large role in driving risk taking decision making and behavior.

In the field of education, research shows that teacher emotion influences classroom practice, and response to curriculum reform and school change. In an overall synthesis of five articles that contained empirical research on teacher emotion Reio (2005) asserted that teachers' emotional experiences of school reform influence risk taking, and further, that emotion and risk taking influence teacher identity formation. The following model, developed by Reio, shows the relationship between school reform, and emotions, identity, risk taking, and ultimately, learning and development.

Figure 3. *A conceptual model of the influence of reform on teacher identity, emotions, risk taking, and learning (Reio, 2005).*

In this case, risk taking can be viewed positively as an instrument for change and self-confidence, if the risk taking leads to a beneficial outcome. Conversely, Reio maintained that negative emotions experienced as a result of the uncertainty and loss involved in school reform efforts would inhibit teacher risk taking. Based on the empirical evidence surrounding these constructs, Reio called for further study of the role of risk taking in educational settings, asserting that evidence indicates that a better understanding of teacher risk taking and

emotions, their effect on teacher identity development, and the resulting impact on school reform efforts could lead to more effective and lasting reform.

In a study of teacher identity, agency, and professional vulnerability in a school reform context, Lasky (2004) used survey and interview data to explore the ways teachers experienced professional vulnerability during school reform. As a part of the process, Lasky addressed risk taking and its connection to feelings of vulnerability, or in other words, how teachers willingly risked being vulnerable. Lasky found that teachers who take risks experience a feeling of vulnerability as they work to maintain the openness necessary to trying something new in class. Some teachers who struggled to maintain a sense of openness and vulnerability were sometimes able to take professional risks that benefited the students, and reported that they became better at it over time. Thus, Lasky asserted, in school reform contexts, an understanding of how feelings of vulnerability are linked to implementing new ideas and taking risks might help us design programs that foster effective school reform.

In summary, in educational reform settings, teacher risk taking and emotion seem to be inextricably linked as we examine the process of teaching during times of change.

Risk Taking and Gender Differences

Early studies about risk taking and gender revealed significant differences in males and females in the perception of risk and the propensity to take risks, both in children and adults. Over time, however, some research has shown little difference, or a closing gap between gender differences in risk taking perception and behavior.

In a meta-analysis of 150 studies of risk taking tendencies of male and female participants, Byrnes, Miller and Schafer (1999) found greater risk taking behavior in male participants. However, for certain topics, such as intellectual risk taking and physical skills, the differences between genders were larger than for others such as smoking. Findings included significant shifts in the size of the gender gap between successive age levels, and that overall, the gender gap seems to be growing smaller over time.

Research on gender differences in education has focused on student risk taking in the classroom. In a review of literature from the 1970s through the early 1990s, Ramos and Lambating (1996) found that students who are greater risk takers perform better on mathematics tests, and that males are greater risk takers than females

in this area. Further, these differences may affect the opportunities available to girls for college admission, scholarship availability, and self-confidence in mathematics. In a similar vein, Streitmatter (1997) conducted a study of a girls-only middle school math class to determine whether girls had a different attitude toward class in general, and toward risk taking when the class was girls only. Using an interview format, the research findings indicated that girls felt more confident taking risks in asking and answering questions, and that girls reported higher levels of self-confidence in this setting.

Finucane, Slovic, Mertz, Flynn, and Satterfield (2000) studied risk perception in relation to gender and race. The researchers found the risk perception of white males was significantly and consistently lower than the other groups studied, including women and other races. In other words, white males perceived the level of risk associated with a specific situation to be lower, and females and other races perceived the risk associated with the same situation to be higher. The researchers concluded that the discrepancies in risk perceptions of men and women may be related to sociopolitical differences rather than differences in rationality or education, the traditional explanation (Finucane, et al., 2000). However, an understanding that

white males may perceive risk differently than others might explain why males seem to be more risk taking than others, and could help in understanding or designing risk taking situations.

Risk Taking in Groups

Dahlback (2003) proposed a theory of group risk taking derived from a "conflict theory" of individual risk taking. The researchers conducted a small empirical study to support their theory, focusing on the interaction of risk taking at the individual and the group level. The researchers proposed that no one consensus on group risk taking has emerged because previous research had not taken individual conflict theory into account. The researchers proposed that individual decision making is influenced by internal conflict, resultant unpleasant feelings, and individual defense mechanisms that moderate the unpleasant feelings, and further, that in groups, the use of such defense mechanisms is facilitated when they make a decision. Dahlback further asserted that the theory of "risky shift," the tendency of groups to take greater risks than the individual acting alone, is supported by his theory, because the following conditions tend to support group risk taking: (a) receiving support, sympathy, and

comfort from group members that can lead to greater risk taking, (b) diffusion of responsibility can lead to increased risk taking, and (c) the concept that people who take risks are given higher social value by the group. This theory illustrates why groups may take larger risks than individuals, drawing on research that helps explain individual risk taking through conflict theory.

Research on risk taking in learning organizations comprises a distinct segment of the risk taking literature in the business sector. Research conducted to more clearly define the effective attributes of learning organizations has established a link between risk taking and organizational success (Clarke, 2001). In learning organizations, risk taking is a hallmark of the corporate culture, voiced as such, and encouraged by leadership.

Risk Taking Research in the Business Sector

Risk Taking and Business Leaders

A portion of the risk-taking literature in the business sector concerns business leaders and their risk-taking tendencies. Publications such as *The Wall Street Journal* and *The New York Times* routinely refer to risk and risk taking in all types of venues, pointing to a cultural view of risk takers as heroic and innovative (Stranger,

1999). Although empirical research on risk taking and leadership behavior is scant, a few studies have helped to identify risk-taking characteristics of business executives.

Nicolaou-Smokoviti (2004) conducted a study of business leaders, gender differences, and leadership styles, finding no significant overall gender differences in risk-taking in leadership style. However, results showed that leaders, both men and women, with a higher level of authority were more likely to take risks than those with a low level of authority. Results also showed that older men were more risk-taking than younger men, and that women also showed that tendency, but the difference for women was not statistically significant. Other findings showed men to be more competitive than women, and that women appear to be more likely to have a democratic and collaborative style of leadership than men.

MacCrimmon and Wehrung (1990) performed a factor analysis of seven consolidated measures of risk taking behavior in business executives. Results showed clear relationships between risk taking behavior and executive success: the most successful executives were the biggest risk takers. Interestingly, this research also showed that

mature executives were the most risk averse, conflicting with the results found by Nicolaou-Smokoviti (2004).

Kamalanabhan and Sunder (1999) conducted an empirical study to test whether managers are more risk taking than other employees. Using ANOVA and Chi-square analysis, results showed that managers, potential managers, and non-managerial employees did not differ significantly in risk taking as measured by the CDQ and Risk-in-Basket questionnaires. Conclusions were that risk is situational, and that expectations of managers are more about *successful* risk taking than simply *more* risk taking.

In an effort to understand and improve managerial decision making, Shapira (1995) conducted a mixed methods exploratory study to evaluate risk definitions, attitudes and risk taking decisions of 706 managerial executives employed by a variety of public and private sector firms in Israel and the United States. Shapira found that managers viewed risk as the "downside" of a situation, defining it as potential loss. These managers also viewed risk as the *magnitude* of possible *bad* outcomes rather than a probability concept. Finally, the managers viewed risk not as chance, as in gambling theory, but as something that must be skillfully addressed and manipulated by the decision maker, using judgment, control, and experience to

make decisions that involve risk. The researcher concluded that managerial risk taking in action does not fit decision theory or classical theoretical conceptions of risk, suggesting that intellectual and emotional considerations play a role in managers' risky decision making.

Risk Taking and Organizational Climate

In organizations, risk taking does not take place in a vacuum. Rather, risk taking is a part of a complicated organizational culture that promotes innovation and growth. Klein and Knight (2005) asserted that the first step in an organization actually adopting and implementing new practices that lead to change is the promotion of a culture of innovation and growth. Another vital step, often missing from an organization's attempts to promote change, is the implementation of an innovation adopted by the leadership of an organization (Klein & Knight, 2005). While the adoption of a new innovation is often the costliest step because it often requires extensive training, the purchase of equipment or curriculum, new technological innovations, and new ways of interacting, coordinating activities, and sharing information, it is the final step of implementation that many organizations never reach.

The changes and activities that come with the adoption of the innovation may be too challenging for an organization to overcome. Klein and Knight (2005) outlined six stumbling blocks that can thwart innovation implementation. First, technological innovations can be unreliable. Hardware and software changes involve working out bugs, ensuring that new computer technology flows from the older, existing technology, and addressing the negative consequences of these challenges on employee job satisfaction and how that translates into implementation of the technology. Second, the acquisition of new knowledge and skills, often with increasing complexity, time commitment for training, and figuring out how to actually execute the changes, is time-consuming and often stressful for employees. Third, the decision to adopt an innovation is often made by the higher levels of management of an organization; however, the actual changes associated with the innovation must be executed by employees lower in the organization as well. For example, a state would mandate school reform and dictate the form of the changes, or the owner of a company might purchase a complicated new tooling system, but it is the employees, in these examples the teachers or the assembly line workers, that must implement the changes. Fourth, innovation requires individuals to

change roles (often hierarchical) and routines. Many individuals who were comfortable with norms and status quo are forced to change how they operate in order for an innovation to succeed.

Fifth, the initial implementation stage can bring a performance decrease as the organization spends time and money on technology start-up, training, communication, and support. The organization may never reach the point of return on that investment. Sixth, organizations can tend to cling to past ways of doing things, for a variety of reasons. Some may fear reprisal for actions or thoughts, for example, which translates into inaction. Many school reform efforts never get to the implementation point, as teachers, parents, and school leaders rigidly adhere to past practices despite the fact that research shows that new methods and ideas could greatly benefit children.

According to Klein and Knight, six key cultural and leadership factors must be present in order for innovation implementation to occur. The first key factor is the set policies and procedures that accompany an innovation (Klein & Ralls, 1995). These policies and procedures include specific expectations for training quality and quantity, technical support, a reward structure for employee implementation, and the user-friendliness of the technology

itself. Second, the organizational climate for innovation implementation must be encouraging, positive, and part of a shared vision, so employees regard the innovation as a priority that helps accomplish goals, rather than as mandated "busy work" or a distraction from the real work of the organization. Third, demonstrable managerial support for the innovation, with strong, convincing, and informed action, plays a supportive role in innovation implementation. Fourth, financial resources are necessary to follow through on implementation innovation. Training, technology, support, communication, and innovation design are expensive components of executing an innovation (Nord & Tucker, 1987; Klein, Conn, & Sorra 2001). Fifth, the organization must have a learning orientation. As Klein and Knight explain, risk taking is part of the definition of learning orientation:

In organizations and teams that have a strong learning orientation, employees eagerly engage in experimentation and risk taking; they are not constrained by a fear of failure. (p. 245)

Support for risk taking enhances organizational ability to overcome obstacles through adaptation and experimentation, allowing for continued effort toward implementation despite failures and setbacks encountered along the way. Employees or group members who feel a

shared vision that includes communication of personal fallibility, and articulation and provision of a psychologically safe environment, are more likely to feel secure taking risks (Edmonson, 1999). Finally, the sixth critical factor is a leadership orientation toward long term, sustained support for innovation implementation. Often, benefits of innovation are seen only after sustained effort over time. Organizations (such as schools) are quick to abandon innovation or reform efforts that do not show short-term results, while a longer-term effort may have been all that was necessary to see the innovation work as envisioned. Indeed, the more leaders focus on immediate task performance (such as prescriptive curriculum), the less employees can devote time to longer term projects that could offer more enduring gains (Repenning & Sterman, 2002).

In a study of organizational characteristics associated with innovation, change adaptation, and bottom-line organizational performance, Kontoghiorghes, Awbrey, and Feurig (2005) focused on the organizational characteristics of open communications, risk taking, support and recognition for learning, available resources for job performance, team orientation, rewards for learning, and training that have been associated with

successful introduction of products or services in learning organizations. The researchers conducted a principal component analysis, multiple regression, and correlational analyses using responses from a Likert-type questionnaire typically used to assess learning organizations. The researchers found that risk taking and new idea promotion are predictors of rapid change adaptation and quick product or service introduction, and bottom line organizational performance. Open communication and information sharing, resource availability, a high-performance team environment, rewards for learning, performance, and new ideas, and a continuous learning climate were also predictors of rapid change adaptation.

Park and Kwon (2004) explored the relationship between self-directed learning readiness and employees' perceptions of work environment in Korean companies. Self-directed learning readiness is defined as an individual's propensity to take responsibility for and initiate his or her own learning and growth, and is positively correlated with job performance (Park and Kwon, 2004). Using a three-part questionnaire that measured self-directed learning readiness, work environment, and demographic variables, the researchers performed an ANOVA to determine differences in perceived work environment and self-directed learning

readiness. They found that self-directed learning readiness was related to perception of individual involvement in risk taking. Work environment characteristics that defined an atmosphere of risk taking included encouraging experimentation and searching for new ways for doing things, creative leadership that encourages innovation, welcoming the application of new concepts, and encouraging taking risks and trying new approaches. The researchers asserted that education that develops skills such as these that help employees adapt to change quickly is indispensable for survival for companies today.

In groups, planning ahead, discussing risk, and using terms that imply a positive view of risk taking can positively influence the propensity to take risks. Van Schie, Van der Pligt, and Van Baaren (1993) conducted a study that resulted in higher levels of risk taking for participants based on the evaluative connotation of the terms used to describe risk. A positive evaluation of risk taking and a negative evaluation of risk avoidance led to increased risk preference. For example, using positive terms such as "daring," "courageous," and "enterprising" versus terms such as "reckless," "over-confident," and "thoughtless" led participants to prefer risk in the

situations that used the positive connotations. This study illustrated that contextual factors influence risk taking.

Fischer and Smith (2002) examined sensation seeking, deliberation (planning ahead, discussing a situation) and the resulting effects on risk taking. The researchers found that deliberation resulted in a lower level of maladaptive risk taking, and also that deliberation may lead to more positive outlets for sensation seeking and risk taking. The researchers suggest that the results show a difference between planning ahead and thrill-seeking, and that an individual can be a "deliberative sensation seeker" (p. 535). In this study, the results also suggest that the practice of suggesting (and deliberating about) alternative thrill seeking outlets for sensation seekers may help them to engage in activities with more positive outcomes, a practice that could be helpful in channeling adolescent risk taking.

Finally, in a segment of organizations that call themselves "learning organizations," risk taking (added to other core values) is encouraged as a hallmark of culture and progress (Clarke, 2001).

Risk Taking and Safety Culture

A significant component of the risk taking literature concerns safety and the minimization of risk or danger to the individual and the organization in industries such machine tool production lines, residential gas and electric energy distribution, or nuclear power plants, for example. The component of organizational culture related to the risk associated with these industries is sometimes called "safety culture," the quality of which predicts safety performance (Harvey, Erdos, Cox, Kennedy, & Gregory, 2002). Here, risk-taking behavior is minimized through education, because it is associated with negative consequences, with little or no positive value for the entity. In organizations that view risk taking in this way, risk is measured using scales that assess risk attitudes and propensity, using negative behaviors and consequences, hazards, and safety culture to develop statements of risk taking related to personal and group responsibility in Likert-type scales.

Risk Taking Research in Education

Risk Taking in the Classroom

Research on risk taking in the educational literature is limited. As cited above, a segment of research in the

classroom has focused on student risk taking and gender differences (Byrnes, Miller & Shafer, 1999; Ramos & Lambating, 1996; Streitmatter, 1997). Traditionally, education has been linked to error avoidance and reinforcement rewards (Clifford, 1991), practices that undermine the intrinsic value of learning. Prescriptive curriculum and high levels of accountability in education, often the result of school reform efforts, do not foster risk taking and innovation because teachers are concerned more with adhering to regulations and requirements than designing innovative teaching methods (Krisko, 2001; Lasky, 2005).

In contrast, more recent teaching and learning best practice and standards based on research across disciplines describe a set of thirteen principles, an emerging consensus, that characterize teaching practices that maximize and enhance student learning: curriculum should be student-centered, experiential, holistic, authentic, expressive, reflective, social, collaborative, democratic, cognitive, developmental, constructivist, and challenging (Zemelman, Daniels, & Hyde, 1998). Several of these best practices are related to the concept of healthy and challenging risk taking, but research is just beginning to empirically link classroom risk taking to any of these

thirteen areas of practice, and some of these relationships require the reader to make assumptive and intuitive leaps.

For example, risk taking can be linked to challenge by applying Bandura's self-efficacy theory (1977). Self-efficacy is defined as "an individual's judgment of his or her ability to organize and execute behaviors to achieve a goal" (Clifford, 1991, p. 269). According to Bandura, mastery of challenging tasks leads to improvement over time and increased self-efficacy. Bandura more clearly links risk taking and challenge to self-efficacy as follows:

The efficacy judgments that are the most functional are probably those that slightly exceed what one can do at any given time. Such self-appraisals lead people to undertake realistically challenging tasks and provide motivation for progressive self-development of their capabilities. (p. 394)

Further, Bandura links teacher self-efficacy to instructional practice, student mastery and academic self-directedness. At the school level, the quality and self-efficacy of leadership, "collective efficacy" (1993), provides an overall atmosphere that promotes academic success for students. Moderate or healthy risk taking associated with this kind of institutional cognitive challenge may promote school success.

In a case study of risk taking in the development of a school-within-a-school program, Ponticell (2003) related

school reform to healthy risk taking, asserting that the traditional definitions of risk taking, including loss, significance of loss, and uncertainty (Yates & Stone, 1992) may not be sufficient to explain teacher risk taking behavior. The concepts of emotion and gain, which are embedded in loss and significance of loss, may be more pertinent to teacher risk taking. Ponticell called for further exploration of teacher risk taking in relation to the concepts of emotion and gain. In addition, Ponticell found that social interactions, organizational processes, and group or organizational values, influenced group risk taking, illustrating the importance of the influence of organizational culture in educational settings.

In a study that examined teacher leadership that resulted in the development of a teacher leader profile, Krisko (2001) developed a list of eight characteristics of effective teacher leaders who led beyond the classroom. The willingness to take responsible risks emerged as one of the attributes, which also included creativity, effectiveness, flexibility, lifelong learning, possessing a sense of humor, good intrapersonal sense and strong interpersonal skills. Ninety three percent of the respondents at the teacher leader level listed "taking responsible risks" as a vital component of effective teacher leadership. The risk

taking aspect of teaching in this research was described as essential in overcoming barriers to ensure an atmosphere of positive student learning, which shows a proactive approach, rather than being content with the status quo. Krisko concluded that these characteristics are necessary in order for true reform and dynamic change to take place, and also that administrators who can foster them will experience more sustained and effective reform efforts.

Another characteristic that Lasky (2005) found to be essential for some teachers to be effective is the feeling of vulnerability. Interviews of teachers revealed a perception that risk taking and experiencing vulnerability were inseparable to teachers (p. 908), and that some teachers felt more effective if they could maintain an openness that resulted in a feeling of vulnerability.

In a collaborative "polylog" created by several practicing teachers, Robbins, Brown, Osburn, Patterson, Prouty, and Swicegood (1991) found that a collegial network supported risk taking, resulting in "spiraling, recursive cycles of risk taking" in which student success and teacher reflection supported higher levels of healthy risk taking by teachers in the classroom.

Clifford (1991) found that student risk taking facilitated learning, and called for more research on the

link between risk taking and educational practice, because "learning through risk taking activities is likely to affect nearly every aspect of the educational process." (p. 292). Clifford, Lan, Chou, and Qi (1989) asserted that as long as prescriptive education without risk taking opportunities continue to exist, teachers and schools would be unlikely to participate in academic risk taking, resulting in little growth.

Smith (1998), through qualitative observations of children on playgrounds, provided a thoughtful rationale for educators to encourage children to take risks to grow intellectually and emotionally. While Smith's research took place on the playground and pertained to physical risks, the concept of adult facilitation of risk in the classroom can be translated into other types of learning and risk beyond the playground. Smith's work illustrated the risk taking elements in children's efforts to try, then master new physical challenges, and the resultant growth these children experienced. He showed, through examples of interactions between children and adults, how teachers can hinder or facilitate growth. For example, an adult showing a child a "better" way to accomplish a physical feat on the monkey bars extinguishes the pride a child feels when demonstrating a new skill to that adult. In contrast,

speaking about the pride a child must feel because of the accomplishment stimulates the self-efficacy and power a child feels when trying the same new skill. Smith posited that teachers have a pedagogical responsibility to understand and support risk. Smith related this type of risk taking to Zuckerman's theory of sensation seeking (1979) and Csikszentmihalyi's theory of flow attainment (1990). Smith concluded that risk is "essential to being with children, ...to growing up, and ...to becoming at home in the world, (p. 181-182). Both teacher and student risk taking were parts of Smith's discussion.

In another theoretical call for risk taking on the playground as a part of natural growth and development, Jambor (1995) asserted that

Learning to handle risk is part of a child's natural growth and development; it is part of growing up; it pervades most of our activities throughout life. We must not deny the children of today the natural risk taking and consequential learning opportunities that have been common to the childhoods of past generations. (p. 3)

Outdoor education literature also often refers to risk taking as a philosophical cornerstone. Beedie (1994) conducted a study summarizing open-ended teacher questionnaires covering the perceived relationship between risk taking and learning. Teachers felt that risk taking was an important part of educating. Beedie, too, pointed to

the pull between prescriptive curriculum versus teacher freedom to innovate and take risks as challenging for teachers to assimilate and overcome.

Anderson (2002) called for risk taking in the context of school reform and the classroom by introducing the concept of autonomy to teacher risk taking. Autonomy allows for risk taking to occur, which, in turn, makes teaching meaningful and engaging. Anderson called for less stringent and prescriptive controls on education and to instead "develop teachers who are willing and able to face the risks of teaching well" (p. 37), to bring teaching alive. It seems that professional development of teachers may play a large role in fostering teacher risk taking.

Risk Taking and Teacher Professional Development

In order for the concept of teacher risk taking to become useful as a teaching strategy, professional development programs must include information on teacher risk taking and its benefits as a part of in-service training. While empirical evidence for incorporating risk-taking training in professional development programs may be lacking, the assumption that risk taking is a vital component of teaching should be present in professional development literature (Anderson, 2002). For example, the

Kentucky Department of Education (2004) published a manual to guide school development of professional development programs, in which fostering an atmosphere of "flexibility, experimentation, and *risk taking*, rather than prescribed lockstep behaviors or punishment for failures" (p. 3) is one of the ten guiding principles for planning effective professional development.

Empirical research on the value of risk taking as a component of high quality teacher professional development is scant. In one study, Berg, Grisham, Jacobs, and Mathison (2000) examined a professional development program and whether core beliefs embedded in the program had a lasting effect on teachers. Risk taking was one of the four core constructs. Results indicated that 15 years later, principals were committed to the four constructs, as were teachers, demonstrating the "lasting" value of high quality professional development. Beck & Kosnik (2001) evaluated student teachers in a pre-service program that emphasized community building. The researchers found that one of the positive effects of the community building approach was a greater willingness to take risks in teaching, including in relationships, on the part of the student teachers.

In a literature review exploring research related to intellectual risk taking in an educational leadership

program, Ridenour and Twale (2005) examined risk and risk-taking behavior in educational leadership preparation programs. Within the context of the educational setting, and, specifically, the context of academic generations, the authors argue although risk is essential for innovation to occur, significant gender differences in risk taking may affect the degree of risk taking in the classroom. Considering the fact that education is a culturally conservative profession, the authors argue, educational administration programs might be more effective if they included direction on how to take purposeful and effective risks. Citing the work of Gilligan (1982) and Ponton (1997), the authors suggested that women are less likely to engage in risk taking behavior because they have had fewer opportunities, and because they may have been warned not to take risks, while men have been encouraged to take risks. Further illustrating the complexity of the teacher risk taking construct, Ridenour and Twale point out that in an educational setting, all members of the faculty and other leadership must feel a part of the dominant cultural group, and innovation and risk may be either dominant, in which case women may not feel comfortable, or not dominant, in which case all may feel uncomfortable taking a risk or innovating.

Risk Taking, School Climate, Innovation, and School Reform

In order for risk taking and innovation to take place in the classroom, the school climate must support the characteristics that foster risk taking and innovation (Clifford, 1991; Robbins, Brown, Osburn, Patterson, Prouty, & Swicegood, 1991; Ponticell, 2003). In one of the few studies on school climate, risk taking and curriculum innovation, Littledyke (1997) studied the effect of teacher culture on educational change over a two-year period in an English primary school. Qualitative methods included participant observation with field notes, document analysis, interviews, and surveys. The British government was in the process of implementing a new, comprehensive National Curriculum, and the Science component was introduced during the period of time of this study. Three headteachers led the school during the two-year study, all with markedly different leadership styles. The first headteacher held the role for 17 years, establishing a tightly controlled, highly monitored, prescriptive culture in which risk taking and innovation were discouraged. Under the leadership of this headteacher, all involved recognized the necessity to evolve to implement the new curriculum, but made little progress toward this goal.

When this headteacher left, the new acting head encouraged more collaborative and participatory practices. The school culture moved toward a higher level of teamwork because of increased communication, collaboration, and enthusiasm. Compared to other schools in the study, during this time, the school achieved a higher level of implementation of the new curriculum. Finally, the third headteacher adopted a strategy of hiring teachers from outside to implement curriculum change, discontinuing the collaboration and breaking up the teams and relationships that had helped the school progress toward curriculum change. Ultimately, morale fell, and the school moved to a position well behind the comparison schools in curriculum implementation. Although this was a case study of a single school, the comparisons with 15 other schools' curriculum implementation provided insight into leadership style (i.e. bureaucratic versus empowering and collaborative, including risk taking) and its influence on growth and innovation.

Reames and Spencer (1998) examined middle school teachers' perceptions of work culture, teaching efficacy, and organizational commitment, using a mixed methods approach of a mailed survey combined with focus groups. The researchers found that a mixture of process variables (such as collaboration, participatory decision making, and

supportive leadership) and structures (encouragement of innovation and risk taking, clear school goals and planning, and high quality staff development) were the essential ingredients for teachers to perceive positive work culture, organizational commitment, and higher levels of perceived teaching efficacy. This research provides evidence that specific aspects of school culture can foster productive teacher risk taking.

Risk Taking, Self-Efficacy, and Innovation

Self-Efficacy Theory

Self-efficacy theory (Bandura, 1993) goes beyond basic cognitive functioning to add social, motivational, and affective components to individual achievement and functioning. Self-efficacy plays an important role in the self-regulation of motivation. An important aspect of self-efficacy is that individuals who experience high levels of self-efficacy are not deterred by setbacks or failures, and can make a more sustained effort to achieve a goal (such as school reform) over time. As Bandura states,

A strong sense of efficacy enhances personal accomplishment in many ways. People with a high efficacy approach difficult tasks as challenges to be mastered rather than as threats to be avoided. Such an efficacious outlook fosters interest and deep engrossment in activities. They set themselves challenging goals and maintain strong commitment to

them. They maintain a task-diagnostic focus that guides effective performance. They heighten and sustain their efforts in the face of failure. They attribute failure to insufficient effort or deficient knowledge and skills that are acquirable. They quickly recover their sense of efficacy after failures or setbacks. They approach threatening situations with assurance that they can exercise control over them. (p. 144-145)

Further, Bandura acknowledged the value of challenge in teaching, stating "those who have a low sense of instructional efficacy favor a custodial orientation" (p. 140), rather than a dynamic, active approach that involves challenge and requires taking risks by moving out of a comfort zone by working at a level that slightly exceeds what one can do at any given time. Mastering challenges successfully leads to increased levels of self-efficacy.

In summary, Bandura's theory of self-efficacy assists in understanding why healthy risk taking can be productive and beneficial. While self-efficacy theory can be applied to all life situations, in the educational setting, an understanding of this theory could help school reform designers understand teacher motivation over time, allowing for a more sustained and, ultimately, more successful approach to school reform.

Risk Taking and Self-Efficacy in Education

Several researchers directly link self-efficacy to risk taking in education (Clifford, 1991; Priest, 1993). Priest, an outdoor educator, studied risk-taking activity in outdoor education, finding risk-taking activity influences an individual's emotional and cognitive development through feedback loops, thus increasing self-efficacy. Clifford (1991) linked self-efficacy and moderate risk taking, relying on the work of Bandura (1977, 1982) to argue that increasing self-efficacy involves taking moderate risks. According to Clifford, self-efficacy and taking the risk of tackling slightly challenging tasks is a precursor and motivation for development of capabilities.

Teacher Efficacy and Innovation

Teacher efficacy refers to teachers' beliefs about their ability to have a positive effect on student learning and achievement (Ashton & Web, 1986). Education reform efforts call for teachers who have high levels of self-efficacy and thus are able to commit to implementing enduring and effective change (Guskey, 1988). Several studies have empirically linked teaching efficacy to curriculum innovation. In an exploratory study of teacher efficacy, self-concept, and attitudes toward the

implementation of instructional innovation, Guskey (1988) administered a questionnaire to 120 elementary and secondary school teachers immediately following a one-day in-service training on mastery learning instructional strategies. Results showed that teaching efficacy and teaching self-concept were significantly related to teacher attitudes toward the importance of implementing new instructional practices. Conversely, teachers who felt lower levels of teaching efficacy appeared to be the least receptive to implementation of new instructional practices.

Ghaith and Yaghi (1997) conducted a study to explore the relationships among experience, teacher efficacy, and attitudes toward instructional innovation. Using a small sample ($N=25$) and the teacher efficacy scale developed by Gibson and Dembo (1984), demographic data that included educational attainment, teaching experience, gender, and teaching level, and a measure of attitudes toward the implementation of instructional innovation (Guskey, 1988), the researchers first computed product-moment correlations for all variables to examine the relationships among the determinants of teacher attitudes toward implementing innovation, and second performed t-tests to determine if teachers' attitudes differed by experience, personal teaching efficacy, and general teaching efficacy.

Questionnaire data revealed that experience was negatively correlated, personal teaching efficacy positively correlated, and general teaching efficacy not correlated with teachers' attitudes toward implementing new instructional practices. The researchers also found supporting evidence for a positive relationship between efficacy and task persistence, but called for further study of personal teaching efficacy, professional development, and how years of experience influence teachers' sense of professional efficacy.

McKinney, Sexton, and Meyerson (1999) empirically validated the "Efficacy-Based Change Model" (Ohlhausen, Meyerson, and Sexton, 1992) by studying teachers moving through curriculum innovation. The Efficacy-Based Change Model (ECBM), developed by researchers interested in understanding the process of change in educational settings, addresses the process of educational change over time and in relation to the internal processes of the participants. In developing the model, Ohlhausen, et al. (1992) discovered that through the process of change, self-reflection and addressing concerns increased self-efficacy, and facilitated commitment to the innovation process.

McKinney, et al. (1999) addressed concepts of persistence in sustaining change and reflective practices,

a concept, they asserted, that received little attention in the research literature. Results showed that teachers who viewed innovative teaching techniques as tools that could help them become better teachers could embrace change, were more persistent in implementing changes, and better able to overcome the cognitive dissonance they experienced during the first stages of curriculum innovation. The researchers found that the value teachers placed in educational innovation was directly impacted by beliefs they could implement the innovation. Data strongly supported and highlighted the role that self-efficacy plays in the organizational change process in an educational setting.

Measurement of Risk Taking, Teaching Efficacy, and Innovation

Risk Taking Measures

No one measure of risk taking has emerged as a universal measure that is applicable to all risk taking situations, possibly because of the evolution of thinking (from negative toward positive) surrounding the construct, because of the situational nature of each risk-taking event, and because researchers do not agree on the definition of risk taking. Risk taking researchers suggested that the lack of definition of the risk propensity construct across domains such as finance,

recreation, health, safety, social and ethical situations and career/prestige-related domains could be the reason there are so few risk measures (Harrison, Young, Butow, Salkeld, & Solomon, 2005; Macrimmon & Wehrung, 1990). Further, Kahneman and Tversky (1979) asserted that the actual risk-taking situation is framed by individual perception, where an individual will be risk averse in situations of gain, and risk seeking in situations in which they perceive they are in a domain of loss.

Harrison, et al. (2005) systematically reviewed instruments that measure risk propensity for use in health settings. Fourteen instruments were identified as useful in measuring risk in this setting. Eight instruments measured risk propensity, six measured personality traits associated with risk propensity. While most instruments demonstrated internal reliability, the application of any single instrument across situations was not appropriate. The researchers called for further adaptation and validation of the instruments.

As early as 1972, researchers were struggling with previously developed measures of risk taking, because no one measure or interpretation seemed to cover all facets of the risk taking construct (Jackson, Hourany, & Vidmar, 1972). This study highlighted different aspects of the

dilemma, asserting that individuals are not consistent risk takers across all situations. The result of this research was a four-dimensional interpretation (and measure) of risk taking that included monetary, physical, social, and ethical risk taking.

Kogan and Wallach (1964) developed a widely used risk taking scale, the Choice-Dilemma Scale, that measures risk-taking propensity using degrees of loss or reward. This measure has been widely used in risk-taking studies.

MacCrimmon and Wehrung (1984) questioned the reliability and validity of this measure because it has not been used in real personality measures. The consequences associated with using this one measure for interpreting all types of risk are the conflicting results obtained in research on risk taking.

In a typical example of risk measurement viewing risk as a negative behavior with negative consequences, Bell, Schoenrock, and O'Neal (2000) measured risk perception and risk behavior using Likert-type scales that defined risk in negative terms such as getting drunk, having sex with no protection, driving over 80 miles per hour, etc. This is one illustration of how previously used risk measures do not measure all facets of the risk construct because of the negative assumptions.

Nicholson, Soane, Fenton-O'Creevy, and Willman (2005) conducted a study to develop a new scale to assess overall risk propensity in six domains: recreation, health, career, finance, safety, and social. Findings were that risk propensity has clear links with age and sex, and with objective measures of career-related risk taking. The researchers also found that risk taking is strongly related to personality, with a clear personality pattern (based on the NEO-PI) emerging that combined high extraversion and openness to experience with low neuroticism, agreeableness, and conscientiousness. Sensation seeking was also determined to be a key component of risk propensity.

Zaleskiewicz (2001) developed the Stimulating-Instrumental Risk Inventory after differentiating between two types of risk: stimulating and instrumental. In evaluating the reliability and validity of this inventory, the researcher found that instrumental risk taking is related to risk preference in the investment domain and determined by personality traits connected with an orientation toward the future, including rational thinking, impulsivity, and sensation seeking. Stimulating risk taking was found to be related to a preference for recreational, ethical, health, and gambling risk taking, and determined

by personality traits connected with paratelic orientation, arousal seeking, impulsivity, and strong sensation seeking.

Teaching Efficacy Measures

Bandura (1977, 1982, 1993) first developed the concept and measures of self-efficacy. Rotter's social learning theory (1966) was another distinct strand of early teaching efficacy research and was also used as a basis for teaching efficacy theory. Using the work of Rotter and Bandura as a starting point, several researchers have developed measures of teaching efficacy (Denzine, Cooney, & McKenzie, 2005; Gibson & Dembo, 1984; Guskey, 1988; Tschannen-Moran & Woolfolk Hoy, 2001; Woolfolk & Hoy, 1990).

After observing that research on measuring teaching efficacy resulted in conflicting validity and reliability results, and also that measures differed over whether teaching efficacy is a two-factor construct (involving internal and external locus of control), Tschannen-Moran and Hoy (2001) developed a new measure of teaching efficacy, the *Ohio State Teacher Efficacy Scale (OSTES)*. The researchers conducted three studies to examine the factor structure, reliability, and validity of the new measure. Testing and refining the OSTES resulted in two forms, a 24-item long form, and a 12-item short form. A

varimax rotation of the 24-item scale yielded three factors (instruction, management, and engagement) with loadings ranging from 0.50 to 0.78. Reliabilities for the subscales were 0.91 for instruction, 0.90 for management, and 0.87 for engagement, and overall reliabilities of 0.94 and 0.90 respectively for the two scales. The researchers examined the construct validity of the instruments by correlating the new measure and other existing measures of teacher efficacy, resulting in strong positive correlations to all previously developed instruments that were compared. The researchers asserted that this new measure would more effectively measure teaching efficacy because it included more measures of teaching aspects that involved strong and capable students as well. Previous measures were developed focusing on coping with student difficulties and disruptions and overcoming impediments. This instrument is a recent and well-researched development in measuring teaching efficacy, and a good fit for the purposes of this study.

Innovation Measures

While innovation and innovative behavior is often a component of other measures of organizational culture (Johnson & Stevens, 2001; Siegel & Kaemmerer, 1978), the

concept of innovation alone may be difficult to measure, depending on the context of the innovation. Assessing innovation in corporate culture involves understanding the construct in all aspects of the organization, not just the research and development segment (Aiman-Smith, Goodrich, Roberts, & Scinta, 2005). Many tools exist that measure innovation in corporate settings. One example is the Value Innovation Potential Assessment Tool, which measures organizational innovation through concepts of meaningful work, risk taking culture, customer orientation, agile decision making, empowerment, business planning, and learning organization characteristics (Aiman-Smith, et al., 2005). These scales have an orientation toward product development and customer satisfaction. While these concepts are relevant to schools, they are not a perfect fit for the measurement of innovation in schools.

Siegel and Kaemmerer (1978) developed a Likert-type scale measuring members' perception of support for innovation in organizations, the Siegel Scale of Support for Innovation (SSSI). Three factors emerged as components of innovation: support of creativity, tolerance of diversity, and feelings of ownership or personal commitment, accounting for 78% of the variance in the matrix. Split-half reliability coefficients for the three

factors were calculated. The reliabilities of the three factors were 0.94, 0.94, and 0.72 respectively. This instrument was specifically developed in school settings, and is a good fit for the purposes of this study.

School Climate Measures

Organizational theory developed in response to a growing need to understand how to make organizations more productive and healthy as the world transformed from early sustenance-based living to mass production and, ultimately, idea and information-based commerce. In response to increased competition and fast-paced evolution and introduction of new products, researchers have attempted to better understand organizational cultures by developing measures of culture that could serve as an overall checkup of organizational health, and help set goals. As a result, many measures of organizational culture exist as tools to examine and fine-tune culture in many types of organizations.

School culture measures that more specifically provide a picture of school culture were developed as an extension of general organizational culture measures, because schools as formal organizations presented a unique and specific set of cultural aspects that general organizational culture

measures could not precisely capture empirically. Early school culture measures focused on structural aspects such as school resources, class size and student-teacher ratios (Johnson & Stevens, 2006). According to Fisher, Docker, and Fraser (1986), early school climate measures included Pace and Stern's College Characteristics Index (CCI), used in the 1950s, Coughlan's School Survey, used in the 1960s, and Stern's High School Characteristics Index, also used in the 1960s.

More recently developed, a frequently used instrument for measuring teachers' perceptions of school climate is the School Level Environment Questionnaire (SLEQ), a 56-item scale, with eight scales that includes student support, affiliation, professional interest, staff freedom, participatory decision making, innovation, resource adequacy, and work pressure (Fraser, 1994; Fraser & Rentoul, 1982). In the early 1980s, Burden and Fraser (1994) and Fraser and Rentoul (1982), were the first to use the SLEQ to measure school climate in several studies of schools in Australia (Cresswell & Fisher, 1998; Fisher & Fraser, 1990b; Fisher & Grady, 1998; Fisher, Grady, & Fraser, 1995; Rentoul & Fraser, 1983; Williamson, Tobin, & Fraser, 1986), South Africa (Mailula & Laugksch, 2003), and the United States (Blose & Fisher, 2003; Henson, 2001a;

Johnson & Stevens, 2000; Johnson & Templeton, 1998).

Despite the focus on school climate and its relationship to achievement, research showed conflicting results in establishing a clear link between climate and achievement.

Most recently, Johnson & Stevens (2006) developed a shorter, revised version of the SLEQ, a 21-item scale with six factors that include overall school climate, affiliation, innovation, participatory decision making, resource adequacy, and student support. The reliability for these six factors ranged from 0.77 to 0.90, demonstrating acceptable reliability coefficients for each factor. In addition, this instrument worked equally well for elementary, middle school, and high school teachers. Because of the high levels of reliability and the ability of the tool to be used in a variety of K-12 settings, this instrument will be a good fit for the purposes of this study.

Chapter Summary

In summary, educators are calling for a deeper understanding of the role of healthy risk taking in the classroom (e.g. Clifford, 1991; Farley, 1991; Fullan, 1995; Ponticell, 2003). Beyond the classroom, we are a nation of risk takers, often giving hero status to risk takers who

forge forward to find new and innovative solutions to old challenges in the process of their risk taking.

Biologically, research shows that risk taking may be instrumental to growth and survival (Arnett, 2001; Kamil & Roitblat, 1985), and related to brain chemical levels (Apter, 2001). In our competitive and ever-changing world, from business to sports, national leadership to education, healthy, instrumental risk taking may be a vital component of personal and organizational agility which is a vital component of our ability to progress and evolve.

While much of the empirical research on risk taking focuses on the negative consequences of risk-taking behavior, very little research exists that helps explain the benefits of healthy and productive risk taking. The purpose of this study is to gain a better understanding of teacher risk taking. In the classroom, our understanding of the risk-taking construct might be vital to better understanding school reform and student achievement; risk taking and its relationship to school culture, teacher efficacy, and instructional innovation might be one of the keys to developing effective and lasting school reform. What better place to begin our journey toward understanding risk taking than in the classroom, where Farley (1991)

believes that risk taking is one of the great lessons we should be giving children.

CHAPTER III

METHODOLOGY

Introduction

The methodology section consists of the following topics: (a) introduction; (b) research questions; (c) survey research and measures; and (d) research protocol.

Research into risk taking in the field of education is a new research area. A handful of researchers have begun to take a look at risk taking as it relates to human growth, learning, motivation, best practice, and school reform (Clifford, 1991; Ponticell, 2003; Robbins, 1991). Several researchers have called for a deeper understanding of the role risk taking offers in the classroom because it might be linked to academic achievement and intellectual performance (Clifford, 1991; Fullan, 1995; Ponticell, 2003). However, despite the societal importance of risk taking, and routine references to the assumed benefits of risk taking in education, we know little about risk taking in educational settings. The next section outlines the research questions this study investigated.

Research Questions

The research questions were as follows:

- 1) How much variance in teacher risk taking can be predicted by the independent variables: years as a teacher, teaching efficacy, school climate, and perceived organizational support for innovation?
- 2) What is the relationship between teacher risk taking and:
 - a. Teaching efficacy
 - b. School climate, and
 - c. Perceived organizational support for innovation?

Research Design

In this study, a basic correlational design was used (Gall, Borg, & Gall, 1996). A significant advantage of this method is that it allows for analysis of a large number of variables within this single study. The correlational method also allows for measurement of the strength and degree of relationships among variables (Pagano, 1998). In addition, a hierarchical regression analysis will be employed to determine the unique variance and effect explained by organizational innovation and teaching efficacy in predicting teacher risk taking in the classroom (Cohen, 1988).

Although this study is primarily quantitative, a qualitative component will be added based on teacher comments voluntarily added at the end of the risk taking section of the questionnaire. At the end of that section, the teacher was asked to "please add any comments about your own risk taking in the classroom." Data analysis was inductive, in other words, the data generated themes that could be coded and organized accordingly. Miles and Huberman (1984) suggested generating themes from the conceptual framework, research questions, hypotheses, problem areas, and key variables that guide the study. They recommended that codes have a conceptual and structural order. Codes should relate to one another in coherent ways that are central to the study; they should move beyond simple descriptive codes to pattern codes that are explanatory or inferential codes, and which identify an emergent theme, pattern, or explanation (Miles & Huberman, 1984). The use of qualitative data generated information about teacher risk taking that could not be found in the quantitative findings.

Use of Surveys

In order to collect the relevant data for this study, a survey approach was used. This method has several advantages over other approaches (such as telephone or face-to-face interviews with participants) because it is more time efficient and less costly, allowing for a larger number of participants. In addition, Dillman (2000) has suggested that respondents may give more accurate and

honest answers when a survey is administered, because no social pressure exists. The Tailored Design Method proposed by Dillman (2000) was followed in this study. This survey was administered during faculty meetings at participating schools during the spring of 2008 and the fall of 2009.

Measures

This study measured demographic data, school climate, innovation, teaching efficacy, and teacher risk taking in order to gain a better understanding of teacher risk taking.

Demographic Variables

A six-item questionnaire was used to collect demographic information for the purposes of this study. Demographic information included in this study were age, gender, race, level of education attained, job tenure, and job title.

School Climate

A recently developed and frequently used instrument for measuring teachers' perceptions of school climate is the School Level Environment Questionnaire (SLEQ), a 56-item scale, with eight scales that includes student

support, affiliation, professional interest, staff freedom, participatory decision making, innovation, resource adequacy, and work pressure (Fraser, 1994; Fraser & Rentoul, 1982). In the early 1980s, Burden and Fraser (1984) and Fraser and Rentoul (1982), were the first to use the SLEQ to measure school climate in several studies of schools in Australia (Cresswell & Fisher, 1998; Fisher & Fraser, 1990b; Fisher & Grady, 1998; Fisher, Grady, & Fraser, 1995; Rentoul & Fraser, 1983; Williamson, Tobin, & Fraser, 1986), South Africa (Mailula & Laugksch, 2003), and the United States (Blose & Fisher, 2003; Henson, 2001a; Johnson & Stevens, 2000; Johnson & Templeton, 1998).

Despite the focus on school climate and its relationship to achievement, research showed conflicting results in establishing a clear link between climate and achievement.

Most recently, Johnson & Stevens (2006) developed a shorter, revised version of the SLEQ, a 21-item scale with six factors that include overall school climate, affiliation, innovation, participatory decision making, resource adequacy, and student support. The reliability for these six factors ranged from 0.77 to 0.90, demonstrating acceptable reliability coefficients for each factor. Overall reliability for the scale was 0.90. In addition, this instrument worked equally well for elementary, middle

school, and high school teachers. Because of the high levels of reliability and the ability of the tool to be used in a variety of K-12 settings, this instrument is a good fit for the purposes of this study.

Risk Taking Measure

Risk taking is difficult to define as well as to measure. The majority of scales that measure risk taking are related to personality traits, adolescent behavior, or business and financial analyses. A large sector of the scholarly work on risk taking defines risk as a hazard; for example, studies about exposure to environmental radioactivity, driving without seatbelts, alcohol abuse, and unprotected sex (Slovic, 2000). Related to theories of hazardous risk taking is the empirical research on adolescence, personality development, and risk taking (Lipsett & Mitnick, 1992). Another distinct sector of empirical research links personality traits and risk taking (Kogan & Wallach, 1964; Zuckerman, 1994), and thus defines risk taking through the lens of personality traits associated with risk taking. Yet another distinct body of empirical research links risk to decision-making, defining risk in terms of the probability distribution of outcomes (Shapira, 1994). Because risk taking is so highly

contextual, no one conceptual model or measure of risk taking seems appropriate for application across disciplines or psychological constructs. A common thread in defining risk taking, however, is through the attributes of loss, significance of loss, lack of certainty, and negative consequences (Kogan & Wallach, 1967; Ponticell, 2003; Yates & Stone, 1992). Research on positive risk taking has yet to define the construct through the use of concepts such as gain and positive outcomes. No one risk-taking scale developed in conjunction with the above theories of risk taking was appropriate for use in this study.

Accordingly, in an effort to develop an appropriate scale to measure teacher risk taking in the classroom, I developed a risk-taking scale consisting of questions that pertain to teaching and productive risk taking. A pilot sample of 14 teachers completed the Risk Taking Scale in July 2008. The 14-item scale had a Cronbach alpha internal consistency reliability coefficient of .88. This exceeds the criterion of .70 that is recommended as the minimal value for attitudinal scales (Nunnally & Bernstein, 1994).

In addition to the Likert-type Teacher Risk Taking survey, at the end of this section of the survey I included a qualitative, open-ended question about teacher risk

taking: "Please add any comments about your own risk taking in the classroom."

Teaching Efficacy Measure

After observing that research on measuring teaching efficacy resulted in conflicting validity and reliability results, and also that measures differed over whether teaching efficacy is a two-factor construct (involving internal and external locus of control), Tschannen-Moran and Hoy (2001) developed a new measure of teaching efficacy, the *Ohio State Teacher Efficacy Scale (OSTES)*. The researchers conducted three studies to examine the factor structure, reliability, and validity of the new measure. Testing and refining the OSTES resulted in two forms, a 24-item long form, and a 12-item short form. A varimax rotation of the 24-item scale yielded three factors (instruction, management, and engagement) with loadings ranging from 0.50 to 0.78. Overall reliabilities for the 24-item and the 12-item scales were 0.94 and 0.90 respectively. The researchers examined the construct validity of the instruments by correlating the new measure and other existing measures of teacher efficacy, resulting in strong positive correlations to all previously developed instruments that were compared. The researchers asserted

that this new measure would more effectively measure teaching efficacy because it included more measures of teaching aspects that involved strong and capable students as well. Previous measures were developed focusing on coping with student difficulties and disruptions and overcoming impediments. This instrument is a recent and well-researched development in measuring teaching efficacy, and a good fit for the purposes of this study.

Innovation Measure

Siegel and Kaemmerer (1978) developed a Likert-type scale measuring members' perception of support for innovation in organizations, the Siegel Scale of Support for Innovation (SSSI). Three factors emerged as components of innovation: support of creativity, tolerance of diversity, and feelings of ownership or personal commitment, accounting for 78% of the variance in the matrix. Split-half reliability coefficients for the three factors were calculated. The reliabilities of the three factors were 0.94, 0.94, and 0.86 respectively. Scores for the three factors were correlated with one another, indicating that all factors were related to an overall construct of innovativeness. This would justify using a single score for innovativeness, based on all the items in

the instrument. Since the lowest subscale reliability was .86, the overall reliability will equal or exceed .86. This instrument was specifically developed in school settings, and is a good fit for the purposes of this study.

Research Protocol

Feasibility Estimate

Prior to the administration of the survey in each school, several tryout subjects were given the instruments to ensure that the survey will be filled out correctly and be understood by subjects. Dillman (2000) suggested such a step to determine whether the procedures designed to conduct the survey will be effective. In addition, this will allow the researcher to estimate the time required to complete the survey.

Selection of Participants and Aggregation of Data

Of the instruments used in this study, two are measuring variables at the organizational level rather than the person level. School climate and Perceived organizational support for innovation both describe organizational characteristics rather than characteristics of individuals. Thus, the most appropriate analysis of data in this study (for inferential statistical tests) is at the

school level. To produce the necessary data for school-level analyses, a two step process occurred.

First, the researcher contacted a number of schools. The original goal was to contact Jefferson County, Kentucky public schools. After contacting several schools, not one school agreed to participate, and the research protocol had to be changed in order to collect data. I then began to contact ISACS (Independent Schools Association of the Central States) schools by e-mail, contacting the principal directly, and immediately began to receive favorable responses. Upon permission of officials at each school (e.g., principal, school council) surveys were sent to schools and teachers completed the surveys. The sample was a purposive sample of Kentucky and Midwestern schools and included elementary and middle school teachers from both private and public schools.

The researcher dropped off the survey at staff meetings at participating schools in spring and fall 2009, and picked up completed surveys after each meeting. Alternatively, the researcher sent the required number of surveys with a paid return label to schools in locations other than Louisville, Kentucky.

In the second step of the two step process, data from the instruments were aggregated at the school level. Mean

scores for each school were calculated for the variables that address the research questions of the study: Years as a teacher, Teaching efficacy, School climate, Perceived organizational support for innovation, and Teacher risk taking.

Statistical Analysis Procedures

The researcher used SPSS to analyze the study data. Data from teachers at each school were coded. Each teacher received a numerical ID number for the purpose of the study, but each teacher remained anonymous and no data reporting allowed the identification of a specific teacher or school. An arbitrary numerical ID number was used to identify each school (e.g., school 1, school 2, etc.). The school ID variable allowed the data to be aggregated, as explained in the section above on Selection of Participants and Aggregation of Data.

The first part of the data analysis consisted of reporting individual level descriptive statistics for all the study variables and demographic variables that are collected (e.g., gender, ethnicity). Statistics included means and standard deviations for continuous variables and percentages for categorical variables.

The second part of the data analysis consisted of reporting Cronbach's alpha internal consistency reliability coefficients for the study variables that are based on scales. Coefficients equaled or exceeded the value of .70, a commonly accepted minimum value for reliability of instruments (Nunnally & Bernstein, 1994).

The third part of the data analysis consisted of statistical analyses that address the research questions. These analyses will be performed on aggregated data since, as explained above, aggregated data are most appropriate for the questions raised in this study.

Questions 1-2. For research questions 1 and 2, four Pearson correlations were calculated. In each correlation, the dependent variable will be Teacher risk taking. Independent variables will be: (a) Years as a teacher, (b) Teaching efficacy, (c) School climate, and (d) Perceived organizational support for innovation.

Question 2. For research question 2, hierarchical multiple regression and hierarchical linear modeling was performed. The dependent variable will be Teacher risk taking. Independent variables were: (a) Years as a teacher, (b) Teaching efficacy, (c) School climate, and (d) Perceived organizational support for innovation.

The variables were entered in two steps. First, Years as a teacher and Teaching efficacy were entered into the regression equation. Secondly, School climate, and Perceived organizational support for innovation were entered. This process allowed the researcher to calculate how much variance is attributable to data derived from individuals (age, efficacy) and then what additional variance is attributable to perceptions of the organizations (school climate, school support for innovation).

Number of Schools Needed

To estimate the number of cases needed for a multiple regression study, a useful goal for the researcher is to estimate the total amount of variance (i.e., R squared) in such a way that if the study were repeated a similar R squared value would be obtained. To put it another way, the researcher seeks to have a minimal amount of decline in R squared (i.e., shrinkage) from the study sample to other samples (Stevens, 2002). To minimize shrinkage in R squared, the researcher needs to have a sufficient number of cases and, in doing this, to take into consideration the number of predictor variables used in the study.

A table in Stevens (2002) was used to estimate the number of cases (i.e., schools) needed for the study (Table 3-17 on pp. 144-145). The table requires the user to estimate the likely value of R squared in the population of interest. Since it is unknown what this value would be, the researcher examined the table for a range of plausible values for a problem having four predictor variables.

Stevens (2002) reports that values of R squared in social science research are often near .50. With an assumed R squared of .50, and setting the acceptable shrinkage value to be .10, a sample of 27 schools would provide sufficient data for this study. With 27 schools, the probability is .80 that the decline in R squared from a cross validation sample would be .10.

Since the actual effect size (i.e., R squared) in the population is unknown, the researcher decided that .50 would be used to estimate sample size. However, if the effect size were a smaller value of .25, a sample of 34 schools would have provided sufficient data (probability of .80 that the decline in R squared from a cross validation sample would be .10).

Accordingly, the goal in the study was to use a minimum of 27 elementary schools and at least 34 schools.

However, the ultimate number of schools that responded was 53.

Qualitative Analysis Procedures

The open-ended comments teachers volunteered in the Teacher Risk Taking section of the survey were compiled and coded, and significant themes were noted and discussed.

Summary

The purpose of this study is to explore the relationships among school climate, school receptiveness to innovation, teacher efficacy, demographic variables, and teacher risk taking. The procedures outlined above will ensure that a process is in place in this study to answer the research questions.

CHAPTER IV

RESULTS

Introduction

The current study examined the relationships and differences among school environment, teaching efficacy, organizational support for innovation, and teacher risk taking in PK-8 schools. The participants in this research study were teachers employed by public and private Midwestern schools with grades ranging from Pre-k through 8. The questionnaires used in this study measured: (a) demographic characteristics of teachers, (b) school environment, (c) teaching efficacy, (d) organizational support for innovation, and (e) teacher risk taking, with a single open-ended question about teachers' own risk taking.

This chapter includes the results of the study obtained through the quantitative analyses of the questionnaire data. The independent variables were demographic variables (age, gender, ethnicity, educational level, and length of tenure), school environment, teaching efficacy, and organizational support for innovation. The dependent variable was teacher risk taking. The main

statistical procedures were ordinary least squares (OLS) multiple regression and hierarchical linear modeling (HLM). Data analysis was performed by using the Statistical Package for Social Sciences (SPSS) and Hierarchical Linear Modeling (HLM).

The research questions that guided this study were:

- 1) How much variance in teacher risk taking can be predicted by the independent variables: years as a teacher, teaching efficacy, school climate, and perceived organizational support for innovation?
- 2) What is the relationship between teacher risk taking and:
 - a. Teaching efficacy
 - b. School climate, and
 - c. Perceived organizational support for innovation?

Results presented include descriptive statistics of the sample and demographic variables, reliability statistics for each scale, and a description of data analysis for research questions one and two. The discussion and implications of these results are presented in Chapter 5.

Instrument Reliability

The purpose of the reliability analyses was to determine if items in each scale were measuring the same construct (Nunnally & Bernstein, 1994). Table 1 shows that the scales in the questionnaire had high internal consistency reliability coefficients. Cronbach's alpha coefficients ranged from .86 to .90. Data were obtained from 14 subjects who completed the risk-taking instrument during a preliminary tryout of the instruments and study procedures, and from three previously developed scales.

Table 1

Reliability Statistics for Four Scales

Scale	Cronbach's Alpha	N of Items
School Environment	.90	21
Teacher Risk Taking	.88	14
Teaching Efficacy	.90	12
Support for Innovation	.86	61

Results of the Study

Summary of Characteristics of the Sample

Initially, the goal was to have between 27 and 34 schools participate in the study. After first attempting to

contact only public schools in Jefferson County, Kentucky by telephone, not one school agreed to participate. After changing the contact method to e-mail and contacting a wider array of schools (by contacting the principal personally, by name), a total of 53 PK-8 schools participated, with 740 teacher questionnaires returned. Of those schools, one was from Bullitt County, Kentucky, 5 were from Oldham County, Kentucky, 8 were from Jefferson County Kentucky, and 39 were private schools from Kentucky and eight surrounding central states. Table 2 shows the number of school respondents from each type of school contacted.

Table 2

Study Response Rate by School Type

School Type	Contacted	Responded	% by School Type
Public	103	14	14%
Private	123	39	32%

Demographic variables measured on the respondents included age, gender, and ethnicity. In addition, information was obtained on educational level, and years of teaching experience.

Table 3 summarizes the characteristics of the sample by age.

Table 3

Distribution of Respondents by Age

Age	<i>n</i>	%
21-29	103	13.9
30-39	179	24.2
40-49	160	21.6
50-59	165	22.3
60-69	63	8.5
Missing	69	9.3

Table 4 summarizes the distribution of respondents by gender. Out of the 740 respondents, 78.5% (*n* = 581) were female.

Table 4

Distribution of Respondents by Gender

Gender	<i>n</i>	%
Female	581	78.5
Male	93	12.6
Missing	66	8.9

Table 5 summarizes the characteristics of the sample by ethnicity. Out of the 740 respondents, 634 (85.7%) were Caucasian, 16 (2.2%) were African-American, and 66 (8.9%) did not identify their ethnicity.

Table 5

Distribution of Respondents by Ethnicity

Ethnicity	<i>n</i>	%
Asian	10	1.4
African-American	16	2.2
Caucasian	634	85.7
Hispanic	6	0.8
Other	8	1.1
Missing	66	8.9

Table 6 summarizes the distribution of respondents by level of education. Over half the respondents had completed Master's or doctoral degrees, demonstrating a relatively high level of education for the sample.

Table 6

Distribution of Respondents by Level of Education

Education	<i>n</i>	%
Bachelor's Degree	139	18.8
Master's Degree	368	49.7
Some Post-Graduate	152	20.5
Doctoral Degree	9	1.2
Missing	72	9.7

Table 7 presents the distribution of respondents by years of teaching experience. Over one-third of the teachers had taught 10 years or less, over one-quarter of the teachers had taught between 11 and 20 years, with numbers respondents continuing to decline as years of experience rose.

Table 7

Distribution of Respondents by Teaching Experience

Years of Experience	n	%
0-10	277	37.4
11-20	203	27.4
21-30	116	15.7
31-40	69	9.3
40+	4	0.5
Missing	71	9.6

Summary of Reliability Scales for Each Scale

Internal consistency reliability coefficients were calculated for four of the sections of the Teacher Risk Taking, Teaching Efficacy, Innovation, and School Culture Scale: Teaching Efficacy, School Culture (Environment), Organizational Support for Innovation, and Teacher Risk Taking. Coefficient alpha is extensively used in empirical research to estimate the reliability of a test consisting of parallel items. As Table 8 shows, reliabilities were above the minimum level (.70) considered acceptable for research (Nunnally & Bernstein, 1994).

Table 8

Reliability Statistics for Four Scales of the Study

Scale	Cronbach's Alpha	N of Items
School Environment	.86	21
Teacher Risk Taking	.91	14
Teaching Efficacy	.89	12
Support for Innovation	.97	61

Regression Analyses

Ordinary Least Squares (OLS) multiple regression was performed on the data as a way of exploring the variables obtained from the participating teachers. Two analyses were performed: (a) of individual teacher data, and (b) of aggregated data that were averaged by school.

Individual level data

Data from individual teachers were analyzed. However, in order to make the analysis consistent with additional analyses that were performed, not all data were used. Specifically, if a teacher came from one of the eight schools with fewer than five responding teachers, the case

was not used. Further, a case was eliminated if the participant came from one of the three schools in which all the cases had missing data on a number of demographic variables. After reduction in the number of cases, data consisted of variables recorded for 589 teachers coming from 42 schools.

A hierarchical multiple regression was performed. Score on the risk-taking scale was the dependent variable. In the first step, teacher background variables were entered into the equation as predictors. In the second step, three questionnaire scales were entered. Table 9 shows means and standard deviations on all variables and Table 11 shows intercorrelations.

As can be seen in the Table 9, the average scores on the scaled variables were relatively high. For example, the mean score on the Risk scale was 3.96. This was close to 4.00 on a scale that had 5.00 as its highest possible value. The variable gender was coded 1= female, 0= male. Thus, the mean on the variable can be interpreted as the proportion of cases that were female. This was a high number: .86. Ethnicity was coded 1= White, 0= Other. For this sample, the proportion of teachers who were white was .95. The variable education level was a dichotomy, where the code 0 (zero) was used for teachers with a bachelor's

degree or some post-graduate work. The code 1 was used for persons with a Master's degree, doctoral degree, or professional school degree. That group constituted .57 of this sample. The average number of years as a teacher was relatively high, $M = 15.38$ years. A grouped frequency distribution was used for the variable age, which had an average of 3.84. This meant that most teachers were between the age categories 3 (30 to 39 years) to 4 (40 to 49 years).

Examination of Table 10, the correlation table, revealed that the three scaled variables - *environment*, *efficacy* and *innovate* - had significant Pearson correlations with the dependent variable *risk*. The predictor variables were generally uncorrelated with one another, meaning there was little evidence of multicollinearity. The largest correlations among predictors occurred for age and years teaching, $r = .78$. This was understandable, since years teaching could be viewed as an indirect measure of age. An additional high correlation among predictors was the relationship between *environment* and *innovate*, $r = .60$.

Table 9

*Descriptive Statistics on Variables in Individual Level
Regression (n = 589)*

	Mean	Std. Deviation
RISK	3.9592	.49366
Gender	.8557	.35170
Ethnicity	.9542	.20932
Age	3.8370	1.24154
Education Level	.5671	.49590
Years Teaching	15.3823	10.56720
ENVIRO scale	3.9267	.46192
EFFICACY scale	4.2413	.46176
INNOVATE scale	4.6464	.67735

Table 10

Correlations Among Variables Used for Individual Level Regression (n=589)

Correlations										
Pearson Correlation		RISK	Gen2 (M=0, F=1)	Eth2 (O=0, W=1)	Age	ED2 (Lo=0,Hi=1)	Teach Years	ENVIRO	EFFICACY	INNOVATE
	RISK	1.000	.010	.002	-.024	-.035	.030	.295	.249	.198
	Gen2 (M=0, F=1)	.010	1.000	.025	.059	-.057	.062	-.066	.011	.011
	Eth2 (O=0, W=1)	.002	.025	1.000	.056	-.077	.044	.023	.006	-.003
	Age	-.024	.059	.056	1.000	.065	.784	.074	.121	.027
	ED2 (Lo=0,Hi=1)	-.035	-.057	-.077	.065	1.000	.058	.034	.044	.026
	Teach Years	.030	.062	.044	.784	.058	1.000	.123	.162	-.016
	ENVIRO	.295	-.066	.023	.074	.034	.123	1.000	.370	.600
	EFFICACY	.249	.011	.006	.121	.044	.162	.370	1.000	.284
	INNOVATE	.198	.011	-.003	.027	.026	-.016	.600	.284	1.000

Table 11 shows the results of the regression analysis. The table shows regression coefficients for the first step of the equation, when only background variables were entered into the equation, and step 2 when questionnaire variables were added. For step 1, the background variables had no significant relationship with the dependent variable risk, $F(5,583) = 0.95$, $p = .45$. At step 2, the three scaled variables were entered into the equation. This led to a significant prediction of the dependent variable, $F(8,580) = 9.68$, $p < .001$. Examination of the regression coefficients revealed that the significant predictors ($p < .001$) of risk were environment ($\beta = .224$) and efficacy ($\beta = .224$). The higher the rating on these scales, the higher the score on the risk scale. The percentage of variance accounted for by the predictors for the regression equation at step 2 was $R^2 = .118$, (adjusted $R^2 = .106$).

Table 11

*Regression Coefficients for Individual Level Regression
(n =589)*

		Unstandardized		Standardized		
		Coefficients		Coefficients		
		B	Std. Error	Beta	t	Sig.
Step 1	(Constant)	4.064	.128		31.874	.000
	Gender	.010	.058	.007	.168	.867
	Ethnicity	.001	.098	.001	.013	.990
	Age	-.049	.026	-.123	-1.843	.066
	Education	-.034	.041	-.034	-.814	.416
	level					
Step 2	Years teaching	.006	.003	.128	1.921	.055
	(Constant)	2.327	.240		9.705	.000
	Gender	.031	.055	.022	.567	.571
	Ethnicity	-.012	.092	-.005	-.125	.900
	Age	-.043	.025	-.109	-1.717	.087
	Education	-.046	.039	-.046	-1.165	.244
	level					
	Years teaching	.003	.003	.063	.979	.328
	ENVIRO scale	.239	.055	.224	4.350	.000
	EFFICACY scale	.177	.045	.165	3.880	.000
INNOVATE scale	.016	.036	.022	.446	.656	

Note. At step 1, $R^2 = .008$, $p = .45$. At step 2, $R^2 = .118$, $p < .001$, (adjusted $R^2 = .106$).

School level data

Data were analyzed using the school as the unit of analysis. There were several reasons for this. First, teachers were clustered within schools, meaning the data from the individual level analysis was biased somewhat. One

assumption of regression analysis is independence, meaning no systematic connection among participants. This was clearly not the case, since teachers from a given school were likely more similar to one another than teachers from another school. In addition, two of the scales measured perceptions of organizational level variables.

Specifically the innovation scale and the environment scale measured how the teacher perceived the school, not how the teacher perceived himself or herself.

As a preliminary to the school level analysis, a random effects analysis of variance (ANOVA) was performed. The independent variable was school ($n=42$) and the dependent variable was score on the risk scale. Results were statistically significant, $F(41, 608) = 1.94, p < .002$. There were significant differences among schools on the average score on risk. A measure of the variance accounted for in risk scores by school was estimated, using the intraclass correlation (Kirk, 1995). The intraclass correlation was .05 for these data, meaning that 5% of the variance in risk scores could be accounted for by schools. This implies that 95% of the variance in risk scores was related to differences among teachers.

Since 5% of the variance in risk was a result of school (a moderate effect size), it was decided to

determine what school level variables would predict school averages in risk. Consequently, a school level analysis was performed with the 42 schools used as the unit of analysis.

A hierarchical multiple regression was performed. Score on the risk-taking scale was the dependent variable. In the first step, school averages on teacher background variables and other school variables were entered into the equation as predictors. In the second step, school averages for three questionnaire scales were entered. Table 12 shows means and standard deviations on all variables and Table 14 shows intercorrelations.

As can be seen in the Table 12, the average scores on the scaled variables (e.g., risk, efficacy) were relatively high. Of the 42 schools, .69 were private and .31 were public. The average proportion of female teachers in the schools was .88, and the ethnicity proportion was .93 white. The average number of years teaching in the schools was about 15 years, and the average number of teachers responding to the questionnaire in the schools was about 16.

Table 13 shows intercorrelations. The strongest Pearson correlations with the dependent variable risk were those for education level, environmental score, and efficacy score.

Table 12

*Descriptive Statistics on Variables in School Level**Regression (n=42)*

	Mean	Std. Deviation
RISK	3.9392	.17755
Public-Private	.6905	.46790
Years Teaching	15.3111	4.04334
Age	3.9065	.55113
Gender	.8811	.09718
Education level	.5618	.20754
Ethnicity	.9335	.07940
Number of teachers	15.64	8.240
ENVIRO scale	3.8783	.21958
EFFICACY scale	4.2187	.15961
INNOVATE scale	4.6597	.24684

Table 13

Correlations Among Variables Used for School Level Regression (n=42)

Correlations												
Pearson Correlation		RISK	Pub. Priv.	Teach Years	Age	Gen2 mean	ED2 mean	Eth2 mean	N BREAK	ENVIRO mean	EFFICACY mean	INNOVATE mean
	RISK_mean	1.000	-.030	-.144	-.117	-.192	.291	-.123	.157	.436	.338	.151
	PubPriv	-.030	1.000	.508	.564	-.313	-.492	.000	.110	.029	.344	.020
	TeachYears_mean	-.144	.508	1.000	.822	-.042	-.018	.335	.090	.349	.515	.131
	Age_mean	-.117	.564	.822	1.000	-.143	.012	.271	-.135	.125	.485	.113
	Gen2_mean	-.192	-.313	-.042	-.143	1.000	.206	.208	-.354	-.228	-.127	.084
	ED2_mean	.291	-.492	-.018	.012	.206	1.000	.192	-.021	.177	.126	.070
	Eth2_mean	-.123	.000	.335	.271	.208	.192	1.000	.213	.361	.511	.194
	N_BREAK	.157	.110	.090	-.135	-.354	-.021	.213	1.000	.370	.222	-.170
	ENVIRO_mean	.436	.029	.349	.125	-.228	.177	.361	.370	1.000	.471	.428
	EFFICACY_mean	.338	.344	.515	.485	-.127	.126	.511	.222	.471	1.000	.235
	INNOVATE_mean	.151	.020	.131	.113	.084	.070	.194	-.170	.428	.235	1.000

Table 14 shows the results of the regression analysis. The table shows regression coefficients for the first step of the equation, when only background variables were entered into the equation, and step 2 when questionnaire variables were added. For step 1, the background variables had no significant relationship with the dependent variable risk, $F(7,34) = 1.52, p = .19$. At step 2, the three scaled variables were entered into the equation. This led to a significant prediction of the dependent variable, $F(10,31) = 4.61, p < .001$. Examination of the regression coefficients revealed that the significant predictors of risk ($p < .05$) were years teaching ($\beta = -.63$), ethnicity ($\beta = -.47$), environment scale score ($\beta = .57$), and efficacy scale score ($\beta = .49$). A school with a relatively high risk taking mean was associated with having more non-white teachers, younger teachers, and relatively high scores on environment and efficacy. The percentage of variance accounted for by the predictors for the regression equation at step 2 was $R^2 = .598$, (adjusted $R^2 = .468$). Thus, about 47% of the school mean in risk was accounted for by the predictors. It should be noted that 5% of the variance in risk is between schools, so the 47% pertains to the prediction of the 5% of between schools variance, not the

total variance in the risk variable.

Table 14

Regression Coefficients for School Level Regression (n=42)

		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
Step 1	(Constant)	4.423	.479		9.228	.000
	Public Private	.125	.091	.330	1.374	.178
	Years Teaching	-.005	.013	-.115	-.386	.702
	Age	-.065	.111	-.202	-.586	.562
	Gender	-.328	.347	-.180	-.946	.351
	Education Level	.438	.164	.512	2.671	.012
	Ethnicity	-.237	.402	-.106	-.589	.560
	Number of teachers	.002	.004	.074	.366	.716
Step 2	(Constant)	.984	.783		1.257	.218
	Public Private	.081	.072	.215	1.132	.266
	Years Teaching	-.027	.011	-.625	-2.439	.021
	Age	.037	.090	.115	.411	.684
	Gender	.197	.288	.108	.683	.500
	Education Level	.252	.130	.294	1.939	.062
	Ethnicity	-1.049	.346	-.469	-3.031	.005
	Number of teachers	.000	.003	.015	.094	.925
	ENVIRO scale	.462	.145	.572	3.179	.003
	EFFICACY scale	.547	.184	.492	2.978	.006
	INNOVATE scale	-.058	.101	-.080	-.574	.570

Note. At step 1, $R^2 = .238$, $p = .194$. At step 2, $R^2 = .598$, $p < .001$, (adjusted $R^2 = .468$).

Hierarchical linear modeling

A final set of quantitative analyses were performed using hierarchical linear modeling (HLM), an analytic method described by Raudenbush and Bryk (2002). HLM has become increasingly used in educational research as a way to analyze data that are organized in levels. In the current study, teachers (Level 1) are clustered within schools (Level 2). The previous analyses were OLS regression analyses at the individual teacher level and at the school level. HLM provides a way to combine data from both levels in a single analysis.

One-way ANOVA with random effects

The one-way ANOVA provides information about how much variation lies within and between schools and the reliability of each school's sample mean as an estimate of its true population mean. The general model for one-way ANOVA is represented by the following equations reported in Raudenbush and Bryk (2002).

Level-1 equation (teacher level): $Y_{ij} = \beta_{0j} + r_{ij}$

Level-2 equation (school level): $\beta_{0j} = \gamma_{00} + u_{0j}$

HLM analysis is worth doing only if there is sufficient variance at the classroom level that it can be

modeled with additional variables. Sufficient variance has been interpreted by several researchers as 10% or more (Ma, 2001). In the OLS analysis previously reported using a random effects analysis of variance, it was found that about 5% of the variance in risk scores was attributed to variations in schools. This is less than the criterion of 10%. However, the variation was statistically significant ($p < .05$). Furthermore, this was largely an exploratory study and it was decided to pursue HLM to better understand what variables in schools might predict teacher risk scores.

Table 15 shows the results of one-way ANOVA for the data.

Table 15

HLM Results for One-Way ANOVA Model

Fixed effect	Coefficient		Standard error	
Average school mean, γ_{00}	3.94		.03	
Random effect	Variance Component	df	X^2	p
School mean, u_{0j}	.0145	41	71.88	.00
Level 1 effect, r_{ij}	.2299			

As can be seen in the table in the section for fixed effect, the average school mean is 3.94, the same value obtained in the OLS school level analysis. A test of whether there is significant variation among school means is shown as a random effect. The obtained chi-square of 71.88 was significant at $p < .01$, indicating significant variation among school means.

A measure of effect size in random effects ANOVA is the intraclass correlation, which in this study represents the proportion of variance between schools.

$$\rho = \frac{\hat{\tau}_{00}}{\hat{\tau}_{00} + \hat{\sigma}^2} = \frac{.0145}{(.0145 + .2299)} = .06$$

The intraclass correlation was .06. This is approximately the result obtained previously in the OLS school level analysis, meaning about 6% of the variance in risk scores is between schools.

Random Coefficient Model

A random coefficient model was constructed to estimate several statistics. These included the average intercept and slopes of the regression equations derived from the 42

schools. In addition, the HLM procedure allowed the researcher to calculate how much the regression equations varied among schools - i.e., the variability of the intercept and the slopes (i.e., regression coefficients).

Level 1 regression equations were constructed with the two strongest predictors as revealed by the OLS individual level analysis. These were the variables *environment* and *efficacy*. Both of these variables were group-centered. The HLM analysis is summarized in Table 16. As can be seen in the upper part of the table, the two fixed effects had large *t* values associated with them. Controlling for efficacy, environment was significantly related to risk and controlling for environment, efficacy was significantly related to risk. This confirms the results of the individual level OLS regression analysis.

The random effect part of the table summarized tests of three hypotheses. First, the school means, controlling for environment and efficacy, were shown to have significant differences among one another $\chi^2 (41) = 95.65, p < .01$. This implies that there is significant variance that can be modeled with variables measured at the school level. The slopes of the two predictors did not have significant chi-square values associated with them, meaning it would be unproductive to attempt to model the variance

of these effects.

An estimate of the amount of variance risk that was predicted by environment and efficacy could be made by using data from the one-way random effects ANOVA and the random coefficient model in the formula below.

$$\frac{[(\text{random ANOVA}) - (\text{random coefficient model})]}{(\text{random ANOVA})}$$

The result of this formula was:

$$[(.2299) - (.1983)] / (.2299) = .1377$$

Adding the predictors *environment* and *efficacy* reduced the within school variance by 13.8%. To put it another way:

13.8% of the variance in risk was accounted for by individual teacher scores on the variables *environment* and *efficacy*.

Table 16

HLM Results for Random Coefficient Model

Fixed effect	Coefficient	Standard Error	t
Average school mean, γ_{00}	3.94	.03	
Environment slope, γ_{10}	0.24	.06	4.24**
Efficacy slope, γ_{20}	0.21	.05	4.29**
Random Effect	Variance Component	df	χ^2
School mean, u_{0j}	.0178	41	95.65**
Environment slope, u_{1j}	.0314	41	46.47
Efficacy slope, u_{2j}	.0183	41	38.67
Level 1 effect, r_{ij}	.1983		

** $p < .01$

Note. Percentage of variance in risk accounted for by predictors = 13.8%

Intercepts-as-Outcome Model

The random coefficient model revealed that mean risk scores varied among schools, but that the slopes of efficacy predicting risk and environment predicting risk did not significantly vary. Consequently, an intercepts-as-outcomes HLM model was estimated using as level 2

predictors those variables from the OLS analysis of school means that were statistically significant. These were school means on the variables *environment*, *efficacy*, *teaching years*, and *ethnicity*. All of these were grand-mean centered. Level 1 regression equations the variables *environment* and *efficacy* as predictors, both group-centered.

The analysis is summarized in Table 17. As can be seen in the upper part of the table, all of the predictors that had been significant in the OLS regression of school means were again significant, and all had the same direction. Mean efficacy and environment were positively associated with risk. Schools with relatively high mean values on these were also schools with relatively high risk scores. Furthermore, relatively high mean risk was associated with relatively low average years of teaching experience and a lower proportion of teacher who were non-white.

An estimate of the amount of variance risk that was predicted by the school level variables could be made with data from the random coefficient model and the intercepts-as-outcomes model using the formula below.

$$[(\text{random coefficient model}) - (\text{intercepts-as-outcomes model})] \div (\text{random coefficient model})$$

The result of this formula was: $[(.0178) - (.0039)] /$
 $(.0178) = .78302$

Adding the school level predictors environment,
efficacy, teaching years, and proportion minority accounted
for 78.3% of the variance in school average risk.

Table 17

HLM Results for Intercepts-as-Outcomes Model

Fixed Effect	Coefficient	Standard Error	t
School means			
Intercept, γ_{00}	3.94	.02	--
Mean Environment Slope, γ_{01}	0.32	.11	3.01**
Mean Efficacy Slope, γ_{02}	0.67	.20	3.30**
Mean Teaching years slope, γ_{03}	-0.01	.01	-3.43**
Mean Ethnicity slope, γ_{04}	-0.97	.18	-5.44**
School Slopes			
Environment Slope, γ_{10}	0.24	.06	4.21**
Efficacy Slope, γ_{20}	0.19	.05	3.55**
Random effect	Variance Component	df	χ^2
School mean, u_{0j}	.0038	37	43.88
Level 1 effect, r_{ij}	.2054		

** $p < .01$

Note. Percentage of variance in school average risk accounted for by school-level predictors = 78.3%

Summary of HLM analyses

The HLM analyses were consistent with the analyses of

risk performed by OLS regression analyses. At the individual level, the teacher's perception of environment and efficacy were both positively associated with risk. At the school level, the means on efficacy and environment were both positively associated with risk. The school average in years teaching was inversely related to risk. In addition, schools with a relatively higher proportion of non-white teachers were those with higher mean scores on risk.

Additional Quantitative Analysis

The study had teachers from both private ($n = 38$) and public ($n = 15$) schools. Schools were coded 0 = *public* and 1 = *private*. For the school-level regression analysis, the variable was entered into the regression equation as background predictor variable, and it had no significant correlation with risk-taking. In addition, the researcher preformed a one factor multivariate analysis of variance, with school type (public and private) the independent variable and four dependent variables. The latter were scale scores on the key variables of interest in the study. These were school mean scores on the scales *environment*, *efficacy*, *innovate*, and *risk-taking*.

There was no significant difference between public and

private schools on the mean scores of the four dependent variables, Wilks' $\lambda = .869$, $F(4, 48) = 1.80$, $p = .143$.

Quantitative analysis summary

The purpose of this section is to summarize the quantitative analyses performed in the study. Because the data were analyzed several ways, conclusions about the data depend on the level of the analysis: whether the latter is at the individual level or the school level.

Table 18 shows the key results of the three quantitative analyses, and also shows the results of the study based on the research questions. At both the individual level and school level, scores on environment and efficacy were both positively related to risk taking. The higher individual teachers scored on environment and efficacy, the higher they scored on risk taking. Similarly, at the school level, the higher the school averages on environment and efficacy, the higher the school average on risk taking.

Two results unique to the school level and HLM analyses pertained to average experience level of teachers in the school and proportion of non-white teachers in the school. Both had negative relationships with risk taking. Schools with relatively younger teachers had higher risk-

taking scores. The inverse relationship between ethnicity and risk-taking at the school level meant that schools with more non-white teachers had relatively higher average scores in risk taking. The HLM analyses confirmed the results obtained in the OLS regression analyses at the school level.

Table 18

Major Quantitative Results: Variables Significantly Predicting Risk Taking

Predictor Variable	Level of Analysis		
	Teacher	School	HLM ^a
Environment	+	+	+
Efficacy	+	+	+
Years Teaching		-	-
Ethnicity		-	-

^a Intercept and slopes as outcome model

Note. A plus sign (+) indicates a positive relationship between the predictor and the dependent variable risk-taking, and a negative sign (-) means an inverse relationship. The inverse relationship between years teaching and risk-taking at the school level meant that schools with a lower average in years teaching had relatively higher average scores in risk taking. Ethnicity was defined 0 = non-white and 1 = white. The inverse relationship between ethnicity and risk-taking at the school level meant that schools with more non-white teachers had relatively higher average scores in risk taking.

Two results unique to the school level analysis pertained to average experience level of teachers in the school and proportion of non-white teachers in the school. Both had negative relationships with risk taking. This meant that schools with relatively younger teachers had higher risk-taking scores. The inverse relationship between ethnicity and risk-taking at the school level meant that schools with more non-white teachers had relatively higher average scores in risk taking.

Qualitative Results

Qualitative analysis was conducted on the participants' responses submitted from the open-ended question at the end of the Teacher Risk Taking Scale section of the survey. The open-ended question simply asked each teacher to "please add any comments about your own risk taking in the classroom." Eighty-five teachers, or 11%, of the teachers volunteered comments. This form of questioning provided insight not available through closed form survey items (Rossman & Rallis, 1998). According to Rossman and Rallis, after gathering qualitative data, the researcher should generate categories, identify themes, and look for recurring patterns among the responses to the open

form items. A code number was assigned for each identified category and recurring theme.

Six overarching themes emerged from the teachers' qualitative comments. The themes were: (a) risk taking can be beneficial, but takes planning and thought, and should not be just for the sake of the thrill; (b) a teacher must balance techniques, and should not always seek risk taking when tried and true methods work well; (c) risk taking is necessary because a teacher must model how to take risks to help children learn that it is okay to try and fail; (d) vulnerability is sometimes a component of risk taking; (e) risk taking keeps curriculum and teaching fresh and evolving, even exciting, leading to growth as a teacher and person; and (f) teachers wanted to better define risk taking as a construct. These themes will be discussed below.

First, 20 teachers felt that while risk taking can be beneficial to children, it takes careful planning to execute that risk. This finding supports Nicholson, et al (2005) suggesting that there are two types of risk takers: risk seekers and risk bearers, the former seeking sensation and thrill, and latter planning and using risk to achieve a goal. As one teacher stated, "Just be aware that there's a

difference between 'risk taking' and 'well-planned risk taking.'"

Another teacher felt that

It is imperative for teachers to remain open-minded about trying new approaches to meeting the needs of students, while holding on to successful techniques that have previously met with success...

Second, teachers felt that seeking risk simply for the thrill of the risk was not appropriate. Thirteen teachers mentioned that "tried and true" techniques were sometimes the best to use, and that a teacher must assess situations and use a balance of new and old techniques.

Third, 14 teachers mentioned that they must take risks in order to model risk taking for the students they teach.

If we don't set an example by taking risks, how can we expect our students to take risks. They need to see us do this and realize it is okay to make mistakes. Many of our students exhibit perfectionistic tendencies and need to understand that we learn by our mistakes. How else will we go forward? Who wants to feel stagnant?

Another teacher illustrated how he celebrates risk taking in the classroom:

I ask students to point out my mistakes. We keep a count on the board. I throw a 100th mistake party to celebrate my mistakes, which usually come from new routines or lessons. Why I try NOT to do is make the

same mistake twice. I teach gifted students and they are often perfectionists!

Yet another teacher remarked,

If a teacher cannot say, "I don't know," or "Let's see what happens!" what kind of model are we? This is how we support flexibility, creativity, and life-long learning.

Fourth, and in a related vein, teachers linked the concept of vulnerability to risk taking, supporting the work of Lasky (2004, 2005). Several teachers mentioned feeling uncomfortable taking risks but felt it was necessary, but another teacher put it most eloquently:

I believe it's important that children see our vulnerability. I always tell them that educated people are not necessarily those who know all of the answers. An educated person admits/recognizes when they don't know/understand and follows up with the steps to gain the knowledge needed.

The fifth theme that emerged from the teachers' qualitative comments on risk taking was the idea of their own growth as a teacher and person. They felt that trying new things by being adaptable, flexible, and creative led to personal and professional growth.

The sixth and final overarching theme the teachers presented was that risk taking must be better defined. Most assumed that risk taking equates with trying new techniques, while some even suggested their own definitions. A recurring theme in the risk taking

literature is that risk taking can be difficult to define precisely, and may vary depending on the circumstance. Most of the respondents who wanted to define risk taking suggested that it equates with trying new techniques, while one teacher thoughtfully remarked

The questions here seem to equate risk taking with new teaching methods. To me, though, teacher risk taking involves more of a "letting go of the mask" and allowing my true self to be with the students...

This teacher echoes the theme of vulnerability (Lasky, 2004, 2005) as well.

These six overarching qualitative themes add richness to the data, helping us to further understand teacher risk taking.

Summary

According to the literature, teacher risk taking is a much talked-about construct, but there is very little research that empirically examines the idea. The results of this exploratory study suggested that teacher risk taking is positively associated with teacher perceptions of a positive school environment, greater risk taking took place in schools with a relatively large number of non-white teachers and schools with less experienced teachers.

Qualitative comments provided insight into teachers risk taking, showing overarching themes that suggested that (a) risk taking can be beneficial, but takes planning and thought, and should not be just for the sake of the thrill; (b) a teacher must balance techniques, and should not always seek risk taking when tried and true methods work well; (c) risk taking is necessary because a teacher must model how to take risks to help children learn that it is okay to try and fail; (d) vulnerability is sometimes a component of risk taking; (e) risk taking keeps curriculum and teaching fresh and evolving, even exciting, leading to growth as a teacher and person; and (f) teachers wanted to better define risk taking as a construct.

This research helps provide a deeper understanding of teacher risk taking.

CHAPTER V

DISCUSSION

Overview

In the field of education, a handful of researchers have begun to study risk taking as it relates to human growth, learning, best practice, and school reform (Clifford, 1991; Ponticell, 2003; Robbins, Brown, Osburn, Patterson, Prouty, & Swicegood, 1991). Several researchers have called for a deeper understanding of the role risk taking offers in the classroom because it might be linked to academic achievement and intellectual performance (Clifford, 1991; Fullan, 1995; Ponticell, 2003). However, despite the societal importance of risk taking, and routine references to the assumed benefits of risk taking in education, we know little about risk taking in educational settings.

The purpose of this exploratory study was to systematically gain a better understanding of teacher risk taking by investigating the relationship among the following variables: teaching efficacy, school culture, support for innovation, and teacher risk taking in schools.

The research questions were as follows:

- 1) How much variance in teacher risk taking can be predicted by the independent variables: years as a teacher, teaching efficacy, school climate, and perceived organizational support for innovation?
- 2) What is the relationship between teacher risk taking and:
 - a. Teaching efficacy
 - b. School climate, and
 - c. Perceived organizational support for innovation?

Based on the results of this exploratory study, this chapter will discuss the findings in relation to the literature and the potential contribution to the development of a theory of teacher risk taking, the potential implications for practice for schools and teachers, the limitations of this study, and recommendations for future research. The following sections provide discussions of each predictive relationship through the presentation of findings from both the quantitative and the qualitative data.

Teaching efficacy, school environment (culture), innovation and teacher risk taking

The results of this study showed a strong positive relationship between the variables Teaching Efficacy and Teacher Risk Taking. The three scaled variables – *environment, efficacy and innovate* – had significant Pearson correlations with the dependent variable *risk*. The predictor variables were generally uncorrelated with one another, meaning there was little evidence of multicollinearity. The largest correlations among predictors occurred for age and years teaching, $r = .78$. This was understandable, since years teaching could be viewed as an indirect measure of age. An additional high correlation among predictors was the relationship between *environment* and *innovate*, $r = .60$.

The results of the regression analysis at the individual level revealed that the significant predictors ($p < .001$) of risk were *environment* ($\beta = .224$) and *efficacy* ($\beta = .224$). The higher the rating on these scales, the higher the score on the risk scale. The percentage of variance accounted for by the predictors for the regression equation at step 2 was $R^2 = .118$, (adjusted $R^2 = .106$). The strong positive relationship between *environment* and risk taking and *teaching efficacy* and risk taking implies that

school environment and teaching efficacy might be significant factors contributing to teacher risk taking.

The hierarchical linear modeling (HLM) analysis echoed the results of the regression analysis at the school level. All of the predictors that had been significant in the OLS regression of school means were again significant, and all had the same direction. Mean efficacy and environment were positively associated with risk. Schools with relatively high mean values on these were also schools with relatively high risk scores. Furthermore, relatively high mean risk was associated with schools having teachers with relatively low average years teaching experience and teachers that were more likely to be non-white.

Teacher risk taking and teaching efficacy

The finding that teaching efficacy and teacher risk taking are strongly related support the research of Bandura (1982, 1993) and Deci and Porac (1978). Teachers who have high levels of instructional efficacy are more motivated and effective teachers, and they create more mastery experiences for their students (Bandura, 1993). In fact, several researchers have directly linked self-efficacy to risk taking in education (Clifford, 1991; Priest, 1993). Priest, an outdoor educator, studied risk-taking activity

in outdoor education, finding risk-taking activity influences an individual's emotional and cognitive development through feedback loops, thus increasing self-efficacy. Clifford (1991) linked self-efficacy and moderate risk taking, relying on the work of Bandura (1977, 1982) to argue that increasing self-efficacy involves taking moderate risks. According to Clifford, self-efficacy and taking the risk of tackling slightly challenging tasks is a precursor and motivation for development of capabilities.

Teacher risk taking and school environment

The finding of this research that risk taking is related to organizational environment supports the work of Klein and Knight (2005), who asserted that the first step in an organization actually adopting and implementing new practices that lead to change is the promotion of a culture of innovation and growth (which includes risk taking). Support for risk taking enhances organizational ability to overcome obstacles through adaptation and experimentation, allowing for continued effort toward implementation despite failures and setbacks encountered along the way. Employees or group members who feel a shared vision that includes communication of personal fallibility, and articulation and

provision of a psychologically safe environment, are more likely to feel secure taking risks (Edmonson, 1999).

Teacher Risk Taking and Innovation

I was surprised that this study did not find a link between Perceived Support for Innovation and Teacher Risk Taking. Intuitively, I suspect that the reason for this is that the Perceived Support for Innovation Scale was very long, some items were reverse-weighted, and the Likert-type scale was reversed compared to the other surveys. Also, it was placed at the end of the survey, at the point where teachers were weary of completing the survey. To have such a complicated and long scale at the end of the survey might have made it less accurate. Also, this scale was developed to use in business settings, and may be an organizational construct that is too remote from individual teacher risk taking to make sense to teachers. I received a number of spontaneous teacher comments indicating that they did not understand the questions. Further study of teacher risk taking and innovation could still show a relationship if another innovation scale could be used.

Risk Taking, Efficacy, and School Reform

Some research has taken the link between teaching efficacy and risk taking and linked it to school reform efforts. Confirming the relationship between teaching efficacy and risk taking is the work of McKinney, Sexton, & Meyerson (1999). Their findings that teachers who experience high levels of efficacy in their teaching are often willing to persist at an innovation despite high levels of cognitive dissonance as they begin the process further strengthen the findings of this study in that they illustrate how an understanding of the relationship between teaching efficacy and risk taking can lead to quality school reform. Although the *impact* of teaching efficacy and teacher risk taking is beyond the scope of this study, this research provides a beginning understanding of the relationship between teacher risk taking and teaching efficacy, and could further our understanding of how to create lasting, high quality school reform.

Qualitative findings on teacher risk taking

The qualitative findings of this research study suggested six overarching themes that help us gain insight into teacher risk taking. Qualitative comments provided a deeper understanding of teacher risk taking, showing

overarching themes that suggested that (a) risk taking can be beneficial, but takes planning and thought, and should not be just for the sake of the thrill; (b) a teacher must balance techniques, and should not always seek risk taking when tried and true methods work well; (c) risk taking is necessary because a teacher must model how to take risks to help children learn that it is okay to try and fail; (d) vulnerability is sometimes a component of risk taking; (e) risk taking keeps curriculum and teaching fresh and evolving, even exciting, leading to growth as a teacher and person; and (f) teachers wanted to better define risk taking as a construct.

Teachers who felt that risk taking takes planning and thought supported the work of Fischer and Smith (2002), who asserted that deliberation (planning ahead, discussing a situation) resulted in a lower level of maladaptive risk taking and positive outlets for risk taking, suggesting that there is a difference between planning ahead and thrill-seeking. The teachers' statements articulating that risk taking takes planning exactly mirrored these findings.

The teachers comments about modeling risk taking supports the assertion of Farley (1991) that risk taking is "at the core of human creativity," (p. 372) and that "creative and productive risk taking" is one of the great

lessons teachers and parents should be giving children. Clifford (1991, p. 292) also suggested that "links among academic risk taking, theories of educational psychology, and educational practice need to be identified, explored, and empirically demonstrated, because learning through risk taking activities is likely to affect nearly every aspect of the educational process."

In a related vein, the concept of professional vulnerability in the educational setting, suggested by Lasky (2004), was supported by the teachers comments, suggesting that although they felt vulnerable and had to work to take risks, they felt that it was a necessary component of teaching.

The qualitative findings of this research help provide deeper insight into how teachers view risk taking, pointing to development of a better definition of teacher risk taking, and ultimately a stronger measure.

IMPLICATIONS AND CONCLUSIONS

The results of this exploratory study begin to help us gain an understanding of teacher risk taking, a construct that educators have discussed and encouraged for years, although there is scant evidence leading to a true understanding of this construct.

Limitations of the Study

First, self-ratings of risk were high. The average score on the items in the risk-taking scale was almost 4.00 on a five-step scale. This means that participants tended to agree with items that identified them as risk-takers. There might have been some social desirability operating which caused teachers to rate themselves high on these items.

Somewhat related to this, the construct of teacher risk-taking needs to be more clearly defined. What dimensions might it have? The themes that emerged from the qualitative analysis of this study could provide a good first step toward a reconceptualization of risk-taking that is multi-dimensional.

An additional limitation of this study was that all variables were collected in the same data collection session. This could result in a degree of common methods bias, meaning correlations among variables resulting from the fact that similar rating methods were used for the scaled variables.

The selection and size of the population used for this study may limit the generalization of the findings. Future studies are warranted to compare more in depth teacher risk

taking and school type. For example, future studies with teachers in diverse types of schools could compare teacher risk taking in many different types of schools, i.e. Montessori, Waldorf, college prep, special needs, to name a few.

The response rates of teachers within schools and of schools requested to participate were not high. It is possible that school principals who agreed to participate identified themselves as risk takers, and also that the teachers who agreed to participate within each school viewed themselves as risk takers, skewing the results.

Another limitation of this study is that the results from the research are reliant on teacher self reports and perceptions of their own skills and school level variables of culture and support for innovation.

Recommendations for Future Research

This study was a beginning attempt to examine risk taking within the classroom, and focused on teachers. Many teachers felt that their own risk taking enhanced the risk taking of their students. The ultimate result in teaching is student success. If student risk taking is linked to

student outcomes, educators may gain more understanding into how to facilitate student success. Examination of student risk taking will be important, as well as examination of the relationship between teacher risk taking and student risk taking.

In addition, based on the finding that school environment is related to teacher risk taking, more research into the area of exactly how school environment and culture support the construct of teacher (and student) risk taking will be important. Related to school culture and environment is the concept of school reform. How is lasting and effective school reform related to teacher risk taking? How can in-service training teach teachers to take healthy and productive risks? Empirical research on the value of risk taking as a component of high quality teacher professional development is scant. In one study, Berg, Grisham, Jacobs, and Mathison (2000) examined a professional development program and whether core beliefs embedded in the program had a lasting effect on teachers. Risk taking was one of the four core constructs. Results indicated that 15 years later, principals were committed to the four constructs, as were teachers, demonstrating the "lasting" value of high quality professional development.

In efforts to embrace school reform efforts that result in lasting and effective change, teachers, principals, and districts that understand how to promote healthy change (or school reform efforts) through the use of risk taking and innovation may ultimately be more effective educators despite the negative dissonance they experience at the beginning (McKinney, Sexton, & Meyerson, 1999). However, the relationship between risk taking and innovative behavior in education, from district and school leadership to the classroom, remains unclear. Further study is warranted.

Indeed, the more leaders focus on immediate task performance (such as prescriptive curriculum), the less employees can devote time to longer term projects that could offer more enduring gains (Repenning & Sterman, 2002). Prescriptive curriculum and high levels of accountability in education, often the result of school reform efforts, do not foster risk taking and innovation because teachers are concerned more with adhering to regulations and requirements than designing innovative teaching methods (Krisko, 2001; Lasky, 2005). Beedie (1994) pointed to the pull between prescriptive curriculum versus teacher freedom to innovate and take risks as challenging for teachers to assimilate and overcome. Interestingly,

since the results of this study showed no significant difference between public school and private school teacher risk taking, it is possible that prescriptive curriculum requirements do not affect teacher risk taking. Further study on the idea of prescriptive curriculum requirements and teacher risk taking could shed light on a possible dichotomy that teachers must balance.

Another recommendation for future research into teacher risk taking is to explore how teacher emotion and teacher risk taking are related. Reio (2005) maintained that negative emotions experienced as a result of the uncertainty and loss involved in school reform efforts would inhibit teacher risk taking. Based on the empirical evidence surrounding these constructs, Reio called for further study of the role of risk taking in educational settings, asserting that evidence indicates that a better understanding of teacher risk taking and emotions, their effect on teacher identity development, and the resulting impact on school reform efforts could lead to more effective and lasting reform. Research into emotion and risk taking could further our understanding of the risk taking construct in general, pointing to an understanding of how to foster healthy teacher risk taking in school environments.

Summary

Farley (1991, p. 372) claimed that risk taking is "at the core of human creativity," and that "creative and productive risk taking" is one of the great lessons teachers and parents should be giving children. Further, he posits that our future as a nation depends on fostering the healthy side of our risk taking, making the most of our national propensity to innovate by engaging in risk taking. Clifford (1991, p. 292) suggests, "links among academic risk taking, theories of educational psychology, and educational practice need to be identified, explored, and empirically demonstrated, because learning through risk taking activities is likely to affect nearly every aspect of the educational process."

This study was a cursory empirical examination of the teacher risk-taking construct. It has helped to define the construct, and has established links between teaching efficacy, school environment, and teacher risk taking. It is my hope that further research will help us to define and understand teacher risk taking as well as student risk taking, leading to useful support of teacher and student risk taking, and ultimately, student success, which is the end goal of education.

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APPENDIX A

Teacher Risk Survey Teaching Efficacy Innovation and School Culture

An Exploratory Doctoral Study

By Margaret Taylor
University of Louisville College of Education
Fall 2009

Dear Teacher,

You are being invited to participate in a research study by answering the attached survey about teacher risk taking, teaching efficacy, innovation, and school culture. There are no known risks for your participation in this research study. The information collected may not benefit you directly. The information learned in this study may be helpful to others. The information you provide will help researchers and policy makers understand what affects the instructional choices of teachers. Your completed survey will be stored in Room 343 of the College of Education and Human Development, University of Louisville. The survey will take approximately 20 minutes to complete.

Individuals from the Department of Leadership, Foundations, and Human Resource Education, the Institutional Review Board (IRB), the Human Subjects Protection Program Office (HSPPO), and other regulatory agencies may inspect these records. In all other respects, however, the data will be held in confidence to the extent permitted by law. Should the data be published, your identity will not be disclosed.

Taking part in this study is voluntary. By completing this survey you agree to take part in this research study. You do not have to answer any questions that make you uncomfortable. You may choose not to take part at all. If you decide to be in this study you may stop taking part at any time. If you decide not to be in this study or if you stop taking part at any time, you will not lose any benefits for which you may qualify.

If you have any questions, concerns, or complaints about the research study, please contact: Dr. Joseph Petrosko, 502-852-0638.

If you have any questions about your rights as a research subject, you may call the Human Subjects Protection Program Office at (502) 852-5188. You can discuss any questions about your rights as a research subject, in private, with a member of the Institutional Review Board (IRB). You may also call this number if you have other questions about the research, and you cannot reach the research staff, or want to talk to someone else. The IRB is an independent committee made up of people from the University community, staff of the institutions, as well as people from the community not connected with these institutions. The IRB has reviewed this research study.

If you have concerns or complaints about the research or research staff and you do not wish to give your name, you may call 1-877-852-1167. This number is a 24 hour hot line answered by people who do not work at the University of Louisville.

Sincerely,
Joseph Petrosko

Margaret Taylor

TEACHER SURVEY

Overview

The purpose of this survey is to explore relationships among attitudes that affect teaching. Your assistance in this project is kindly requested and much appreciated. Your participation is strictly voluntary, and all responses will be kept completely confidential.

Instructions

Please complete each section of the survey, following the instructions in each section. Upon completion, place the completed survey in the box at the front of the room.

General Information

Instructions: Please circle the one letter that corresponds to each of your answers.

1. Your age.

- a.) Under 21 b.) 21-29 c.) 30-39 d.) 40-49 e.) 50-59
f.) 60-69 g.) 70 or over

2. Your gender.

- a.) Male b.) Female

3. Your race / ethnic background.

- a.) Asian b.) Black c.) Caucasian d.) Hispanic
e.) Other _____

4. Your highest educational level attained.

- a.) Bachelor's degree b.) Master's degree or professional school
c.) Some post-graduate courses d.) Doctoral degree

5. What is your current occupation or job title?

6. How long have you been a teacher?

_____ years

7. What grade do you currently teach?

8. How long have you taught this grade?

_____ years

THE SCHOOL LEVEL ENVIRONMENT QUESTIONNAIRE

The following are statements about the school in which you work and your working environment. Think about how well each statement AGREES WITH YOUR DESCRIPTION OR VIEWS of your school environment. For each statement, please indicate your response choices t

1 =	Strongly Disagree
2 =	Disagree
3 =	Neither Agree nor Disagree
4 =	Agree
5 =	Strongly Agree

1.) Teachers design instructional programs together.	1	2	3	4	5
2.) Most students are well mannered or respectful of the school staff.	1	2	3	4	5
3.) Instructional equipment is not consistently accessible.	1	2	3	4	5
4.) Teachers are frequently asked to participate in decisions.	1	2	3	4	5
5.) New and different ideas are always being tried out.	1	2	3	4	5
6.) There is good communication among teachers.	1	2	3	4	5
7.) Most students are helpful and cooperative with teachers.	1	2	3	4	5
8.) The school library has sufficient resources and materials.	1	2	3	4	5
9.) Decisions about the school are made by the principal.	1	2	3	4	5
10.) New courses or curriculum materials are seldom implemented.	1	2	3	4	5
11.) I have regular opportunities to work with other teachers.	1	2	3	4	5
12.) Students in this school are well behaved.	1	2	3	4	5
13.) Video equipment, tapes, and films are readily available.	1	2	3	4	5
14.) I have very little to say in the running of the school.	1	2	3	4	5
15.) We are willing to try new teaching approaches in my school.	1	2	3	4	5
16.) I seldom discuss the needs of individual students with other teachers.	1	2	3	4	5
17.) Most students are motivated to learn.	1	2	3	4	5
18.) The supply of equipment and resources is not adequate.	1	2	3	4	5
19.) Teachers in this school are innovative.	1	2	3	4	5
20.) Classroom instruction is rarely coordinated across teachers.	1	2	3	4	5
21.) Good teamwork is not emphasized enough at my school.	1	2	3	4	5

TEACHER RISK TAKING

The following are statements about teacher risk taking. Think about how well each statement describes you. Risk taking means performing an action where there is some probability of success, but also some probability of failure or lack of success. This sur

1 =	Strongly Disagree
2 =	Disagree
3 =	Neither Agree nor Disagree
4 =	Agree
5 =	Strongly Agree

1.) I like risk taking.	1	2	3	4	5
2.) I will try things with students sometimes to see if a new approach will stimulate their interest.	1	2	3	4	5
3.) I try new methods quickly without wasting time.	1	2	3	4	5
4.) In order to help students progress, a teacher has to take risks.	1	2	3	4	5
5.) If there is a chance to help a student, I will try something new.	1	2	3	4	5
6.) The skill of taking reasonable risks is one of the most important teaching skills.	1	2	3	4	5
7.) To achieve something in the classroom, a teacher has to take reasonable risks.	1	2	3	4	5
8.) When I am teaching, I prefer to try new things with students.	1	2	3	4	5
9.) I am attracted by trying new methods to reach students.	1	2	3	4	5
10.) Taking a risk to help a student learn seems exciting to me.	1	2	3	4	5
11.) If a student might gain, I will take a reasonable risk even though the outcome is uncertain.	1	2	3	4	5
12.) While trying new methods to reach students, I feel excited.	1	2	3	4	5
13.) In order to help students learn, a teacher has to take risks.	1	2	3	4	5
14.) In the classroom, I am willing to be vulnerable if it helps a student learn.	1	2	3	4	5

Please add any comments about your own risk taking in the classroom:

TEACHING EFFICACY

The following scale measures how effective you feel in your teaching. For each question, please rate your response choice to the right.

1 =	Nothing or none
2 =	Very little
3 =	Some
4 =	Quite a bit
5 =	A great deal

1.)	To what extent can you use a variety of assessment strategies?	1	2	3	4	5
2.)	To what extent can you provide an alternative explanation or example when students are confused?	1	2	3	4	5
3.)	To what extent can you craft good questions for your students?	1	2	3	4	5
4.)	To what extent can you implement alternative strategies in your classroom?	1	2	3	4	5
5.)	How much can you do to control disruptive behavior in the classroom?	1	2	3	4	5
6.)	How much can you do to get children to follow classroom rules?	1	2	3	4	5
7.)	How much can you do to calm a student who is disruptive or noisy?	1	2	3	4	5
8.)	How much can you do to establish a classroom management system with each group of students?	1	2	3	4	5
9.)	How much can you do to get students to believe they can do well in schoolwork?	1	2	3	4	5
10.)	How much can you do to help your students value learning?	1	2	3	4	5
11.)	How much can you do to motivate students who show low interest in school work?	1	2	3	4	5
12.)	How much can you assist families in helping their children do well in school?	1	2	3	4	5

ALMOST FINISHED!
THANK YOU SO MUCH FOR PARTICIPATING IN THIS STUDY.

The last set of questions follows this page.
Please note that in this last set, the numerical weights are different than the previous scales.

FOR THIS LAST SET:

- 1 = Strongly agree
- 2 = Agree
- 3 = Agree Slightly
- 4 = Disagree Slightly
- 5 = Disagree
- 6 = Strongly Disagree

INNOVATION

The following scale measures how much your organization supports innovation. For each question, please rate your response choice to the right.

1 =	Strongly agree
2 =	Agree
3 =	Agree Slightly

4 =	Disagree slightly
5 =	Disagree
6 =	Strongly Disagree

1.) This organization is always moving toward the development of new answers.	1	2	3	4	5	6
2.) This organization can be described as flexible and continually adapting to change.	1	2	3	4	5	6
3.) I can personally identify with the ideas with which I work.	1	2	3	4	5	6
4.) Our ability to function creatively is respected by the leadership.	1	2	3	4	5	6
5.) Around here, people are allowed to try to solve the same problem in different ways.	1	2	3	4	5	6
6.) I help make decisions here.	1	2	3	4	5	6
7.) Creativity is encouraged here.	1	2	3	4	5	6
8.) People talk a lot around here, but they don't practice what they preach.	1	2	3	4	5	6
9.) People around here are expected to deal with problems in the same way.	1	2	3	4	5	6
10.) The people in charge around here usually get the credit for others' ideas.	1	2	3	4	5	6
11.) There is one person or group here who assumes the role of telling others what to do.	1	2	3	4	5	6
12.) Sometimes the way things are done around here makes matters worse, even though our goals aren't bad.	1	2	3	4	5	6
13.) The role of the leader in this organization can best be described as supportive.	1	2	3	4	5	6
14.) The leaders in this organization talk one game but act another.	1	2	3	4	5	6
15.) In this organization, we sometimes reexamine our most basic assumptions.	1	2	3	4	5	6
16.) The members of our organization are encouraged to be different.	1	2	3	4	5	6
17.) People in this organization are always searching for fresh, new ways of looking at problems.	1	2	3	4	5	6
18.) The way we do things seems to fit with what we're trying to do.	1	2	3	4	5	6
19.) Persons at the top have much more power than persons lower in this organization.	1	2	3	4	5	6
20.) Work in this organization is evaluated by results, not how they are accomplished.	1	2	3	4	5	6
21.) A person can't do things that are too different around here without provoking anger.	1	2	3	4	5	6
22.) The leadership acts as if we are not very creative.	1	2	3	4	5	6

INNOVATION Con't

The following scale measures how much your organization supports innovation. For each question, please rate your response choice to the right.

1 =	Strongly agree
2 =	Agree
3 =	Agree Slightly

4 =	Disagree slightly
5 =	Disagree
6 =	Strongly Disagree

23.) I really don't care what happens to this organization.	1	2	3	4	5	6
24.) I am committed to the goals of this organization.	1	2	3	4	5	6
25.) The methods used by our organization seem well suited to its stated goals.	1	2	3	4	5	6
26.) Most people here find themselves at the bottom of the totem pole.	1	2	3	4	5	6
27.) My goals and the goals of this organization are quite similar.	1	2	3	4	5	6
28.) Members of this organization would rather be working here than anywhere else.	1	2	3	4	5	6
29.) In this organization we tend to stick to tried and true ways.	1	2	3	4	5	6
30.) Assistance in developing new ideas is readily available.	1	2	3	4	5	6
31.) New ideas can come from anywhere in this organization and be equally well received.	1	2	3	4	5	6
32.) On the whole, I feel a sense of commitment to this organization.	1	2	3	4	5	6
33.) We're always trying out new ideas.	1	2	3	4	5	6
34.) People in this organization are encouraged to develop their own interests, even when they deviate from those of the organization.	1	2	3	4	5	6
35.) Members of this organization feel encouraged by their superiors to express their opinions and ideas.	1	2	3	4	5	6
36.) The people here are very loyal to this place.	1	2	3	4	5	6
37.) Members of this organization realize that in dealing with new problems and tasks, frustration is inevitable; therefore it is handled constructively.	1	2	3	4	5	6
38.) I have the opportunity to test out my own ideas here.	1	2	3	4	5	6
39.) I feel a real sense of responsibility for my work.	1	2	3	4	5	6
40.) In this organization, the way things are taught is as important as what is taught.	1	2	3	4	5	6
41.) This organization is open and responsive to change.	1	2	3	4	5	6
42.) A motto of this organization is "The more we think alike, the better job we will do."	1	2	3	4	5	6
43.) My ability to come up with original ideas and ways of doing things is respected by those at the top.	1	2	3	4	5	6

INNOVATION Con't

The following scale measures how much your organization supports innovation. For each question, please rate your response choice to the right.

1 =	Strongly agree
2 =	Agree
3 =	Agree Slightly

4 =	Disagree slightly
5 =	Disagree
6 =	Strongly Disagree

44.) This place seems to be more concerned with the status quo than with change.	1	2	3	4	5	6
45.) The role of the leader here is to encourage and support individual members' development.	1	2	3	4	5	6
46.) The best way to get along in this organization is to think the way the rest of the group does.	1	2	3	4	5	6
47.) Individual independence is encouraged in this organization.	1	2	3	4	5	6
48.) Nobody asks me for suggestions about how to run this place.	1	2	3	4	5	6
49.) One individual is usually the originator of ideas and policies in this organization.	1	2	3	4	5	6
50.) In this organization, the power of final decisions can always be traced to the same few people.	1	2	3	4	5	6
51.) Creative efforts are usually ignored here.	1	2	3	4	5	6
52.) Once this organization develops a solution to a particular problem, that solution becomes a permanent one.	1	2	3	4	5	6
53.) Around here, a person can get into a lot of trouble by being different.	1	2	3	4	5	6
54.) I have a voice in what goes on in this organization.	1	2	3	4	5	6
55.) People around here try new approaches to tasks, as well as tried and true ones.	1	2	3	4	5	6
56.) Others in our organization always seem to make the decisions.	1	2	3	4	5	6
57.) The leader's "pets" are in a better position to get their ideas adopted than most others.	1	2	3	4	5	6
58.) The main function of members in this organization is to follow orders that come down through channels.	1	2	3	4	5	6
59.) I mostly agree with how we do things here.	1	2	3	4	5	6
60.) There is little room for change here.	1	2	3	4	5	6
61.) These aren't my ideas, I just work here.	1	2	3	4	5	6

CURRICULUM VITAE

NAME: Margaret E. Taylor

ADDRESS: Department of Education, Learning Foundations,
and Leadership
University of Louisville
Louisville, KY 40202

EDUCATION

& TRAINING: A.B., Business Economics
Brown University
1981-1985

M.A., Early Childhood Education
University of Cincinnati
1988-1989

PhD, Educational Leadership
University of Louisville
Expected May 2010

2004 - Present: Clay & Cotton, Louisville, KY

Own and operate two shops, Clay & Cotton, in the Louisville area. Responsible for all accounting, buying, merchandising, staffing, and general operations of this retail boutique. Sales will exceed \$600,000 in 2009.

2007 - 2008: McKendree University

Instructor for undergraduate Business Administration class.

1999 - 2003: Friends School, Louisville, KY

Principal. Increased enrollment by 65% in 3 years. Responsible for curriculum, financial management, teacher supervision.

2003 - 2004: University of Louisville

While a graduate student, worked on Project Care, a grant examining the use of reading technology software in Kentucky K-12 schools.

1997 - 1999: Chance School, Louisville, KY

Teacher for early childhood program and kindergarten.

HONORS

Awarded full Academic Scholarship and Graduate Assistantship to University of Cincinnati during Master's Degree Program in Education, 1988-1989.

Awarded Louisville National Association of Women in Business Woman of Distinction, 2009, for excellence in business, leading Clay & Cotton to continued success during the recession of 2009.