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The Relationship Among Student Creativity, Curiosity, and Academic Intrinsic Motivation: A Mixed Methods Phenomenological Study of Sixth Grade Students

Jennifer L. Rinkevich
Indiana University of Pennsylvania

THE RELATIONSHIP AMONG STUDENT CREATIVITY, CURIOSITY, AND ACADEMIC INTRINSIC MOTIVATION: A MIXED METHODS PHENOMENOLOGICAL STUDY OF SIXTH GRADE STUDENTS

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Jennifer L. Rinkevich

Indiana University of Pennsylvania

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Indiana University of Pennsylvania
School of Graduate Studies and Research
Department of Professional Studies in Education

We hereby approve the dissertation of

Jennifer L. Rinkevich

Candidate for the degree of Doctor of Education

_____ _____
Sue A. Rieg, Ed.D.
Professor of Education, Advisor

_____ _____
George R. Bieger, Ph.D.
Professor of Education

_____ _____
Kelli R. Paquette, Ed.D.
Professor of Education

ACCEPTED

_____ _____
Timothy P. Mack, Ph.D.
Dean
School of Graduate Studies and Research

Title: The Relationship Among Student Creativity, Curiosity, and Academic Intrinsic Motivation: A Mixed Methods Phenomenological Study of Sixth Grade Students

Author: Jennifer L. Rinkevich

Dissertation Chair: Dr. Sue A. Rieg

Dissertation Committee Members: Dr. George R. Bieger
Dr. Kelli R. Paquette

The purpose of this study was to examine the constructs of creativity, curiosity, and academic intrinsic motivation as they related to sixth grade students. These variables were examined independent of achievement scores in order to focus on the ways in which creativity and curiosity related to the participants' academic intrinsic motivation. In today's educational climate, there are students who are disengaged in learning because of the use of standardized, high-stakes assessment. This disengagement can influence an individual's self-concept and feelings towards present and future learning. Self-determination theory served as the theoretical framework for this study as the need for autonomy, competence, and relatedness was examined in relation to creativity, curiosity, and academic intrinsic motivation.

Quantitative data for the 87 participants in the first phase of the study were collected using valid and reliable instruments which measured the participants' levels of creativity, curiosity, and academic intrinsic motivation. The data were analyzed using correlational tests. After identifying the levels of each of the study's constructs that, when combined, formed statistically significant patterns, the 23 participants, whose levels of creativity, curiosity, and academic intrinsic motivation combined to fit a significant relationship, completed an on-line survey in order to collect qualitative data. The data were used to determine the characteristics and factors regarding the study's variables that were common among the different groups.

Results of this study indicated that participants' levels of curiosity and academic intrinsic motivation were opposite their levels of creativity. In addition, subject-specific motivation followed this same opposing relationship for low reading and mathematics motivation, as well as for high reading and social studies motivation. The most substantial findings of the qualitative portion of the study were that students with high creativity, low curiosity, and low academic intrinsic motivation levels reported that they do not have an opportunity to learn about their interests in school and that they were better at things outside of school. The researcher made recommendations to educate all stakeholders about creativity and creative behaviors, as individuals with these characteristics may be disenfranchised from learning - a factor that can influence future learning and well-being.

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CHAPTER ONE

INTRODUCTION

As the current emphasis on standardized testing in the United States educational system has led some educators and students to become disenfranchised with education, promoting an interest in learning plays an integral role in educating today's youth. More exploration into factors that motivate students must be done in order to engage these learners. Considering success in school is often times gauged by scores on standardized achievement tests, students who do not score well are often labeled as underperforming without any real investigation into the underlying reasons why the students' scores may be considered "low". In fact, current data analysis being performed in many of today's schools looks into specific areas of the subject in which the student scored low so that instruction can focus on that particular area. Many times the focus is shifted to the teacher and his or her instructional strategies and what can be done to improve the teacher's skills. What is not usually investigated is student motivation and desire to learn without a connection to standardized test scores. Therefore, determining factors that can explain or support student interest in learning is extremely worthy of exploration.

Many times, teachers get caught up in "covering" content and as a result forget the important responsibility they have of motivating students and getting them interested in the subject matter. In a study by Szklarski (2011), it was indicated that:

> The teacher's approach is of major significance for the pupils' interest. According to the informants, this is the single most important factor affecting interest. With the right approach a teacher can make a boring subject interesting, and the wrong approach can make an enjoyable or current topic less interesting. (p. 45)

This information stresses just how important the role of the teacher is in getting students interested in learning. One way teachers can increase student interest and motivation is to make them curious about the world around them. This form of creative thinking can also be an impetus to self-initiated learning which can play an important role in sparking a love for life-long learning. To achieve this goal, Silverstein (2005) indicated the need for a transfer of extrinsic curiosity, or the kind of curiosity that is imposed by a school assignment, to intrinsic curiosity, or the kind of curiosity that applies to the student's own life.

One such factor that can shed some light on student motivation is creativity in schools. As students learn in different ways, promoting student curiosity and creative thinking may help students find interest in subject matter and increase levels of student engagement in learning. The work of Amabile (as cited in Sternberg, 2006) essentially stated that in order to be truly creative, individuals must be focused on the task itself, rather than the reward. Also, if one is required to give attention to a task he or she does not find particularly interesting, an individual will often attempt to find a way to make it appealing to him or her. This theory plays an important role in this study, as it is believed that engaging in truly creative work can, and will, aid in motivating a student to be engaged in a task or subject matter. It is believed that the intrinsic motivation to create will drive a student's engagement more so than the extrinsic reward of a good grade on a test. This has tremendous implications for education.

Purpose of the Study

The purpose of this study was to determine if a relationship existed among creativity, curiosity, and academic intrinsic motivation. This goal was reached by utilizing results from a test of creative thinking, a curiosity inventory, and an academic motivation inventory. It helped determine if different combinations of levels of curiosity and creativity had stronger or weaker

relationships to academic intrinsic motivation. A second purpose was to uncover the commonalities among those individuals reporting similar levels of the three constructs. This was done by surveying students to determine factors that were common among different relationships involving curiosity, creativity, and academic intrinsic motivation. In essence, the purpose of this study was to determine if there was a relationship among the three constructs and to then describe the characteristics of students with similar levels of each.

Theoretical Framework

Deci and Ryan's (1985) Self-Determination Theory (SDT), which is rooted in the human need for autonomy, competence, and relatedness, served as the theoretical framework for this study. These concepts are believed to be innate, universal necessities that cross time, gender, and culture. It is also thought that there is a natural tendency toward growth and development with active encouragement from the environment. Deci and Ryan (2000) stated that "SDT suggests that it is part of the adaptive design of the human organism to engage in interesting activities, to exercise capacities, to pursue connectedness in social groups, and to integrate intrapsychic and interpersonal experiences into a relative unity" (p. 229). This description of SDT essentially explains the origins of the current study's constructs of curiosity, creativity, and intrinsic motivation.

Preceding the introduction of SDT, drive theory was of particular interest. Based on physiological needs, this theory essentially stated that behaviors were a response to needs such as food, water, and sex. What drive theory could not explain, however, is the "curious exploration, investigatory manipulation, vigorous play, and other spontaneous activities that had no apparent ties to the dynamics of drive reduction" (Deci & Ryan, 2000, p. 228). According to Deci and Ryan (2000), SDT essentially explained why individuals engage in activities that they find

rewarding or interesting. Unlike drive theory, SDT posited that there does not have to be a desire for equilibrium. In other words, behaviors are not always the result of a deficit. In this sense, behaviors are exhibited not to satisfy a deficiency in basic physiological needs, but to meet the psychological needs of competence, autonomy, and relatedness. Each of the three constructs involved in this study: curiosity, creativity, and academic intrinsic motivation, were examined through this lens.

In regard to SDT, the concept of relatedness is described as the feeling of being connected, cared for, or close to others (Ryan & Deci, 2008). A second psychological need according to SDT - autonomy - involves freedom and having control or regulation over one's behaviors (Deci & Ryan, 1985; Ryan & Deci, 2006). Finally, competence is described as one's confidence that his or her skills can elicit a particular result or one's feeling of effectiveness in a situation (Deci & Ryan, 1985; Ward, Lundberg, Ellis, & Berrett, 2010).

As mentioned, through the lens of SDT, a behavior may be based on something a person finds interesting or goal fulfilling (Deci & Ryan, 2000). In fact, one is highly intrinsically motivated when the task at hand is challenging but obtainable (Deci & Ryan, 1985). If the task is not challenging enough, it is likely that it will be viewed as uninteresting and therefore not intrinsically motivating. Deci and Ryan (2008b), in referencing their earlier work on Self-Determination Theory, indicated that when discussing motivation, there are four types, two of which are considered autonomous and two that are considered controlled. Among the autonomous types, the authors first described intrinsic motivation as an ideal type, which is based on self-endorsement, experience, and volition. The second type of autonomous motivation is an extrinsic type that is classified as "identified", meaning that the individuals have identified the value of the task and have begun to integrate it within themselves. When examining

controlled motivation, it is important to note that both types of controlled motivation are forms of extrinsic motivation. Introjected motivation is evident when one has partially integrated the task, but the individual is still looking for approval, or to avoid shame. Finally, the last form of controlled motivation is external regulation, in which all rewards and punishments are given externally. The authors noted that when discussing motivation, there must also be mention of amotivation, or the lack of motivation. This, of course, is even less desirable than controlled motivation.

In his early research on motivation, Deci (1971) indicated that when external rewards were introduced to an activity that was previously intrinsically motivated, the subject's intrinsic motivation sharply declined. The loss of autonomy, now that the reward was controlling their behavior, was indicated as the reason for this drop. In support of this view, Hennessey (2000) found that children perceived activities with rewards as "work", while activities without social controls, such as playing, were viewed more positively.

Academic Intrinsic Motivation and Self-Determination Theory

Academic Intrinsic Motivation (AIM) was defined by Gottfried (1985) as "the enjoyment of school learning characterized by an orientation toward mastery, curiosity, persistence, task endogeny; and the learning of challenging, difficult, and novel tasks" (p. 632). Whether a person is intrinsically or extrinsically motivated has a profound impact on learning, as a number of studies have indicated that activities with an intrinsic goal promoted "a deeper processing of the learning material, greater conceptual understanding of it, and both short-term and long-term persistence at relevant learning tasks" (Vansteenkiste, Lens, & Deci, 2006, p. 28).

Using SDT as a framework, it is hypothesized that the most intrinsically motivated individuals will be those who feel they have competence, autonomy, and a connection to others.

Deci and Ryan (2000) stated that "intrinsically motivated activities were defined as those that individuals find interesting and would do in the absence of operationally separable consequences" (p. 233). In essence, this definition explained that academic motivation that is intrinsic in nature is not reliant on grades or the expectations of others. This presumption was explored in the present study.

Katz and Assor (2007) asserted that according to SDT, when given choices, individuals are allowed to feel autonomous. However, in order for the opportunity to choose to benefit the individual, the other psychological needs of competence and relatedness must also be met. In this sense, choices in learning can motivate individuals who feel competent and connected to the given task. However, the opportunity for choice can be less motivating, or even detrimental, to an individual who does not feel competent or connected to the task. This idea was reflected in some of the data that were collected.

Creativity and Self-Determination Theory

Sternberg, O'Hara, and Lubart (2007) stated "that to be creative, a person has to like using the inventing thinking style and have a preference for thinking in novel ways of his own choosing" (p. 12). Other research indicated that when students were offered freedom, opportunities for self-expression, and chances to be creative, they were more motivated to learn (Zinn, 2008). Furthermore, Jaquith (2011) asserted that creative inquiry is fueled by autonomy and making connections with the world. However, Jin Wook, Huang, and Jin Nam (2012) found that in relation to creativity, task autonomy was only beneficial when the individuals felt they had the requisite skills or experience, or in other words, competence. Without feelings of competence, autonomy-supportive practices regarding creativity can actually have a negative effect on the individual. Feeling disconnected from others who are creatively competent, or who

possess requisite skills, serves as a barrier to achieving a feeling of relatedness. Conversely, creativity can be motivated by the idea that others will view them as competent in their work, as competence energizes human activity (Deci & Ryan, 2000).

In regard to the desire for intrinsic forms of motivation, the work of Amabile (as cited in Deci & Ryan, 2000) indicated that evaluation and rewards were associated with a decline in creativity. In their research, Deci and Ryan (2000) found that rewards and threats lessened creativity and decreased intrinsic motivation. Through the lens of SDT, engaging in creative activities that satisfy the need for autonomy, relatedness, and competence will prompt expression that is naturally intrinsically motivated.

Curiosity and Self-Determination Theory

As put forth by Deci and Ryan (2000), SDT can be used to explain curious exploration and investigatory manipulation. In this sense, individuals engage in autonomous exploration based on curiosities in order to feel a sense of competence. The ability to answer a puzzling question or find a solution to a problem increases feelings of competence within oneself (Litman, 2005). Kashdan and Steger (2007) observed that individuals feel extremely curious when a situation satisfies the need for novelty and challenge. However, those factors alone were not enough. Without competence or the ability to understand the novelty or challenge and the freedom to approach the problem as one chooses, the feelings of curiosity were likely not acted upon, as there was no real motivation to do so.

Independent learning, or intrinsically motivated learning, relies on curiosity (Kedge & Appleby, 2010). Additionally, there is a degree of autonomy involved when curiosity drives learning. In support of this assertion, Deci and Ryan (2008b) found that students felt more competent, curious, and intrinsically motivated in autonomy supportive classrooms. In

accordance with SDT, Loewenstein (1994) posited that people commonly seek information because they believe they will find it interesting, not because the absence of the information is viewed as a deficiency. Furthermore, Loewenstein stated that cognition itself, without an actual physiological need, can motivate curiosity. This view was supported by Deci and Ryan's (2008a) explanation that SDT carries with it the assumption that humans are naturally curious because it is both rewarding and satisfying.

Self-Determination Theory served as an appropriate theoretical framework for this study, as the theory asserts that creativity, curiosity, and academic intrinsic motivation are each optimized when the psychological need for competence, autonomy, and relatedness is met. Surveys and inventories that were utilized in the study reflected many of the tenets of SDT. Furthermore, qualitative data analysis and discussion of the study results were guided by the principles of SDT.

Significance of the Study

Exploring the relationship among student creativity, curiosity, and motivation to learn helped highlight the importance of enhancing and promoting creativity and curiosity in schools. This area of study is significant because determining and promoting factors that aid in student engagement and interest in school is extremely beneficial to student learning, success, and motivation. Studies have indicated the benefits of curiosity and creativity in learning; however, this is the first known study that examined both in relation to a specific aspect of learning, academic intrinsic motivation. It is for these reasons this study had merit.

Research Questions

The research questions of this study were designed to guide the researcher in determining whether or not relationships existed among student curiosity, creativity, and academic intrinsic

motivation. Research questions were framed in such a way that motivation in school was examined overall, as well as in regard to individual subjects. Additional research questions aimed to determine characteristics, sources, and factors that influenced student curiosity, creativity, and academic intrinsic motivation.

Question 1

What is the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation?

Question 2

How does the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation vary among different subjects (reading, mathematics, science, and social studies)?

Question 3

What are the common characteristics of students who possess similar levels of creativity, curiosity, and academic intrinsic motivation?

Question 4

To what sources and/or factors do students attribute their levels of creativity, curiosity, and academic intrinsic motivation?

Hypotheses

Collecting and analyzing quantitative data pertaining to the first two research questions aided in determining whether or not to reject the null hypotheses. Alternative hypotheses supported the belief that significant relationships and differences existed among the study's constructs.

Null Hypotheses

$H_0 1$: There is no significant relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation.

$H_0 2$: There is no significant difference among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation when compared to different subjects (reading, mathematics, science, and social studies).

Alternative Hypotheses

$H_1 1$: There is a significant relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation.

$H_1 2$: There is a significant difference among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation when compared to different subjects (reading, mathematics, science, and social studies).

Definitions

Academic Intrinsic Motivation

This construct, as defined by Gottfried (1985), is "the enjoyment of school learning characterized by an orientation toward mastery; curiosity; persistence, task endogeny; and the learning of challenging, difficult, and novel tasks" (p. 632).

Creativity

Creativity is defined as "something novel and appropriate" by Sternberg and Lubart (1999); this definition will be used to define creativity in this research study. Novel, in this sense, means that the product or thought is new or not a reproduction, while appropriate means that the thought or tangible product is related to the task. This definition allows creativity to be viewed as both a process and a product.

Creative Opportunities

Creative opportunities are defined as instances where students are permitted to produce or respond with a thought or product that is novel and appropriate, in that each student has the opportunity to produce a clearly unique work or respond in a clearly unique way.

Curiosity

Curiosity, as was conceptualized by Kashdan, Rose, and Fincham (2004) as "a positive emotional-motivational system associated with the recognition, pursuit, and self-regulation of novelty and challenge" will be used as the operational definition for this study (p. 291).

Student Engagement

The definition of student engagement defined by Newmann (1992, p. 12) as "the student's psychological investment in and effort directed toward learning, understanding or mastering the knowledge, skills or crafts that academic work is intended to promote" will be used to define student engagement in this study.

Assumptions

This study operated under the assumption that creativity was a measureable attribute. Another assumption of this study was that participants were accurate in responding to survey questions and items on the test and inventory instruments.

Limitations

Researcher bias was a limitation of this study, as the researcher subscribed to the belief that creativity and creative opportunities were important for engaging students. To minimize any bias, quantitative data were collected directly from the participants without chance for misinterpretation by the researcher. The administration of all test instruments involved standardized directions and scoring.

Another limitation of this study was the ability to identify a setting in which the research could take place. Prior to beginning the study, concerns surrounding this limitation were addressed to ensure that an appropriate population who addressed the purpose of this study was accessible.

Although data collection did not take place in the specific school in which the researcher was a teacher, this study was carried out in the school district in which the researcher was employed. As a result, there existed the possibility that some participants would be familiar with the researcher. The researcher was aware of this concern and was diligent in ensuring confidentiality.

A final limitation of this study was that the sample size used in this study may be seen as small. As a result, there were difficulties in generalizing the findings to a larger population.

Summary

In today's climate of standardized, high-stakes testing, the attention of education in many schools has turned toward test preparation and the improvement of test-taking skills. This focus on scores has undoubtedly marginalized those who do not perform well on these types of assessments. In addition, these test scores serve as an extrinsic reward or goal for many students. This type of motivation is less powerful than intrinsic motivation, especially in regard to curiosity and creativity. As explained by Self-Determination Theory, engaging in curious and creative inquiry has the potential to satisfy the basic psychological needs of autonomy, competence, and relatedness. Individuals who are autonomous, competent, and connected benefit by being intrinsically motivated to complete tasks. A specific type of intrinsic motivation - academic intrinsic motivation - is extremely beneficial in education because it serves as a foundation for interest and life-long learning. Unlike the ability to score well on a test, instilling

behaviors that foster intrinsic motivation in students can have long-term effects and be beneficial to one's well-being. The aim of the current study was to examine and describe the circumstances surrounding the relationship among student curiosity, creativity, and academic intrinsic motivation. This determination can inform educators and administrators and possibly help redirect instructional practices to include the promotion of creativity and curiosity so that all students benefit.

Chapter Two will focus on current literature and research related to the topics that were examined in the current study. It will provide descriptions, definitions, and perspectives on the constructs and population that were studied. Together, the information and findings will provide an understanding of how the constructs are related and the impact that human development and individual attributes have on motivation and learning.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

This chapter will explore current literature and research related to creativity, curiosity, academic intrinsic motivation, as well as the characteristics of sixth grade students. It aims to define and clarify the often misunderstood concepts of creativity and curiosity, as well as explain common assessment methods that make research into these topics more robust. Academic intrinsic motivation is explored in terms of influences, goals, and commonly held beliefs that surround its decline as students mature and enter different stages in their education. This natural part of human development is a concept that is explored in depth when discussing common characteristics of sixth grade students. The description of the study's population will serve as the conclusion of the review of related literature.

Creativity

Creativity is both an interesting and complex notion. Reflective of this fact, researchers hold varying perspectives and subscribe to different theories of creativity in an attempt to define and understand it. According to Cullingford (2007), it is because of this difficulty that many policy makers have dismissed creativity, viewing it as unnecessary, weak, or a frill. This dismissal or lack of understanding of creativity is evident in both education and society at large.

Creativity and research into why it is important to the field of education has been a topic of interest since the mid-20th century. Specifically, Guilford (1950) spurred the examination of the topic as he called to mind the lack of research on creativity in his seminal address as president of the American Psychological Association. In his address, he shed some light on the very small amount of research that was being published on the topic. This speech essentially

served as the impetus for research on the topic of creativity that blossomed and persisted for the last sixty years.

It is apparent that any discussion of creativity undoubtedly starts with a definition, as the idea of struggling for a common view of creativity is seen in much of the literature on creativity. In fact, Kampylis and Valtanen (2010) conducted a literature review in which they discovered 42 explicit definitions of creativity. Furthermore, Glück, Ernst, and Unger (2002) indicated that each group of participants in their study included imaginativeness in its definition of creativity. However, other than imaginativeness, the three groups of participants, which included free artists, constrained artists, and psychology students, each stressed varying levels of importance on other characteristics that they thought constituted creativity. It was therefore suggested that different fields of interest define creativity differently.

De Souza (2000) posited that, essentially, researchers have defined and studied creativity through person, product, process, and environment lenses. Some researchers have defined creativity in simple terms. For example, Runco (2008) indicated that if an interpretation is useful and original, it is then creative. Others offered a bit more involved definition, such as that of Mumford and Gustafson (1988) who explained:

> creativity appears to be best conceptualized as a syndrome involving a number of elements: (a) the processes underlying the individual's capacity to generate new ideas or understandings, (b) the characteristics of the individual facilitating process operation, (c) the characteristics of the individual facilitating the translation of these ideas into action, (d) the attributes of the situation conditioning the individual's willingness to engage in creative behavior, and (e) the attributes of the situation influencing evaluation of the individual's productive efforts. (p. 28)

When collectively examining definitions of creativity put forth by researchers, however, it is quite easy to see parallels between definitions. Pinpointing the source of this common ground, Claxton, Pannells, and Rhoads (2005) indicated that many of the commonly held or referenced definitions today are a reflection of the work of Guilford over six decades ago. Fluency, flexibility, and originality were viewed by Guilford as the essential components of creativity and researchers in the field today often reference these constructs as the foundation of divergent thinking, which is a very popular way of viewing creativity. Recently, Dhingra and Sharma (2012) explained that "divergent thinking is the ability to produce unusual and original ideas and to take an idea and spin out elaborate variants of the idea" (p. 155). However, divergent thinking's components of fluency, flexibility, and originality are not the only components of creativity, as it has been indicated that divergent thinking and creativity are not synonymous. Guilford (1964) indicated that creativity is not simply divergent thinking, but instead divergent thinking along with the ability to redefine, transform, and reinterpret.

Thus, in an attempt to narrow down creativity to a definition that is clear and comprehensive and most reflective of the current study, the definition put forth by Sternberg and Lubart (1999) as something that is both novel and appropriate, has been selected. This simple, yet powerful, definition is all encompassing as it can pertain to products, persons, processes, and environments.

In light of the different ways of defining creativity, it is apparent that creativity is viewed as both an object that is produced and a way of thinking. Wu and Chiou (2008) presented the idea that creativity research typically is viewed from either a psychological measurement or creative process approach. Viewing creativity through a psychological measurement lens involves viewing creativity as a matter of individual ability and difference involving

performance, while the creative process approach focuses on creativity as an internal process. The notion of everyday creativity highlights this process and Cropley's (2001) book on creativity in education focused solely on this type of creativity. The author viewed creativity as person-centered and requiring intent or purpose. This approach was detailed by Sternberg (as cited in Cropley, 2001, p.9) as involving six components, five of which include: knowledge, insightful thinking, intrinsic motivation, self-confidence, flexibility, or risk-taking. In light of this explanation, it is apparent that viewing creativity as a process can very easily be examined through the lens of Self Determination Theory (SDT), as self-confidence is undoubtedly related to the competence component of the theory.

Runco (2007) suggested a hierarchical framework from which to study creativity as he posited that creative potential needs to be addressed in the research. This assertion is based on the idea that just because young children may not yet be able to make a contribution to society through their creative abilities, it does not mean that they do not have the potential to do so. The author urges readers to avoid looking at creativity only from production and art perspectives and to focus more on creativity as interpretations and thinking. This sheds light on the idea that we must value and recognize creative potential, especially in the school setting.

Like approaches and definitions, many types of creativity have been described in the literature. Beghetto (2007) has made a distinction between little-c and mini-c creativity. Little-c creativity is described as interpersonal knowledge that is meaningful and appropriate, while mini-c creativity is described as personal knowledge. The latter is more associated with the learning process. Kaufman and Beghetto (2009) elaborated on the significance of the exploration of types of creativity by explaining that big C, or the type related to famous individuals, is misleading to the general population and to studies of creativity in everyday life and learning.

They expressed that little-c explained the necessity for creativity in schools and mini-c creativity for the learning process. This explanation helps frame the study of creativity in a way that is manageable in education and therefore in this present study.

Ivcevic (2007) also explored the idea of distinguishing between different types of creativity. The author concluded that there is a difference between everyday creativity and artistic creativity, as evidenced in an act-frequency study of the topic. This type of study involved first having a group of individuals list acts that they thought typified everyday and artistic creativity. Next, a group, different from the first, chose the acts on the list that they found to be typical of the two types of creative people. Finally, the researcher recorded the number of times a participant exhibited the acts in a given time period. It was indicated that everyday creativity results in personal growth and more improved problem solving skills. The work of both Beghetto and Ivcevic helps categorize creativity, thus making it more relevant and manageable in regard to education and research.

Often times, creativity is viewed as an innate talent that one either does or does not possess. However, research into enhancing creativity suggests otherwise. A 2009 study by Erdogan, Akkaya, and Akkaya indicated that there was a statistically significant difference on the pre- and posttest scores of students that had been subjected to the Van Hiele model of instruction involving geometric thinking. The students scored higher in fluency, originality, titles being abstract, creative forces list, and creativity, which reflected an increase in creative thinking skills.

Another view of creativity that suggests it is capable of being enhanced is through the lens of the investment theory of creativity. Sternberg (2006) stated that according to this theory, creativity calls for the union of six separate resources that are connected. These resources

include intellectual abilities, personality, knowledge, motivation, styles of thinking, and environment. In addition, this theory suggests that creativity is indeed a skill, but mostly a choice, and therefore can be developed in individuals. It is believed that a legislative thinking style and investing time at first to be able to be effective later are the hallmarks of the investment theory of creativity. What, according to the author, holds back individuals from making the decision to be creative is the high cost of this behavior in our present society. In agreement with this view, Dhingra and Sharma (2012) indicated that as age and grades increased, students' divergent thinking skills decreased. The authors hypothesized that this may be indicative of the negative social and educational forces that are at play in the lives of students. This is also reflective of an important idea put forth by Csikszentmihalyi (1990) in which he indicated that social and historical events in one's life must be considered when studying an individual's ability to think creatively.

Assessing Creativity

Thirty years ago, Amabile (1982) suggested that the tools used to assess creativity in empirical studies often times did not include an operational definition of creativity. As described earlier, there are many approaches to understanding and defining creativity and this factor can contribute to confusion concerning the assessment of creativity. Following Guilford's address in 1950, many prominent researchers have been at the forefront of creativity research. These researchers have carried out studies that have not only attempted to define, categorize, and explain creativity, but also determine how to assess it (Hu & Adey, 2002; Niu & Sternberg, 2001; Proctor & Burnett, 2004; Sternberg & Lubart, 1999). Sternberg (2006) has pointed out that Guilford and Torrance, two prominent researchers in the field, were similar in their approaches because of the fact that they were both psychometric theorists and therefore

measured creativity from a psychometric standpoint. They viewed divergent thinking as the essence of creativity and the tests they devised were a reflection of this viewpoint. Torrance, as cited in Kim (2008), indicated nearly forty years ago that his Torance Tests of Creative Thinking (TTCT) assessed the creative ability that one possesses. However, the assessment did not assure that the individual would behave in a way that reflects this ability. Kim (2008), however, argued that in the most recent revision of the TTCT scoring structure, creative behaviors are reflected, thus making it more than just a divergent thinking test.

Researchers in the field have claimed that it is possible to construct a valid instrument to rate a student's real world creativity characteristics in a classroom context. They have asserted that divergent thinking assessment is more valid with creativity instructions and more dependable with a number of tasks, all while indicating that divergent thinking is not synonymous with creativity (Epstein, Schmidt, & Warfel, 2008; Hu & Adey, 2002; Proctor & Burnett, 2004; Silvia, 2008).

In regard to subject matter, studies have addressed many different disciplines, as to not view creativity as pertaining only to the creative and performing arts. A Hu and Adey (2002) study of secondary science students resulted in a valid 7-item test for assessing scientific creativity. At the elementary level, a Proctor and Burnett (2004) study resulted in the formation of a creativity checklist that can, although not exclusively, aid teachers in profiling, observing, and monitoring a student's real-world creativity characteristics.

Many, if not most, studies involving the assessment of creativity have been carried out in relation to intelligence or IQ (Leahy & Sweller, 2008; Palaniappan, 2008; Schacter, Yeow Meng & Zifkin, 2006). As Kim (2005) illustrated, there have been studies that have both shown and failed to show a relationship between creativity and intelligence. Reasons indicated for this

discrepancy include the types of creativity and intelligence tests being used, socioeconomic factors, age, and gender. Wu and Chiou (2008), for instance, have indicated that when creativity is viewed from the process approach, developmental changes in creativity are often times ignored. In Kim's (2005) meta-analysis of studies involving a total of 45,800 participants, it was indicated that the relationship between creativity and IQ scores was small and positive, but insignificant.

Creativity in Education

Currently in the United States, students who are gifted and creative are being failed by the educational system as they are forced to fit into the mold of a standards-based, rigid school environment. Seeley (as cited in Kim, 2008) indicated that as many as 30% of high school dropouts are highly creative, gifted, and talented students. To shed light on the significance of this statistic, Hayes (2007) used Einstein as a historical example of one such student where the monotony of school led to labeling him as lazy and even as an "academic failure". This raises the question of whether or not allowing more opportunities for students to be creative in schools can prevent this boredom and encourage student engagement.

According to the Association for the Study of Higher Education (2007), the nature of the institution, student, and discipline affects student engagement in creative activities in higher education. At the K-12 level, teachers report feeling pressured by the system, standards, and unmanageable class size and indicate those factors as reasons for not including more creative opportunities in the classroom (Kim, 2008). Others, such as Beghetto (2007), found that teachers view creativity as one more responsibility or as something "extra".

As stated by Kim (2008), it is not uncommon to find that the emphasis on standardized testing is often cited as a reason for the lack of creativity in the classroom. It is evident that

standardized testing, which is given such a huge emphasis in schools, primarily measures only one type of learning. It encourages convergent thinking which is quite the opposite of the basis of many creativity tests that emphasize and, in fact, measure divergent thinking. If this type of learning is made the focus of education, it is obvious that instruction based on memory and analytical skills will be emphasized (Sternberg, 2003). Solely relying on this type of instruction will not address the needs of all learners, thus the need for the integration of creative opportunities in order to engage each student. Burke-Adams (2007) indicated gifted students as one particular group of learners that this type of education would benefit, mainly because having freedom and choice motivates this type of learner.

It is important to note that not all classroom settings stifle creativity. In fact, in a study conducted by Sarsani (2008), the highly creative students who were studied reported being able to express ideas, speak out, and follow their own ideas. They felt as if the teachers were not anxious if they asked unexpected questions and the teachers, in fact, entertained their questions. However, students who were categorized low or average in terms of creativity felt more criticized and that teachers were stricter with them than with the students who were highly creative. These groups of students felt that teachers ignored them and seemed anxious when they asked unexpected questions. This finding attests to the idea of having a learning environment that is conducive to the learning of all types of students.

Addressing different types of learners, Sternberg (2006) indicated that groups in a study that were highly creative and highly practical were diverse in terms of race, ethnicities, SES, and education. On the other hand, groups that were highly analytical were not as diverse. This indicates that intelligence should be thought of in a more broad way so that those considered intelligent will encompass more types of intelligences. An example of this concept was seen in a

study by Kim (2008) where the TTCT, a measure of creativity that gave educators the ability to report on student ability separate from aptitude and standardized achievement tests, was used to determine student ability. The author placed importance on this feature of the test in regard to the identification of gifted students by using the state of Georgia as an example. By using more than simple IQ tests, more minority, at-risk, and disadvantaged youth were placed in programs for the gifted. The ability of the TTCT to measure ability separate from that tested on traditional standardized achievement tests is of particular interest to the current study, as the researcher is interested in looking at creativity and curiosity along with motivation, not achievement.

In addition to those who are considered gifted, Brandau et al. (2007) have indicated that other groups of students that are at a disadvantage in most of today's educational settings are those diagnosed with attention deficit hyperactivity disorder (ADHD) or those who are highly creative and exhibit many behaviors that are similar to those diagnosed with ADHD. They posited that education is full of digital and symbolic information, which includes sequential analysis, planning, and observing. This is difficult for students with ADHD or those with ADHD-like symptoms because their behavior is more fluid and spatial. Another disadvantage for these students is the way in which teachers view their behaviors. Brandau et al. reported, however, that students who exhibited behaviors that were seen as impulsive or disruptive by the teacher, scored better on the fluency portion of a creativity test, while students who were viewed as attentive and less introverted scored better on the flexibility portion of the creativity test. These results are significant in that they indicate that extraversion can be used as a predictor of creativity.

Consistent with behaviors, ways of thinking can also influence the manner in which one interacts with the world. Wu and Chiou (2008) indicated that postformal thinking is positively

correlated with creativity, while formal thinking is negatively related to creativity. Those considered postformal thinkers view knowledge as relative, accept contradiction (and in fact see them as creative opportunities), and integrate these contradictions into the bigger picture. They differ from formal thinkers in that formal thinkers operate in a closed system, view contradictions as problems, and look for single logical answers that will hold true over time. In light of the current standards-based educational settings, it is apparent that formal thinkers are at an advantage over more creative, postformal thinkers.

Although the prevalence of a standards-focused education is evident in the United States, blaming standards for the lack of opportunity for student creativity may not be a fair assertion. In fact, Schacter, Yeow Meng, and Zifkin (2006) actually found accountability and teaching creatively to be complementary and suggested focusing on standards while adding more creative teaching techniques to one's instructional strategies. In this case, standards make creativity valid or appropriate, while creativity makes teaching with accountability more interesting and meaningful to students. The benefits of creativity in education were also explored by Sarsani (2008) who indicated that with the exception of highly creative students, the majority of students reported a dislike for science, mathematics, and social studies. It was also found however, that if taught in an interesting way, the students' dislike for the subjects diminished. Results from a Brandau et al. (2007) study also indicated that when students were taught in a way that matched how they thought, they performed better. Essentially, these results indicate that in the present conditions of most schools, creative and practical students are at a disadvantage. This is, of course, unless creativity is stressed in the classroom.

Horng, Hong, ChanLin, Chang, and Chu (2005) investigated those who teach in a more innovative manner and identified certain personality traits of creative teachers which include

persistence, self-confidence, and possessing a sense of humor. Oreck (2006), in a study of New York City Public School teachers, also found key characteristics of those teachers who employed the arts in teaching and in turn, taught more creatively. The author found that a willingness to push boundaries and take risks is what defined this specific group of teachers. This is of importance because students should be able to observe creativity and be exposed to a curriculum or approach that allows creativity to surface through open-ended and ill-defined tasks (Runco, 2007).

Although it is somewhat difficult to train individuals to be more persistent, have a greater sense of humor, and gain self-confidence, there are indeed strategies that can be utilized by those who consider themselves uncreative educators in order to become more creative in teaching. Horng, Hong, ChanLin, Chang, and Chu (2005) described student-centered learning, classroom management strategies, connections between teaching contents and real life, and open questions as effective approaches to creative teaching. Along with these strategies, a Niu and Liu (2009) study indicated that simply adding the words "be creative" resulted in more creative outputs from students. Cheng, Himsel, Kasof, Greenberger, and Dmitrieva (2006) also found that instructions to "be creative" not only elicited a more creative response, but also increased the domain-general aspect of the creativity. Similar to the way in which domain general and domain specific creativity types have been explored, Beghetto (2007) also addressed different types of creativity in his research. The author suggested ways of creating a more creative classroom by listening to students, cueing students who are not on task with the goal, and providing opportunities for moving between "little-c" and "mini-c" creativity in the classroom.

Interestingly enough, however, deciding how to categorize creativity is not usually a priority of many educators. In fact, oftentimes creative teaching is simply not evident because

educators claim that teacher-training programs and workshops for creative instructions are non-existent (De Souza Fleith, 2000; Hong, Chuan Lin, Chang & Chu, 2005). However, as Oreck (2006) found, when employing more art-based teaching in a general classroom, it is teacher attitude, not skill, that determined if an educator was creative in teaching. If teachers believe that all students are capable of high achievement and they have broad views of "art", more creative teaching will result. Beghetto (2007) also found that viewing constraint and creativity as a complementary combination will help teachers avoid dismissing creativity as something wild or stereotypically negative, thus resulting in more creative teaching. Simplico (2000) also indicated another attitude, or misconception about creativity. The author put forth the notion that creative teaching is not done on a whim, but instead is hard work, involving much planning and preparation.

Looking at patterns of creativity in teaching, Beghetto (2006) found that there is a notion of "creative justice" when it comes to teaching creatively. To elaborate, if an individual had a negative, creativity-suppressing school experience, the study indicated that those individuals had become creativity advocates as teachers. On the other hand, those who reported positive creative experiences in school are more likely to not be as focused on promoting creativity in their own classroom.

As it is apparent that many times teachers are not focused on creativity, it has also been indicated that teachers may view students' activities as creative when they are actually not. Walling (2009) indicated a "creativity continuum" on which replication sits at one end and originality at the other. As the author indicated, although computer programs for presentations are viewed as ways for students to "be creative", they are preloaded with so much content that the technology could actually be viewed as more limiting than liberating. This idea cautions

educators to evaluate the actual, not assumed, level of creative opportunities offered in one's classroom.

Creative opportunities, in the form of student choice, are another way in which students can become engaged in learning. Zinn (2008) found that when students were permitted to carry out a learning task or show understanding in a way that allowed for creativity, self-expression, and freedom, students were more motivated to learn. Runco (2008) supported the idea of providing opportunities in the curriculum that allow students to construct their own knowledge through open-ended tasks rather than those that rely on memory. He claimed that creative behaviors and originality are only possible if creative opportunities are provided in the classroom. Sarsani (2008) echoed this view as he claimed that if the goal of education is simply to meet predetermined goals, discovery and excitement in learning will be diminished. This push for creativity in learning is seen in the work of Cullingford (2007) as he posited that a child's learning is like that of an artist because it involves association, imaging, and the self-consciousness of criticism. Imaging, or the ability to categorize, is a component of creativity that involves connecting pieces to make a clear whole. A curriculum that is based on real life therefore provides the opportunity for students to use the creative process of imaging.

It is clear that students benefit from a dimension of creativity in education, as it has been indicated that creativity is conducive to learning, student achievement, and cognitive development, as well as predicting academic success (Eckhoff & Urbach, 2007; Freund & Holling, 2008; Leahy & Sweller, 2008; Schater, Yeow Meng, & Zifkin, 2006). Students who learn, achieve, and develop successfully may be more motivated to apply themselves in an academic setting. This motivation is crucial, as getting students engaged in school is the first step to meaningful learning and creating life-long learners. Many times, however, it is not

engagement in school but a grade that is the goal of students. Sarsani (2008) emphasized the idea that students are often times focused on and rewarded for formal grades, which leads to a diminished focus on acquiring creative skills. This view is supported by Kaufman and Beghetto (2009) who explained that intrinsic motivation feeds creativity, while extrinsic motivation harms it. This movement away from honing and exhibiting creativity, which is driven more by intrinsic motivation, may have a negative impact on student engagement. This is because the goal is focused more on a short term grade, or extrinsic reward, than on building a foundation for engagement and life-long learning.

In support of engagement through creativity, Allam (2008) examined one particular learning situation in which students were given an opportunity to be creative as they produced films as a way to interact with academic content. Students reported enjoying themselves and the playfulness that was involved in the learning process. Students were highly motivated and therefore put much time and effort into the project. This research directly addressed the importance of including an element of student creativity in the educational process.

Fasko (2001) indicated that we can better understand the creative process because analysis done using statistical measures is now possible. The researcher indicated that based on the belief that creative individuals are intrinsically motivated to complete a task; there can be a major clash between the creative individual and the extrinsic motivation encouraged by grades. Like instruction and expectations, assessment is another area where one can find a disparity between creative students and the educational system. In a study conducted by Sternberg (2006), students who were taught in a way that was congruent to their way of thinking performed better in school. In contrast, students who were more practical and creative were considered lower achieving, in part because of the method of assessment that was employed.

The benefits of creativity for lifelong learning have been illustrated, but there are other benefits to honing creativity. Runco (2004) claimed that creative people are more flexible, a characteristic which allows the individual to deal with changes in and throughout life. Consequently, this research study aimed to focus on and examine the relationship among students' curiosity, creativity, and academic intrinsic motivation. The current study was not concerned with academic achievement, or grades, which are forms of extrinsic motivation, but with intrinsic motivation for academics.

Curiosity

Curiosity, like creativity, has traditionally been defined in a number of ways with a lack of consensus as to an ultimate definition. It has been described as a desire, a system, a state, recognition, engagement, and a condition (Berlyne, 1966; Kashdan et al., 2009; Kashdan, Rose, & Fincham, 2004; Kashdan & Steger, 2007; Leonard & Harvey, 2007; Litman, 2005; Litman & Jimerson, 2004; Littman & Spielberger, 2003; Schmitt & Lahroodi, 2008; Silvia, 2008). Also, like creativity, it has been examined from many different perspectives and it has been placed into different categories. Curiosity has been viewed as a feeling of interest and deprivation (Loewenstein, 1994). It has been described using the terms epistemic, perceptual, occurrent, social, cognitive, and sensory (Berlyne, 1969; Reio, 2009; Renner, 2006; Schmitt & Lahroodi, 2008).

Regardless of the lens through which one views curiosity, discussion of the topic can most likely be traced back to the 1950s and specifically to Berlyne. Berlyne (1966) defined curiosity as "the condition of discomfort, due to inadequacy of information that motivates specific exploration" (p. 26). In this explanation, he is equating curiosity with specific exploration which not only clears up uncertainties but also seeks to obtain knowledge.

Conversely, he explains that diversive exploration is not curiosity per se, but an exploration driven by novelty in order to relieve boredom.

Along with different types of exploration, Berlyne's (1966) view of curiosity was that there were perceptual and epistemic types. He suggested that perceptual curiosity is related to tactile, visual, and auditory stimuli, while epistemic curiosity deals with knowledge or the need to know.

Day (1969) agreed with Berlyne in some ways, stating that specific curiosity is driven by stimuli. However, while Berlyne believed that boredom drives diversive exploration, Day believed that curiosity drove diversive exploration. This runs counter to Berlyne's thought that curiosity is, in fact, specific exploration and therefore does not explain diversive exploration.

Current research in the field still reflects the work of Berlyne. For instance, Kashdan et al. (2009) explained that "specific curiosity refers to an open and receptive attitude and willingness to explore events that are ambiguous, strange, unusual, or uncertain" (p. 988). While they explained:

> diversive curiosity refers to a more general desire to seek out new experiences and information, with exploration leading to some degree of insight of the previously unknown. Diversive curiosity originates when someone feels a readiness to grow and expand as opposed to remaining in familiar, certain territory. (p. 988)

One difference between Berlyne's era and today is the way in which current definitions look at curiosity as more of a desire for new knowledge and experiences or novelty (Kashdan et al., 2009; Litman & Jimerson, 2004; Litman & Spielberger, 2003). Interestingly, contemporary definitions offered by authors do not focus on discomfort and inadequacy as much as Berlyne (1966) did in his definition. Today, commonly held definitions include that of Kashdan, Rose,

and Fincham (2004), which states that curiosity is "a positive emotional-motivational system associated with the recognition, pursuit and self-regulation of novelty and challenge" (p. 291). Leonard and Harvey (2007) put forth another example, as they viewed curiosity as a motivational state in which environmental information is internalized and compared to mental models and maps. Other definitions are broader and include "a desire for acquiring new knowledge and new sensory experiences that motivate exploratory behavior" (Litman & Spielberger, p. 75).

Berlyne's view of curiosity as a way of dealing with a lack of information has not been abandoned over the years. Although it is not commonly included in formal definitions, this idea has been addressed in the discussion of different types and models of curiosity, as it has been described as both a feeling of interest and a feeling of deprivation. According to the Interest/Deprivation model, Type D curiosity is defined as the type of curiosity that encourages learners to seek new information because it reduces feelings of uncertainty that are usually viewed as negative. Type D curiosity is an unsatisfied need-like state that promotes specific exploration and looks to solve problems (Litman, 2008; Yau, Kan, & Cheng, 2012). Conversely, Type I curiosity is motivated by positive feelings in that interest and the opportunity to learn something new evokes emotions that are positive. Type I curiosity is concerned with adding new ideas or concepts and motivates diversive exploration (Litman, 2008; Yau, Kan, & Cheng, 2012).

In much of the literature, Type I curiosity is described as curiosity as a feeling of interest (CFI), while Type D is described as curiosity as a feeling of deprivation (CFD). In much the same way Littman and Spielberger (2003) indicated that perceptual and epistemic types of curiosity are distinct but are highly correlated, Eren (2009) indicated that curiosity as a feeling of deprivation (CFD) and curiosity as a feeling of interest (CFI) are separate but strongly correlated.

Others have put forth the idea that although they are strongly related, a distinction is indeed needed because CFD and CFI correlate with different constructs such as anxiety and depression (Litman & Jimerson, 2004). In addition, unlike with curiosity as a feeling of interest, understanding curiosity as a feeling of deprivation has been linked to mastery goals by many researchers (Eren, 2009; Ferguson & Sheldon, 2010; Meyer & Turner, 2006).

Theories, such as the interest-deprivation model of curiosity, have persisted for quite some time. Litman and Silvia (2006) have stated that after the drive and satiation view of curiosity in the 1950s, optimal arousal theory and stimulation became more prominent in the 1960s. This perspective has driven curiosity studies for over 50 years, as many theories of curiosity today are based on optimal arousal theory. In order to make a preliminarily attempt to move curiosity beyond arousal and drive theories, Litman (2005) proposed building directly on the I/D model of curiosity. He urged that the addition of wanting and liking to the model will aid in further explaining the complex construct of curiosity. Although more research is needed in regard to this proposed model, preliminary descriptions are promising in that the author's assertions expanded the explanation of curiosity beyond arousal and drive theories.

Another theory or model that has been advanced is the information-gap theory. In this theory, Loewenstein (1994) specifically addressed the idea of curiosity as a feeling of deprivation (CFD), stating that this type of curiosity is more purposeful in education than when curiosity is viewed as a feeling of interest. In fact, his theory somewhat explains CFD considering he posited that the gap in one's knowledge is essentially the realization that one is deprived of desired knowledge. As a result, a necessary condition for the information-gap theory is that one must first be aware that there is a gap in one's knowledge or basically that what one wants to know is not satiated by one's present knowledge. Research has indicated that when

compared with CFI, CFD is associated with more intense feelings of exploration (Litman, 2005; Litman & Jimerson, 2004; Loewenstein, 1994). Littman and Jimerson (2004) have developed an instrument that specifically measures CFD. They take into consideration intolerance, problem-solving, and competence as elements of curiosity when viewed as a feeling of deprivation. Conversely, they explained that CFI is associated with pleasurable experiences.

Others have explored different perspectives of curiosity. Schmitt and Lahroodi (2008) described curiosity as tenacious, biased, and independent. To elaborate, the researchers viewed curiosity as a medium that deepens and broadens knowledge as well as supports our interests. The authors described occurrent curiosity as both a state where curiosity is focused on the topic given and as a disposition, which entails being occurrently curious. They distinguish this from trait curiosity, or when an individual is curious about many topics. The authors also applied the term "estimable distribution" to epistemic curiosity that involves cognition.

Like Schmitt and Lahroodi, others have explored the idea of curiosity in relation to cognition. In fact, Kagan (1972) described epistemic curiosity as "the motive for cognitive harmony, consonance, equilibrium, or simply the motive to know" (p. 57). Reio, Petrosko, Wiswell, and Thongsukmag (2006) proposed a model of curiosity that is based on cognition, as well as physical and social thrill seeking. Results of their study supported the belief in cognitive and sensory curiosity which individuals express through thrill and information seeking behaviors. Reio (2009) later furthered this idea, explaining that cognitive curiosity involves seeking knowledge, while sensory curiosity involves seeking sensations. Both, however, led to exploratory behavior. Although this was proposed over forty years later, it is very similar to Berlyne's (1966) view that there were two types of curiosity: perceptual, which is related to

tactile, visual, and auditory stimuli, and epistemic, which deals with knowledge or the need to know.

Other theorists have made an effort to address curiosity in the present time by using more advanced psychological measures. Litman and Jimerson (2004) have indicated that drive and optimal-level theorists look at the underlying causes of curiosity, while personality theorists explain curiosity as a trait. Exploring the latter, a Leonard and Harvey (2007) study indicated that there is a significant relationship between emotional intelligence and trait curiosity. The researchers tried to determine if people with high levels of trait curiosity had a better sense of well-being on days when they were more curious. Findings indicated that curiosity helps develop feelings of well-being and meaning in life. Renner (2006) is one other contemporary researcher who asserted that social curiosity is a separate and distinct facet of curiosity that is many times not addressed in studies of curiosity. Surely, these aspects and relationships will continue to be researched in future studies of curiosity.

Why and How are Individuals Curious

As indicated by Borowske (2005), Day's Zone of Curiosity explained that curiosity lies between feeling relaxed and feeling anxious. It is in this zone that one feels excited, interested, and compelled to explore. Silvia (2008) argued that interest is an emotion that results from appraisals of an event's novelty-complexity and comprehensibility. In light of this view, the author posited that interest is aroused when events or objects are new and understandable, while confusion arises when events or objects are new and not understandable. In a study conducted by the researcher, participants found abstract objects more interesting when clues were given that aided in their ability to comprehend the subject.

This notion was echoed by Kashdan and Steger (2007) who observed that individuals feel extremely curious when a situation satisfies the need for novelty and challenge. However, those factors alone were not enough. The individuals must have felt that they were competent and could understand the challenge and novelty of the situation, which is reflective of Self-Determination Theory.

Litman, Hutchins, and Russon (2005) studied how individual differences in epistemic curiosity and feelings of knowing affected exploratory behaviors and curiosity. In an attempt to study the topic, feelings of knowing were categorized as essentially knowing, not knowing, and partially knowing. The researchers believed that when an individual felt tension and doubt, there would be more exploratory behavior exhibited. Both exploratory behaviors and state curiosity were reported to be highest when there was partial knowledge of the answer. In other words, when knowledge gaps were at their smallest, curiosity and exploration were at their highest.

Others have also explored the idea of knowledge gaps and their benefits to thinking. Min Jeong et al. (2009) posited that in regard to new information, curiosity may enhance memory. The researchers indicated that when subjects in the study answered a question incorrectly, there was increased activity in memory areas of the brain. In later sessions, participants were then better able to recall the answers to the questions they had first answered incorrectly. Their findings suggested that curiosity is linked to the anticipation of rewarding information and the consolidation of new information.

Curiosity Synonyms

Regardless of the type of curiosity being discussed, curiosity is a complex construct that is many times described using different terms, including interest and openness (Kashdan et al., 2009). For example, Silvia (2008) used curiosity and interest interchangeably as he melded the

work of both Berlyne (1966) and Csikszentmihalyi (1975) and put forth the idea that interest is aroused when events or objects are new and understandable, while confusion arises when events or objects are new and not understandable. While some suggest interchangeability, other researchers have indicated that there is indeed a difference and a need for a distinction between curiosity and other constructs such as interest or wonder (Opdal, 2001; Reio, Petrosko, Wiswell, & Thongsukmag, 2006; Schmitt & Lahroodi, 2008). Arnone, Small, Chauncey, and McKenna (2011) pointed out that curiosity cannot be equated with interest or learning because competence is needed in addition to curiosity in order to produce true learning. This view is consistent with SDT in that competence, along with curiosity, is necessary in order to carry out curious behavior. Opdal (2001) urged for the distinction between wonder and curiosity by reasoning that wonder calls for a stretch beyond the rules that have been established, while curiosity is more standardized and can be systematically satiated while adhering to the rules. In other words, Opdal (2001) posited that curiosity works within established frameworks, while wonder involves ignoring or challenging the frameworks. Schmitt and Lahroodi (2008) also supported the differentiation between wonder and curiosity as they stated that unlike wonder, curiosity is lasting because it involves a need to know. This is reflective of the difference between CFI and CFD because as Litman, Hutchins, and Russon (2005) explained, curiosity, when viewed as a feeling of interest, does not need to be satiated. Conversely, curiosity as a feeling of deprivation indeed needs to be satiated because it is necessary in order to ease tension or relieve frustration.

Curiosity and Education

Thirty-five years ago, based on a positive relationship between measures of curiosity and divergent thinking, Vidler and Karan (1975) indicated that curiosity was positively related to divergent thinking and therefore creativity. In addition, they indicated that there was a decline in

curiosity and creativity as students progressed through school. This is not an uncommon finding in studies being conducted today. Reio (2009) offered an interesting explanation of this decline in curiosity of adolescents as he claimed that there is not so much of a decline as there is a shift in the target of the individual's curiosity. In other words, an adolescent's curiosity becomes more focused on social factors than school factors. Most of the parents and teachers in Chak's (2007) study supported this thought in that they believed the decrease in curiosity with age is based on the environment and not biology.

Maintaining high levels of student curiosity is worthy of addressing in regard to education because it is considered beneficial to well-being and because it is the motivation to think and interpret, which is the first step to learning (Kashdan & Steger, 2007; Tamdogon, 2006). In addition, other researchers have reported that curiosity as a feeling of deprivation has been linked to mastery goals (Eren, 2009; Ferguson & Sheldon, 2010; Meyer & Turner, 2006). Mastery goals are reflective of SDT in that competence or mastery is one condition needed to create intrinsically motivated individuals. This is of importance because intrinsic motivation is essential to the development of life-long learners. Fabris (2010) stressed the importance of the teacher in this process as she urged that teachers who do not show passion about learning may be ineffective at fostering curiosity in their students. The author summed up her opinion of schools and curiosity as she stated:

> If schools are to fully and effectively produce students who are intrinsically motivated to learn and explore, there must be a clear paradigmatic shift in the expectations of teachers, and corresponding shifts both in the programs that prepare them for teaching and the attitudes of school districts to nontraditionally trained teacher candidates. (p. 2)

In essence, if they are to pique students' curiosity, learning experiences cannot follow a linear progression that is predetermined by the teacher. Instead, educators must integrate learning content with student interests in a more organic fashion (Fabris, 2010).

Researchers have begun to study this idea by exploring contemporary factors that influence curiosity in educational settings. Shroff, Vogel, and Coombes (2008) determined that interactive technologies aided students in choosing learning activities that were both interesting and that matched their ability level, a combination that aroused curiosity. Along the same lines, Arnone, Small, Chauncey, and McKenna (2011) claimed that curiosity does not always constitute an interest or level of engagement that leads to true learning. In fact, in order for this to occur, the authors posited that an individual must first feel competent. In today's media-saturated context, they contended, interest and engagement may never be reached because a quest beginning with curiosity will be abandoned when too much effort is required to discover the answer to the given question.

Silverstein (2005) also explored contemporary methods and how digital technologies in elementary through high school can facilitate the shift of motivation and curiosity from a student's formal learning to his or her informal learning. For the purposes of his study, Silverstein described informal learning as "unimposed queries that children send to digital reference services—services that were originally intended to support only imposed queries directly related to curricula" (p. 230). Results indicated that the majority of elementary school aged students asked questions about how the world works, while middle school children were more interested in learning about conceptual or abstract topics. Along with asking the fewest number of questions of any age group, high school students were more or less just focused on issues that revolved around them personally. Silverstein indicated that the elementary grades

reported the most influence of formal learning on informal learning, or that their curiosity was more influenced by school, an effect that noticeably dropped off as students got older. Another way of interpreting the results is that younger students are more prone to use technology to internalize motivation and learn about topics than their older counterparts.

Regardless of the influence of contemporary technologies, trait curiosity, or the predisposition to be curious, in conjunction with school challenge, can be reflective of student success. Researchers have indicated that students with high trait curiosity in challenging schools reported the greatest success, while students with high trait curiosity in low challenge schools reported the least success (Kashdan & Yuen, 2007). In addressing another important key ingredient to student success, Chak (2007) surveyed parents and teachers to determine what they believed characterized curiosity. An interest in knowledge, personal qualities, and exploratory behaviors were common among both groups. It was reported, however, that although both parents and teachers value curiosity, teachers were viewed as more willing to encourage it due to their training.

Whether or not teachers receive explicit training on curiosity, it seems as if they have the responsibility to encourage it. This is considering that Kashdan and Steger (2007) claimed that it is necessary for an individual's well-being to be provided experiences that are both novel and challenging. Since they claimed that it is the deliberate interaction with challenging and novel stimuli that sparks curiosity, teachers should naturally work to incorporate these types of experiences in their classrooms. However, in today's society, it can be argued that in many instances, students are engaged in test practice for a good part of the day and consequently, it is quite possible that students may not be provided enough opportunities to engage with materials or ideas that are new and challenging. The basic premise of Kashdan and Steger's argument is

that the well-being of highly curious students is hindered by not enough novel stimuli. This is particularly alarming in a society and school culture that is based on standardization—an environment that can undoubtedly lead to a decline in both creativity and curiosity, and potentially intrinsic motivation.

Assessing Curiosity

Curiosity scales and assessments have historically been based on the optimal arousal model and, more often than not, lacking in terms of clarity, reliability, and validity (Arnone, Small, Chauncey, & McKenna, 2011; Kashdan et al., 2009; Litman & Silvia, 2006). More recently, researchers have attempted to classify and assess types of curiosity in order to construct a valid, whole picture of curiosity. Litman and Jimerson (2004) put forth the idea that in learning, CFD is more potent than CFI, yet at the time of the article's publication, an instrument to measure CFD had yet to be developed. As a result of their attempt to construct a valid and reliable scale to measure CFD, they determined that curiosity can be measured as both a feeling of deprivation and interest. Litman and Jimerson (2004) found that CFD and CFI are distinguishable, but related and overlapping explanations of curiosity.

Eren (2009) used Epistemic Curiosity (EC) scales to assess curiosity as a feeling of interest (CFI) and used Curiosity as a Feeling of Deprivation (CFD) scales to measure curiosity as a feeling of being deprived of information. When viewed as a feeling of deprivation, curiosity predicted mastery goals, more so than when it was viewed as a feeling of interest.
Leonard and Harvey (2007) also assessed curiosity by examining two different facets that comprise curiosity as they associated the Curiosity and Exploration Inventory's (CEI) exploration component with diversive curiosity and its absorption component with specific

curiosity. The authors' findings support the idea that curiosity is comprised of, and can be measured according to, the factors of absorption and exploration.

In designing the Curiosity and Exploration Inventory- II, Kashdan et. al (2009) attempted to improve a previous version of the instrument (CEI) by addressing issues raised by other contemporary curiosity researchers (Leonard & Harvey, 2007; Litman & Silvia, 2006; Reio, Petrosko, Wiswell & Thongsukmag, 2006). In essence, the inventory is based on the idea that curiosity reflects the tendency to embrace uncertainty and to explore or stretch.

In a Yau, Kan, and Cheng (2012) study, in which the relationship between curiosity and intrinsic motivation was studied, it was reported that those with higher levels of curiosity also reported higher levels of intrinsic motivation. According to Leonard and Harvey (2007), curiosity is currently viewed as a motivational state in which environmental information is internalized and compared to mental models and maps.

Academic Intrinsic Motivation

The construct of Academic Intrinsic Motivation was operationally defined by Gottfried (1985) as "the enjoyment of school learning characterized by an orientation toward mastery; curiosity; persistence, task-endogeny; and the learning of challenging, difficult, and novel tasks" (p. 632). More recently, Brophy (2008) advocated for a shift in "focus from intrinsic motivation to *motivation to learn*, defined as engaging purposefully in curricular activities by adopting their goals and thus trying to learn the concepts or master the skills that they were designed to develop" (p. 133). He noted that this is necessary because many definitions of intrinsic motivation are more closely related to fun and enjoyment and less to cognition and satisfaction. This tendency is reflected by Barkoukis, Tsorbatzoudis, Grouius, and Sideridis (2008) who

defined intrinsic motivation as when one engages in an activity because of the satisfaction one receives for doing so or for the pleasure they receive from the activity.

Deci and Ryan (2008), in referencing their earlier work on Self-Determination Theory (SDT), indicated that when discussing motivation, there are four types— two of which are considered autonomous and two that are considered controlled. Among the autonomous types, the authors first described intrinsic motivation, an ideal type, which is based on self-endorsement, experience, and volition. The second type of autonomous motivation is an extrinsic type that is classified as "identified", meaning that the individuals have identified the value of the task and have begun to integrate it within themselves. When examining controlled motivation, it is important to note that both types of controlled motivation are forms of extrinsic motivation. Introjected motivation is evident when one has partially integrated the task, but the individual is still looking for approval, or to avoid shame. Finally, the last form of controlled motivation is external regulation in which all rewards and punishments are given externally. The authors note that when discussing motivation, there must also be mention of amotivation, or the lack of motivation. This, of course, is even less desirable than controlled motivation.

Others have addressed these types of motivation in different ways as Bronstein, Ginsburg, and Herrera (2005) suggested that looking at motivation should be done so on a continuum, as opposed to either classifying the motivation as intrinsic or extrinsic. In this sense, motivation can be viewed as more like one than another but not completely separate from the other. Vansteenkiste, Lens, and Deci (2006) also looked at motivation from an autonomous and controlled perspective. They put forth a more simplified view and categorized intrinsic motivation and some types of extrinsic motivation as autonomous, while most forms of extrinsic motivation are viewed as controlled.

Competence

Results of a Bouffard, Marcoux, Vezeau, and Bordeleau (2003) study indicated that Intrinsic Motivation (IM) and competence are not interchangeable. This is in contrast to the assertions of other researchers such as White (1959). The basis for this assertion was that the researchers found that IM did not necessarily contribute to achievement in school, whereas perceived competence did. If they were indeed interchangeable, there would be consistency among the contributions. These findings are important to the current study because levels of academic intrinsic motivation were compared with levels of curiosity and creativity. Although curiosity is thought to relate to intrinsic motivation, and curiosity and creativity are many times viewed as similar, the current study explored if there was any actual significant correlation among the three. This was done through the lens of Self-Determination Theory.

Spinath and Spinath (2005) also made a distinction between competence and intrinsic motivation by indicating that after negative feedback, competence beliefs may decrease but intrinsic motivation may remain the same. Although the results of the study indicated that first through fourth grade students' learning motivation and competence beliefs decreased over the elementary years, with a stronger decline in learning motivation in the older students in the study, there was no determination of causality. In this sense, even if realistic decreases in competence beliefs occur, it should not necessarily lead to a decrease in intrinsic motivation. Additionally, a result in a Gherasim, Butnaru, and Iacob (2011) study was that intrinsic motivation did not predict competence. Although this finding was, in some regards, unexpected, the authors explained the role that the participants' age played in the findings. In fact, research into the decline of intrinsic motivation of students around this age has been well-documented in

the research (Bronstein, Ginsburg, & Herrera, 2005; Guay, Chanal, Ratelle, Marsh, Larose, & Moivin, 2010, Spinath & Spinath, 2005).

Freiberger, Steinmayr, and Spinath (2012) focused on the subject of mathematics, but unlike other studies of competence beliefs, intrinsic motivation, and achievement, they also included the students' perception of what they believed the teacher thought of their ability. The study results indicated that although competency beliefs did influence achievement and intrinsic motivation, the students' beliefs of what their teachers thought of their ability did not. An interesting indication in this study, however, was that a student's belief of how his or her teacher perceived his or her ability still had an effect on intrinsic motivation. This is because if a student felt that the teacher viewed his or her ability as low, it could drive the student's competency beliefs, which do, in fact, influence intrinsic motivation. The design of this study is important to the current study because it aims to not only look at the relationship between pairs of variables, but instead among all three variables.

In line with Self-Determination Theory, Spinath and Steinmayr (2008) suggested that children who refer to their own past performance as a way of measuring their competence are more intrinsically motivated than those who compare their competence to that of others. Ferguson and Sheldon (2010) also studied mastery or competence, as they explored the idea of matching the difficulty of a task to the skill level of the student. The results suggested that an appropriate match of the two leads to optimism in regard to achieving the prescribed goal. This optimism leads to motivation that is a result of the ability to feel competent. This research, along with the work cited in Meyer and Turner (2006), is consistent with Self-Determination Theory, as these views of motivation rely on the idea of competence as a factor of motivation.

Additionally, Spinath and Steinmayr (2008) stated that:

> Intrinsic motivation should depend on an optimal fit between task difficulty and own competence. Such an optimal fit can be given at different levels of competence, so that not only the most competent individuals experience intrinsic motivation. Therefore, the degree of intrinsic motivation might not so much depend on the absolute level of normatively based ability perceptions but rather on perceiving oneself as successful at tasks that fit the level of one's competence. (p. 1557)

Motivational Goal Types

Ames and Archer (1988) have indicated that performance goals are usually facilitated by grades, relative ability, and performance. On the other hand, mastery-focused goals are adopted when improvement, effort, and task-mastery are stressed. The researchers focused on learning in general and investigated how different types of goals influenced the way they chose to learn. Findings indicated that focusing on mastery goals led to better involvement, attention, learning, belief in the importance of effort, and the selection of more challenging tasks. Conversely, when focus was placed on performance goals, students did not look at lack of effort as a cause for not attaining the goal, but instead placed blame on their lack of ability. This outlook reduced the interest in working at the goal because of the belief that they did not have the ability to attain the goal. This is detrimental because it has been argued that the courage to take risks is an essential component of learning. Clifford (as cited in Meyer and Turner, 2006) highlighted the idea that risk takers are intrinsically motivated by challenges, are more capable of seeing the larger goal of understanding, and are more mastery-focused. Specifically, Clifford described flexibility, tolerance, and mastery-focus as the characteristics of students who are risk takers. These characteristics may be harder, but not impossible, to recognize or manifest in students who are

performance goal-oriented. An example of this and the effects of goal types is seen in the work of Grant and Dweck (2003) who indicated that students were able to cope better, increase motivation and achievement, and select challenges that were at the right level if their goals were based on active learning. Performance related goals, on the other hand, were motivating for students when the challenge at hand was matched to their ability. However, if the challenge was too difficult, withdrawal from the challenge was noted. Outcome goals, or those that dealt with grades, had similar effects to performance goals. A fourth type of goal, a normative goal, reportedly had neither an increasing nor decreasing effect on a student's performance or motivation.

Decline in Motivation and Subject Matter

Spinath and Steinmay (2008) set out to study the assumption that student intrinsic motivation declines with age because of more realistic self-concepts. The researchers indicated that both competence beliefs and intrinsic motivation declined over a one year period. This is consistent with the work of other researchers (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003; Spinath & Spinath, 2005). Guay, Chanal, Ratelle, Marsh, Larose, and Moivin (2010) further explained that between the ages of eight to eleven, students begin to be able to comprehend and use feedback to understand that through past learning experiences, they have both strengths and weaknesses. They have a self-perception that is more accurate. This is in contrast to five to seven year olds who often view themselves as either good or bad at a task overall. Motivational decline with age was also studied by Alivernini, Lucidi, and Manganelli (2008) who conducted a study in which they explored aspects related to motivation in both primary and secondary school. They found that intrinsic motivation decreased when students transitioned from primary to secondary school, as more than half of the fourth to eighth grade participants reported being

extrinsically motivated in regard to school. Conversely, only a quarter of the participants felt intrinsically motivated, or motivated by the pleasure of learning. An important finding, however, was that although intrinsic motivation decreased, identified motivation significantly increased. This finding indicated that students are aware that there are tasks at hand but there is no intrinsically motivated drive to address them.

Sanacore (2008) also looked at the decline from a developmental standpoint. He hypothesized that the loss of enthusiasm for school in the middle grades is a result of the increase in academic requirements, the belief that learning is irrelevant to their lives, the desire to fit in with peers, and a way of rebelling against parents. This decline in intrinsic motivation as a result of social influences is reflected in the work of others. Spinath and Spinath (2005) offered an explanation for the decline in competence beliefs and motivation as they stated that the decline was reflective of the differences in the norms of reference of the classroom, as middle schools are more likely to be socially than individually referenced.

In studying intrinsic motivation and its decline through schooling, Bouffard, Marcoux, Vezeau, and Bordeleau (2003) indicated that it is indeed important to consider the academic domain being studied, as perceived competence declines at different rates for different subjects. Research indicated that motivation for school varies across domains and from subject to subject (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003; Anderman, 2004; Guay, Chanal, Ratelle, Marsh, Larose, & Moivin, 2010). Furthermore, it has been suggested that motivation can reflect either individual personality or a response to the environment. If this were indeed true, it may be expected that students be grouped and taught accordingly (Anderman, 2004). Additionally, to understand the idea of motivation in different domains, it may be beneficial to dissect the nature of each subject.

Findings in a Guay, Chanal, Ratelle, Marsh, Larose, and Moivin (2010) study indicated that students can be more intrinsically motivated in some subjects over others. This is essential to the present study because there is a desire to examine motivation in different school subjects in regard to a student's level of curiosity and creativity. The current study takes into account the recommendation of Guay et al. that suggested looking at motivation in specific school subjects, rather than looking at school motivation as a whole.

Motivational Influences

Viewing motivation through a Self-Determination Theory (SDT) lens, Vallerand, Pelletier, and Koestner (2008) suggested that the impact of an environment is critical to the type of motivation and level of competency, autonomy, and relatedness needs that are met. This often happens without conscious awareness. For instance, in a Leroy, Bressoux, Sarrazin, and Trouilloud (2007) study, the authors reported that when teachers felt external pressures or had a low self-efficacy, the opportunity for intrinsic motivation was lower and the environment was viewed as more controlling. Conversely, in an autonomy supportive climate, led by a more experienced teacher, students possessed higher levels of intrinsic motivation and self-determination. This assertion was similar to a 2003 study carried out by Meyer and her associates, where findings indicated that students that were in classrooms that had either an unsupportive and negative climate or an inconsistently positive and supportive classroom reported more instances of cheating and disruptive or avoidance related behaviors (Patrick, Turner, Meyer, & Midgley, 2003). Furthermore, after examining the work of others in the field, Patrick, Turner, Meyer, and Midgley (2003) indicated that a commonality found in the research is that when a teacher exhibited intrinsic motivation and positive emotions, students generally reported positive emotions and being motivated to learn. This finding speaks not only to the

importance of a climate that is supportive, but also to the importance of teacher modeling. Reflecting this idea, Tamdogon (2006) addressed learning in a classroom that encourages creativity and curiosity and stated that a culture for learning is essential and must be a joint effort by both the student and teacher. The author suggested that to be motivated, both teachers and students should be asking themselves questions regarding why they are there and what they are to do. Sanacore (2008) indicated that one way to connect students and teachers is for teachers to relate learning to the lives of students. This is essential for transforming reluctant learners into autonomous learners because it fosters intrinsic motivation.

The value of motivational speech, emotions, and goal framing has also been explored by researchers. As indicated by Vansteenkiste, Lens, and Deci (2006), competence, relatedness, and autonomy aid in an individual's ability to internalize tasks. Furthermore, they found that if a goal was intrinsically framed in an autonomy supportive environment, where autonomy supportive language was used, learning was deeper and persistence and performance was enhanced. The researchers attributed this to the idea that intrinsic motivation is more closely aligned with satisfying the basic psychological needs of competence, autonomy, and relatedness. Furthermore, they explained that focusing on long-term goals that are believable and relevant will evoke intrinsic motivation. The findings of Meyer and Turner's (2006) study indicated that offering students emotional experiences that are positive and consistent is essential to student engagement in learning. They found that students who were successful at regulating emotions were more apt to have a goal perspective based on mastery. Supporting this view, Gherasim, Butnaru, and Iacob (2011) examined whether or not the learning environment impacts motivational beliefs and as expected, they indicated that "the classroom cohesiveness, task

orientation, and cooperation were significant predictors of students` achievement and perceived competence" (p. 361).

In terms of individual classroom environment norms, researchers have posited that in classrooms where there is a social norm of reference, students with high abilities will experience high levels of learning motivation and competence beliefs, while those with low abilities will experience the opposite. However, in classrooms with an individual norm of reference, each student can feel competent and motivated (Spinath & Spinath, 2005). In viewing the impact of the environment on a larger scale, a 2005 study by Rathunde and Csikszentmihalyi compared the motivation of traditional middle school students with those who attended Montessori schools. The results indicated that the students had similar experiences when engaging in non-academic situations. However, when engaged in academic work, the Montessori students reported greater intrinsic motivation, interest, affect, energy, and flow experience. This type of experience (flow) is defined by Csikszentmihalyi (1990) as a type of focused motivation where an individual is absorbed in the task and all attention is given to the activity. The researchers posited the findings to be so because, many times, experiences in Montessori schools are structured in ways that emphasize student concentration, thus leading to flow.

Although extremely important, the learning environment and teachers are not the only factors that play a role in motivating students, as researchers have indicated that parental involvement can play an important part in fostering intrinsic motivation (Bronstein, Ginsburg, & Herrera, 2005; Froiland, 2011; Gonzalez-DeHass, Willems, & Holbein, 2005). Ohtani and Nakaya (2011) studied the relationship between the independent variables of self-concept, self-determination, and intrinsic motivation with the dependent variable of academic achievement. Interestingly, all correlations between the independent and dependent variables were

significantly low. It was indicated that family environments and school climate have more of a direct impact on academic achievement, although it is possible that a child's home environment can impact intrinsic motivation.

Bronstein, Ginsburg, and Herrera (2005) put forth the idea that as students enter the middle school grades, students receive less guidance and attention from outside sources. In this regard, internal factors of motivation become more important. The researchers hypothesized that parental behavior could feature external control, a lack of guidance, or be considered autonomy supportive. They posited that the autonomy-supportive parenting style promoted intrinsic motivation, while parenting styles that feature external control or lack of guidance were more closely linked with extrinsic motivation. In fact, in a longitudinal study of students in grades five to seven, Bronstein et al. found that fifth grade students with parents who used external control by offering rewards and using coercion and/or pressure were then less intrinsically motivated in the seventh grade. Likewise, fifth grade children of parents who offered little guidance by providing limited consistency or structure then had seventh graders who were less intrinsically motivated. Alivernini, Lucidi, and Manganelli (2008) also highlighted the impact of this type of parenting as they indicated that more than half of the fourth to eighth grade participants in their study reported being extrinsically motivated in regard to school, with family influence often being the source. Conversely, fifth grade students of parents who were autonomy-supportive by listening, allowing students to participate in rule making, and allowing their input in decision making were more intrinsically motivated two years later in the seventh grade (Bronstein, Ginsburg, & Herrera, 2005).

In a review of literature, Gonzalez-DeHass, Willems, and Holbein (2005) discovered that when parents were involved, students benefited with increased levels of motivation and

engagement, a focus on mastery goals, and higher perceptions of competence and control. Specifically, they indicated that when parents were involved, students were more likely to enjoy schoolwork, put forth more effort, have more interest in learning, seek challenges, and persist through those challenges. It was reported that parent praise and encouragement was associated with increased intrinsic motivation.

Other researchers have put interventions into place in order to study sources of intrinsic motivation. Froiland's (2011) study examined teaching intrinsic learning goals to fourth and fifth grade students. These goals included encouraging students to empower others, to discover something that is of interest to them, and to gain a better understanding of the topic. The researcher equipped parents with the tools needed to be autonomy-supportive and to aid in helping students set intrinsic homework goals. Results of the study indicated that parents in the treatment group reported that their students showed increased intrinsic motivation as a result of the treatment. In addition, students also reported higher scores on the Inventory of Homework Feelings after the intervention. This study supported the idea that positive, autonomy supportive parental involvement can help improve intrinsic motivation.

Sixth Grade Student Characteristics

The population addressed in the present study is at a particularly interesting stage of development. As most sixth grade students are approximately ten to twelve years old, these students are considered early adolescents. Armstrong (2006) has indicated that there are many rapid changes that occur during these years that have a strong impact on the lives of these individuals. These changes are cognitive, physical, social, and emotional in nature and vary from individual to individual. Adding to the complexity is the fact that many times a change in

one domain causes a change in another. In essence, developmental changes during early adolescence are both inconsistent and intertwined (Scales, 2005).

In the view of Erikson, adolescence is a crucial time in one's life because it is viewed as a period when identity formation occurs. Particularly, there is a conflict involving identity and role confusion. As adolescents strive for their own identity, they may outwardly begin to separate themselves from their parents in an attempt to prove their autonomy (Nicholson & Ayers, 2004). In order to feel a sense of belonging in the transition to adulthood, many students will engage in more risky situations in an attempt to distinguish themselves from a child (Armstrong, 2006). This is especially true considering peers often become the most important sources of companionship, information, and affirmation in the lives of adolescents (Steinberg, 2005). Internally, however, youth at this stage of development still yearn for the support and guidance of their parents. Research supports this notion as it has been indicated that an adolescent's perception of parental involvement is correlated with his or her well-being (Cripps & Zyromski, 2009).

In regard to the cognitive development of typical sixth grade students, Piaget, (as cited in Schunk, 2008, p. 339), explained that students at this age are transitioning from the concrete operational stage to the formal operational stage; a level of functioning which is posited to follow into adulthood. As students move from a period of rapid skill and language enhancement, they enter a stage of growth where abstract and hypothetical thought is possible. At the formal operational stage, metacognition becomes possible and in return egocentrism becomes a characteristic of many early adolescents (Green & Piel, 2010). Consequently, adolescents are increasingly aware of their own appearance and bodies as they fine tune gross and fine motor skills. Students start to develop at different rates and physical attractiveness and athletic ability

become especially important. Perhaps most pronounced are the physical changes that begin to take place from the onset of puberty (Finnan, 2010).

Like physical differences, discrepancies in ability levels also become more noticeable at this time. This factor can impact some students more than others. Spinath and Spinath (2005) contended that as schooling becomes more socially referenced, there may be a decline in motivation for students whose abilities are lower than others. Conversely, those with high abilities benefit from this type of norm of reference. Adolescents become much more self-aware and self-critical at this time (Finnan, 2010; Green & Piel, 2010). During the transition from elementary to middle school, students begin to doubt their work and abilities more (Rathunde & Csikszentmihalyi, 2005). No longer do students feel like they excel at each activity in which they engage. This realization comes at a time when emotions are heightened. Adolescents begin to experience more than one emotion at a time, recognize the context that leads up to emotions, and become more cognizant of emotional reactions (Coyl, 2009). As a result of this emotional development, students become interested in activities and interactions that evoke feelings.

Trust is an important psychological issue at this developmental stage. In the school setting, issues such as bullying can have an impact on students' ability to trust. Carney, Jacob, and Hazler (2011) found that sixth grade students who witnessed bullying reported lower levels of trust and feelings of being treated fairly. This is of particular concern because it can impact a child's ability to form the close relationships that are crucial in adolescence. For many students, sixth grade marks the beginning of friendships rooted in interests and choice, rather than on the factors of location and convenience that are typical of elementary school friendships (Akos, Hamm, Mack, & Dunaway, 2007). This is especially true as students begin to take interests in activities that appeal to them or at which they excel (Dove, Pearson, & Hooper, 2010).

A physical move to a new school, that is sometimes required when students enter the sixth grade, may impact more than just friendships. Jacobson, Williford, and Pianta (2011) indicated that changes in responsibilities and expectations are more obvious for students who make a physical transition to a new school. As opposed to those who remain in an elementary school setting, students who transition to a different school have a new dynamic and structure to familiarize themselves with. These changes are related to school size, expectations, student groupings, and climate and can heighten student anxieties and worries. A change in setting, combined with internal biological, physical, social, and emotional changes can have a profound impact on the well-being of adolescents. Research has indicated that adjusting to new settings, teaching styles, and the decrease in personal attention a student receives can cause a decline in his or her ability to identify behavioral norms (Cauley & Jovanovich, 2006).

The constructs of creativity, curiosity, and academic intrinsic motivation being examined in the present study can undoubtedly be influenced by the typical developmental characteristics of sixth grade students. As students begin to become more self-conscious, they may begin to look at creativity as risky and begin to doubt their ability to be creative. Their curiosity about the world may be overshadowed by the adolescent's natural drive to establish peer relationships and form an identity (Barnwell, 2009). Furthermore, intrinsic motivation for school may be impacted by an early adolescent's more realistic self-concept, increased fear of failure, or inability to see the relevance of school work to their own lives (Finnan, 2010; Spinath & Steinmay, 2008).

Summary

As evident in this literature review, novelty, challenge, and process are common links among curiosity, creativity, and academic intrinsic motivation, the constructs being explored in the current study. Even from an operational definition standpoint, these constructs are connected

(Gottfried, 1985; Kashdan, Rose, & Fincham, 2004; Sternberg & Lubart, 1999). The connection between the constructs can be seen in the work of Barkoukis, Tsorbatzoudis, Grouius, and Sideridis (2008) who asserted that individuals who are intrinsically motivated are focused on the process, rather than the product that results from the activity. This echoes the work on creativity by Wu and Chiou (2008) who described different ways of looking at creativity, one of which is from a performance standpoint, while the other is from a process standpoint. Sternberg (2006) indicated that task-focused, intrinsic motivation is necessary for creative work. Referencing the work of Amabile, the author indicated that creative work usually results when an individual is focused on the work itself, rather than a reward.

Self-Determination Theory, and specifically its components of mastery, autonomy, and relatedness, therefore, served as an appropriate lens through which the current study was conducted. This research built on previous studies in that curiosity has been linked to intrinsic motivation (Yau, Kan, & Cheng, 2012), while intrinsic motivation has been associated with creativity (Kaufman & Beghetto, 2009). However, this study attempted to explain the relationship among all three constructs to determine if there was, in fact, a statistically significant relationship.

CHAPTER THREE

METHODOLOGY

Chapters One and Two provided the theoretical and conceptual ideas that were the basis of this study. A correlational study was chosen for this research design because the aim of the study was to determine whether, and to what degree, a relationship existed among three quantifiable variables. This study was designed to determine whether, and how, the variables of creativity, curiosity, and academic intrinsic motivation were related. In order to determine if a relationship existed among the variables, instruments were used to obtain scores for each of the three variables, from each participant. The scores were then correlated in the form of a correlation coefficient, which indicated if there was a relationship and to what degree.

The current study was not focused on academic achievement in the more standard ways in which it is measured, but more on the ways in which students are motivated to learn. If successful students are only identified by the ability to correctly answer standardized test questions, there are populations of students that may be labeled as unsuccessful, below basic, or unintelligent. This is a disservice to many of the learners who are not engaged by current methods and practices in education; students who are not instructed in ways that meet their needs, or those who are simply incapable, due to disability, of reaching predetermined benchmarks that are commonly used to define success. The importance of allowing students to feel success in learning, separate from measurements of academic achievement, was put forth by Spinath and Steinmayr (2008) as they stated at the conclusion of their research, "even in the face of realistically held low ability self-concepts, learners can develop an optimistic, learning-oriented perspective in which they consider low competencies as learning opportunities and learning as an end in itself" (p. 1568). This, in essence, defines intrinsic motivation and helps

illustrate a way in which all students can feel motivated to be lifelong learners and reach their full potentials.

Participants

Participants for this study were selected using cluster sampling. The main reason for this method of sampling was that it was an efficient and less obtrusive method for administering surveys, tests, and inventories to groups of students in an educational setting (Gay, Mills, & Airasian, 2009). Although simple random sampling was preferred in order to make the results more generalizable, gathering groups of participants selected in this manner to administer surveys, tests, and inventories would have been inefficient and disruptive to the teaching and learning process.

The target sample was approximately 100 students of mixed socioeconomic backgrounds in grade six who attended school in a rural public school district. Considering that cluster sampling was used, it was the researcher's intent to select clusters that would produce a representative sample. This goal was attained as the actual sample was comprised of approximately 70% Caucasian, 10% African American, 10% Asian, 9% Latino, and 1% of other ethnicities. Obtaining parent permission from the 220 students in the population proved to be too difficult. As a result, the actual sample was comprised of all students in the population for which the researcher had obtained parent permission. The target population of this study was all grade six students in the state of Pennsylvania and it was the hope of the researcher to be able to make the results generalizable to other parts of the United States.

Instruments

The instruments that were used to collect quantitative data included an existing test of creativity and published inventories of academic intrinsic motivation and curiosity. The Torrance Tests of Creative Thinking (TTCT) were used to measure levels of student creativity. The TTCT is comprised of a verbal and figural test. The verbal test includes seven subtests: Asking, Guessing Causes, Guessing Consequences, Product Improvement, Unusual Uses, Unusual Questions, and Just Suppose. These tests are scored on the basis of fluency, flexibility, and originality and can be converted to a standard T-score. The figural test has three subtests: Picture Construction, Picture Completion, and Parallel Lines. These tests are scored using some or all of the measures used in the verbal test. In a review of the TTCT, Chase (1985) indicated that the correlation between scorers ranged from .86 to .99, while inter-rater reliabilities ranged from .66 to .99, with most coefficients in the .90s. Lower reliability figures were reported in test-retest studies, as most coefficients were in the .60s and into the .70s. In terms of validity, Treffinger (1985) described the problems with the predictive validity of the TTCT because of the complexity of creativity, the construct that the TTCT measures. The reviewer also indicated that the test cannot assess all forms of creativity, as no creativity test can. It was indicated, however, that TTCT scores were positively related to other contemporary criteria of creative thinking. As a result, Treffinger concluded that the TTCT has adequate validity for research, evaluation, and general instructional planning decisions, which was the purpose of using the test in this study.

The Children's Academic Intrinsic Motivation Inventory (CAIMI), designed for fourth through eighth grade students, was used to assess student levels of motivation for overall learning, as well as for assessing motivation for learning in the specific subjects of reading, mathematics, science, and social studies. This unique inventory is comprised of scales that

measure motivational attitudes. Reliability of the CAIMI was reported by Posey (1989) to be adequate. Two-month retest coefficients ranged from .66 to .76. Internal consistency coefficients range from .83 to .93. In addition, no differences were found as a function of race, sex, or IQ. After completing three separate studies, Gottfried (1985) concluded:

> The reliability and validity of the CAIMI were established across the three present studies. Concurrent criterion-related validity with anxiety, perception of competence, and achievement was demonstrated. Further, the construct validity of the CAIMI has been established through the confirmation of the hypotheses based on theories. Both positive and negative correlations were predicted and obtained, indicating convergent and discriminant validity of the CAIMI. The partial correlations further indicate that the CAIMI is an independent and unique measure of intrinsic motivation. (p. 642)

In addition, Posey reported that "studies of convergent and discriminant validity indicate these scales provide a fairly good measure of a child's academic ability, thoughts regarding self-efficacy as it relates to school work, and teacher perception of a child's motivation" (p. 1) .

The Curiosity and Exploration Inventory II (CEI-II) was used to assess curiosity. As reported by Kashdan et al. (2009), the CEI-II is an improved version of the Curiosity and Exploration Inventory (CEI). The major difference between the two versions of the inventory is the omission of the absorption component of curiosity that was initially addressed in the first version. The CEI-II measures two distinct, but related, components of curiosity. This includes stretching, which is the motivation to seek out knowledge and new experiences and embracing, which is the willingness to embrace the novel, uncertain, and unpredictable nature of everyday life. As explained by the developers of the CEI-II, the inventory items were derived from descriptions of curiosity, interest, intrinsic motivation, and flow by leading theorists and

researchers, literary and philosophy texts, discussions with colleagues, and discussions with a focus group (Kashdan, Rose, & Fincham, 2004). After in-depth analysis of the improved CEI-II, the researchers concluded that the 10 item Likert-type scale inventory had an overall Cronbach's of .83 to .86, indicating the instrument's reliability. The internal reliability of the CEI-II is adequate as an alpha of .86 was reported.

Kashdan et. al (2009) explained that validity was first examined by correlating the scores of the CEI-II with participants' scores on other established instruments attempting to measure constructs that are indicative of curiosity. After exploratory factor analysis (EFA), the original list of 36 items the authors had begun with was distilled to 10 items. In this first study of the instrument, adequate reliability was achieved, as the exploratory factor analysis reported alphas from .68 to .89, with most in the .80 range. Further exploration of the instrument's validity was carried out using confirmatory factor analysis (CFA) in a second study. Alphas ranged from .70 to .92 in this study. The purpose of the final study conducted by the researchers to establish validity of the 10 item CEI-II was, according to Kashdan et. al, to examine the support for the two-factor latent structure identified in the first two samples. This model demonstrated good-fit according to each of the fit indices. Therefore, it was concluded that the CEI-II had adequate validity and reliability for the present study's purpose.

Although reliability and validity were established, one limitation in these validation studies of the CEI-II was that the authors readily admitted that there was more evidence of validity of the stretching aspect of curiosity than of the validity of the embracing aspect of it. This instrument was appropriate for the population that was studied, as the original version of this instrument was successfully implemented in a study of Slovak 4th and 5th grade students (Čavojová & Sollár, 2007).

General Procedures

The researcher first secured all study tests and inventories, either by purchasing the instruments or by being granted permission to use them by the instrument developers (see Appendix A). Letters were then sent to all administrators involved in this research study, including principals of sixth grade students and the superintendent of the Indiana Area School District, asking them for permission to be part of this study (see Appendix B and Appendix C). At this time, the researcher also clarified the amount of time she was permitted to administer the study instruments. This clarification was important, as it was determined that due to time constraints, the researcher would have to opt to only administer the figural version of the Torrance Tests of Creative Thinking (TTCT).

Once permission was granted by school administration, contact with involved teachers was made and letters were sent home to all sixth grade parents/guardians describing the study and asking for their permission to have their child participate in the study (see Appendix D and Appendix E). The return rate was not over 150 so cluster sampling was not used to select a sample of students. Instead, because the return rate was low (less than 100), all students who returned permission forms served as participants in this study. The rationale for not including more than approximately 100 students in the sample was for time and monetary reasons (each survey or test administration disrupted the normal school day and incurred cost).

The variables that were examined in this correlational study were creativity, curiosity, and academic intrinsic motivation. The data collection began with the administration of the Curiosity and Exploration Inventory II (CEI-II), which measured student curiosity (see Appendix F). The researcher allowed approximately 15 minutes for the instructions, administration, and collection of the inventories. This instrument was administered first due to its brevity.

Considering the inventory took a short amount of time, the researcher was afforded the time to first introduce the overall study to the students and field any questions during the initial meeting. As a result, the researcher requested approximately 45 minutes of time for the initial data collection period.

The following meeting with the participants was to administer the Torrance Tests of Creative Thinking (see Appendix G). This instrument assessed students' creative thinking. Due to the time allotted by school administration and financial constraints, just the figural test was administered. This administration required approximately one hour of participants' time.

The final quantitative data collection session involved the administration of the Children's Academic Intrinsic Motivation Inventory (CAIMI), which assessed students' level of motivation for overall learning, as well as student motivation for learning in the specific subjects of reading, mathematics, science, and social studies (see Appendix H). This collection took approximately one hour. Once data were collected from all three instruments (Curiosity and Exploration Inventory, Children's Academic Intrinsic Motivation Inventory, and the Torrance Tests of Creative Thinking), the quantitative data collection period concluded.

After analyzing the quantitative data, the qualitative data collection commenced. At this time, the researcher once again gained entry to the school in order to administer a researcher constructed survey (see Appendix I) to the students who were identified during the quantitative data analysis. These students had similar correlations among measures of creativity, curiosity, and academic intrinsic motivation. The survey was used to gather information regarding the students' influences, preferences, and motivations in and outside of school. The completion of these surveys brought the study's data collection period to a close.

Data Analysis Procedures

The variables that were examined in this correlational study were creativity, curiosity, and academic intrinsic motivation. The data collected from the administration of the Curiosity and Exploration Inventory- II were converted to levels of creativity with 1= low curiosity, 2= moderate curiosity, and 3= high curiosity. This data regarding curiosity was considered ordinal data. In order to analyze creativity, each participant's results of the Torrance Tests of Creative Thinking were converted to a T-score using the scoring manual that accompanied the tests. These test data were interval in nature.

Data indicating the students' level of motivation for overall learning, as well as student motivation for learning in the specific subjects of reading, mathematics, science, and social studies, were collected using the Children's Academic Intrinsic Motivation Inventory (CAIMI). As CAIMI results could be reported as T-scores or percentiles, the data were able to be expressed as interval or ordinal. These scores were reported in five categories: general, reading, mathematics, science, and social studies. This breakdown of scores allowed the researcher to answer the research question of whether or not the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation varied among different subjects.

Considering the data were not all interval, the Pearson Correlation was not used and instead a non-parametric test was used. Since at least one variable was expressed in ordinal data, the Spearman Rank-Order was used to run statistical analyses. These analyses indicated that there were statistically significant correlations among the variables. As there were statistically significant correlations, correlation coefficients were used to indicate if the relationships were negative or positive and to what degree.

This correlational research design and methods of data analysis allowed the researcher to answer the study's research questions:

- What is the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation?
- How does the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation vary among different subjects (reading, mathematics, science, and social studies)?

The research design and data analysis method also allowed the researcher to make a sound decision about whether or not to reject the study's null hypothesis:

- $H_{0:}$ There is no significant relationship among sixth grade students' levels of creativity, curiosity, and overall academic intrinsic motivation.

Qualitative data from surveys were analyzed using the empirical phenomenological method. Specifically, Giorgi's (1997) method involving phenomenological reduction, description, and a search for essences was used in the data analysis. This method was combined with Colaizzi's (1978) suggestions in order to verify the essences. The qualitative data collected from the survey (see Appendix I) were used to answer the remaining research questions:

- What are the common characteristics of students who possess similar levels of creativity, curiosity, and academic intrinsic motivation?
- To what sources and/or factors do students attribute their levels of creativity, curiosity, and academic intrinsic motivation?

Chapter Three included a summary of the purpose of the study as well as descriptions and explanations of the participants, instruments, procedures, and data analysis methods used to conduct the study. The results of the data analysis are reported in the following chapter.

CHAPTER FOUR

DATA ANALYSIS

The purpose of this mixed methods research study was to first determine if there was a statistically significant relationship among levels of student creativity, curiosity, and academic intrinsic motivation. The participants' levels of creativity, curiosity, and academic intrinsic motivation were measured using three valid and reliable instruments. The Torrance Tests of Creative Thinking (TTCT), Curiosity and Exploration Inventory-II (CEI-II), and Children's Academic Intrinsic Motivation Inventory (CAIMI) enabled the researcher to collect quantitative data regarding the constructs. Chapter Four explains the data analysis used in this study. First, the results of the data from the three quantitative survey instruments are presented to provide the groundwork for further data manipulation and analysis. Findings are then presented and organized according to the research questions that served at the basis of this study:

- What is the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation?
- How does the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation vary among different subjects (reading, mathematics, science, and social studies)?
- What are the common characteristics of students who possess similar levels of creativity, curiosity, and academic intrinsic motivation?
- To what sources and/or factors do students attribute their levels of creativity, curiosity, and academic intrinsic motivation?

This study design included two phases of data collection and analysis. The first phase was quantitative and the second phase was qualitative. The purpose of the first phase of this

study was to answer research questions one and two by determining if a statistically significant relationship existed among student levels of creativity, curiosity, and academic intrinsic motivation. Academic intrinsic motivation was examined in general, as well as by the specific subjects of reading, mathematics, social studies, and science. The quantitative data were collected using the Curiosity and Exploration Inventory II (CEI-II) (see Appendix F), Torrance Tests of Creative Thinking (TTCT) (see Appendix G), and Children's Academic Intrinsic Motivation Inventory (CAIMI) (see Appendix H). The TTCT, which is scored on the basis of fluency, flexibility, and originality, was used to measure participant creativity. The figural form of the test that was used in this study contained three subtests: Picture Construction, Picture Completion, and Parallel Lines. The CAIMI is designed for fourth through eighth grade students and was used to assess student levels of motivation for overall learning, as well as for assessing motivation for learning in the specific subjects of reading, mathematics, social studies, and science. This unique inventory is comprised of 44 scales that measure motivational attitudes. The CEI-II measures two distinct, but related components of curiosity. One is stretching, or the motivation to seek out knowledge and new experiences, and the other is embracing, which is the willingness to embrace the novel, uncertain, and unpredictable nature of everyday life. Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 21.0. Chi-Square analysis and Fisher's Exact tests were used to determine if there was a significant relationship among variables. The results from this phase led to the identification of participants for the second phase of this study. The following hypotheses guided this study:

- $H_0 1$: There is no significant relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation.

- $H_1 1$: There is a significant relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation.
- $H_0 2$: There is no significant difference among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation when compared to different subjects (reading, mathematics, science, and social studies).
- $H_1 2$: There is a significant difference among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation when compared to different subjects (reading, mathematics, science, and social studies).

The qualitative data for phase 2 were collected using an online survey instrument (see Appendix I) that was designed by the researcher using Qualtrics. This survey was based on student responses from phase 1, as well as current literature, and was designed to answer research questions three and four. As a result, data were collected from the participants regarding the sources to which they attribute their creativity, curiosity, and academic intrinsic motivation. The other survey purpose was to identify common characteristics of those with high and low levels of curiosity, creativity, and academic motivation. Twenty-four participants who reported having low or high levels of all three constructs were invited to participate in phase 2. These participants were selected based on the fact that their specific levels of curiosity, creativity, and academic motivation were necessary to answer research questions three and four. Each survey response required participants to rank, indicate, or rate whether the survey item pertained to them and for some questions, to what degree. There were no open ended questions included in this survey.

Description of Sample

Approximately 200 students were invited to participate in this study. All invited individuals were sixth grade students at a rural public school in Pennsylvania. Of the 200 students, 115 completed consent forms. Ninety-one agreed to participate while 24 indicated they were not interested in participating in the study. Of the 91 participants who agreed to be part of the study, 87 completed all three study instruments. Two students decided not to participate at the time the instruments were being administered, while two others moved out of the area sometime between the collection of consent forms and the administration of the survey instruments. The remaining 87 participants formed the sample for the first phase of this study. Fifty-two (68%) of the 87 participants were female and thirty-five (32%) of the participants were male.

For phase 2 of the study, 24 of the 87 participants from phase 1 were identified as possible participants in the second, qualitative phase of the study. Purposive sampling was used based on the fact that the students' reported low or high levels of creativity, curiosity, and academic intrinsic motivation were necessary to answer the third and fourth research questions. Of the 24 eligible participants, 23 completed the online survey, as one student moved from the district between phases 1 and 2. Ten (43%) were male, while thirteen (57%) were female. Throughout phase 2, these participants were grouped and regrouped a number of times based on their levels of creativity, curiosity, and academic intrinsic motivation. Analyzing the data in this manner enabled the researcher to answer research questions three and four. The findings of this study will be shared using only the group labels of "low levels" and 'high levels" of each construct in order to ensure anonymity.

Results

The following section includes a report of the analysis of the creativity, curiosity, and academic intrinsic motivation data. These data were collected using the Torrance Tests of Creative Thinking (TTCT), Curiosity and Exploration Inventory-II (CEI-II), and the Children's Academic Intrinsic Motivation Inventory (CAIMI). The sections of this chapter that follow will address the study's specific research questions.

Initial review of data included checking for missing values, outliers, and errors to ensure a clean data set for addressing the assumptions that needed to be satisfied for most of the statistical tests. Although there were no errors, there were outliers present for the variables "Social Studies" and "Science", as indicated in the boxplots in Figure 1. As a result, the mean scores were checked against the trimmed means. Social Studies (M=49.46) had a trimmed mean of 49.54, while Science (M=40.39) had a trimmed mean of 39.91. Considering these outliers were not extreme points and they did not skew the data, it was not necessary to remove any data from the set.

The raw data collected from the CEI-II were manipulated into a form that could be used to conduct analyses and to test the hypotheses of the study. Specifically, scores from the 10 items (CuQ1-CuQ10) that make up the curiosity scale of the CEI-II were totaled to yield an overall score, thus creating the variable "TCuriosity". The boxplot in Figure 1 depicts the data associated with total scores from the CEI-II, rather than each of the 10 items separately. The statistics shown in Table 1 include each item separately, as well as the overall curiosity score labeled "TCuriosity".

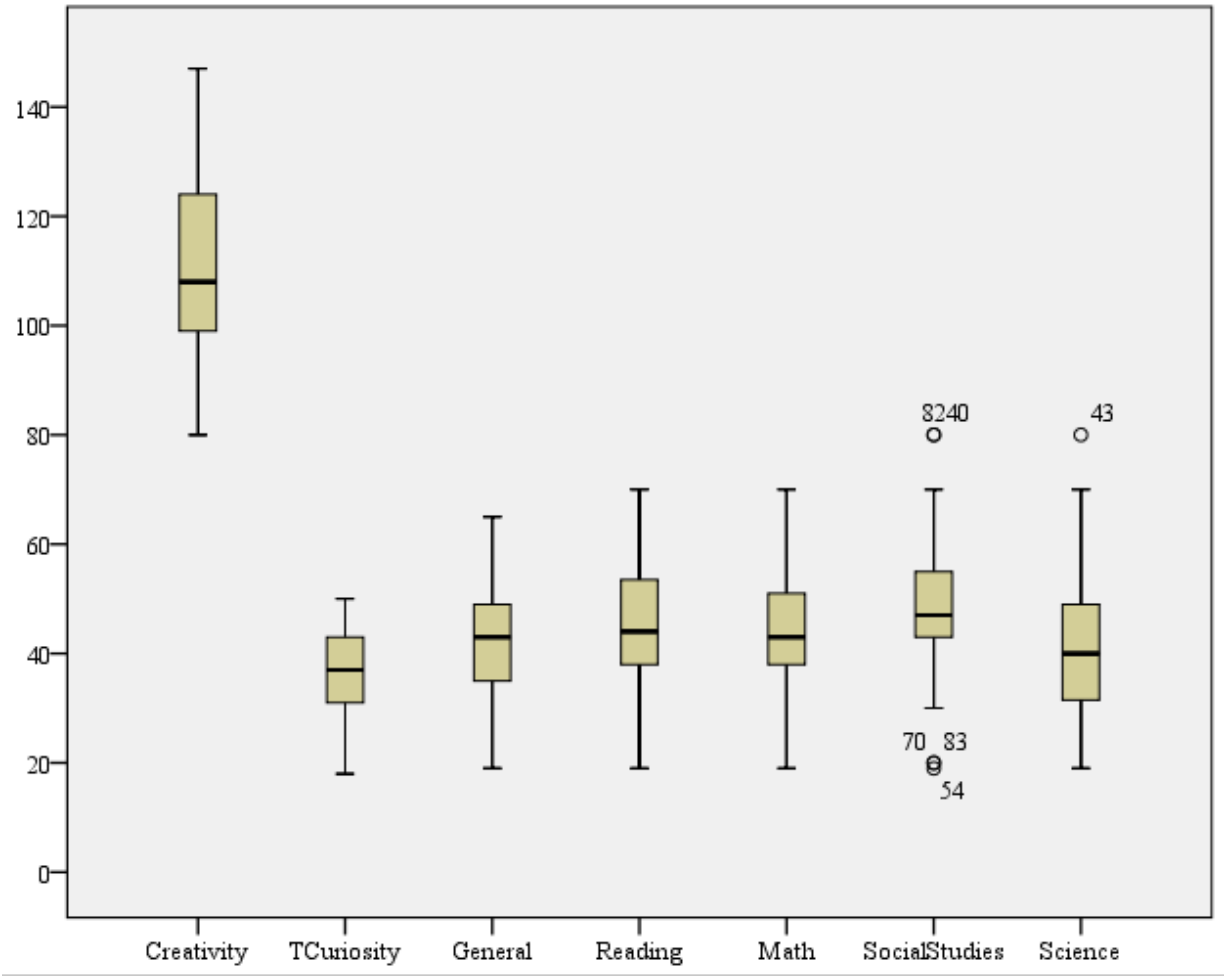


Figure 1. Boxplots for all variables indicating potential outliers.

Once a clean data set was confirmed, the researcher began the process of inspecting the data and exploring the nature of the variables. Descriptive analysis was conducted in order to begin testing the assumptions that needed to be satisfied before running individual tests. Table 1 illustrates the descriptive statistics for all data from the TTCT, CEI-II, and CAIMI.

Table 1

Descriptive Statistics from Survey Instruments for All 87 Participants

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Creativity	87	80	147	111.00	16.052	.435	.258	-.795	.511
TCuriosity	87	18.00	50.00	36.2184	8.20865	-.349	.258	-.514	.511
General	87	19	65	42.92	10.114	-.120	.258	-.160	.511
Reading	87	19	70	44.90	13.457	-.210	.258	-.345	.511
Mathematics	87	19	70	44.21	11.669	-.059	.258	.231	.511
SocialStudies	87	19	80	49.46	11.919	.156	.258	.637	.511
Science	87	19	80	40.39	14.381	.258	.258	-.325	.511
CuQ1	87	1	5	3.43	1.187	-.287	.258	-.854	.511
CuQ2	87	1	5	3.29	1.311	-.235	.258	-1.030	.511
CuQ3	87	1	5	3.63	1.202	-.525	.258	-.784	.511
CuQ4	87	1	5	3.63	1.286	-.586	.258	-.852	.511
CuQ5	87	1	5	3.72	1.107	-.324	.258	-.827	.511
CuQ6	87	1	5	3.52	1.454	-.523	.258	-1.146	.511
CuQ7	87	1	5	3.67	1.236	-.545	.258	-.749	.511
CuQ8	87	1	5	3.71	1.266	-.494	.258	-.993	.511
CuQ9	87	1	5	3.97	1.083	-.829	.258	-.136	.511
CuQ10	87	1	5	3.66	1.129	-.670	.258	-.156	.511
Valid N (listwise)	87								

Skewness for Creativity (.435), Science (.258), and Social Studies (.156) was positive, indicating that scores were clustered to the left, or at low values for these variables. For the variables of Reading (-.210), Mathematics (-.059), General (-.120), and TCuriosity (-.349), skewness values were negative, indicating that scores were clustered to the right, or at high values for these variables. A skewness value of zero would indicate that the data distributions were perfectly symmetrical. Although the skewness values of the variables of this study were not zero, the skewness is between -.5 and +.5, indicating that the distribution is approximately symmetric.

All but two kurtosis values for the study's variables were negative, indicating a platykurtic kurtosis or one where distribution was relativity flat with more extreme values in the tails. Positive kurtosis statistics for Mathematics (.231) and Social Studies (.637) indicated that the distribution was lepykurtic, or more peaked in the center of the distribution with less extreme values in the tails.

The pattern of data distribution was unique for each variable in the study. However, all skewness values were between -1 and +1, while all kurtosis values were between -2 and +2. Therefore, all skewness and kurtosis values fell within an acceptable range.

Research Question One

In phase two of this study, the researcher sought to answer the research question, "What is the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation?" Responses to the Torrance Tests of Creative Thinking (TTCT), Children's Academic Intrinsic Motivation Inventory (CAIMI), and Curiosity and Exploration Inventory II (CEI-II) were analyzed in order to answer this question. In checking for assumptions prior to conducting the correlation test to answer research question one, it was indicated that all three variables are indeed independent of each other. For the creativity and general academic intrinsic motivation variables, however, significant values were less than .05. This finding indicated that all but one of the dependent variables were not normally distributed, which suggested a violation of the assumption of normality. A Kolmogorov-Smirnov test for the normality of data indicated a significant value for curiosity ($p = 0.2$). For creativity and general academic intrinsic motivation, values were < .05, indicating a violation of the assumption of normality. However, because of the reasonably robust techniques that were used and the fact that the sample size is well over 30, the violation of the assumption did not interfere with data analysis. Additionally,

visual inspection of data indicates a rather normal distribution. In the normality probability plots in Figure 2, a reasonably straight line is observed for each, indicating rather normal distributions.

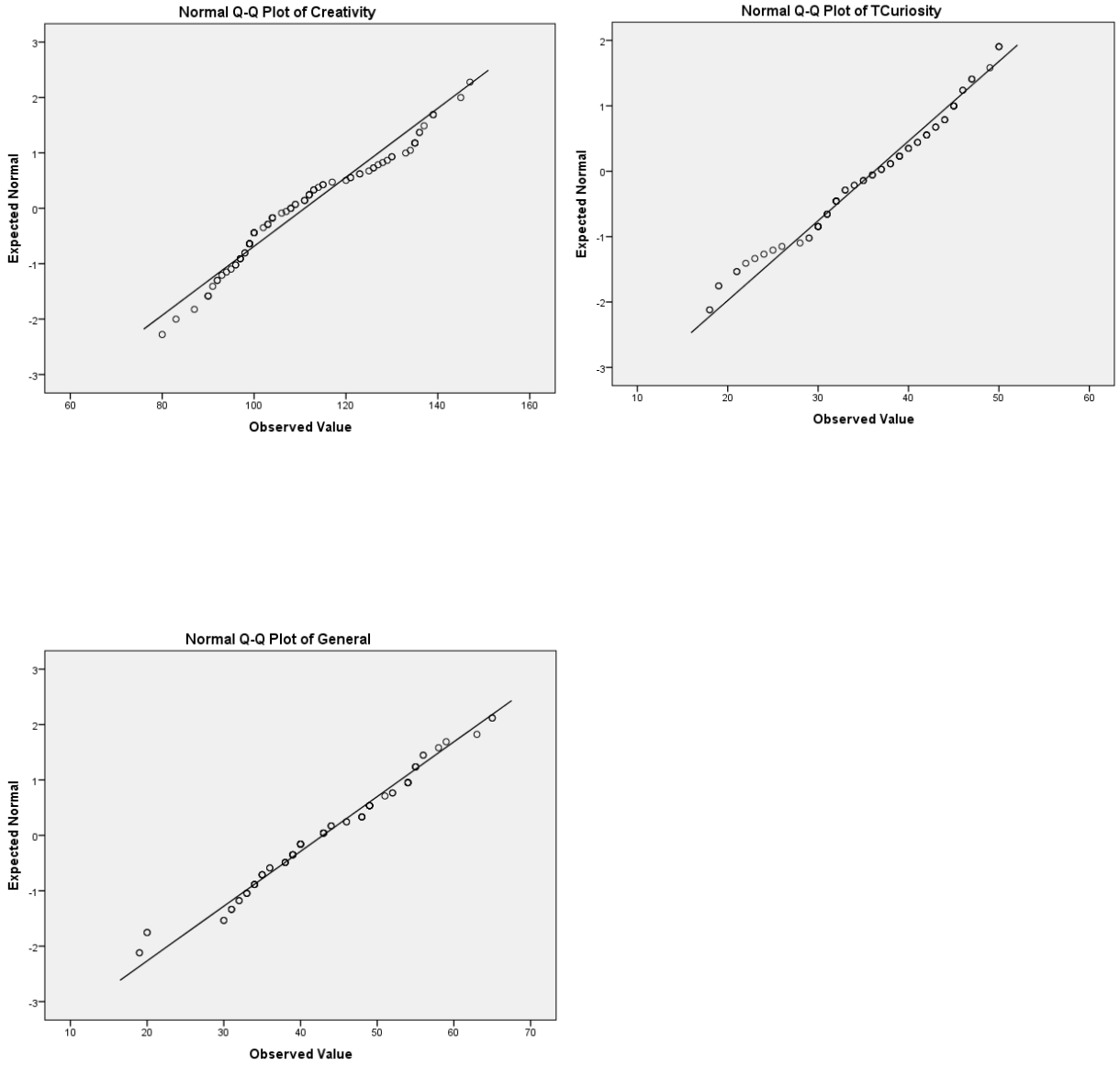


Figure 2. Normal Q-Q plots indicating rather normal distribution for all variables.

As data for more than one variable did not follow the assumptions for running parametric tests, it was determined that non-parametric correlation tests would be run to determine if a

relationship existed among student levels of creativity, curiosity, and academic intrinsic motivation. Homoscedasticity and linearity were not of concern based on the fact that non-parametric tests were used in data analysis. One-tailed tests were used because the researcher put forth alternative hypotheses supporting the belief that significant relationships and differences existed among the study's constructs. The first round of data analysis involved exploring the relationship among all three of the study's variables for all 87 initial participants. The correlations among variables are shown in Table 2.

Table 2

Correlations Between Creativity, Curiosity, and General Motivation for 87 Total Participants

			Creativity	TCuriosity	General
Spearman's rho	Creativity	Correlation Coefficient	1.000	.121	.117
		Sig. (1-tailed)	.	.133	.139
		N	87	87	87
	TCuriosity	Correlation Coefficient	.121	1.000	.468**
		Sig. (1-tailed)	.133	.	.000
		N	87	87	87
	General	Correlation Coefficient	.117	.468**	1.000
		Sig. (1-tailed)	.139	.000	.
		N	87	87	87

**. Correlation is significant at the 0.01 level (1-tailed).

In order to answer research question one, it was necessary to create three levels of each of the variables. The data were transformed using the visual binning feature in Statistical Package for the Social Sciences (SPSS) version 21.0. Visual binning resulted in the ability to designate groups with low, middle, and high levels of creativity, curiosity, and general academic intrinsic motivation which was necessary to carry out statistical analyses. Three creativity groups were determined from the TTCT results: (a) low creative group, which scored up to 100, (b) middle creative group, which scored between 101 and 115; and (c) high creative group, which scored

116 or more. Three curiosity groups were also determined from the CEI-II results: (a) low curiosity group, which scored up to 32, (b) middle curiosity group, which scored between 33 and 41; and (c) high curiosity group, which scored 42 or more. Finally, three motivation groups were determined from the CAIMI results: (a) low motivation group, which scored up to 38, (b) middle motivation group, which scored between 39 and 49; and (c) high motivation group, which scored 50 or more. The correlation test of these binned variables is seen in Table 3.

Table 3

Correlations for Binned Creativity, Binned Curiosity, and Binned General Academic Intrinsic Motivation for 87 Total Participants

			Creativity Binned	TCuriosity Binned	General Binned
Spearman's rho	Creativity Binned	Correlation Coefficient	1.000	.102	.089
		Sig. (1-tailed)	.	.173	.207
		N	87	87	87
	TCuriosity Binned	Correlation Coefficient	.102	1.000	.448**
		Sig. (1-tailed)	.173	.	.000
		N	87	87	87
	General Binned	Correlation Coefficient	.089	.448**	1.000
		Sig. (1-tailed)	.207	.000	.
		N	87	87	87

**. Correlation is significant at the 0.01 level (1-tailed).

In order to address the first research question, those participants with middle levels of creativity were removed from the data analysis so that the researcher could focus on those at opposite ends of the scoring range, or on those participants with either low or high levels of creativity. It was also determined that participants who scored in the middle range for curiosity and general academic intrinsic motivation would also be removed from the data analysis so that each participant would be categorized as having either low or high levels of each of the study's variables. Twenty-three participants scored either low or high in each of the areas. The data

collected from these participants were used to answer research question one. Table 4 illustrates the correlations for this particular sample.

Table 4

Correlations for Binned Creativity, Binned Curiosity, and Binned General Academic Intrinsic Motivation for 23 Participants Scoring Either High or Low in Each

			Creativity Binned	TCuriosity Binned	General Binned
Spearman's rho	Creativity Binned	Correlation Coefficient	1.000	.233	.124
		Sig. (1-tailed)	.	.143	.286
		N	23	23	23
	TCuriosity Binned	Correlation Coefficient	.233	1.000	.742**
		Sig. (1-tailed)	.143	.	.000
		N	23	23	23
	General Binned	Correlation Coefficient	.124	.742**	1.000
		Sig. (1-tailed)	.286	.000	.
		N	23	23	23

**. Correlation is significant at the 0.01 level (1-tailed).

In order to determine the patterns at which correlations among levels of creativity, curiosity, and general academic intrinsic motivation could be found, the researcher employed a crosstab analysis to further explore the relationship among the three variables. Table 5 shows the counts that resulted from the crosstab analysis.

Table 5

Crosstabulations for Low and High Levels of Creativity, Curiosity, and General Academic Intrinsic Motivation

CreativityBinned				GeneralBinned		Total
				<= 38	50+	
<= 100	TCuriosity Binned	<= 32.00	Count	7	1	8
			Expected Count	4.6	3.4	8.0
		42.00+	Count	1	5	6
			Expected Count	3.4	2.6	6.0
		Total	Count	8	6	14
			Expected Count	8.0	6.0	14.0
116+	TCuriosity Binned	<= 32.00	Count	3	0	3
			Expected Count	1.3	1.7	3.0
		42.00+	Count	1	5	6
			Expected Count	2.7	3.3	6.0
		Total	Count	4	5	9
			Expected Count	4.0	5.0	9.0
Total	TCuriosity Binned	<= 32.00	Count	10	1	11
			Expected Count	5.7	5.3	11.0
		42.00+	Count	2	10	12
			Expected Count	6.3	5.7	12.0
		Total	Count	12	11	23
			Expected Count	12.0	11.0	23.0

For students with low levels of creativity, an association between curiosity and general academic intrinsic motivation levels was found, $\chi 2$ (1, N = 14) = 7.02, p = 0.008. Examination of the cell frequencies showed that about 83% (five out of six) of the students who scored high on the curiosity measure also scored high on the general academic intrinsic motivation inventory. For students with high levels of creativity, an association between curiosity and general academic intrinsic motivation levels was found, $\chi 2$ (1, N = 9) = 5.62, p = 0.018. Examination of the cell frequencies showed that 100% (3 out of 3) of the students who scored low on the curiosity measure also scored low on the general academic intrinsic motivation inventory.

Considering the low number of counts in some cells, results of Fisher's Exact tests were used to confirm the findings of the chi square analyses. For those with low levels of creativity (<= 100), a significant value (p=.016) resulted from the Fisher's Exact tests. A significant value (p=.048) was also returned for those participants with high levels of creativity (116+). In conclusion, findings from the Fisher's Exact tests indicated that a significant relationship existed among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation. Specifically, there was a significant relationship among low levels of creativity, high levels of curiosity, and high levels of general academic intrinsic motivation, as well as among high levels of creativity, low levels of curiosity, and low levels of general academic intrinsic motivation. The researcher, therefore, rejected the following null hypothesis for research question one:

- $H_0 1$: There is no significant relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation.

Research Question Two

In phase one of this study, the researcher sought to answer a second research question, "How does the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation vary among different subjects (reading, mathematics, science, and social studies)?" Responses to the Torrance Tests of Creative Thinking (TTCT), Children's Academic Intrinsic Motivation Inventory (CAIMI), and Curiosity and Exploration Inventory II (CEI-II) were analyzed in order to answer this question. In checking for assumptions prior to conducting a correlation test, it was determined that all variables were indeed independent of each other. A Kolmogorov-Smirnov test for the normality of data indicated a significant value for curiosity (p = 0.2). For creativity, reading, mathematics, social studies, and science, values were < .05, indicating a violation of the assumption of normality. However, because of the

reasonably robust techniques that were used and the fact that the sample size was well over 30, the violation of the assumption did not interfere with data analysis. Additionally, visual inspection of the data indicated a rather normal distribution. In the normality probability plots in Figure 3, a reasonably straight line is observed for each variable, indicating rather normal distributions.

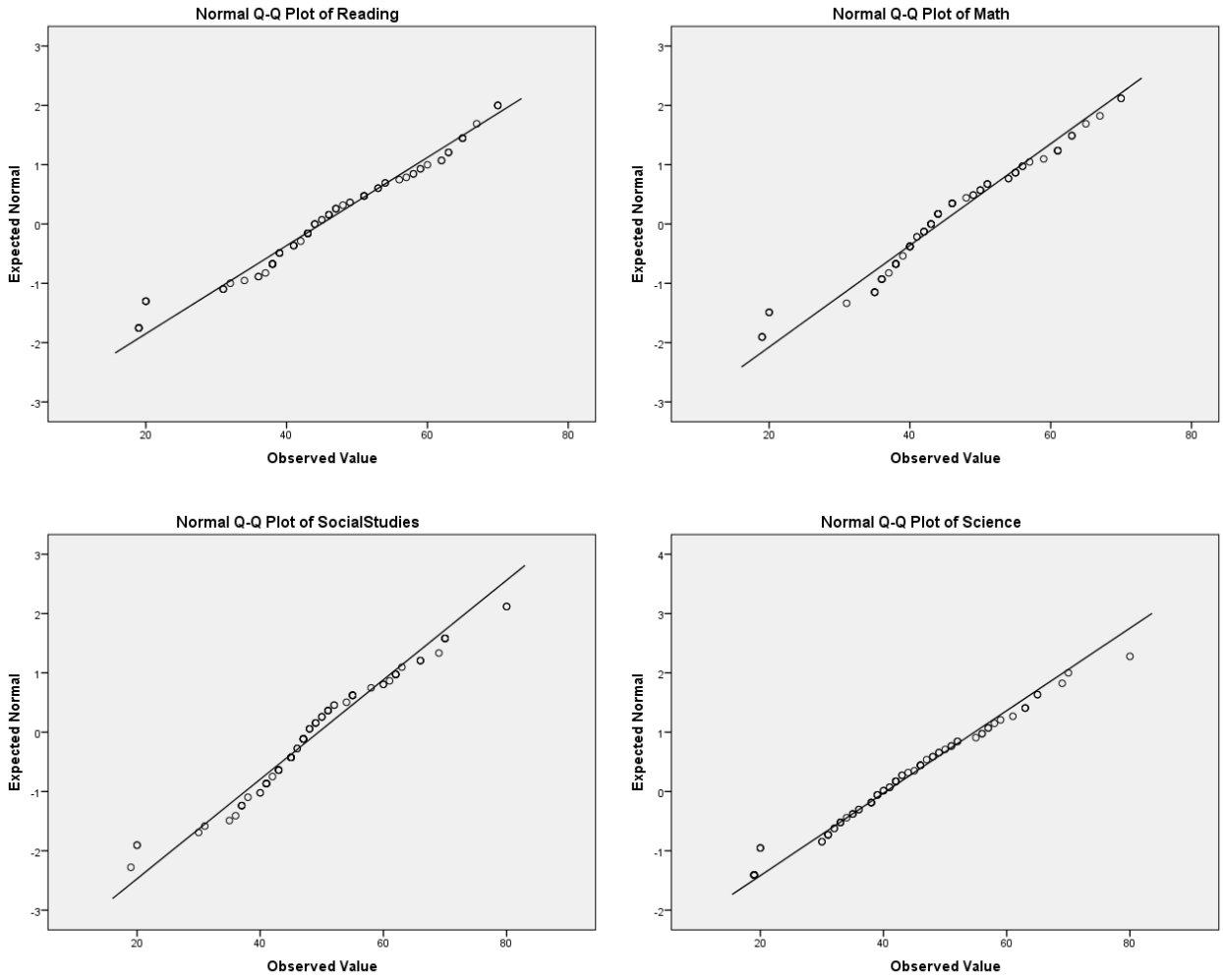


Figure 3. Normal Quantile-Quantile (Q-Q) plots showing the expected values for reading, mathematics, social studies, and science data against the observed value of each.

As data for more than one variable did not follow the assumptions for running parametric tests, non-parametric correlation tests were run to determine if a relationship existed among students' levels of creativity, curiosity, and academic intrinsic motivation in the subjects of reading, mathematics, social studies, and science. Homoscedasticity and linearity were not of concern based on the fact that non-parametric tests were used in data analysis. One-tailed tests were used because the researcher put forth alternative hypotheses that supported the belief that significant relationships and differences existed among the study's constructs. The first round of data analysis for this research question involved exploring the relationship among creativity, curiosity, and each of the individual subjects for all 87 initial participants. Table 6 shows the correlations among these variables.

Table 6

Correlations for Creativity, Curiosity, and Academic Intrinsic Motivation in Individual Subjects for 87 Total Participants

			Creativity	TCuriosity
Spearman's rho	Reading	Correlation Coefficient	.286**	.443**
		Sig. (1-tailed)	.004	.000
		N	87	87
	Mathematics	Correlation Coefficient	.051	.368**
		Sig. (1-tailed)	.320	.000
		N	87	87
	SocialStudies	Correlation Coefficient	.094	.378**
		Sig. (1-tailed)	.193	.000
		N	87	87
	Science	Correlation Coefficient	.080	.216*
		Sig. (1-tailed)	.229	.022
		N	87	87

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

In order to answer research question two, it was necessary to create three levels of each of the variables. The data were transformed using the visual binning feature in Statistical Package for the Social Sciences (SPSS) version 21.0. Visual binning resulted in the ability to designate low, middle, and high levels of creativity, curiosity, and academic intrinsic motivation in reading, mathematics, social studies, and science which was necessary to carry out statistical analyses. Three reading motivation groups were determined from the CAIMI results: (a) low reading motivation group, which scored up to 39, (b) middle reading motivation group, which scored between 40 and 51; and (c) high reading motivation group, which scored 52 or more. Three mathematics motivation groups were also determined from the CAIMI results: (a) low mathematics motivation group, which scored up to 40, (b) middle mathematics motivation group, which scored between 41 and 46; and (c) high mathematics motivation group, which scored 47 or more. In the same manner, three social studies motivation groups were determined from the CAIMI results: (a) low social studies motivation group, which scored up to 45, (b) middle social studies motivation group, which scored between 46 and 51; and (c) high social studies motivation group, which scored 52 or more. Finally, three science motivation groups were determined from the CAIMI results: (a) low motivation group, which scored up to 34, (b) middle motivation group, which scored between 35 and 46; and (c) high motivation group, that scored 47 or more. The correlation test of these binned variables is seen in Table 7.

Table 7

Correlations for Binned Creativity, Binned Curiosity, and Binned Academic Intrinsic Motivation in Reading, Mathematics, Social Studies, and Science for 87 Total Participants

			Creativity Binned	TCuriosity Binned
Spearman's rho	ReadingBinned	Correlation Coefficient	.295**	.459**
		Sig. (1-tailed)	.003	.000
		N	87	87
	MathematicsBinned	Correlation Coefficient	.097	.418**
		Sig. (1-tailed)	.186	.000
		N	87	87
	SocialStudiesBinned	Correlation Coefficient	.063	.395**
		Sig. (1-tailed)	.282	.000
		N	87	87
	ScienceBinned	Correlation Coefficient	.096	.227*
		Sig. (1-tailed)	.187	.017
		N	87	87

**. Correlation is significant at the 0.01 level (1-tailed).

*. Correlation is significant at the 0.05 level (1-tailed).

In order to address the second research question, those participants with middle levels of creativity and curiosity were removed from the data analysis so that the researcher could focus on those at opposite ends of the scoring range, or on those participants with either low or high levels of the variables. This action resulted in identifying 40 participants. Data from these participants were used to answer research question two. For each subject, the number of participant data used in analysis varied, as those who that scored in the middle level of academic intrinsic motivation in that particular subject were removed from the data set in order to concentrate on those participants at the low and high ends of scoring in the subject.

Reading. Of the 87 total participants, 25 scored high or low in creativity, curiosity, and motivation in reading. Correlation coefficients were used to examine the relationship among these three variables for this particular sample. There were positive correlations between

creativity and curiosity (r = .458, p = .011), motivation in reading and curiosity (r = .757, p < .01), and motivation in reading and creativity (r = .368, p = .035). The data were then analyzed according to low and high levels of creativity. For participants with low levels of creativity, there was a significant relationship between curiosity and motivation in reading (r = .775, p < .01). There was also a significant relationship between curiosity and motivation in reading (r = .675, p < .01) for those with high levels of creativity.

In order to further examine these data, a chi square analysis was conducted to determine the specific pattern of levels at which there were significant correlations among creativity, curiosity, and academic intrinsic motivation in reading. For students with low levels of creativity, an association between levels of curiosity and academic intrinsic motivation in reading was found, $\chi 2$ (1, N = 12) = 7.2, p = .007. Examination of the cell frequencies showed that 100% (2 out of 2) of the students who scored high on the curiosity measure also scored high on the reading academic intrinsic motivation inventory. For students with high levels of creativity, an association between curiosity and reading academic intrinsic motivation levels was found, $\chi 2$ (1, N = 13) = 5.92, p = .015. Examination of the cell frequencies showed that 80% (four out of five) of the students who scored low on the curiosity measure also scored low on the reading academic intrinsic motivation inventory.

Considering the low number of counts in some cells, results of Fisher's Exact tests were used to confirm the findings of the chi square analyses. For those with low levels of creativity (<= 100), a significant value (p=.045) resulted from the Fisher's Exact test. A significant value (p=.032) was also returned for those participants with high levels of creativity (116+). In conclusion, findings from the Fisher's Exact tests indicated that a significant relationship existed among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation in

reading. Specifically, there was a significant relationship among low levels of creativity, high levels of curiosity, and high levels of reading academic intrinsic motivation, as well as among high levels of creativity, low levels of curiosity, and low levels of reading academic intrinsic motivation.

Mathematics. Of the 87 total participants, 27 scored low or high in creativity, curiosity, and motivation in mathematics. Correlation coefficients were used to examine the relationship among these three variables for this particular sample. There was a positive correlation between creativity and curiosity ($r = .331$, $p = .046$), as well as between motivation in mathematics and curiosity ($r = .642$, $p < .01$). The data were then analyzed according to low and high levels of creativity. For participants with low levels of creativity, there was a significant relationship between curiosity and motivation in mathematics ($r = .533$, $p = .02$). There was also a significant relationship between curiosity and motivation in mathematics ($r = .707$, $p < .01$) for those with high levels of creativity.

In order to further examine this data, a chi square analysis was completed to determine the specific pattern of levels at which there were significant correlations among creativity, curiosity, and academic intrinsic motivation in mathematics. For students with low levels of creativity, an association between levels of curiosity and academic intrinsic motivation in mathematics was found, $\chi 2$ (1, N = 15) = 4.26, p = .039. Examination of the cell frequencies showed that 60% (three out of five) of the students who scored high on the curiosity measure also scored high on the mathematics academic intrinsic motivation inventory. For students with high levels of creativity, an association between curiosity and mathematics academic intrinsic motivation levels was found, $\chi 2$ (1, N = 12) = 6.0, p = .014. Examination of the cell frequencies

showed that 100% (four out of four) of the students who scored low on the curiosity measure also scored low on the mathematics academic intrinsic motivation inventory.

Considering the low number of counts in some cells, results of Fisher's Exact tests were used to confirm the findings of the chi square analysis. For those with low levels of creativity (<= 100), no significant value resulted from the test. However, a significant value (p=.030) was returned for those participants with high levels of creativity (116+). In conclusion, findings from the Fisher's Exact tests indicated that a significant relationship existed among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation in mathematics. Specifically, there was a significant relationship among high levels of creativity, low levels of curiosity, and low levels of academic intrinsic motivation in mathematics.

Social Studies. Of the 87 total participants, 30 scored low or high in creativity, curiosity, and motivation in social studies. Correlation coefficients were used to examine the relationship among these three variables for this particular sample. There was a positive correlation between motivation in social studies and curiosity (r = .464, p < .01). The data were then analyzed according to low and high levels of creativity. For participants with low levels of creativity, there was a significant relationship between curiosity and motivation in social studies (r = .633, p < .01). There was no significant relationship between curiosity and motivation in social studies for those with high levels of creativity.

In order to further examine this data, a chi square analysis was completed to determine the specific pattern of levels at which there were significant correlations among creativity, curiosity, and academic intrinsic motivation in social studies. For students with low levels of creativity, an association between levels of curiosity and academic intrinsic motivation in social studies was found, $\chi 2$ (1, N = 17) = 6.80, p = .009. Examination of the cell frequencies showed

that 83% (five out of six) of the students who scored high on the curiosity measure also scored high on the social studies academic intrinsic motivation inventory. For students with high levels of creativity, no significant association between curiosity and social studies academic intrinsic motivation levels resulted from the test.

Considering the low number of counts in some cells, results of Fisher's Exact tests were used to confirm the findings of the chi square analysis. For those with low levels of creativity (<= 100), a significant value (p=.018) resulted from the Fisher's Exact test. No significant value was returned for those participants with high levels of creativity (116+). In conclusion, findings from the Fisher's Exact tests indicated that a significant relationship existed among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation in social studies. Specifically, there was a significant relationship among low levels of creativity, high levels of curiosity, and high levels of academic intrinsic motivation in social studies.

Science. Of the 87 total participants, 22 scored low or high in creativity, curiosity, and motivation in science. Correlation coefficients were used to examine the relationship among these three variables for this particular sample. There was a positive correlation between motivation in science and curiosity (r = .455, p = .017). However, when the data were analyzed according to low and high levels of creativity, there were no significant relationships between curiosity and motivation in science for those with low or high levels of creativity. As a result, no further analysis was carried out regarding a possible relationship among creativity, curiosity, and academic intrinsic motivation in science.

In summary, results of correlation tests for those with low levels of creativity (<= 100) indicated there was evidence that moderate to strong, positive relationships existed among sixth grade students' levels of curiosity and academic intrinsic motivation in reading (r = .775, p <

.01), mathematics (r = .533, p = .02), and social studies (r = .633, p < .01). Results also indicated that for students with high levels of creativity (116+), there was evidence that indicated there are moderate to strong, positive relationships among sixth grade students' levels of curiosity and academic intrinsic motivation in reading (r = .675, p < .01) and mathematics (r = .707, p < .01). The researcher, therefore, rejected the following null hypothesis for research question two:

- $H_0 2$: There is no significant difference among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation when compared to different subjects (reading, mathematics, science, and social studies).

Research Question Three

The first of two questions that was answered using qualitative analysis involved uncovering common characteristics or beliefs of students who possessed similar levels of creativity, curiosity, and academic intrinsic motivation. The third research question asks "What are the common characteristics of students who possess similar levels of creativity, curiosity, and academic intrinsic motivation?" Data were collected using an online survey designed in Qualtrics. Twenty-three students completed the survey designed to uncover characteristics that were consistent among each statistically significant group that was discovered during the quantitative data analysis period. Data from the online survey were entered into Nvivo 10 for qualitative data analysis. Data were coded according to common responses and subsequently grouped into nodes within the program. The researcher then ran matrix coding queries so that intersections between groups and their responses could be analyzed in order to pinpoint those with similar characteristics. Data were then exported to Microsoft Excel in order to easily sort and manipulate the data.

For the purposes of this study, a common characteristic was determined by a collection of responses in which each individual in the given group responded in the same manner. If the response among group members was not unanimous, it was determined that the particular response would not be considered a common characteristic among the group. The following combinations of variable levels formed statistically significant groups, as determined by the quantitative portion of the study, and were further explored through qualitative data analysis:

- Low Creativity-High Curiosity-High Motivation
- High Creativity-Low Curiosity-Low Motivation
- Low Creativity-High Curiosity-High Reading
- Low Creativity-High Curiosity-High Social Studies
- High Creativity-Low Curiosity-Low Mathematics
- High Creativity-Low Curiosity-Low Reading

Data analysis revealed characteristics that were common among all six of the groups. All participants whose levels of creativity, curiosity, and academic intrinsic motivation fit a statistically significant pattern described themselves as happy. They reported feeling like they had a group of friends to which they felt they belonged. All sixth grade students surveyed reported being bothered when they cannot figure out how something works, while no one indicated that their primary reason for learning and getting good grades was to show others. Participants in these groups believed that curiosity can be influenced by other people and that creativity does not only pertain to the arts. Finally, none of the participants in these groups reported a decline in their enjoyment of learning, as they indicated that they did not enjoy learning more in the past. In the following section, each statistically significant group's common characteristics will be reported.

Low creativity-high curiosity-high motivation. Participants that presented low levels of creativity, high levels of curiosity, and high levels of academic intrinsic motivation characterized themselves as happy and organized. They reported having a sense of belonging to a group of friends and that they are bothered when they cannot figure out how something works. In regard to creativity, they felt people can learn to be more creative and that creativity is not only related to the arts. These individuals encouraged themselves to be creative and felt that the subjects of mathematics and reading allow for creativity. These individuals encouraged themselves to be curious and felt that people can influence another's curiosity. They felt as if they are as curious now as they were in the past. These individuals motivated themselves to learn and expressed that they were not interested in getting good grades so they can show others. They continue to have the same level of interest in learning, as they reported not liking learning more in the past.

High creativity-low curiosity-low motivation. Individuals with a high level of creativity, low level of curiosity, and low level of motivation felt that they were happy and not serious. They had a group of friends to which they felt they belonged. They felt that they can accomplish tasks that they set out to do. However, they felt that they are better at things outside of school and that they do not have the chance to learn about their interests inside of school. They reported liking to use details when writing and felt bothered when they cannot figure out how something works. Although this group was considered highly creative, the only common belief held among them in regard to creativity is that excelling at art is not the only way to be creative. In terms of curiosity, they felt that people can influence curiosity levels and that reading was a subject in which they were made to feel curious. These particular students did not like to learn more in the past and are not motivated to learn so they can compare their ability now

to their past abilities. Instead, they are motivated by current interests, as well as rewards. However, the number one reason they were motivated to get good grades was to make themselves happy.

Low creativity-high curiosity-high reading. Participants characterized as having a low level of creativity, high level of curiosity, and high level of reading described themselves as serious, organized, confident, and happy. They are not easily distracted and are bothered when they cannot figure out how something works. Standardized tests were viewed as important by this group of individuals. They enjoy group work and do not enjoy working alone. They felt they had a group of friends to which they belonged. They enjoyed talking about new ideas and if they were not interested in something, they reported trying to make it fun. This particular group of participants encouraged themselves to be creative and felt that people can learn to become more creative. They did not see creativity as only belonging to the arts and felt as if the subjects of reading, mathematics, social studies, and science allow for creativity on some level. Participants in this group encouraged themselves to be curious and felt that people can influence curiosity levels. They did not feel they were more curious when they were younger. They felt as if the subjects of reading and social studies really made them curious. These individuals motivated themselves to learn and all ranked avoiding getting in trouble as the last reason they were motivated to learn. They were motivated by current interests and are no less motivated than they were in the past. They were, however, not only interested in learning if it related to something in which they were already interested in. They were not primarily interested in learning and getting good grades to show others, avoid getting in trouble, or to make themselves happy.

Low creativity-high curiosity-high social studies. Individuals that reported a low level of creativity, high level of curiosity, and high level of motivation in social studies expressed that they were confident, serious, organized, and happy. They felt like they belonged to a group of friends. They reported trying to make uninteresting things fun and that it bothered them when they cannot figure out how something works. They encouraged themselves to be creative and felt that people can learn to be more creative. They did not view creativity as being exclusive to the field of art and felt that mathematics, reading, science, and social studies allowed for creativity. They encouraged themselves to be curious and felt they were just as curious now as they were when they were younger. They believed that people can influence curiosity levels and felt that social studies was a subject that really made them curious about the world. Participants with low creativity levels, high curiosity levels, and high social studies motivation motivated themselves to learn. They liked learning now as much as they did in the past and they were not only interested in topics that matched their current interests. Making themselves happy, avoiding getting in trouble, and getting good grades to show others were not indicated as their primary reason for learning.

High creativity-low curiosity-low mathematics. Participants with high creativity levels, low levels of curiosity, and low levels of motivation in mathematics felt that their teacher's perception of their ability made a difference as to how hard they tried. Whether or not they liked their teacher also made a difference as to whether or not they enjoyed learning. They felt as if they had a friend group to which they belonged and considered themselves happy and not serious. Although they felt they could accomplish tasks they set out to do, they felt they were better at things outside of school and that they did not get to learn about their interests in school. They were bothered when they could not figure out how something works. Although they

reported using details when writing, they did not use details when drawing. Also, if given a choice, they did not prefer the opportunity to draw a response to a question. In fact, they reported enjoying standardized tests. Although they reported high levels of creativity, they did not feel that they encouraged themselves to be creative and they did not view art as the only way to be creative. Participants in this group felt reading and science allowed for creativity, while mathematics did not. Like creativity, they did not feel that they encouraged themselves to be curious. They also felt that they were more curious when they were younger. Participants in this group agreed that people could influence curiosity and that the subjects of reading and science made them curious. Those with high levels of creativity, low levels of curiosity, and low levels of motivation for mathematics indicated that they were motivated by their current interests, as well as by rewards. They did not like to learn more in the past and they were not motivated to learn in order to compare their ability now to their past abilities. Each participant in this group listed "to make themselves happy" as their first reason for learning and getting good grades. The last reason they indicated for being motivated to learn was to get good grades in order to show others.

High creativity-low curiosity-low reading. Participants with high creativity levels, low curiosity levels, and low levels of motivation for reading felt that they were easily distracted and were bothered when they could not figure out how something works. They did, however, feel that they can accomplish the tasks they set out to do. They viewed themselves as happy, not serious, and as having a group of friends to which they felt they belonged. Individuals in this particular group felt they are better at things outside of school and that they did not get to learn about their interests inside of school. They did not view standardized tests as being important. They enjoyed group work and using details when writing. This group of individuals did not

equate creativity with the arts and they felt as if people can learn to be more creative. They agreed that people can influence curiosity and that reading made them curious on some level. The number one reason this group was motivated to learn was to make themselves happy. However, they were not motivated to learn in order to compare their ability now to past abilities. Instead, they were motivated by current interests and rewards. Finally, the participants in this group felt as if their desire to learn has not changed much from the past.

The purpose of this research question was to identify common beliefs and characteristics of those groups of participants whose levels of creativity, curiosity, and general or subject specific academic intrinsic motivation fit into one of or more of the patterns there were determined to be statistically significant. The last research question associated with this study aimed to answer a closely related, but separate question.

Research Question Four

The final research question addressed in this study involved discovering the common factors and influences that were associated with participants who possessed similar levels of creativity, curiosity, and academic intrinsic motivation. The final research question asks, "To what sources and/or factors do students attribute their levels of creativity, curiosity, and academic intrinsic motivation?" Data were collected using the same online survey designed in Qualtrics that was used to answer research question three. Twenty-three students completed the survey aimed at uncovering factors and/or sources that were consistent among each participant in the statistically significant groups that resulted from the quantitative data analysis period. As with question three, data from the online survey were entered into Nvivo 10 for qualitative data analysis. Data were coded according to common responses and subsequently grouped into nodes within the program. The researcher then ran matrix coding queries so that intersections between

groups and their responses could be analyzed in order to pinpoint the common sources or factors that were associated with the constructs addressed in the study. Data were then exported to Microsoft Excel in order to more easily sort and manipulate. For the purposes of this study, a common source or factor was determined by a collection of responses in which each individual in the given group responded in the same manner. If the response among group members was not unanimous, it was determined that the particular factor or source would not be considered common among that particular group. As with question three, the following combinations of construct levels formed statistically significant groups, as determined by the quantitative portion of the study, and were further explored through qualitative data analysis:

- Low Creativity-High Curiosity-High Motivation
- High Creativity-Low Curiosity-Low Motivation
- Low Creativity-High Curiosity-High Reading
- Low Creativity-High Curiosity-High Social Studies
- High Creativity-Low Curiosity-Low Mathematics
- High Creativity-Low Curiosity-Low Reading

As with common beliefs and characteristics, data analysis revealed that there were common factors or sources among all six of the groups. In fact, the number was quite high as participants indicated twenty one sources or factors (see Table 8) that were common among all six groups.

Table 8

Common Factors or Sources Relating to Creativity, Curiosity, or Motivation Among the Six Statistically Significant Groups

Home Access	Board Games	Computer	Listening to Music	Sports Equipment	Video Games
School Access	Books				
Creativity	Parents Encourage	Grandparents Encourage			
Curiosity	Parents Encourage	Grandparents Encourage			
Motivation	Parents Encourage	Grandparents Encourage	Siblings Do Not Encourage	Coaches Encourage	
Place and Experiences	Amusement Park	Book Store	Zoo		
Hobbies and Interests	Amusement Parks	National Parks	Visiting Zoos	Playing Sports with Friends	

Low creativity-high curiosity-high motivation. In addition to the factors or sources that were common among all groups (see Table 8), participants with low levels of creativity, high levels of curiosity, and high levels of motivation indicated 10 additional sources. All reported having access to books at home, while not having access to video games at school. This particular group expressed that the instructors they worked with outside of school (such as dance or piano teachers) did not encourage creativity. They did, however, indicate teachers inside school as a common source of learning motivation. Participants in this group have also had the opportunity to visit a campground and national park. Additional hobbies and interests that were common among this group included visiting bookstores and campgrounds, as well as exercising and playing sports on a team.

High creativity-low curiosity-low motivation. Participants scoring high in creativity, low in curiosity, and low in academic intrinsic motivation reported just five additional, common

sources that were present or lacking for this particular group. In addition to those displayed in Table 8, a common hobby among this group was listening to music, although they indicated that they did not have access to music or sports equipment at school. Each participant expressed that outside instructors (such as dance or piano teachers) encouraged their motivation to learn and each has visited a library outside of school.

Low creativity-high curiosity-high reading. Participants in this group reported a considerable number of common sources or factors that involved creativity, curiosity, or academic intrinsic motivation. This group indicated 29 common sources or factors beyond the 21 (see Table 8) that were shared across all groups. All had access to books and art materials at home, as well as computers, sports equipment, and music at school. Participants reported that they did not have access to video games at school. They expressed that friends, coaches, and teachers encouraged creativity, while siblings and outside instructors (such as dance or piano teachers) did not encourage creativity. In terms of curiosity, they reported that friends, coaches, and teachers encouraged curiosity, while siblings did not. Participants felt that they had teachers who encouraged learning. All participants in this group had the chance to visit a campground, library, and national park. This particular group enjoyed animals, bookstores, campgrounds, exercising, history museums, playing sports on a team, libraries, video games, reading, and watching television. Participants in this particular group did not enjoy arts and crafts.

Low creativity-high curiosity-high social studies. Access to books at home, as well as computers and sports equipment at school were common among this group. This group reported that they did not have access to video games at school. Along with the individuals included in Table 8, this group felt as if they had friends who encouraged creativity, while they felt that outside instructors (such as dance or piano teachers) did not encourage creativity. Participants in

this group had friends who encouraged curiosity and teachers who motivated them to learn. Each participant in this group reported visiting a national park, a history museum, and a campground. Participants in this group did not enjoy arts and crafts but they enjoyed animals and visiting bookstores, campgrounds, history museums, and libraries. Additionally, they enjoyed playing video games and sports on a team.

High creativity-low curiosity-low mathematics. In addition to those sources and factors common among all statistically significant groups (see Table 8), sources or factors related to creativity, curiosity, or motivation that were common among this particular group included access to books at home and computers at school. In the school setting, this group reported not having access to video games, music, sports equipment, or board games. Participants with high creativity levels, low curiosity levels, and low mathematics levels were unique from other groups in that they reported having friends that encouraged creativity, curiosity, and the motivation to learn. Although they were considered highly creative, they did not enjoy arts and crafts, nor did they enjoy board games, museums, campgrounds, or puzzles.

High creativity-low curiosity-low reading. Participants with high levels of creativity, low levels of curiosity, and low levels of reading had access to music, art materials, board games, computers, sports equipment, and video games at home. At school, participants in this group reported having access to books but not having access to music or sports equipment. Outside instructors (such as dance or piano teachers) did not encourage creativity according to this group. Each participant in this group visited a campground and an art museum and enjoyed or was interested in art and history museums, animals, and listening tomusic. These interests, sources, and factors were in addition to those common among all statistically significant groups (see Table 8).

Summary

In this chapter, the researcher reported the results of both quantitative and qualitative data analysis. Quantitative data analysis was used to answer the first two research questions. This analysis indicated six combinations of creativity, curiosity, and academic intrinsic motivation levels that were statistically significant. These patterns included (a) low creativity, high curiosity, and high motivation; (b) high creativity, low curiosity, and low motivation; (c) low creativity, high curiosity, and high reading; (d) low creativity, high curiosity, and high social studies; (e) high creativity, low curiosity, and low mathematics; (f) high creativity, low curiosity, and low reading. Common characteristics, factors, and sources relating to each of the six groups were then identified through qualitative data analysis of survey results in order to answer the third and fourth research questions. Seven characteristics or beliefs were common among all groups and 54 others were determined to be common among one or more of the groups. The final round of qualitative analysis was used to determine the common factors or sources associated with the participants' creativity, curiosity, and academic intrinsic motivation levels. Twenty-one factors or sources were common among all groups and 48 others were determined to be common among one or more of the groups.

In the final chapter, the researcher will discuss these findings in light of related literature and Self-Determination Theory (SDT), the theoretical framework associated with this study. Findings will be compared and contrasted and the implications of this study will be outlined. Finally, the researcher will provide recommendations for future studies, as well as a conclusion to the study.

CHAPTER FIVE

DISCUSSION, RECOMMENDATIONS, AND CONCLUSIONS

There were two purposes, and therefore phases, of this mixed methods research study. The first purpose was to determine if there were any statistically significant relationships among levels of sixth grade students' creativity, curiosity, and academic intrinsic motivation. In this study, academic intrinsic motivation was studied in general, as well as according to the specific subjects of reading, mathematics, social studies, and science. Phase two addressed the second purpose of this study, which was to identify commonalities among those sixth grade students with statistically significant levels of curiosity, creativity, and academic motivation. The following research questions guided this study:

- What is the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation?
- How does the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation vary among different subjects (reading, mathematics, science, and social studies)?
- What are the common characteristics of students who possess similar levels of creativity, curiosity, and academic intrinsic motivation?
- To what sources and/or factors do students attribute their levels of creativity, curiosity, and academic intrinsic motivation?

The sample for the study began with 87 students who were attending school in a rural area of Pennsylvania. After scoring the quantitative instruments, it was determined that 23 participants' levels of creativity, curiosity, and academic intrinsic motivation were considered either low or high. The researcher's goal was to identify these participants because their

particular levels of each of the variables were necessary for data analysis. Quantitative data analysis revealed that there were statistically significant patterns among the variables. The 23 participants then completed a qualitative survey regarding creativity, curiosity, and academic intrinsic motivation. The data that resulted from the survey collection were integral in determining the characteristics, attributes, sources, and factors that were common among the different groups.

This research study was conducted because there was a lack of investigation into student motivation and desire to learn without reference to standardized test or IQ scores. Although numerous studies have been conducted that show or fail to show a relationship between test scores and creativity, curiosity, or motivation (Kim, 2005), the researcher intentionally avoided standardized test and IQ scores in the design of this study in order to focus on the participants' intrinsic motivation to learn in relation to curiosity and creativity. One reason for taking the emphasis away from scores and grades is that in today's climate of standardized, high-stakes testing, the attention of education in many schools has turned toward test preparation and the improvement of test-taking skills. This focus on scores has undoubtedly marginalized those who do not perform well on these types of assessments, as standardized tests measure more convergent than divergent thinking (Sternberg, 2003). In addition, these test scores serve as extrinsic rewards or goals for many students. The researcher performed this study because determining and promoting factors that aid in student engagement in school can set a foundation for interest and life-long learning. Unlike the ability to score well on a test, instilling behaviors that foster curiosity and intrinsic motivation in students can have long-term effects and be beneficial to one's well-being (Leonard & Harvey, 2007).

In the sections that follow, the researcher will interpret the study's findings in relation to each of the four research questions. After summarizing and interpreting the results, the researcher will discuss the implications of the study and what they may mean for students, educators, administrators, and policy makers. Recommendations for future research that suggest replicating, modifying, or extending the current study will be offered to the reader. Finally, the researcher will provide a summary and conclusion to the study.

Discussion of Findings

Previous studies have indicated that curiosity has been linked to intrinsic motivation (Yau, Kan, & Cheng, 2012), while intrinsic motivation has been associated with creativity (Kaufman & Beghetto, 2009). Others have stressed that independent learning, or intrinsically motivated learning, actually relies on curiosity (Kedge & Appleby, 2010). These results from past studies highlight the interconnectivity of creativity, curiosity, and academic intrinsic motivation and provide a platform from which to discuss the findings of the current study.

Along with results from past research, the theoretical framework that guided this study plays an integral role in the discussion of the findings. Researchers have indicated that an individual's creativity can be motivated by the idea that others will view them as competent in their work, as competence energizes human activity (Deci & Ryan, 2000). In much the same way, Kashdan and Steger (2007) observed that individuals felt extremely curious when a situation satisfied their need for novelty and challenge. However, those factors alone were not enough. Without competence or the ability to understand the novelty or challenge and the freedom to approach the problem as one chooses, the feelings of curiosity were likely not acted upon, as there was no real motivation to do so. In their early research, Deci and Ryan (1985) explained this by simply stating that one is highly intrinsically motivated when the task at hand is

challenging but obtainable. All of the given situations reflect what Deci and Ryan view as the universal and innate human need for autonomy, competence, and relatedness. The belief that an individual's behavior can be determined by the quest to satisfy these needs is the essence of Self-Determination Theory (SDT). The findings of the present study are examined in light of related literature and SDT, which served as the theoretical framework for the study. Discussion is arranged according to the study's four research questions.

Research Question One

The first research question of this study aimed to determine if a statistically significant relationship existed among the participants' levels of creativity, curiosity, and general academic intrinsic motivation. The first research question asked:

- What is the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation?

Results of data analysis indicated that there were statistically significant relationships among two groups with particular combinations of creativity, curiosity, and academic intrinsic motivation. For students with low levels of creativity, an association between curiosity and general academic intrinsic motivation was found, $\chi 2$ (1, N = 14) = 7.02, p = 0.008. Fisher's Exact tests were used to confirm the findings of the chi square analysis. For those with low levels of creativity (<= 100), a significant value (p=.016) resulted from the Fisher's Exact test. Examining the cell counts allowed the researcher to determine that there was a statistically significant relationship among those with low levels of creativity, high levels of curiosity, and high levels of general academic intrinsic motivation.

For students with high levels of creativity, an association between curiosity and general academic intrinsic motivation was also found, $\chi 2$ (1, N = 9) = 5.62, p = 0.018. Fisher's Exact

tests were again used to confirm the findings of the chi square analysis. For those with high levels of creativity (116+), a significant value (p=.048) resulted from the Fisher's Exact tests. Examining the cell counts allowed the researcher to determine that there was a significant relationship among those with high levels of creativity, low levels of curiosity, and low levels of general academic intrinsic motivation.

The results of data analysis for question one allowed the researcher to determine that there was a statistically significant relationship among those with low levels of creativity, high levels of curiosity, and high levels of general academic intrinsic motivation. The opposite of this relationship (high levels of creativity, low levels of curiosity, and low levels of general academic intrinsic motivation) also proved to be statistically significant. The researcher, therefore, rejected the null hypothesis for research question one and supported the alternative hypothesis. The hypotheses associated with the first research question were:

- $H_0 1$: There is no significant relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation.
- $H_1 1$: There is a significant relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation.

The results of this study are supported in literature on the topics of creativity, curiosity, and intrinsic motivation. In a study of the relationship between curiosity and intrinsic motivation, Yau, Kan, and Cheng (2012) reported that those with higher levels of curiosity also reported higher levels of intrinsic motivation. This relationship was supported by the results of the current study. Other findings associated with the first research question and particularly those that highlight the opposite relationship between creativity and curiosity may seem unexpected considering, as with curiosity and intrinsic motivation, research has indicated

associations between creativity and intrinsic motivation (Kaufman & Beghetto, 2009). One explanation for the correlation between high creativity and low curiosity, as well as high creativity and low intrinsic motivation may relate to the nature of schooling today. Fasko (2001) reported that initially creative individuals were intrinsically motivated to complete a given task. When grades were introduced and encouraged, however, the motivation became more extrinsic. Intrinsic forms of motivation are much more powerful, as studies have indicated that activities with an intrinsic goal promoted "a deeper processing of the learning material, greater conceptual understanding of it, and both short-term and long-term persistence at relevant learning tasks" (Vansteenkiste, Lens, & Deci, 2006, p. 28).

Highly creative students' intrinsic motivation for learning may also be affected by the type of thinking that is often encouraged in today's schools. Wu and Choi (2008) indicated that postformal thinking is positively correlated with creativity, while formal thinking is negatively correlated with creativity. In this sense, creative thinkers accept contradiction and view knowledge as relative, while more formal thinkers view contradictions as problematic as they search for one absolute answer. Companies and organizations that create standardized tests undoubtedly ask students to arrive at one correct answer. This request may have a negative impact on highly creative students as Sternberg (2006) reported that students in his study who were taught in a way that was congruent to their way of thinking performed better in school. Postformal, or more creative, thinkers feel as though the educational system robs them of their autonomy and devalues their style of thinking. As a result, competency beliefs may be affected in a negative way. This effect, along with the alienation a creative thinker may feel in this environment, indicates that the individual's three psychological needs associated with SDT may not be satisfied. This is detrimental to learning, as SDT asserts that a human's natural tendency

for growth and development is fostered when the needs for autonomy, competence, and relatedness are met (Deci & Ryan, 1985).

Although the nature of the current educational system may have a negative impact on creative thinkers, it may actually support those less creative or more formal thinkers (Wu & Choi, 2008). The participants in the present study with low levels of reported creativity indicated that they are highly curious and highly intrinsically motivated; a correlation that was indicated in previous studies (Yau, Kan, & Cheng, 2012). If teaching and assessment in schools are more aligned with formal thinking, competency beliefs among those with this thinking style may be enhanced by current practices, even without the intent to do so. This is important for certain participants in the present study, as research has indicated that true learning is a result of curiosity coupled with competence (Arnone, Small, Chauncey, & McKenna, 2011).

Research Question Two

The goal of the second research question of this study was to determine if a statistically significant relationship existed among the participants' levels of creativity, curiosity, and academic intrinsic motivation for the individual subjects of reading, mathematics, social studies, and science. The second research question asked:

- How does the relationship among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation vary among different subjects (reading, mathematics, science, and social studies)?

Quantitative data analysis was used to determine that there were statistically significant relationships among creativity, curiosity, and academic intrinsic motivation in reading, mathematics, and social studies. There was no indication of any significant relationship involving science. Results of data analysis indicated that there were statistically significant

relationships among two groups with particular combinations of creativity, curiosity, and academic intrinsic motivation in reading. These relationships involving reading motivation mimicked the pattern of those involving general motivation from research question one. For participants with low levels of creativity, an association between curiosity and academic intrinsic motivation in reading was found, $\chi 2$ (1, N = 12) = 7.2, p = .007. Fisher's Exact tests were used to confirm the findings of the chi square analyses. For those with low levels of creativity (<= 100), a significant value (p=.045) resulted from the Fisher's Exact test. Examining the cell counts allowed the researcher to determine that there was a significant relationship among those with low levels of creativity, high levels of curiosity, and high levels of academic intrinsic motivation in reading.

For participants with high levels of creativity, an association between curiosity and academic intrinsic motivation in reading was also found, $\chi 2$ (1, N = 13) = 5.92, p = .015. Fisher's Exact tests were again used to confirm the findings of the chi square analysis. For those with high levels of creativity (116+), a significant value (p=.032) resulted from the Fisher's Exact tests. Examining the cell counts allowed the researcher to determine that there was a significant relationship among those with high levels of creativity, low levels of curiosity, and low levels of academic intrinsic motivation in reading.

The researcher discovered that there were two other statistically significant relationships which involved the subjects of mathematics and social studies. For participants with high levels of creativity, an association between curiosity and academic intrinsic motivation in mathematics was found, $\chi 2$ (1, N = 12) = 6.0, p = .014. Fisher's Exact tests were used to confirm the findings of the chi square analysis. For those with high levels of creativity (116+), a significant value (p=.030) resulted from the Fisher's Exact test. Examining the cell counts allowed the researcher

to determine that there was a significant relationship among those with high levels of creativity, low levels of curiosity, and low levels of academic intrinsic motivation in mathematics.

The final relationship indicated in the data analysis involved social studies. For participants with low levels of creativity, an association between curiosity and academic intrinsic motivation in social studies was found, $\chi 2$ (1, N = 17) = 6.80, p = .009. Once again, Fisher's Exact tests were used to confirm the findings of the chi square analysis. For those with low levels of creativity (<= 100), a significant value (p=.018) resulted from the tests. Examining the cell counts allowed the researcher to determine that there was a significant relationship among those with low levels of creativity, high levels of curiosity, and high levels of academic intrinsic motivation in social studies. This finding, combined with the three other statistically significant relationships regarding reading and mathematics, led the researcher to reject the null hypothesis for research question two and therefore support the alternative hypothesis. The null and alternative hypotheses associated with this research question were as follows:

- $H_0 2$: There is no significant difference among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation when compared to different subjects (reading, mathematics, science, and social studies).
- $H_1 2$: There is a significant difference among sixth grade students' levels of creativity, curiosity, and academic intrinsic motivation when compared to different subjects (reading, mathematics, science, and social studies).

The findings regarding this research question were not surprising, as research has indicated that motivation for school varies across domains and from subject to subject (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003; Anderman, 2004; Guay, Chanal, Ratelle, Marsh, Larose, & Moivin, 2010). However, a finding that is interesting to note is that low motivation in reading

was correlated with low curiosity and high creativity, while high motivation in reading was correlated with high curiosity and low creativity. This pattern mimics the patterns for general motivation that were determined when answering the first research question. As a result, much of the discussion and interpretation of the first research question can also apply to the discussion of the statistically significant patterns associated with reading motivation. This assertion was supported by the qualitative phase of the current study. Participants with low academic intrinsic motivation in general and those with low academic intrinsic motivation in reading shared the same characteristics with the exception of each group possessing just two additional common characteristics that were not shared with the other group.

Unlike those with low general academic intrinsic motivation, participants in the low reading motivation, low curiosity, and high creativity group indicated that they did not feel that standardized tests were important and that they were easily distracted. This characteristic is noteworthy, as highly creative students who were easily distracted have been examined in previous research. Brandau et al. (2007) reported that students who scored high on creativity measures were viewed as impulsive, disruptive, and as possessing ADHD like behaviors. In a subject where concentration is fundamental to success, it is possible that certain characteristics of highly creative students may negatively impact their ability and therefore, their motivation. This possibility is perhaps the most interesting interpretation in regard to the group with high creativity, low curiosity, and low reading motivation.

The group involving high reading motivation, low curiosity, and low motivation shared many characteristics with those in the high general academic intrinsic motivation group. Therefore, again, much of the discussion and interpretation of the first research question can also apply to the discussion of this particular group. However, some of the most important findings

from the qualitative portion of the present study could be used to illustrate the major difference between the two different reading motivation groups. Unlike those with low reading motivation, those participants with high motivation in reading indicated that they did feel standardized tests were important and that they were not easily distracted. The ability to concentrate in a subject that requires attention and in a testing atmosphere that encourages convergent thinking is certainly beneficial to this group's interest, success, and motivation (Wu & Chiou, 2008). Based on previous research, a somewhat expected result was that this group was the only one in the entire study to report that reading made them "really" curious. As previously stated, the correlation between curiosity, competence, and intrinsic motivation has been indicated in past research (Arnone, Small, Chauncey, & McKenna, 2011; Wu & Choi, 2008; Yau, Kan, & Cheng, 2012).

Although low and high reading motivation followed the same significant patterns as low and high general motivation, the same was not true for mathematics and social studies. Only high levels of social studies and low levels of mathematics motivation were part of statistically significant relationships. Low levels of mathematics motivation were correlated with low curiosity and high creativity. Considering participants did not indicate that mathematics made them curious in the qualitative portion of this study, it was somewhat expected that the group would have a low motivation for the subject, as research indicates that intrinsic motivation relies on curiosity (Kedge & Appleby, 2010). The most interesting discussion of the group in the present study with low mathematics motivation, low curiosity, and high creativity revolved around the participants' perception of their teacher and their teachers' thoughts. This group of participants indicated that whether or not they liked their teachers made a difference as to whether or not they liked to learn. They also indicated that what their teachers thought about

their ability in mathematics made a difference in how hard they tried. These findings are supported in a study by Freiberger, Steinmayr, and Spinath (2012) which focused specifically on the subject of mathematics. Study results indicated that a student's belief of how his or her teacher perceived his or her ability had an effect on intrinsic motivation. When a student felt that the teacher viewed his or her ability as low, the student's competency beliefs were affected, which in turn influenced the student's intrinsic motivation. Interestingly, the group in the present study with a low intrinsic motivation in mathematics was the only group to indicate that whether or not they liked their teachers made a difference as to whether or not they liked to learn. They were also the only group to indicate that what their teachers thought about their ability made a difference in how hard they tried.

The significant relationship related to social studies involved the opposite pattern of creativity, curiosity, and motivation from that associated with mathematics. High levels of social studies motivation were correlated with high curiosity and low creativity levels. Unlike the results from reading and mathematics, there was only one characteristic of this group that made the interpretation of the findings unique from those with general high motivation. The group of participants with a high level of general academic intrinsic motivation did not commonly indicate that social studies made them curious. However, in the qualitative portion of this study, students with a high motivation for social studies not only indicated that social studies made them curious, but they also reported that social studies "really" made them curious. Once again, previous research indicated that there were correlations between curiosity and motivation (Arnone, Small, Chauncey, & McKenna, 2011; Wu & Choi, 2008; Yau, Kan, & Cheng, 2012).

Research Question Three

The third research question was the first answered using qualitative data analysis. Data were collected using an online survey designed in Qualtrics. Twenty-three participants completed the survey designed to uncover characteristics that were consistent among each statistically significant group discovered during quantitative data analysis. Data from the online survey were entered into Nvivo 10 for analysis. Data were coded according to common responses and subsequently grouped into nodes within the program. The researcher was then able to run matrix coding queries so that intersections between groups and their responses could be analyzed in order to pinpoint those with similar characteristics.

Data from the participants who were identified as fitting one of the following statistically significant patterns from phase one: (a) low creativity-high curiosity-high motivation, (b) high creativity-low curiosity-low motivation, (c) low creativity-high curiosity-high reading, (d) low creativity-high curiosity-high social studies, (e) high creativity-low curiosity-low mathematics, and (f) high creativity-low curiosity-low reading, were used to answer the following research question:

- What are the common characteristics of students who possess similar levels of creativity, curiosity, and academic intrinsic motivation?

First, discussion of the findings of the third research question will relate to all statistically significant groups. Findings will then be interpreted in relation to groups that involve high creativity, low curiosity, and low general or subject specific motivation. The researcher will then discuss the findings in relation to the opposite pattern or in regard to those groups with low creativity, high curiosity, and high general or subject specific motivation.

All statistically significant groups. Qualitative data analysis allowed the researcher to determine that the characteristics or beliefs that were shared among the six statistically significant groups were (a) the feeling of being happy most of the time, (b) the feeling that they had a group of friends to which they belong, (c) the feeling of being bothered when they cannot figure out how something works, (d) the belief that curiosity can be influenced by other people, (e) the belief that creativity does not only pertain to the arts, (f) the feeling of not being motivated to get good grades in order to show others, and (g) the belief of possessing a motivation to learn that has not changed from when they were younger.

As previously stated, a common characteristic was determined by a unanimous response to a particular survey item. The characteristics that were common among all groups will be discussed briefly, as the aim of this research question was to determine and then examine the commonalities among specific groups and to determine the characteristics which make one group unique from another.

The characteristics and beliefs that were common among all statistically significant groups can be dissected through the lens of self-determination theory (SDT). Self-determination theory asserts that humans are programmed to satisfy the psychological needs of autonomy, competence, and relatedness (Deci & Ryan, 1985). In general, it can be assumed that when an individual's needs are satisfied, physical or psychological, happiness will result. Interestingly, all statistically significant groups in this study reported that they felt happy most of the time. As no two groups were identical, it is possible that the psychological needs of each group are met in different ways. The following section will examine this possibility while referencing the six other beliefs that were common among all groups.

Using SDT as a lens, one can interpret that belonging to a group of friends satisfies the need for relatedness. What is interesting to note is that the high creativity, low curiosity, low mathematics motivation group was the only one to indicate that their friends motivated them to learn. Three of the six groups (high creativity, low curiosity, low mathematics motivation; low creativity, high curiosity, high reading; and low creativity, high curiosity, and high social studies) in the study reported that friends encouraged them to be creative and curious. Two of the three highly curious groups had friends who encouraged curiosity, while only one highly creative group had friends who encouraged them to be creative. There may seem to be no logic to these associations. However, it is important to mention that at this stage of development, or at the ages of 11 to 12, there are many factors at play. Friendships are more selective, as they become based more on interests and activities at which the individuals excel (Akos, Hamm, Mack, & Dunaway, 2007; Dove, Pearson, & Hooper, 2010). At this age, an individual's need for relatedness can be met through friendships that both support the participants' existing interests, as well as expand upon them as the individuals begin to form their own identities (Barnwell, 2009).

Believing that a person's curiosity can be influenced by others and that creativity does not only pertain to the arts are powerful thoughts that can undoubtedly affect competency beliefs. If being creative is equated with the ability to produce an artistic product, one may feel that creativity involves natural talent and, therefore, one is either creatively competent or creatively incompetent. This view of creativity is limiting and ignores everyday creativity, or the type of creativity that is needed to solve problems (Ivcevic, 2007). Viewing creativity as more than the ability to create art allows an individual to feel creatively competent in other ways. One such way is the creative ability to understand and interpret the world in ways that are personally meaningful to the individual (Beghetto & Kaufman, 2007). The ability to make these

associations is essential to learning. The participants' common belief that a person's curiosity can be influenced by others also has an impact on a person's feelings of competence. More importantly, it speaks to the importance of passionate teachers and the use of interactive technologies, which have been indicated as having positive influences on curiosity and therefore, motivation (Fabris, 2010; Shroff, Vogel, & Coombes, 2008).

Finally, the notion of autonomy is addressed as the participants reported that their motivation for learning is not driven by the desire to show others their achievement. Autonomy has been described as the freedom and control over one's behaviors (Deci & Ryan, 1985; Ryan & Deci, 2006). Considering all groups in this study indicated that they already had a friend group to which they belonged, they may be less focused on showing their achievement to others in order to gain acceptance. Without this pressure, one may feel more freedom or autonomy.

Finally, all groups in the present study indicated that their intrinsic motivation has not suffered a decline, a common occurrence among individuals of this age (Spinath & Spinath, 2005). The presence of a friend group to which they feel they belong may have an influence on the fact that the participants' motivation has not suffered a decline. This assertion is based on research that indicated one reason for a drop in motivation is that students become more focused on fitting in with peers at this stage of their development (Sanacore, 2008).

Low creativity-high curiosity-high motivation groups. In addition to those beliefs or characteristics that were common among all groups, those with low levels of creativity, high levels of curiosity, and high levels of general or subject specific academic intrinsic motivation described themselves as organized. Wu and Chiou (2008) indicated that formal thinkers, or those who do not think creatively, operate in a closed system, view contradictions as problems, and look for single logical answers that will hold true over time. Organization and the ability to

achieve a prescribed goal or to arrive at an absolute answer are qualities that are many times encouraged in schools (Dhingra & Sharma, 2012; Sternberg, 2003). In this sense, the motivation of these organized individuals may be encouraged just by the very nature of today's educational system (Grant & Dweck, 2003).

Understandably, participants in low creativity, high curiosity, high motivation groups reported that they motivated themselves to learn and encouraged themselves to be curious. They also reported that they are just as curious now as they were when they were younger. Maintaining these high levels of curiosity may prove essential to maintaining high levels of intrinsic motivation. This assertion is based on past research that reported a correlation between the two constructs, with those with high levels of curiosity also reporting high levels of intrinsic motivation (Arnone, Small, Chauncey, & McKenna; Kedge & Appleby, 2010; Wu & Choi, 2008; Yau, Kan, & Cheng, 2012).

Although this group scored low in creativity, they reported that they encouraged themselves to be creative. This encouragement may be reflective of the fact that this group agreed that people can learn to be more creative. The ability to enhance one's creativity was supported in a Nui and Lui (2009) study in which participants' levels of creativity were enhanced by simple instructions to "be creative".

Although these participants comprised the group that was considered high in academic intrinsic motivation, no members of this group indicated making themselves happy as the number one reason they were motivated to learn. This group was also the only one in the study in which a participant indicated "to avoid getting in trouble" as the first reason he or she was motivated to learn. This finding may seem surprising, but it can be explained by and attributed to many sources. Parenting styles that are more externally controlled, classrooms where there is

a social norm of reference that encourages competition among its members, and possessing performance framed goals can have an influence on these participants, as they may be concerned with being embarrassed or being viewed as incompetent (Ames & Archer, 1988; Bronstein, Ginsburg, & Herrera, 2005; Spinath & Spinath, 2005).

Low creativity-high curiosity-high reading or social studies motivation. Participants in the low creativity, high curiosity, and either high reading or high social studies groups described themselves as confident and serious. These highly curious groups reported that they were not only interested in learning if it was related to something in which they were already interested in. They also indicated that if they were not interested in something, they tried to make it fun. Based on previous research and SDT, it is quite possible that their desire to learn is reflective of their perceived competence, their quest to satisfy natural curiosities, and their desire to relate to the world (Deci & Ryan, 2008a).

As mentioned, previous research indicated strong correlations between curiosity and motivation (Arnone, Small, Chauncey, & McKenna, 2011; Wu & Choi, 2008; Yau, Kan, & Cheng, 2012). Therefore, it was not surprising that the groups with low creativity, high curiosity, and high motivation in particular subjects indicated that the subject also made them curious. In fact, those with high academic intrinsic motivation in social studies reported that social studies "really" made them curious. Likewise, the group with a high academic motivation in reading reported that reading "really" made them curious.

High creativity-low curiosity-low motivation groups. Of all the findings in the current study, those of the high creativity, low curiosity, low motivation groups offered the most interesting discussion. Individuals in these groups reported that they felt they can accomplish the things they set out to do, while they also reported low levels of general, reading, or math

academic intrinsic motivation. This correlation may seem puzzling and even counter to research in early studies such as Deci and Ryan (1985) who determined that an individual is highly intrinsically motivated when the task at hand is challenging but obtainable. While their research may seem to contradict the findings of the current study, it can also be used to support the findings, as the authors also indicated that if the task is not challenging enough, it is likely that it will be viewed as uninteresting and therefore not intrinsically motivating. In this sense, although the participants feel they are capable, they may not be motivated because the task does not make them curious. This connection between curiosity and motivation is well documented in past research (Gherasim, Butnaru, & Iacob, 2011).

The work of Barkoukis, Tsorbatzoudis, Grouius, and Sideridis (2008) also offered an explanation as to why feelings of competence do not equate to intrinsic motivation. They indicated that those people who are intrinsically motivated are focused on the process, rather than the product that results from an activity. In this sense, this highly creative group may have a low academic intrinsic motivation because they are not interested or curious about the things they are taught in school. It is important to note that the current study was focused on academic intrinsic motivation and not just intrinsic motivation. This statement serves as a clarifying point, as it explains research that indicated that there was an association between creativity and intrinsic motivation (Allam, 2008; Fasko, 2001; Kaufman & Beghetto, 2009). Although creative individuals are intrinsically motivated in self-selected tasks outside of school, they may just not be interested in the tasks presented to them in the school setting. In fact, participants in the present study supported that statement. All participants in the highly creative groups reported that they are better at things outside of school and that they do not get to learn about their

interests inside of school. What makes this finding even more powerful is that no low creativity, high curiosity, high motivation group made this indication.

The findings of the current study also bring to light the environment in which the participants learn. A Meyer and Turner (2006) study suggested that experiences that are consistent, positive, and emotional were conducive to student engagement in learning. Considering creative students may behave differently, and often less desirably than their non-creative counterparts, questions arise as to whether or not teachers are equipped with the skills required to meet the needs of highly creative students. The answer to this question may be no, considering there is an overwhelming amount of evidence that creative students and their behaviors are often times viewed negatively by teachers (Beghetto, 2006; Brandau et al., 2007; Freund & Holling, 2008; Kim, 2008).

Another finding of the current study that brings with it interesting discussion refers to the work of Amabile (as cited in Sternberg, 2006) which essentially stated that in order to be truly creative, individuals must be focused on the task itself, rather than the reward. Also, if one is required to give attention to a task he or she does not find particularly interesting, an individual will often attempt to find a way to make it appealing to him or her. This runs counter to the results of the present study, as those groups that included participants with high levels of creativity reported being motivated by rewards. Perhaps the fact that this particular group of highly creative individuals also happened to report low levels of curiosity and motivation plays a role in this discrepancy. The findings of the present study indicated that although the participants were considered highly creative, their academic intrinsic motivation scores fell in the low range. In their research, Deci and Ryan (2000) found that rewards and threats lessened creativity and decreased intrinsic motivation. The work of Amabile (as cited in Deci & Ryan,

2000) also indicated that evaluation and rewards were associated with a decline in creativity. In this sense, a cyclical pattern may be at work. It is possible that highly creative students are not interested in and, therefore, are not intrinsically motivated in tasks presented in schools. As a result, they may look to rewards as a source of motivation. These rewards, however, can then lessen their creativity, which in turn makes them feel less intrinsically motivated and engaged in school. In order to motivate themselves in some way, they turn to their creativity. However, because their creativity is often not supported in schools, the cycle may repeat.

There were no participants in any high creativity, low curiosity, and low motivation group who were motivated to learn in order to compare their present ability with their past ability. Being uninterested in this comparison can perhaps explain their low motivation levels as Spinath and Steinmay (2008) suggested that children who referred to their own past performance as a way of measuring their competence were more intrinsically motivated than those who compared their competence to that of others.

High creativity-low curiosity-low reading motivation. Fabris (2010) indicated that if learning experiences are to pique students' curiosity, they cannot follow a linear progression that is predetermined by the teacher. Instead, educators must integrate learning content with student interests in a more organic fashion. This assertion may be vital to understanding the high creativity, low curiosity, low reading motivation group. Unlike any other high creativity and low curiosity group, those with low levels of reading motivation reported that they were easily distracted. Perhaps this attribute contributed to their low reading motivation in that they felt they did not have the competence to complete tasks that were assigned to them. Although certainly not all individuals who are easily distracted are individuals who are diagnosed with ADHD, Brandau et al. (2007) posited that many facets of education include sequential analysis, planning,

and observation. The authors asserted that this type of learning environment is difficult for students with ADHD or those with ADHD-like symptoms because their behavior is more fluid and spatial. In a subject where concentration is fundamental to success, it is possible that certain characteristics of highly creative students and their style of thinking may negatively impact their ability and therefore, their motivation. What is very interesting about this group, however, is that they indicated that reading made them curious, which one might feel would affect motivation positively. However, this speaks to the idea of both curiosity and competence being necessary for motivation, as well as the idea that competence and motivation are not interchangeable. Both of these ideas are well-documented in past research (Gherasim, Butnaru, & Iacob, 2011; Kashdan & Steger, 2007; Spinath & Spinath, 2005).

High creativity-low curiosity-low mathematics motivation. Considering the high creativity, low curiosity, low mathematics motivation group scored low in curiosity, it is not surprising that they reported that they did not encourage themselves to be curious. Although low in curiosity, this group is considered highly creative. What is interesting is that participants reported that they did not encourage themselves to be creative. This, along with other findings, such as the fact that this highly creative group did not prefer the opportunity to draw a response to a question and, in fact, enjoys standardized tests, may seem contrary to how many view creative individuals. However, these assertions may reflect the participants' lack of relatedness to the task or others. Katz and Assor (2007) asserted that according to SDT, learning choices motivated individuals who felt competent and connected to the given task. However, the opportunity for choice was less motivating for individuals who did not feel competent or connected to the task. In this sense, it is possible that participants in the present study did not enjoy using their creativity to complete tasks that they did not choose or enjoy. Sternberg's

(2006) investment theory of creativity supports this assertion. The theory suggests that creativity is indeed a skill, but mostly a choice and, therefore, can be developed in individuals. Considering it is a choice, highly creative individuals do not necessarily need to act on their ability. Sternberg's theory, as well as the work of other researchers, explained that one reason individuals do not act upon their creativity is because the cost or negative reaction from peers may be too costly (Dhingra & Sharma, 2012). In this sense, it is possible that highly creative students do not embrace or choose to exercise their creativity.

This high creativity, low curiosity, low mathematics motivation group also reported that teacher perceptions regarding their ability and whether or not they liked their teacher made a difference as to how hard they tried and to whether or not they liked to learn. These statements are especially important to interpreting the findings, as research indicates that there is a negative correlation between teachers' favorite students and those students who are viewed as creative (Kim, 2008). Additionally, Freiberger, Steinmayr, and Spinath (2012) conducted a mathematics specific study in which they examined intrinsic motivation in relation to students' perceptions of what teachers thought about their ability. Participants indicated that their teachers' views drove their competency beliefs, which in turn, influenced their intrinsic motivation.

Research Question Four

The fourth and final research question was also answered using qualitative data analysis. Data were collected using the same online survey designed in Qualtrics that was used to answer the third research question. Twenty-three participants completed the survey designed to uncover factors or sources influencing creativity, curiosity, or academic intrinsic motivation that were consistent among each statistically significant group discovered during quantitative data analysis. Data from the online survey were entered into Nvivo 10 for analysis. Data were coded according

to common responses and subsequently grouped into nodes within the program. The researcher was then able to run matrix coding queries so that intersections between groups and their responses could be analyzed to pinpoint those that indicated similar sources or factors.

Data from the participants who were identified as fitting one of the following statistically significant patterns from phase one: (a) low creativity-high curiosity-high motivation, (b) high creativity-low curiosity-low motivation, (c) low creativity-high curiosity-high reading, (d) low creativity-high curiosity-high social studies, (e) high creativity-low curiosity-low mathematics, and (f) high creativity-low curiosity-low reading were used to answer this fourth research question:

- To what sources and/or factors do students attribute their levels of creativity, curiosity, and academic intrinsic motivation?

First, discussion of the findings that relate to the final research question will address all statistically significant groups. Findings will then be interpreted in relation to groups that involved high creativity, low curiosity, and low general or subject specific motivation. The researcher will then discuss the findings in relation to the opposite pattern or in relation to those groups with low creativity, high curiosity, and high general or subject specific motivation.

All statistically significant groups. There were quite a few factors or sources that were common among all groups. However, when examining these similarities, the fact that all groups had access to board games, computers, music, and video games at home appeared to have no real significance. All participants reported being interested in visiting national parks, having books at school, and having been to a book store. Again, these findings appear to have no real significance. All participants in the study reported going to and enjoying amusement parks and zoos. All groups also reported that they enjoyed playing sports with friends and that they had

access to sports equipment at home. These findings have a bit more significance simply because they indicated the activities that all participants both enjoyed and had access to. Later discussion of the differences in interests and access between groups will explain these findings in a more significant and meaningful way.

In addition to hobbies and interests, people are also sources in an individual's life that can have an influence on creativity, curiosity, or academic intrinsic motivation. All participants in the current study reported that they had parents and grandparents who encouraged creativity and curiosity, as well as the motivation to learn. All participants also reported that their siblings did not motivate them to learn. The influence of family members, with a focus on parents, has been well-represented in past research (Alivernini, Lucidi, & Manganelli, 2008; Chak, 2007; Bronstein, Ginsburg, & Herrera, 2005; Chak, 2007; Gonzalez-DeHass, Willems, & Holbein, 2005). The possible effects of different parenting styles will be discussed as they relate to each group in the following sections.

Low creativity-high curiosity-high motivation groups. Although all statistically significant groups indicated that parents and grandparents encouraged creativity, curiosity, and the motivation to learn, all groups did not score high in all three areas. It is quite possible that parenting style and the type of encouragement and motivation offered to the participants had a strong influence on motivation. This assertion is supported by a longitudinal study by Bronstein, Ginsburg, and Herrera (2005) who presented strong evidence to suggest that autonomy-supportive parenting style promoted intrinsic motivation.

Another explanation as to why these particular groups possess high levels of academic intrinsic motivation relates to the fact that these groups indicated that not only their parents, but also their teachers, encouraged them to learn. In a study of student interest conducted by

Szklarski (2011), participants indicated that the teacher was the most important factor that influenced their interest in learning. This finding is an indication of just how powerful of an influence the teacher is on a student's motivation to learn.

The high motivation, high curiosity, low creativity groups only differed from groups with opposite levels of the three constructs in that they reported enjoying and having access to more outdoor activities. Enjoying and visiting campgrounds and national parks, as well as playing team sports and exercising were indicated as common interests among this group.

Low creativity-high curiosity-high reading motivation. Chak (2007) surveyed parents and teachers to determine what they believed characterized curiosity. An interest in knowledge, personal qualities, and exploratory behaviors were common among both groups. It was reported, however, that although both parents and teachers value curiosity, teachers were viewed as more willing to encourage it due to their training. Interestingly, the low creativity, high curiosity, high reading group was the only one to report that their teachers encouraged curiosity. It would seem that this group had a very supportive learning environment, as there are many benefits to the presence of curiosity in the learning process. Research has indicated that teachers who show passion about learning are more effective at fostering curiosity which leads to a better sense of well-being, interpretation skills, and the development of mastery goals (Eren, 2009; Fabris, 2010; Ferguson & Sheldon, 2010; Kashdan & Steger, 2007; Tamdogon, 2006). Ames and Archer (1988) explained that creating mastery goals takes the focus away from grades and relative ability and allows the individual to focus on growth, improvement, and effort. The authors stressed the importance of this goal framing, as they indicated that it led to better involvement, attention, learning, belief in the importance of effort, and the selection of more challenging tasks.

Low creativity-high curiosity-high social studies motivation. The most interesting finding among any low creativity, high curiosity, high motivation group related to those with high levels of social studies motivation. Participants in this group reported that they had the opportunity to take their interests outside of school. Participants in this group who had a high level of academic intrinsic motivation in social studies were the only ones to indicate that they enjoyed or were interested in history museums and that they also have had the opportunity to visit one. Silverstein (2005) indicated this need for a transfer of extrinsic curiosity, or the kind of curiosity that is imposed by a school assignment, to intrinsic curiosity, or the kind of curiosity that applies to the student's own life. This self-initiated learning is especially important because it can play an important role in sparking a love for life-long learning.

High creativity-low curiosity-low motivation groups. As mentioned earlier, these groups of participants share sources and factors that were common among all groups. These commonalities included having parents that encouraged creativity, curiosity, and the motivation to learn. Although it cannot be positively determined from the type of data collected in the current study, research-based suggestions can be offered regarding the influence of parents on groups with low academic intrinsic motivation. One explanation refers to the work of Ginsburg and Herrera (2005) in which strong evidence was presented to suggest that a parenting style involving external control was more closely linked to extrinsic motivation. In the authors' longitudinal study, students of parents who used rewards, coercion, and pressure had students who were less intrinsically motivated two years later.

In addition to those factors and sources that are common among all statistically significant groups, participants in these groups reported that they had been to a library outside of

school and that they did not have access to sports equipment at school. However, these commonalities appear to have no real significance.

The most striking findings associated with the fourth research question involved the high creativity, low curiosity, low motivation groups. All low motivation groups reported enjoying listening to music but not having access to it at school. The lack of access to interests inside of school, the belief that they are better at things outside of school, and the feeling that they do not get to learn about their interests at school may be reflected in the low levels of motivation reported by this group. Through the lens of SDT, those with a sense of competence, autonomy, and relatedness to others would be the most intrinsically motivated individuals (Deci & Ryan, 2000). In the present study, it is quite possible that the needs of the groups with high creativity, low curiosity, and low motivation were simply not being met in school. Based on past studies, the researcher hypothesized that the participants' competence needs may not be met because they do not feel they are good at things in school. Their need for autonomy may be affected by their inability to access a defining interest (music) at school. Finally, their need for relatedness may be viewed as unattainable due to the fact that they reported not being able to learn about their interests in school. Simply put, when students view learning as irrelevant to their lives, there is often a decline in motivation (Sanacore, 2008).

High creativity-low curiosity-low reading motivation. Common sources and factors exclusive to the high creativity, low curiosity, low reading group, such as the interest in and experience of visiting an art museum, make it somewhat hard to resist stereotyping these participants as a highly creative group who is interested in and excels at the creative arts. However, as Kaufman and Beghetto (2009) explained, equating creativity with those who are famous or successful in their artistic pursuits can lead individuals to the wrong idea about

creativity. Instead, the researchers expressed the need for "little-c" and "mini-c" types of creativity, or those forms of creativity that involve thinking and problem solving which are integral components of the learning process. It is interesting to note that although this group reported enjoying art museums, they did not indicate that they enjoyed arts and crafts as a hobby. In addition to the experiences and factors mentioned, this group had similar access to materials and shared other common interests and experiences. However, there seems to be no real significance to the group's shared interest in animals and history museums. The experience of visiting a campground, the lack of video games at school, and the lack of sports equipment at home also seemed to be of no real significance.

High creativity-low curiosity-low mathematics motivation. Common sources or factors related to the high creativity, low curiosity, low mathematics motivation group that set it apart from others was that it was the only group that reported having friends who encouraged all three of the study's variables; creativity, curiosity, and the motivation to learn. Also, out of all of the groups with low motivation levels, this was the only one that indicated teachers as a source of learning motivation. With all of the sources of motivation and encouragement, it would not be surprising if this group reported high levels of creativity, curiosity, and motivation. However, this group only scored high in creativity. Interestingly, this high creativity, low curiosity, low mathematics motivation group was the only group to indicate that the subject of mathematics did not allow for creativity. This may be indicative of the strong role creativity plays in one's life. It is possible that the desire to think creatively and act upon creative thoughts overshadows all of the curiosity and learning motivation that is offered to them.

Summary of Findings

The major findings of this study focused on the correlation between curiosity and academic intrinsic motivation and its relationship to creativity. In groups where curiosity and general academic intrinsic motivation were high, creativity was low. The opposite relationship among the variables was also indicated in the findings. In groups where curiosity and general academic intrinsic motivation were low, creativity was high. These relationships indicated that participants' creativity levels were opposite their academic intrinsic motivation and curiosity levels.

For individual subjects, significant relationships were also indicated in the findings. Academic intrinsic motivation in reading followed the same patterns as general academic intrinsic motivation. There were significant relationships involving both high and low reading motivation. The same was not true for other subjects. Only the relationship involving low levels of mathematics motivation, low curiosity, and high creativity was considered significant. The opposite was true for social studies. Only the relationship involving high levels of social studies motivation, high curiosity, and low creativity was considered significant. These relationships indicated that participants' creativity levels were opposite their subject specific academic intrinsic motivation and curiosity levels.

There were certain characteristics that stood out among the significant general academic intrinsic motivation groups. The high creativity, low curiosity, low motivation group reported not being serious and being motivated by rewards. These participants felt that they did not get to learn about their interests in school. They also indicated that they felt they are better at things outside of school. For those with low creativity, high curiosity, and high motivation, a common characteristic was that they all described themselves as organized. Unlike the group reporting

opposite levels, this group encouraged themselves to be creative and curious, while they also indicated that they motivated themselves to learn.

There were also noteworthy findings related to the subject-specific academic intrinsic motivation groups. The group with high levels of motivation in social studies indicated that social studies "really" made them curious, while the group with high levels of motivation in reading was the only one to indicate that reading "really" made them curious. The highly creative group with low levels of curiosity and low motivation in mathematics was the only group to indicate that mathematics did not allow for creativity.

Some of the findings of this study may have been somewhat expected, while others may have been quite surprising. Expected or not, the findings of this study have major implications for students, educators, administrators, and policy makers. The following section will put forth these implications.

Implications of the Study

The current educational climate in the United States is undoubtedly focused on accountability. Although accountability is certainly necessary and beneficial, there exists the possibility that schools have dedicated too many resources and too much attention towards test preparation and the improvement of test-taking skills. This focus could be detrimental for many students, as the types of thinking that are necessary for excelling at standardized tests are not common among all students (Sternberg, 2003). In addition, these test scores serve as extrinsic rewards or goals for many students. This type of motivation is less powerful than intrinsic motivation, especially in regard to curiosity and creativity (Kaufman & Beghetto, 2009).

Many studies have indicated the positive influence that creativity, curiosity, and motivation can have on achievement (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003; Freund &

Holling, 2008; Schacter, Yeow Meng, & Zifkin, 2006). What is not usually investigated, however, is student motivation and desire to learn without a connection to standardized test scores. Unlike the ability to score well on a test, instilling behaviors that foster intrinsic motivation in students can have long-term effects and be beneficial to one's well-being (Kashdan & Steger, 2007; Leonard & Harvey, 2007).

The aim of the current study was to examine and describe the circumstances surrounding the relationship, if any, among student curiosity, creativity, and academic intrinsic motivation. This examination and description can be used to inform those involved in education in order to help redirect instructional practices so that all students benefit.

The study's most telling finding was that highly creative students possessed low levels of curiosity and academic intrinsic motivation. This relationship is problematic because it indicates that there may be a certain population of students that are not interested in or motivated by their current educational environment. Based on self-determination theory, previous research, and the results of this study, recommendations for educators, administrators, and policy makers are as follows:

Implications for educators

- Encourage a norm of reference that is more individual than social whenever possible. This type of reference provides all students with the opportunity to feel competent and motivated (Spinath & Spinath, 2005).
- Make learning as relevant to students' lives as possible. Findings in the current study indicated that those who were highly creative felt that they do not get to learn about their interests in school and that they are better at things outside of school. These findings are supported in the literature, as one often cited reason for the decline in student learning

motivation during adolescence is that students start to view school as irrelevant to their lives (Sanacore, 2008).

- Utilize teaching strategies and resources that promote competence and autonomy. One suggestion of such a resource is interactive technologies which can adapt to student ability and interest (Shroff, Vogel, & Coombes, 2008).
- Understand the important influence that educators have on students. In the present study, only groups that included highly motivated students indicated that their teachers encouraged them to learn. In past research, it was indicated that the teacher was the most important factor that influenced student interest in learning (Szklarski, 2011).
- Evaluate if the learning environment is structured to help meet the students' needs for competence, relatedness, and autonomy. This type of environment encourages growth and development (Deci & Ryan, 1985).
- Exercise the freedom to control certain aspects of teaching. Although it is beyond the teacher's control as to whether or not standardized tests are used as a way of measuring student and teacher success, teachers do have control over how content is taught and the atmosphere of their classrooms. Research has indicated that in an autonomy supportive environment, where autonomy supportive language was used, learning was deeper and persistence and performance were enhanced (Vansteenkiste, Lens, & Deci, 2006).
- Attempt to dispel the myth that standards and creativity cannot exist harmoniously. Kim (2008) indicated the one reason teachers did not provide creative opportunities in the classroom was the pressure they felt from trying to meet the standards associated with their disciplines. However, other researchers have indicated the benefits of embracing both creativity and standards. For example, Schacter, Yeow Meng, and Zifkin (2006)

found that standards can validate creativity while creativity can make teaching with accountability more interesting and meaningful to students.

- Begin, or continue, to listen to students. Results of the current study indicated that all participants felt that curiosity could be enhanced by others. By promoting curiosity, more students may develop an intrinsic motivation for school, as curiosity has been positively correlated with intrinsic motivation in past research (Gherasim, Butnaru, & Iacob, 2011; Kashdan & Steger, 2007; Spinath & Spinath, 2005).
- Teach in ways that promote curiosity. One way of promoting curiosity is to make students aware of what they do not know. This can be done by giving students just the right amount of information, as Litman, Hutchins, and Russon (2005) reported that exploratory behaviors and curiosity were at their highest when students had partial knowledge of the answer.
- Promote mastery over performance goals by encouraging students to recognize their personal growth. Findings in the current study indicated that no low motivation group stated that they were motivated to learn in order to compare their current ability to their past ability. This is worthy of addressing, as findings of previous research indicated that focusing on mastery goals led to better involvement, attention, learning, belief in the importance of effort, and the selection of more challenging tasks (Ames & Archer, 1988).
- When possible, use different types of assessment. Findings of the current study indicated that only one group enjoyed standardized tests. Although standardized tests may be mandated, portfolio assessment can also be used within the classroom. This is one way that students can compare their performance with their own past performance. This comparison is important, as research has indicated that those who refer to their own past

performance as a way of measuring their competence are more intrinsically motivated than those who compare their competence to that of others (Spinath & Steinmay, 2008).

Implications for administrators

- Lead a culture of inquiry and curiosity. Administrators have the power to influence the culture of an organization. When administrators empower teachers and provide them with a positive environment, students usually reap the benefits. Patrick, Turner, Meyer, and Midgley (2003) indicated that when a teacher exhibited intrinsic motivation and positive emotions, students generally reported positive emotions and being motivated to learn.
- Provide professional development regarding creative behaviors and the needs of creative students. In the present study, there were highly creative participants who reported that teacher perceptions of their ability and their feelings about their teacher affected their motivation. Previous research has indicated that teachers often view creative students and their behaviors unfavorably (Freund and Holling, 2008; Kim, 2008). Therefore, it is important to provide teachers with information and strategies that will facilitate more positive student-teacher relationships.
- Relieve teachers of external pressures that may be unnecessary. Although top down mandates will always play a role in education, administrators have the power to eliminate any directive that may be unnecessary. Alleviating these pressures can have a positive influence on students, as Leroy, Bressoux, Sarrazin, and Trouilloud (2007) reported that when teachers felt external pressures or had a low self-efficacy, the opportunity for intrinsic motivation was lower and the environment was viewed as more controlling.

- Administrators should encourage teachers to have a passion for learning. Fabris (2010) indicated that teachers who do not show passion for learning may be ineffective at fostering curiosity in their students. Administrators can help ignite teachers' passion for learning by role modeling such behaviors, challenging their staff, and providing them with resources and opportunities to form professional learning communities.
- Implement a school wide program that promotes mastery goals. Performance goals are usually facilitated by grades, relative ability, and performance (Ames & Archer, 1988). It is comparisons of this nature that naturally accompany test scores. Therefore, to give students an opportunity to be recognized for success related more to effort than scores, a school wide program focused on mastery goals would be beneficial for student motivation.

Implications for policy makers

- Work collaboratively with other states' departments of education. Considering success in school is often times gauged by scores on standardized achievement tests, students who do not score well are often labeled as underperforming. Policy makers should investigate how others have addressed this issue in order to make more informed decisions. For instance, Kim (2008) indicated that when schools in the state of Georgia used additional measures beyond IQ tests, such as creativity tests, more minority, at-risk, and disadvantaged youth were placed in programs for the gifted.
- Examine the possibility that embracing, instead of dismissing, creativity could help close the achievement gap. Sternberg (2006) indicated that groups in a study that were highly creative and highly practical were diverse in terms of race, ethnicity, socioeconomic status, and education. Conversely, groups that were highly analytical were not as diverse.

This may indicate that the current educational system favors more homogeneous populations of learners.

- Educate policy makers about creativity. Creativity is a complex notion that is defined in many ways (Kampylis & Valtanen, 2010). Cullingford (2007) stated that it is because of this difficulty that many policy makers have dismissed creativity, viewing it as unnecessary, weak, or a frill. Informing policy makers about the types of creativity that are associated with the learning process will help clarify the difference between artistic creativity and everyday creativity (Kaufman & Beghetto, 2009).
- Maintain programs that speak to student interests. Sanacore (2008) indicated that the decline in motivation in the middle grades is a result of the increase in academic requirements, the belief that learning is irrelevant to their lives, the desire to fit in with peers, and a way of rebelling against parents. It is logical, then, to maintain programs that speak to students' interests instead of eliminating them. An example in the findings from the current study was that all low academic intrinsic motivation, low curiosity, high creativity groups indicated that they enjoyed listening to music, while these same groups indicated that they did not have access to music at school. In this sense, it would seem that the elimination of music programs would be very detrimental for these students.

Limitations of the Study

As initially stated, researcher bias was a limitation to this study, as the researcher subscribed to the belief that creativity and creative opportunities were important for engaging students in learning. The researcher attempted to minimize any bias by citing relevant literature and adhering to the standardized test directions that were supplied with the testing materials.

Although data collection did not take place in the specific school in which the researcher was a teacher, this study was conducted in the school district in which the researcher was employed. Initially, this was viewed as a limitation because of the chance that participants would refuse to take part in the study because of their familiarity with the researcher. Assuring and maintaining confidentiality was viewed as a way to address this limitation. However, the real implication of this limitation was that participant misbehavior that occurred while study instruments were being completed may have been a result of the participants' familiarity with the researcher.

Originally, it was thought that the small sample size would make it difficult to generalize the findings to a larger population. This limitation held true and was in fact magnified by the extremely small numbers that comprised each of the groups in the qualitative pieces of this study. As a result, there were many categories in which one participant's disagreement led to the source or attribute being disregarded as a common one among the group.

A final limitation of the study was the problematic phrasing of the fourth research question. As it is worded, one would assume that students would directly attribute certain sources and/or factors to their levels of creativity, curiosity, and academic intrinsic motivation. However, the research instrument used to collect this information only indicated which factors or sources were present in their lives. It is important to note that although sources may be present, it cannot be assumed that they necessarily influenced creativity, curiosity, or academic intrinsic motivation. Rewording the research question or designing an open ended survey would have helped avoid this limitation.

Recommendations for Future Research

The current study was designed to explore creativity, curiosity, and academic intrinsic motivation as it related to sixth grade students. Studying such complex variables with a specific population allowed for many opportunities to expand, replicate, or address the limitations of the current study. Based on the study's findings and limitations, as well as related literature, the researcher makes the following recommendations for future research:

- Replicate the study with the addition of an open ended survey or interview to more authentically collect data that relates to factors that influence student creativity, curiosity, and academic intrinsic motivation.
- Replicate the study with a population from an urban area and compare the results with the results of this study.
- Examine parenting style to determine the effect it may have on creativity, curiosity, and academic intrinsic motivation.
- Examine the nature of the different subjects to determine if there are certain characteristics related to each subject that leads students to be more or less creative, curious, or motivated.
- Design a case study focusing on a subject that fits one of the statistically significant patterns that resulted from the current study.
- Explore the participants' IQ scores and scores on common assessments to determine if any relationship exists among the scores and the students' creativity, curiosity, and academic intrinsic levels.
- Replicate the current study with at least 200 participants, which would double the number of participants in this study and result in more generalizable results.

- Replicate the study with a different age group to determine whether or not human development and age influence the findings.
- Specifically explore curiosity as a feeling of interest (CFI) and curiosity as a feeling of deprivation (CFD) to determine the differing effects the two types of curiosity have on learning motivation.
- Conduct the study again with the same participants when they are in a high school setting to see if their responses change when they are in a different setting.
- Replicate the quantitative portion of the study. However, for the qualitative piece, design a study that will focus solely on the participants' teachers and characteristics of the classrooms in which they learn.

Conclusion

This mixed methods research study explored student creativity, curiosity, and academic intrinsic motivation. The specific goals of the study were to determine if there were any significant relationships among different levels of each of the constructs and, if so, to describe the characteristics and factors that were common among each of the groups. Academic intrinsic motivation was studied in general, as well as according to the individual subjects of reading, mathematics, social studies, and science. The theoretical framework that guided this study explained that humans have a natural tendency towards growth and development that is facilitated by meeting the need for autonomy, competence, and relatedness. Correlations between curiosity and academic intrinsic motivation, as well as between creativity and motivation, have been indicated in the literature. However, there was a lack of research that addressed creativity, curiosity, and academic intrinsic motivation simultaneously. According to the 23 participants who ultimately formed the sample for this study, those with low levels of

creativity scored high in curiosity and academic intrinsic motivation, while those with high levels of creativity scored low in curiosity and academic intrinsic motivation. This opposite relationship demanded a closer look at the characteristics of and factors surrounding the participants who made up the two contrasting groups. It was determined that the group of students with low levels of creativity is undoubtedly favored and rewarded in the current educational system. In a time when high-stakes, standardized tests are used to gauge and recognize achievement, those less creative, or formal thinkers, benefit from their style of thinking which includes viewing contradictions as problems in an attempt to arrive at one single, logical answer (Wu & Choi, 2008).

The findings of the current study and a review of the literature indicated that there are populations of students who are being ignored, alienated, and viewed as problems because their ways of thinking and behaviors conflict with the nature and methods of instruction and assessment that are currently used in schools. Teachers feel pressure to teach to the tests that are used to evaluate not only whether or not their students are low or high achieving, but also whether or not they are effective teachers. There is a strong possibility, however, that policy makers, administrators, and the public are measuring quality and success using misguided goals. In twenty years, the participants in this study will begin their third decade of life. Many will be parents, most will have joined the workforce, and some will serve as the leaders of society. This reality almost begs one to ask, "What skills should we equip young people with today that will be necessary for the success of children, businesses, and government twenty years from now?" A system of accountability is no doubt necessary, but what is the system accounting for?

A more important question and one that can be addressed today is, "Are the needs of today's students being met by the current educational system?" The reality is that while teachers

may not be successful in the quest to have all students achieve 100% on a standardized test, educators can be successful at promoting competence, relatedness, and autonomy. Meeting these needs now can lead to a generation of individuals who have a good sense of well-being, an interest in the world around them, and the ability to solve problems. A society in which individuals feel a sense of autonomy, competency, and relatedness has a greater chance of being a harmonious one.

References

Akos, P., Hamm, J., Mack, S., & Dunaway, M. (2007). Utilizing the developmental influence of peers in middle school groups. *Journal for Specialists in Group Work*, *32*(1), 51-60.

Alivernini, F., Lucidi, F., & Manganelli, S. (2008). Assessment of academic motivation: A mixed methods study. *International Journal of Multiple Research Approaches*, *2*(1), 71-82.

Allam, C. (2008). Creative activity and its impact on student learning- Issues of implementation. *Innovations in Education & Teaching International*, *45*(3), 281-288. doi:10.1080/ 14703290802176196

Amabile, T. M. (1982). Social psychology of creativity: A consensual assessment technique. *Journal of Personality & Social Psychology*, *43*(5), 997-1013.

Ames, C., & Archer, J. (1988). Achievement goals in the classroom: Students' learning strategies and motivation processes. *Journal of Educational Psychology*, *80*, 260-267.

Anderman, L. H. (2004). Student motivation across subject-area domains. *Journal of Educational Research*, *97*(6), 283-285.

Armstrong, T. (2006). *Best schools: How human development research should inform educational practice.* Alexandria, VA: Association for Supervision & Curriculum Development.

Arnone, M. P., Small, R. V., Chauncey, S. A., & McKenna, H. (2011). Curiosity, interest and engagement in technology-pervasive learning environments: A new research agenda. *Educational Technology Research & Development*, *59*(2), 181-198. doi:10.1007/s11423-011-9190-9

Association for the Study of Higher Education. (2007). What matters to student engagement in

research and creative activities. *ASHE Higher Education Report, 33*(4), 45-55.

Barkoukis, V., Tsorbatzoudis, H., Grouios, G., & Sideridis, G. (2008). The assessment of intrinsic and extrinsic motivation and amotivation: Validity and reliability of the Greek version of the Academic Motivation Scale. *Assessment in Education: Principles, Policy & Practice, 15*(1), 39-55. doi:10.1080/09695940701876128

Barnwell, P. (2009). Fostering positive behavior in middle school classrooms. *Principal Leadership, 9*(9), 32-34.

Beghetto, R. (2006). Creative justice? The relationship between prospective teachers' prior schooling experiences and perceived importance of promoting student creativity. *Journal of Creative Behavior, 40*(3), 149-162.

Beghetto, R. (2007). Ideational code-switching: Walking the talk about supporting student creativity in the classroom. *Roeper Review, 29*(4), 265-270.

Berlyne, D. (1954). A theory of human curiosity. *British Journal of Psychology, 45*(3), 180-191.

Berlyne, D. E. (1966). Curiosity and exploration. *Science, 153,* 25-33.

Borowske, K. (2005, April). *Curiosity and motivation-to-learn*. Paper presented at the ACRL 12th National Conference, Minneapolis, MN. Retrieved from http://www.ala.org /ala/ acrl/ acrlevents/ borowske05.pdf

Bouffard, T., Marcoux, M., Vezeau, C., & Bordeleau, L. (2003). Changes in self-perceptions of competence and intrinsic motivation among elementary schoolchildren. *British Journal of Educational Psychology, 73*(2), 171-186.

Brandau, H., Daghofer, F., Hollerer, L., Kaschnitz, W., Kellner, K., Kirchmair, G., & Schlagbauer, A. (2007). The relationship between creativity, teacher ratings on

behavior, age, and gender in pupils from seven to ten years. *Journal of Creative Behavior, 41*(2), 91-113.

Bronstein, P., Ginsburg, G. S., & Herrera, I. S. (2005). Parental predictors of motivational orientation in early adolescence: A longitudinal study. *Journal of Youth and Adolescence, 34*(6), 559-575.

Brophy, J. (2008). Developing students' appreciation for what is taught in school. *Educational Psychologist, 43*(3), 132-141. doi:10.1080/00461520701756511

Burke-Adams, A. (2007). The benefits of equalizing standards and creativity: Discovering a balance in instruction. *Gifted Child Today, 30*(1), 58-63.

Carney, J. V., Jacob, C. J., & Hazler, R. J. (2011). Exposure to school bullying and the social capital of sixth grade students. *Journal of Humanistic Counseling, 50*(2), 238-253.

Catterall, J., & Peppler, K. (2007). Learning in the visual arts and the worldviews of young children. *Cambridge Journal of Education, 37*(4), 543-560. doi:10.1080/ 03057640701705898.

Cauley, K. M., & Jovanovich, D. (2006). Developing an effective transition program for students entering middle school or high school. *Clearing House: A Journal of Educational Strategies, Issues and Ideas, 80*(1), 15-25.

Čavojová, V., & Sollár, T. (2007). The curiosity and exploration inventory: Structure and reliability. *Studia Psychologica, 49*(1), 89-100.

Chak, A. (2007). Teachers' and parents' conceptions of children's curiosity and exploration. *International Journal of Early Years Education, 15*(2), 141-159. doi:10.1080/ 09669760701288690

Chase, C. I. (1985). [Review of the test Torrance Tests of Creative Thinking]. *The ninth*

mental measurements yearbook.

Cheng, C., Himsel, A., Kasof, J., Greenberger, E., & Dmitrieva, J. (2006). Boundless creativity: Evidence for the domain generality of individual differences in creativity. *Journal of Creative Behavior, 40*(3), 179-199.

Claxton, A. F., Pannells, T. C., & Rhoads, P. A. (2005). Developmental trends in the creativity of school-age children. *Creativity Research Journal, 17*(4), 327-335. doi:10.1207/s15326934crj1704_4

Colaizzi, P. F. (1978). Psychological research as the phenomenologist views it. In R.Valle & M. King (Eds.), *Existential-phenomenological alternatives for psychology* (pp. 48-71). New York, NY: Oxford University Press.

Coyl, D. D. (2009). Kids really are different these days. *Phi Delta Kappan, 90*(6), 404-407.

Cripps, K., & Zyromski, B. (2009). Adolescents' psychological well-being and perceived parental involvement: Implications for parental involvement in middle schools. *RMLE Online: Research in Middle Level Education, 33*(4), 1-13.

Cropley, A. J. (2001). *Creativity in education & learning: A guide for teachers and educators*. London, UK: Kogan Page.

Csikszentmihalyi, M. (1975). *Beyond freedom and anxiety*. San Francisco, CA: Jossey-Bass.

Csikszentmihalyi, M. (1990). *Flow.* New York, NY: Harper & Row.

Cullingford, C. (2007). Creativity and pupils' experience of school. *Education 3-13, 35*(2), 133-142.

Day, H. I. (1969, February). *A progress report on the development of a test of curiosity*. Paper presented at the meeting of the National Seminar on Adult Education Research, Toronto, Canada.

Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology, 18*(1), 105–115.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York, NY: Plenum.

Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227.

Deci, E. L., & Ryan, R. M. (2008a). Facilitating optimal motivation and psychological well being across life's domains. *Canadian Psychology, 49*(1), 14-23.

Deci, E. L., & Ryan, R. M. (2008b). Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology, 49*(3), 182-185. doi:10.1037/a0012801

De Souza Fleith, D. (2000). Teacher and student perceptions of creativity in the classroom environment. *Roeper Review, 22*(3), 148-153.

Dhingra, R., & Sharma, N. (2012). Assessment of divergent thinking ability of school children (6 - 9 years). *International Journal of Academic Research, 4*(2), 155-162.

Dove, M., Pearson, L., & Hooper, H. (2010). Relationship between grade span configuration and academic achievement. *Journal of Advanced Academics, 21*(2), 272-298.

Eckhoff, A., & Urbach, J. (2008). Understanding imaginative thinking during childhood: Sociocultural conceptions of creativity and imaginative thought. *Early Childhood Education Journal, 36*(2), 179-185. doi:10.1007/s10643-008-0261-4

Epstein, R., Schmidt, S. M., & Warfel, R. (2008). Measuring and training creativity competencies: Validation of a new test. *Creativity Research Journal, 20*(1), 7-12. doi:10.1080/10400410701839876

Erdogan, T., Akkaya, R., & Akkaya, S. (2009). The effect of the Van Hiele model based instruction on the creative thinking levels of 6th grade primary school students. *Educational Sciences: Theory and Practice*, *9*(1), 181-194.

Eren, A. (2009). Examining the relationship between epistemic curiosity and achievement goals. *Eurasian Journal of Educational Research*, *36*, 129-144.

Fabris, N. J. (2010). Curiosity in contemporary American education. *Encounter, 23*(2), 1-4.

Fasko, D. (2001). Education and creativity. *Creativity Research Journal*, *13*(3/4), 317-327.

Ferguson, Y. L., & Sheldon, K. M. (2010). Should goal-strivers think about "why" or "how" to strive? It depends on their skill level. *Motivation & Emotion*, *34*(3), 253-265. doi:10.1007/s11031-010-9174-9

Finnan, C. (2010). A focus on upper elementary teacher preparation: Developmentally appropriate practice and standards shaping our programs. *SRATE Journal*, *19*(1), 7-14.

Freiberger, V., Steinmayr, R., & Spinath, B. (2012). Competence beliefs and perceived ability evaluations: How do they contribute to intrinsic motivation and achievement? *Learning and Individual Differences*, *22*(4), 518-522.

Freund, P., & Holling, H. (2008). Creativity in the classroom: A multilevel analysis investigating the impact of creativity and reasoning ability on GPA. *Creativity Research Journal*, *20*(3), 309-318. doi:10.1080/10400410802278776

Froiland, J. (2011). Parental autonomy support and student learning goals: A preliminary examination of an intrinsic motivation intervention. *Child & Youth Care Forum*, *40*(2), 135-149.

Gay, L. R., Mills, G. E., & Airasian, P. (2009). Educational research: Competencies for analysis and application (9th ed.). New York, NY: Merrill-Prentice Hall.

Gherasim, L., Butnaru, S., & Iacob, L. (2011). The motivation, learning environment and school achievement. *International Journal of Learning, 17*(12), 353-364.

Giorgi, A. (1997). The theory, practice, and evaluation of the phenomenological method as a qualitative research procedure. *Journal of Phenomenological Psychology, 28*(2), 235-261.

Glück, J., Ernst, R., & Unger, F. (2002). How creatives define creativity: Definitions reflect different types of creativity. *Creativity Research Journal*, *14*(1), 55-67.

Gonzalez-DeHass, A. R., Willems, P. P., & Holbein, M. (2005). Examining the relationship between parental involvement and student motivation. *Educational Psychology Review, 17*(2), 99-123.

Gottfried, A. E. (1985). Academic intrinsic motivation in elementary and junior high school students. *Journal of Educational Psychology, 77*(6), 631-645. doi:10.1037/0022-0663.77.6.631

Grant, H., & Dweck, C. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*(3), 541-553.

Green, M., & Piel, J. (2009). *Theories of human development: A comparative approach* (2nd ed.). Boston, MA: Allyn & Bacon.

Guay, F., Chanal, J., Ratelle, C. F., Marsh, H. W., Larose, S., & Moivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology*, *80*(4), 711-735. doi:10.1348/000709910X499084

Guilford, J. (1950). Creativity. *American Psychologist, 5*, 444-454.

Guilford, J. P. (1964). Creative thinking and problem solving. *Education Digest*, *29*, 29-31.

Hayes, D. (2007). What Einstein can teach us about education. *Education*, *35*(2), 143-154. doi:10.1080/03004270701311986

Hennessey, B. A. (2000). Self-determination theory and the social psychology of creativity. *Psychological Inquiry*, *11*(4), 293-298.

Horng, J., Hong, J., ChanLin, L., Chang, S., & Chu, H. (2005). Creative teachers and creative teaching strategies. *International Journal of Consumer Studies, 29*(4), 352-358. doi:10.1111/j.1470-6431.2005.00445.x

Hu, W., & Adey, P. (2002). A scientific creativity test for secondary school students. *International Journal of Science Education, 24*(4), 389-403. doi:10.1080/ 09500690110098912

Ivcevic, Z. (2007). Artistic and everyday creativity: An act-frequency approach. *Journal of Creative Behavior, 41*(4), 271-290.

Jacobson, L. A., Williford, A. P., & Pianta, R. C. (2011). The role of executive function in children's competent adjustment to middle school. *Child Neuropsychology, 17*(3), 255-280. doi:10.1080/09297049.2010.535654

Jaquith, D. B. (2011). When is creativity? Intrinsic motivation and autonomy in children's artmaking. *Art Education, 64*(1), 14-19.

Jin Wook, C., Huang, D., & Jin Nam, C. (2012). Is task autonomy beneficial for creativity? Prior task experience and self-control as boundary conditions. *Social Behavior & Personality: An International Journal, 40*(5), 705-724.

Kagan, J. (1972). Motives and development. *Journal of Personality & Social Psychology, 22*(1), 51-66.

Kampylis, P. G., & Valtanen, J. (2010). Redefining creativity-Analyzing definitions, collocations, and consequences. *Journal of Creative Behavior, 44*(3), 191-214.

Kashdan, T. B., Gallagher, M. W., Silvia, P. J., Winterstein, B. P., Breen, W. E., Terhar, D., & Steger, M. F. (2009). The curiosity and exploration inventory-II: Development, factor structure, and psychometrics. *Journal of Research in Personality*, *43*(6), 987-998. doi:10.1016/j.jrp.2009.04.011

Kashdan, T. B., Rose, P., & Fincham, F. D. (2004). Curiosity and exploration: Facilitating positive subjective experiences and personal growth opportunities. *Journal of Personality Assessment, 82*(3), 291-305.

Kashdan, T. B., & Steger, M. F. (2007). Curiosity and pathways to well-being and meaning in life: Traits, states, and everyday behaviors. *Motivation & Emotion, 31*(3), 159-173. doi:10.1007/s11031-007-9068-7

Kashdan, T., & Yuen, M. (2007). Whether highly curious students thrive academically depends on perceptions about the school learning environment: A study of Hong Kong adolescents. *Motivation & Emotion*, *31*(4), 260-270. doi:10.1007/s11031-007-9074-9

Katz, I., & Assor, A. (2007). When choice motivates and when it does not. *Educational Psychology Review, 19*(4), 429-442. doi:10.1007/s10648-006-9027-y

Kaufman, J., & Beghetto, R. (2009). Beyond big and little: The four c model of creativity. *Review of General Psychology, 13*(1), 1-12. doi:10.1037/a0013688

Kedge, S., & Appleby, B. (2010). Promoting curiosity through the enhancement of competence. *British Journal of Nursing*, *19*(9), 584-587.

Kim, K. (2005). Can only intelligent people be creative? *Journal of Secondary Gifted Education*, *16*(2/3), 57-66.

Kim, K. (2008). Underachievement and creativity: Are gifted underachievers highly creative? *Creativity Research Journal, 20*(2), 234-242. doi:10.1080/10400410802060232

Leahy, W., & Sweller, J. (2008). The imagination effect increases with an increased intrinsic cognitive load. *Applied Cognitive Psychology, 22*(2), 273-283. doi:10.1002/acp.1373

Leonard, N. H., & Harvey, M. (2007). The trait of curiosity as a predictor of emotional intelligence. *Journal of Applied Social Psychology, 37*(8), 1914-1929. doi:10.1111/ j.1559-1816.2007.00243.x

Leroy, N., Bressoux, P., Sarrazin, P., & Trouilloud, D. (2007). Impact of teachers' implicit theories and perceived pressures on the establishment of an autonomy supportive climate. *European Journal of Psychology of Education, 22*(4), 529-545.

Litman, J. A. (2005). Curiosity and the pleasures of learning: Wanting and liking new information. *Cognition & Emotion, 19*(6), 793-814. doi:10.1080/02699930541000101

Litman, J. A. (2008). Interest and deprivation factors of epistemic curiosity. *Personality & Individual Differences, 44*(7), 1585-1595. doi:10.1016/j.paid.2008.01.014

Litman, J. A., Hutchins, T. L., & Russon, R. K. (2005). Epistemic curiosity, feeling-of-knowing, and exploratory behaviour. *Cognition & Emotion, 19*(4), 559-582. doi:10.1080/ 02699930441000427

Litman, J. A., & Jimerson, T. (2004). The measurement of curiosity as a feeling of deprivation. *Journal of Personality Assessment, 82*(2), 147-157.

Litman, J. A., & Silvia, P. J. (2006). The latent structure of trait curiosity: Evidence for interest and deprivation curiosity dimensions. *Journal of Personality Assessment, 86*(3), 318-328.

Litman, J. A., & Spielberger, C. D. (2003). Measuring epistemic curiosity and its diversive and specific components. *Journal of Personality Assessment, 80*(1), 75-86.

Liu, L. (2007). The relationships between creativity, drawing ability, and visual/spatial intelligence: A study of Taiwan's third-grade children. *Asia Pacific Education Review, 8*(3), 343-352.

Loewenstein, G. (1994). The psychology of curiosity: A review and reinterpretation. *Psychological Bulletin, 116*(1), 75-98. doi:10.1037/0033-2909.116.1.75

Makel, M. (2009). Help us creativity researchers, you're our only hope. *Psychology of Aesthetics, Creativity, and the Arts, 3*(1), 38-42. doi:10.1037/a0014919

Meyer, D. K., & Turner, J. C. (2006). Re-conceptualizing emotion and motivation to learn in classroom contexts. *Educational Psychology Review, 18*(4), 377-390.

Min Jeong, K., Ming, H., Krajbich, I. M., Loewenstein, G., McClure, S. M., Wang, J., & Camerer, C. F. (2009). The wick in the candle of learning: Epistemic curiosity activates reward circuitry and enhances memory. *Psychological Science, 20*(8), 963-973.

Mumford, M. D., & Gustafson, S. B. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin, 103*(1), 27-43.

Newmann, F. M. (Ed.). (1992). *Student engagement and achievement in American secondary schools*. New York, NY: Teachers College Press.

Nicholson, D., & Ayers, H. (2004). *Adolescent problems: A practical guide for parents, teachers and counselors* (2nd ed.). London: David Fulton.

Niu, W., & Liu, D. (2009). Enhancing creativity: A comparison between effects of an indicative instruction “to be creative” and a more elaborate heuristic instruction on Chinese student creativity. *Psychology of Aesthetics, Creativity, and the Arts, 3*(2), 93-98. doi:10.1037/a0013660.

Niu, W., & Sternberg, R. (2001). Cultural influences on artistic creativity and its evaluation.

International Journal of Psychology, *36*(4), 225-241.

Ohtani, K., & Nakaya, M. (2011). Academic contingency of self-worth and intrinsic motivation in academic failure: Undermining and enhancing processes for intrinsic motivation and the mediating role of state self-esteem and emotions. *Japanese Journal of Personality*, *19*(3), 206-216.

Opdal, P. (2001). Curiosity, wonder and education seen as perspective development. *Studies in Philosophy & Education*, *20*(4), 331-344.

Oreck, B. (2006). Artistic choices: A study of teachers who use the arts in the classroom. *International Journal of Education & the Arts*, *7*(8), 1-27.

Palaniappan, A. (2008). Influence of intelligence on the relationship between creativity and academic achievement: A comparative study. *International Journal of Learning*, *15*(7), 267-277.

Patrick, J., Turner, J. C., Meyer, D. K., & Midgley, C. (2003). How teachers establish psychological environments during the first days of school: Associations with avoidance in mathematics. *Teachers College Record*, *105*(8), 1521–1558.

Posey, C. D. (1989). [Review of the test Children's Academic Intrinsic Motivation Inventory]. *The tenth mental measurements yearbook.*

Proctor, R., & Burnett, P. (2004). Measuring cognitive and dispositional characteristics of creativity in elementary students. *Creativity Research Journal*, *16*(4), 421-429. doi:10.1207/s15326934crj1604_5

Rathunde, K., & Csikszentmihalyi, M. (2005). Middle school students' motivation and quality of experience: A comparison of Montessori and traditional school environments. *American Journal of Education*, *111*(3), 341.

Reio, T. G., Jr. (2009). Where does the curiosity go? *New Horizons in Adult Education and Human Resource Development, 23*(2), 3-5.

Reio, T. G., Jr., Petrosko, J. M., Wiswell, A. K., & Thongsukmag, J. (2006). The measurement and conceptualization of curiosity. *Journal of Genetic Psychology*, *167*(2), 117-135.

Renner, B. (2006). Curiosity about people: The development of a social curiosity measure in adults. *Journal of Personality Assessment, 87*(3), 305-316.

Rostan, S., Pariser, D., & Gruber, H. (2002). A cross-cultural study of the development of artistic talent, creativity and giftedness. *High Ability Studies, 13*(2), 125-155. doi:10.1080/ 1359813022000048789

Runco, M. A. (2004). Creativity. *Annual Review of Psychology, 55*(1), 657-687. doi:10.1146/annurev.psych.55.090902.141502

Runco, M. A. (2007). A hierarchical framework for the study of creativity. *New Horizons in Education*, *55*(3), 1-9.

Runco, M. A. (2008). Creativity and education. *New Horizons in Education*, *56*(1), 1-8.

Ryan, R. L. (2006). Self-regulation and the problem of human autonomy: Does psychology need choice, self-determination, and will? *Journal of Personality, 74*(6), 1557-1586.

Ryan, R. M., & Deci, E. L. (2008). A self-determination theory approach to psychotherapy: The motivational basis for effective change. *Canadian Psychology, 49*(3), 186-193. doi:10.1037/a0012753

Sanacore, J. (2008). Turning reluctant learners into inspired learners. *Clearing House: A Journal of Educational Strategies, Issues and Ideas*, *82*(1), 40-44.

Sarsani, M. (2008). Do high and low creative children differ in their cognition and motivation? *Creativity Research Journal, 20*(2), 155-170. doi:10.1080/10400410802059861

Scales, P. C. (2005). Developmental assets and the middle school counselor. *Professional School Counseling, 9*(2), 104-111.

Schacter, J., Yeow Meng, T., & Zifkin, D. (2006). How much does creative teaching enhance elementary school students' achievement? *Journal of Creative Behavior, 40*(1), 47-72.

Schmitt, F. F., & Lahroodi, R. (2008). The epistemic value of curiosity. *Educational Theory, 58*(2), 125-148. doi:10.1111/j.1741-5446.2008.00281.x

Schunk, D. (2008). *Learning theories: An educational perspective* (5th ed.). Upper Saddle, NJ: Pearson.

Shroff, R. H., Vogel, D. R., & Coombes, J. (2008). Assessing individual-level factors supporting student intrinsic motivation in online discussions: A qualitative study. *Journal of Information Systems Education, 19*(1), 111-125.

Silverstein, J. (2005). Just curious: Children's use of digital reference for unimposed queries and its importance in informal education. *Library Trends, 54*(2), 228-244.

Silvia, P. J. (2008). Interest—The curious emotion. *Current Directions in Psychological Science, 17*(1), 57-60. doi:10.1111/j.1467-8721.2008.00548.x

Simplico, J. (2000). Teaching classroom educators how to be more effective and creative. *Education, 120*(4), 675-630.

Spinath, B., & Steinmayr, R. (2008). Longitudinal analysis of intrinsic motivation and competence beliefs: Is there a relation over time? *Child Development, 79*(5), 1555-1569.

Spinath, B. B., & Spinath, F. M. (2005). Longitudinal analysis of the link between learning motivation and competence beliefs among elementary school children. *Learning and Instruction, 15*(2), 87-102.

Steinberg, L. (2005). *Adolescence*. New York, NY: McGraw Hill.

Sternberg, R. J. (2003). Creative thinking in the classroom. *Scandinavian Journal of Educational Research, 47*(3), 325–338.

Sternberg, R. J. (2006). The nature of creativity. *Creativity Research Journal, 18*(1), 87-98. doi:10.1207/s15326934crj1801_10

Sternberg, R. J., & Lubart, T. I. (1999). The concept of creativity: Prospects and paradigms. In R. J. Sternberg (Ed.), *Handbook of creativity* (pp. 3-15). Cambridge, England: Cambridge University Press.

Sternberg, R. J., O'Hara, L. A., & Lubart, T. I. (1997). Creativity as investment. *California Management Review, 40*(1), 8-21.

Szklarski, A. (2011). Pupils' experience of being motivated to learn in school: An empirical phenomenological study. *Teaching Science -The Journal of the Australian Science Teachers Association, 57*(1), 43-48.

Tamdogon, O. (2006). Creativity in education: Clearness in perception, vigorousness in curiosity. *Education for Information, 24*(2/3), 139-151.

Treffinger, D. J. (1985). [Review of the test Torrance Tests of Creative Thinking]. *The ninth mental measurements yearbook.*

Vallerand, R. J., Koestner, R., & Pelletier, L. G. (2008). Reflections on self-determination theory. *Canadian Psychology, 49*(3), 257-262. doi:10.1037/a0012804

Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist, 41*(1), 19-31. doi:10.1207/s15326985ep4101_4

Vidler, D. C., & Karan, V. E. (1975). A study of curiosity, divergent thinking, and test anxiety. *Journal of Psychology, 90*(2), 237-244.

Walling, D. (2009). The creativity continuum. *TechTrends: Linking Research & Practice to Improve Learning, 53*(4), 26-27. doi:10.1007/s11528-009-0301-y

Ward, P., Lundberg, N., Ellis, G., & Berrett, K. (2010). Adolescent peer followership: A self-determination theory perspective. *Journal of Park & Recreation Administration, 28*(2), 20-35.

Warner, S., & Myers, K. (2009). The creative classroom: The role of space and place toward facilitating creativity. *Technology Teacher, 69*(4), 28-34.

White, R. (1959). Motivation reconsidered: The concept of competence. *Psychological Review, 66*, 297-333.

Wu, P., & Chiou, W. (2008). Postformal thinking and creativity among late adolescents: A post-Piagetian approach. *Adolescence, 43*(170), 237-251.

Wubbolding, R. E. (2005). The power of belonging. *International Journal of Reality Therapy, 24*(2), 43-44.

Yau, H., Kan, M., & Cheng Alison, L. (2012). The impact of curiosity and external regulation on intrinsic motivation: An empirical study in Hong Kong education. *Psychology Research, 2*(5), 295-307.

Zinn, W. (2008). Making fun of school, or why does learning have to be such a drag? Six key elements for motivating learning. *International Journal of Learning, 15*(8), 153-160.

APPENDICES

Appendix A

Permission to Use Instrument

Subject: Re: CEI-II
From: Todd Kashdan <tkashdan@gmu.edu>
Date: 07/26/12 02:16 PM
To: Jennifer Leah Rinkevich <j.l.rinkevich@iup.edu>

Absolutely. Yes. Check out the latest articles using it on my website.

Sent from my iPhone

On Jul 26, 2012, at 1:31 PM, Jennifer Leah Rinkevich
<j.l.rinkevich@iup.edu> wrote:

> Dr. Kashdan,
> I am writing up to follow up to my email I had written in January
> requesting permission to use the CEI-II (see below). It is my
> understanding that you had granted permission in your response,
> however, I was writing to be granted formal permission for my IRB
> protocol. Again, I thank you for your time!
> Jennifer
>
>
> On Thu, 12 Jan 2012 09:03:38 -0500
> Todd Kashdan <tkashdan@gmu.edu> wrote:
>> great, go to article #68 and the PDF of the measure-
>> http://psychfaculty.gmu.edu/kashdan/publications.php
>>
>> I have at least 3 follow-up papers that are almost published that
>> continue
>> to show the value of this scale.
>>
>> keep me posted.
>>
>> On Wed, Jan 11, 2012 at 9:01 PM, Jennifer Leah Rinkevich <
>> j.l.rinkevich@iup.edu> wrote:
>>
>>> Hello Dr. Kashdan,
>>> My name is Jennifer Rinkevich and I am a doctoral student hopefully
>>> about
>>> to start my dissertation study. I am writing to first say that I
>>> thoroughly
>>> enjoy your work on the topic of curiosity. Secondly, I am writing
>>> to ask
>>> permission to use the CEI-II and also to get some scoring
>>> information for
>>> the instrument. I have listed my research questions below to briefly
>>> describe the aim of my mixed methods study.
>>>
>>> Question 1
>>> What is the relationship among 6th grade students' levels of
>>> creativity,
>>> curiosity, and academic intrinsic motivation?
>>>
>>> Question 2
>>> What is the relationship among 6th grade students' levels of
>>> creativity,
>>> curiosity, and academic intrinsic motivation in regard to different
>>> subjects (reading, math, science, and social studies)?
>>>
>>> Question 3
>>> What are the characteristics of students who possess high levels of
>>> creativity, curiosity, and academic intrinsic motivation?
>>>
>>>
>>> Question 4

>>> What are the characteristics of students who possess high levels of
>>> creativity and curiosity, but low levels of academic intrinsic
>>> motivation?
>>>
>>>
>>> Question 5
>>> To what sources and/or factors do students attribute their levels of
>>> creativity, curiosity, and academic intrinsic motivation?
>>>
>>> Should you be interested in more information on my topic, I will
>>> be happy to provide it. I look forward to hearing from you and I
>>> thank you
>>> in advance for you time.
>>>
>>> Jennifer Rinkevich
>>>
>>
>>
>>
>> --
>> Todd B. Kashdan, Ph.D.
>> Associate Professor
>> Department of Psychology
>> Associate Editor, *Journal of Personality and Social Psychology:
>> PPID*
>> Senior Scientist, Center for Consciousness and Transformation
>> George Mason University
>> Mail Stop 3F5
>> Fairfax, VA 22030
>> Lab: http://psychfaculty.gmu.edu/kashdan/
>> Homepage: http://toddkashdan.com/
>> Blog:
>> http://www.psychologytoday.com/blog/curious<http://huffingtonpost.com/todd-kashdan>
>> See my new book, *Designing Positive Psychology*:
>> http://amzn.to/edPkF0

Appendix B

Site Approval Letter-Superintendent

Indiana Area School District

Deborah M. Clawson, D.Ed.
Superintendent

501 East Pike • Indiana, PA 15701-2298
724-463-8713 Fax: 724-463-0868

Dale R. Kirsch
Business Manager

December 12, 2011

Ms. Jennifer Rinkevich
504 Wendwood Manor
Greensburg, PA 15601

Dear Jennifer,

Your request to conduct a voluntary study with our sixth grade students on the topic of creativity and intrinsic motivation is approved. Your study proposal, done under the auspices of your doctoral dissertation committee at IUP, has already received the approval of the university's Institutional Review Board.

I will share the full proposal with our Junior High principals, and we look forward to the findings and suggestions that results from your study of our students' reporting on their own creativity, their academic curiosity, and their related level of motivation for academic success. Your focus on the relational aspects of academic success is a welcome one, and a wonderful fit for the values and mission of this district.

We all look forward to benefiting from your work in this study!

Sincerely,

Deborah M. Clawson

Deborah M. Clawson, D.Ed.
Superintendent

cc: Dr. Earman
Mr. Minnick

ELEMENTARY SCHOOLS

Benjamin Franklin	724-465-5637
Horace Mann	724-463-8560
Eisenhower	724-463-8566
East Pike	724-463-8567

CHRISTMAS TREE CAPITAL OF THE WORLD

SECONDARY SCHOOLS

Indiana Area Senior High	724-463-8562
Indiana Area Junior High	724-463-8568

Appendix C

Site Approval Letter-Principal

December 6, 2011

Mr. Minnick,

As a follow up to our conversation a few weeks ago, I am writing to request formal permission to conduct an educational study at the Indiana Junior High School. The topic of the study is an investigation of creativity, curiosity, and academic intrinsic motivation. I feel that the results of the rather non-intrusive study may have educational implications for our school district. I have attached a tentative Institution Review Board (IRB) document that explains the study in more detail, should you need further information. I am eager to begin this endeavor as soon as I receive permission and complete the necessary paperwork. If you approve of this study, please sign and date below and return this letter to me at your earliest convenience. I thank you in advance for your time and consideration.

Sincerely,

Jennifer Rinkevich

I approve of the proposed study outlined above.

Michael Minnick Dec 9 2011

Signature Date

Mr. Mike Minnick, Principal

Appendix D

Child Informed Consent Form

Professional Studies in Education Department
303 Davis Hall
Indiana, Pennsylvania 15705
724-357-2400

My name is Ms. Rinkevich. You are receiving this letter because you are invited to participate in a research study. I am an art teacher, but I am also a student who needs to complete a research study so I can graduate from Indiana University of Pennsylvania (IUP). I would like you to help me with this research study. You are being asked to participate because you are a student in sixth grade at the Indiana Junior High School in Indiana, PA. You will be required to complete 3 surveys over two sessions. The first will take approximately 30 minutes and the second approximately 45 minutes. The following information is provided in order to help you to make a good decision about whether or not to participate. If you have any questions please do not hesitate to ask. My telephone number and e-mail address are listed at the bottom of this page. If you would like to discuss your questions with someone else, you can speak to Mr. Minnick in the main office.

The purpose of this study is to see if there is a relationship between your levels of creativity, curiosity, and your interest in school. The information I will need to collect to answer this question will take about 80 total minutes of your time over two sessions. Your deciding to participate or not participate will not affect your grades in school in any way. This research is separate from any of your classes and it is not being done by the school district. The first time I visit your school, you will answer 7 questions about how curious you are about the things around you. Next, you will be asked to answer 44 questions about how interested you are in school and certain subjects. I will then return on another day and you will complete a non-graded test about creativity. I will take the information from the forms you have filled out to see if there is any kind of relationship between them.

For the second part of the study, I will select approximately 6 students and return once more to your school to have you complete a short survey (lasting about 15 minutes). This survey will be based on the results from the forms you filled out. I will then set up a time to meet and interview you in order to ask some more questions about creativity, curiosity, and your motivation to learn. You will just be talking during this interview and not filling out any papers.

Should you be selected for this part of the study, we will meet at a location in the school to do the interviews. Again, you may or may not be selected for this portion of the study.

I know of no reason why you should be uncomfortable with this research. In fact, filling out some of the forms may be fun and interesting to you. The information gained from this study may help us to better understand how you learn as a student. Hopefully, this information can be used to make school more interesting and fun.

Your participation in this study is voluntary. You are free to decide not to participate in this study or to withdraw at any time. Your decision to withdraw will not harm you in any way. If you choose to participate, you may still withdraw at any time by notifying me in writing. I would then destroy all information relating to you. If you choose to participate, all information will be kept confidential and will in no way affect your school grades. Your responses to the surveys and tests will be recorded using a number and not your name. I will only match your name to your number when I choose the 6 participants for the second part of the study. Only I will know who you are and your responses. The information obtained in the study may be published in journals or presented at conferences, but your identity will be kept strictly confidential.

If you are willing to participate in this study, please sign the next page and return it to your homeroom teacher. Please keep the extra unsigned copy for your records. If you choose not to participate, please return an unsigned copy with just your name listed.

This research is being conducted by Jennifer Rinkevich under the direction of Dr. Sue Rieg.

Researcher:
Ms. Jennifer Rinkevich
Doctoral Candidate
Professional Studies in Education
Davis Hall 323
Indiana, PA 15705
Phone: (724)357-2416

Faculty Sponsor:
Dr. Sue Rieg
Dissertation Chairperson
Professional Studies in Education
Davis Hall 323
Indiana, PA 15705
Phone: (724)357-2416

This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects Phone: (724)357-7730

CHILD INFORMED CONSENT FORM: SIGNATURE PAGE

I understand the information on the form and agree to participate in this study. I understand that no one except Ms. Rinkevich will know my individual answers. I have the right to change my mind and not participate at any time. I have been given a copy of this Informed Consent Form to keep.

_____
Child's Name (PLEASE PRINT)

_____
Child's Signature

_____
Parent/Guardian Signature

_____
Date

Appendix E

Guardian Informed Consent Form

Professional Studies in Education Department
303 Davis Hall
Indiana, Pennsylvania 15705
724-357-2400

My name is Ms. Rinkevich. You are receiving this letter because your child is invited to participate in a research study. I am an art teacher, but I am also a student who needs to complete a research study so I can graduate from Indiana University of Pennsylvania (IUP). I would like your child to help me with this research study. Your child is being asked to participate because they are a student in sixth grade at the Indiana Junior High School in Indiana, PA. Your child will be required to complete 3 surveys over two sessions. The first will take approximately 30 minutes and the second approximately 45 minutes. The following information is provided in order to help you to make a good decision about whether or not to permit your child to participate. If you have any questions please do not hesitate to ask. My telephone number and e-mail address are listed at the bottom of this page. If you would like to discuss your questions with someone else, you can speak to Mr. Minnick in the main office.

The purpose of this study is to see if there is a relationship between student levels of creativity, curiosity, and interest in school. The information I will need to collect to answer this question will take about 80 total minutes of your time child's time over two sessions. Your deciding to let your child participate or not participate will not affect their grades in school in any way. This research is separate from any of your child's classes and it is not being done by the school district. The first time I visit your child's school, they will answer 7 questions about how curious they are about the things around them. Next, they will be asked to answer 44 questions about how interested they are in school and certain subjects. I will then return on another day and they will complete a non-graded test about creativity. I will take the information from the forms they have filled out to see if there is any kind of relationship between them.

For the second part of the study, I will select approximately 6 students and return once more to your child's school to have them complete a short survey (lasting about 15 minutes). This survey will be based on the results from the forms they had filled out. I will then set up a time to meet and interview your child in order to ask some more questions about creativity, curiosity, and their motivation to learn. Your child will just be talking during this interview and not filling out any papers. Should your child be selected for this part of the study, we will meet in

a location at the school to do the interviews. Again, your child may or may not be selected for this portion of the study.

I know of no reason why your child should be uncomfortable with this research. In fact, filling out some of the forms may be fun and interesting to them. The information gained from this study may help us to better understand how your child learns as a student. Hopefully, this information can be used to make school more interesting and fun.

Your child's participation in this study is voluntary. You are free to decide to not let your child participate in this study or to withdraw them at any time. Your decision to withdraw will not harm your child in any way. If you choose to let your child participate, you may still withdraw them at any time by notifying me in writing. I would then destroy all information relating to your child. If you choose to allow your child to participate, all information will be kept confidential and will in no way affect your child's school grades. Your child's responses to the surveys and tests will be recorded using a number and not a name. I will only match your child's name to their number when I choose the 6 participants for the second part of the study. Only I will know who your child is and their responses. The information obtained in the study may be published journals or presented at conferences, but your child's identity will be kept strictly confidential.

If you are willing to let your child participate in this study, please sign the next page and return it to your child's homeroom teacher. Please keep the extra unsigned copy for your records. If you choose not to let your child participate, please return an unsigned copy with just your child's name listed.

This research is being conducted by Jennifer Rinkevich under the direction of Dr. Sue Rieg.

Researcher:
Ms. Jennifer Rinkevich
Doctoral Candidate
Professional Studies in Education
Davis Hall 323
Indiana, PA 15705
Phone: (724)357-2416

Faculty Sponsor:
Dr. Sue Rieg
Dissertation Chairperson
Professional Studies in Education
Davis Hall 323
Indiana, PA 15705
Phone: (724)357-2416

This project has been approved by the Indiana University of Pennsylvania Institutional Review Board for the Protection of Human Subjects Phone: (724)357-7730

GUARDIAN INFORMED CONSENT FORM: SIGNATURE PAGE

I understand the information on the form and agree to allow my child to participate in this study. I understand that no one except Ms. Rinkevich will know my child's individual answers. I have the right to change my mind and disallow my child to participate at any time. I have been given a copy of this Informed Consent Form to keep.

_____
Child's Name (PLEASE PRINT)

_____
Parent/Guardian Signature

_____
Date

Appendix F

Curiosity Exploration Inventory II (CEI-II)

Curiosity and Exploration Inventory (CEI-II) *Instructions*: Rate the statements below for how accurately they reflect the way you generally feel and behave. Do not rate what you think you should do, or wish you do, or things you no longer do. Please be as honest as possible.		Very Slightly or Not At All	A Little	Moderately	Quite a Bit	Extremely
1.	I actively seek as much information as I can in new situations.	1	2	3	4	5
2.	I am the type of person who really enjoys the uncertainty of everyday life.	1	2	3	4	5
3.	I am at my best when doing something that is complex or challenging.	1	2	3	4	5
4.	Everywhere I go, I am out looking for new things or experiences.	1	2	3	4	5
5.	I view challenging situations as an opportunity to grow and learn.	1	2	3	4	5
6.	I like to do things that are a little frightening.	1	2	3	4	5
7.	I am always looking for experiences that challenge how I think about myself and the world.	1	2	3	4	5
8.	I prefer jobs that are excitingly unpredictable.	1	2	3	4	5
9.	I frequently seek out opportunities to challenge myself and grow as a person.	1	2	3	4	5
10.	I am the kind of person who embraces unfamiliar people, events, and places.	1	2	3	4	5

Stretching: 1,3,5,7 / Embracing: 2,4,6,8.10.

Appendix G

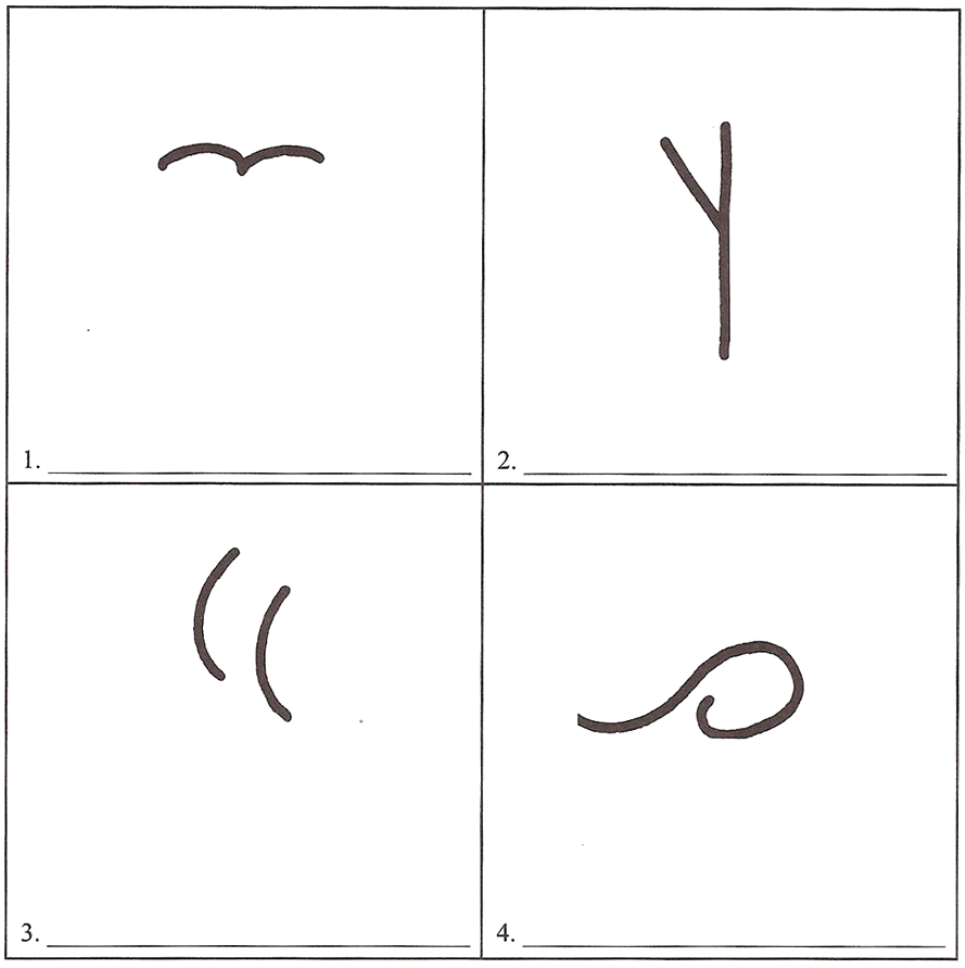
Torrance Tests of Creative Thinking (TTCT)

YOUR TITLE: _____

3

Activity 2. PICTURE COMPLETION

By adding lines to the incomplete figures on this and the next page, you can sketch some interesting objects or pictures. Again, try to think of some picture or object that no one else will think of. Try to make it tell as complete and as interesting a story as you can by adding to and building up your first idea. Make up an interesting title for each of your drawings and write it at the bottom of each block next to the number of the figure.



Activity 3. LINES

In ten minutes see how many objects or pictures you can make from the pairs of straight lines below and on the next two pages. The pairs of straight lines should be the main part of whatever you make. With pencil or crayon add lines to the pairs of lines to complete your picture. You can place marks between the lines, on the lines, and outside the lines—wherever you want to in order to make your picture. Try to think of things that no one else will think of. Make as many different pictures or objects as you can and put as many ideas as you can in each one. Make them tell as complete and as interesting a story as you can. Add names or titles in the spaces provided.

1. _____ 2. _____ 3. _____

4. _____ 5. _____ 6. _____

7. _____ 8. _____ 9. _____

10. _____ 11. _____ 12. _____

13. _____ 14. _____ 15. _____

16. _____ 17. _____ 18. _____

GO ON TO NEXT PAGE

19. _____ 20. _____ 21. _____

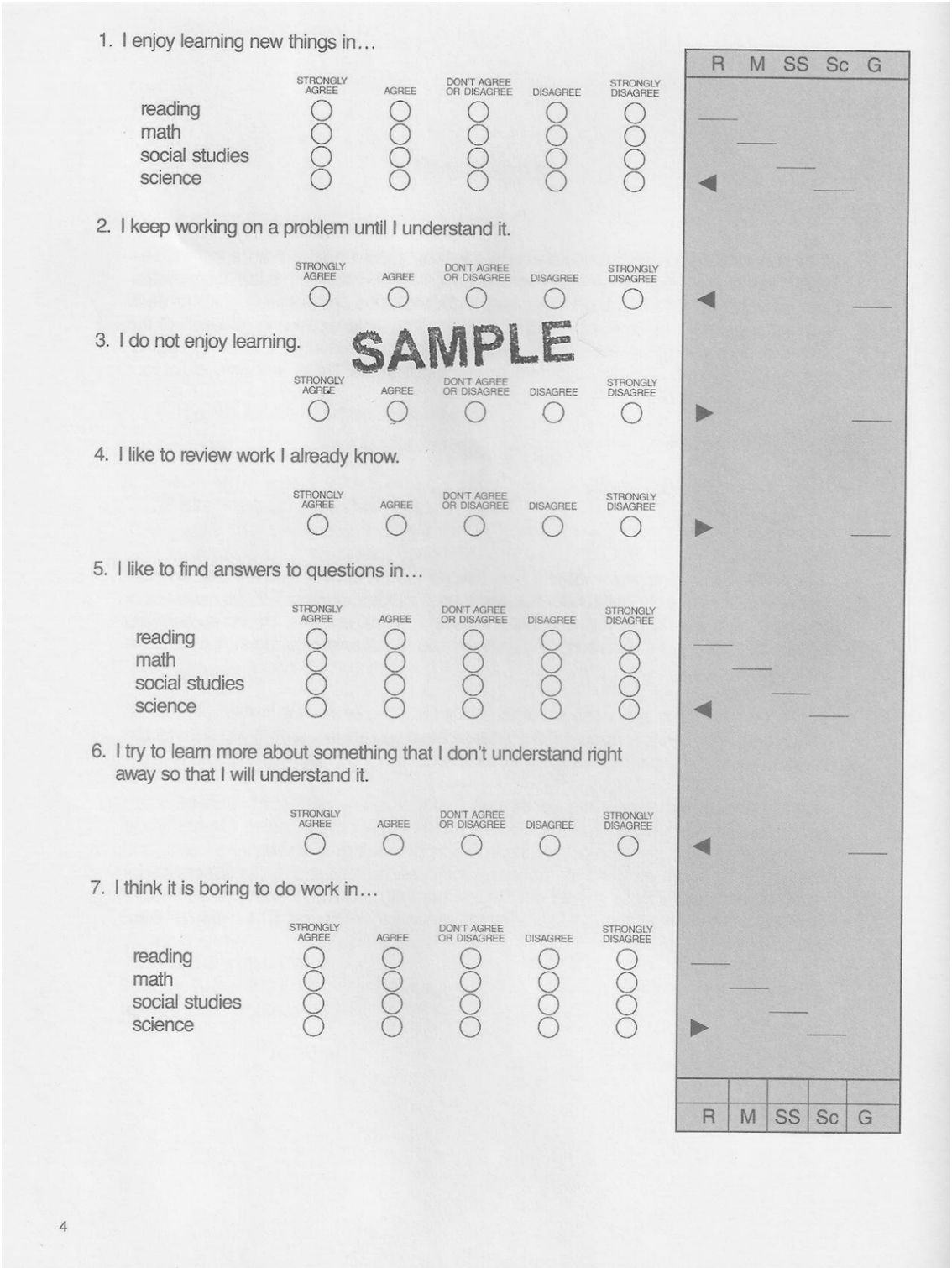
22. _____ 23. _____ 24. _____

25. _____ 26. _____ 27. _____

28. _____ 29. _____ 30. _____

Appendix H

Children's Academic Intrinsic Motivation Inventory (CAIMI)



1. I enjoy learning new things in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

2. I keep working on a problem until I understand it.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

3. I do not enjoy learning.

SAMPLE

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

4. I like to review work I already know.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

5. I like to find answers to questions in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

6. I try to learn more about something that I don't understand right away so that I will understand it.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

7. I think it is boring to do work in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

R	M	SS	Sc	G

4

8. I do not enjoy doing hard assignments in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

9. I feel good inside when I know I have learned something new in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

SAMPLE

10. I like to do easy assignments.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

11. I am not curious about learning things in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

12. When I get bored, I look for new things to do.

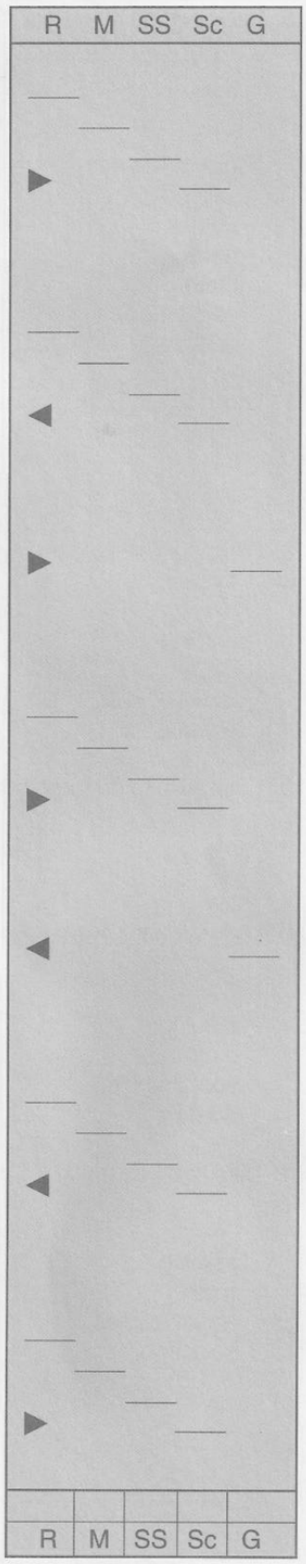
STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

13. I enjoy practicing things I've already learned in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

14. I give up easily when I don't understand an assignment in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○



15. I enjoy doing new work in school.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

16. I enjoy doing easy assignments in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

17. I don't like to work on new problems.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

18. I enjoy understanding my work in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

19. I don't like to do more school work than I have to.

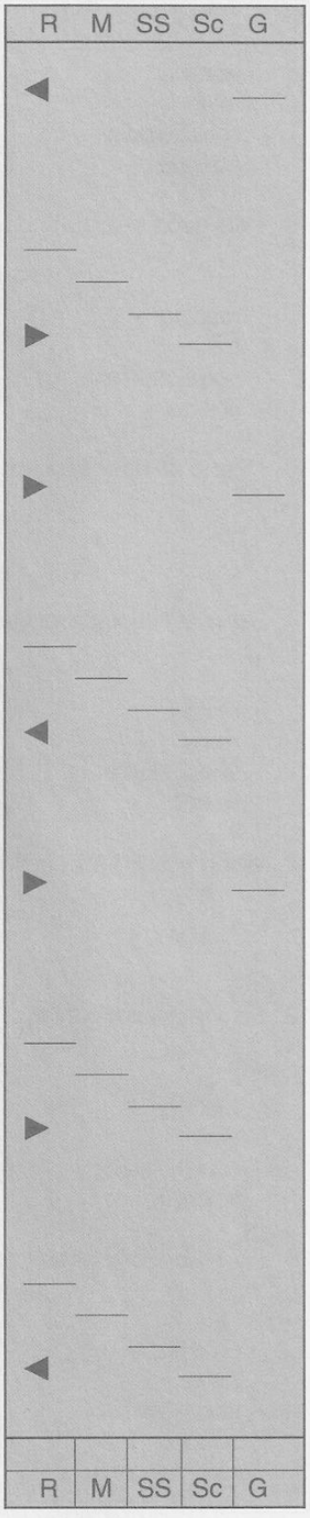
STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

20. I like to do the same assignments over again in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

21. I like to do as much work as I can in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○



22. When I don't understand a problem, I give up right away.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

23. I like to learn new things in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

24. When I don't understand something right away, I try to learn more about it so that I can understand it.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

25. I don't like to figure out problems in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

26. When I don't have new things to do in school, I get bored.

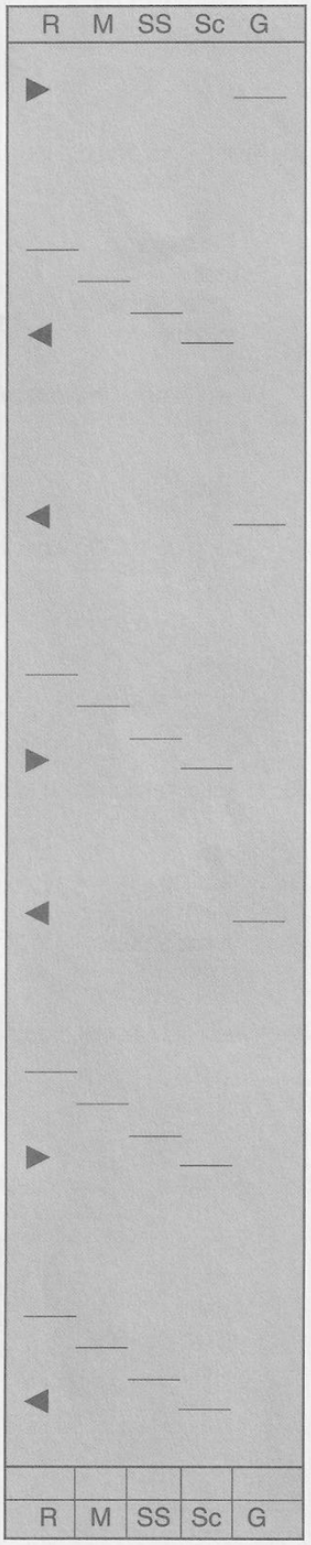
STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

27. New ideas are not interesting to me in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

28. I would like to learn more about…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○



29. I don't like to find answers to questions.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

30. When I get bored, I look for new things to learn in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

31. When I know I have learned something new, I feel good inside.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

32. I like to do as little work as I can in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

33. I think it is interesting to do work in…

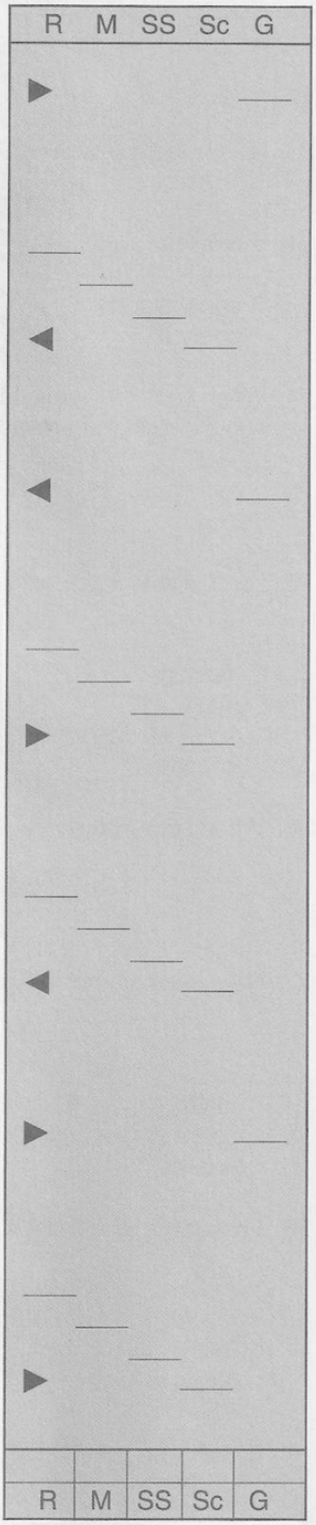
	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

34. When I get bored, I do not look for new things to do.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

35. I do not enjoy practicing things I've already learned in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○



36. I don't give up on an assignment until I understand it in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

37. I get bored when I don't have new things to do in school.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

38. I don't like to find answers to questions in…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

39. I like to learn.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

40. I enjoy doing hard assignments in…

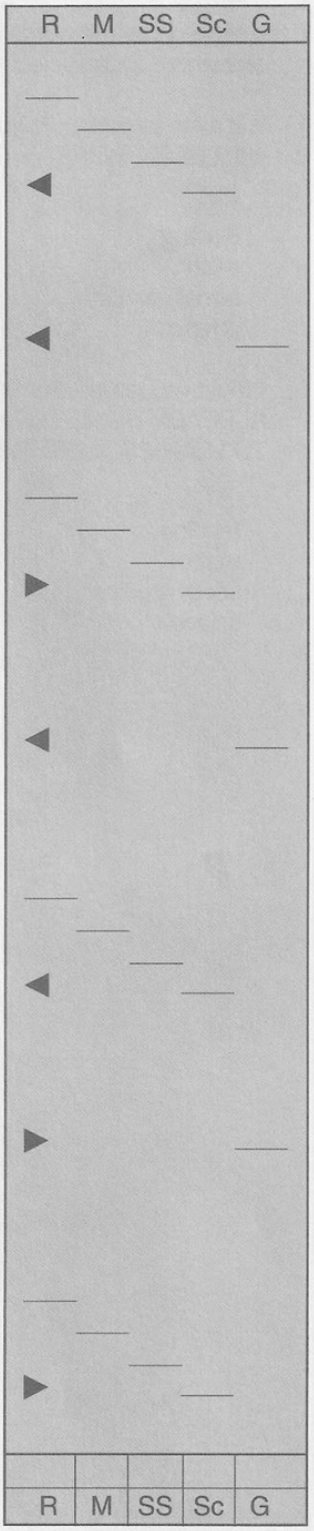
	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○

41. I do not feel good inside when I know I have learned something new.

STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
○	○	○	○	○

42. I would not like to learn more about…

	STRONGLY AGREE	AGREE	DON'T AGREE OR DISAGREE	DISAGREE	STRONGLY DISAGREE
reading	○	○	○	○	○
math	○	○	○	○	○
social studies	○	○	○	○	○
science	○	○	○	○	○



STOP HERE

Wait until you are told to answer the next sentences.

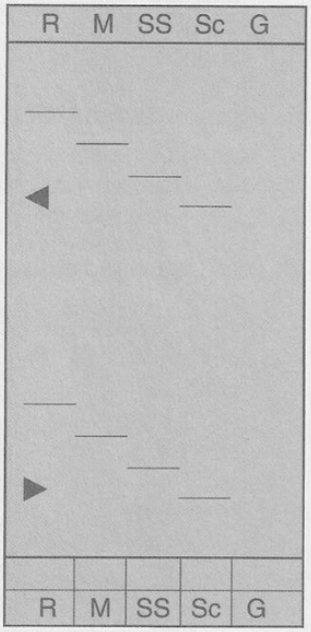
In the next sentences choose the answer that agrees with your opinion. Mark your answer by making an X in the circle under the words that match your opinion. Answer for each subject separately and mark only one answer for each subject. Remember, there are no right or wrong answers. Ask for help if you need it.

43. Is it more important to you to do a school assignment so that you will: LEARN MORE; or GET A GOOD GRADE, in…

	LEARN MORE	GET A GOOD GRADE
reading	○	○
math	○	○
social studies	○	○
science	○	○

44. Would you rather: DO SOMETHING OVER AGAIN THAT YOU'VE ALREADY DONE CORRECTLY; or DO SOMETHING DIFFERENT TO LEARN SOMETHING NEW, in…

	DO SOMETHING AGAIN	DO SOMETHING DIFFERENT
reading	○	○
math	○	○
social studies	○	○
science	○	○



Appendix I

Qualtrics Survey Instrument

Thank you for taking this survey. Although it should not take long, your answers are very important. Please be sure to answer each item as carefully and honestly as possible.

Sources and Characteristics

CREATIVITY- (People)

You will find a list of people below. Please drag each one to the box where you think the person(s) fit best. Please read the headings in each of the three boxes before beginning.

Items	These people try to encourage me to be creative.	These people do not really try to encourage me to be creative.	I do not have these people in my life.
Parents			
Grandparents			
Other Adults Outside of School			
Teachers			
Friends			
Brothers or Sisters			
Coaches			
Instructors or Teachers Outside of School			
Myself			

CURIOSITY- (People)

You will find a list of people below. Please drag each one to the box where you think the person(s) fit best. Please read the headings in each of the three boxes before beginning.

Items
Parents
Grandparents
Other Adults Outside of School
Teachers
Friends
Brothers or Sisters
Coaches
Instructors or Teachers Outside of School
Myself

These people encourage me to be curious, or wonder, about things around me.
These people do not really encourage me to be curious, or wonder, about things around me.
I do not have these people in my life.

MOTIVATION- (People)

You will find a list of people below. Please drag each one to the box where you think the person(s) fit best. Please read the headings in each of the three boxes before beginning.

Items	These people help make me feel motivated to learn.	These people do not really help make me feel motivated to learn.	I do not have these people in my life.
Parents			
Grandparents			
Other Adults Outside of School			
Teachers			
Friends			
Brothers or Sisters			
Coaches			
Instructors or Teachers Outside of School			
Myself			

MOTIVATION- (List in Order)

Please list the following in order according to what motivates you to learn the most (1) to what motivates you to learn the least (5).

- To get a good feeling from learning
- To get good grades to make myself happy
- To get good grades to show others
- To avoid getting in trouble for poor grades
- To get good grades to get into college

CREATIVITY IN SCHOOL SUBJECTS

Please click on the subjects that you feel you have a chance to be creative in.

	How Often		
	Not at all	Sometimes	A lot
In Reading, I am able to be creative.	○	○	○
In Math, I am able to be creative.	○	○	○
In Social Studies, I am able to be creative.	○	○	○
In Science, I am able to be creative.	○	○	○

CURIOSITY IN SCHOOL SUBJECTS

Please click on the subjects that you feel make you curious or cause you to wonder about things.

	How Often		
	Not at All	Sometimes	A lot
Reading class makes me curious or causes me to wonder about things.	○	○	○
Math class makes me curious or causes me to wonder about things.	○	○	○
Social Studies class makes me curious or causes me to wonder about things.	○	○	○
Science class makes me curious or causes me to wonder about things.	○	○	○

WHERE

Below, you will find questions related to when or where you feel motivated, curious, and creative. Please read each one and then choose an answer.

	PLACE			
	At Home	At School	Same at School and Home	Neither Place
I enjoy learning more.....	○	○	○	○
Where do you find you are more creative.....	○	○	○	○
Where are you more curious about things.....	○	○	○	○

ACCESS TO MATERIALS

In a regular week, please click on whether or not you feel you have access to the materials listed below. For school, do not include the times you are in actual music, art, or physical education classes. The first column is for school and the second is for at home.

	At School		At Home	
	Yes	No	Yes	No
Art Materials	○	○	○	○
Books (Other than textbooks)	○	○	○	○
Computer	○	○	○	○
Music	○	○	○	○
Board or Card Games	○	○	○	○
Video Games	○	○	○	○
Sports Equipment	○	○	○	○

INTERESTS and HOBBIES

Please select the box before each of the hobbies that you enjoy.

- ☐ Nature/The Outdoors
- ☐ Playing Sports on a Team
- ☐ Playing Sports Just With Friends
- ☐ Exercising
- ☐ Singing
- ☐ Listening to Music
- ☐ Going to Museums
- ☐ Animals
- ☐ Reading
- ☐ Arts and Crafts
- ☐ Doing Puzzles (any kind)
- ☐ Playing Video Games
- ☐ Playing Card or Board Games
- ☐ Watching TV

PLACES

Please answer this question by first clicking on the number of times you have visited each place. Then in the next column, choose whether or not you do or would enjoy visiting the place.

	How Often			Enjoyment	
	Never	Once	More than once	Yes/Would	No/Would Not
Art Museum	○	○	○	○	○
Science Museum	○	○	○	○	○
History Museum	○	○	○	○	○
Amusement Park	○	○	○	○	○
Zoo	○	○	○	○	○
Campground	○	○	○	○	○
National Park	○	○	○	○	○
Book Store	○	○	○	○	○
Library (not at school)	○	○	○	○	○

MISCELLANEOUS CREATIVITY QUESTIONS

Please answer TRUE or FALSE to the following questions.

	Choose	
	True	False
I like to use a lot of details when I write.	○	○
I like to use a lot of details when I draw.	○	○
If I am asked to do something I am not interested in, I try to make it fun.	○	○
I like coming up with new ways of doing things.	○	○
I enjoy talking about different ideas I have.	○	○
People can learn to be more creative.	○	○
I was more creative when I was younger.	○	○
People are only creative if they are good at art.	○	○
Instead of a regular test where there is one right answer, I would prefer to have the choice to write or draw to show I understand.	○	○

MISCELLANEOUS CURIOSITY QUESTIONS

Please answer TRUE or FALSE to the following questions.

	Choose	
	True	False
It bothers me when I cant figure out how something works.	○	○
People can help make you more curious about the world.	○	○
I was more curious about things when I was younger.	○	○
It is fun to try to figure out problems, even if I am not able to come up with a right answer	○	○
I am only interested to learn if it is about something I am already interested in.	○	○

MISCELLANEOUS MOTIVATION QUESTIONS

Please answer TRUE or FALSE to the following questions.

	Choose	
	True	False
What my teachers think about my ability makes a difference in how hard I try.	○	○
I am motivated to learn so that I can compare my ability now to my ability in the past.	○	○
I feel like I am able to accomplish the things I set out to do.	○	○
I liked to learn more in the past than I do now.	○	○
Whether or not I like my teachers makes a difference as to whether or not I like to learn.	○	○
I am much more motivated to learn about something when it is something I am already interested in.	○	○
I am much more motivated to learn about something if there is a reward involved.	○	○
I have the chance to learn about things that I am interested in at school.	○	○
I am better at things that we don't learn about in school.	○	○

MISCELLANEOUS QUESTIONS

Please answer TRUE or FALSE to the following questions.

	Choose	
	True	False
Being able to answer questions on the tests where there is only one right answer to choose is very important.	○	○
I enjoy taking tests where you have to figure out a problem and then pick the right answer by filling in a bubble.	○	○
I have trouble thinking about things or coming up with new ideas because I get distracted easily.	○	○
I am a confident person.	○	○
I am an organized person.	○	○
I am able to stay focused on a task until it is done.	○	○
I am a serious person.	○	○
I enjoy to work with others in groups.	○	○
I enjoy to work alone on things.	○	○
I have a group of friends where I feel I belong.	○	○
I feel happy most of the time.	○	○