

ENGAGING ALL STUDENTS
IN HIGHER ORDER THINKING

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ABSTRACT

This paper investigates the interaction between poverty and higher-order (higher-level) thinking. Given recent legislation (No Child Left Behind Act of 2002) standards and expectations have changed the way that many educators in high-poverty schools are held accountable for their students' learning. The question investigated in this paper is: How can teachers help students living in poverty develop higher-level thinking skills? The question's significance is even more compelling given the historical implications of limited or oppressive practices of schooling in relation to various marginalized groups of people in the United States.

The research is both encouraging and discouraging in its implications for teaching higher-level thinking to students living in poverty. Research about the relation of teacher expectations and student performance and was a clear factor in student success. In addition, the research found that explicitly teaching higher-order thinking is successfully for all students. In addition, there was a clear relation in the research between socioeconomic status and student performance. Based on the research reviewed in order to develop higher-order thinking skills for students living in poverty teachers must first believe students are capable.

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CHAPTER ONE: INTRODUCTION

In this paper I shall address the question: How can teachers help students living in poverty develop higher-level thinking skills? Given the current high expectations for disadvantaged students, the question seeks practical and applicable ways in which professional educators can best assist tomorrow's thinkers.

Prior to the passage of the No Child Left Behind Act (NCLB) of 2002, education reform focused on a controversial idea aptly named outcome-based education.

(Wikipedia, n.d., http://en.wikipedia.org/wiki/Outcome-based_education) Outcome-based education, or standards-based education, put a focus on ways to objectively quantify student achievement aimed at raising the achievement levels of all students.

This reform has been ever-present in the educational community and hotly debated since the 1980s. (Wikipedia, n.d., http://en.wikipedia.org/wiki/Standards-based_education_reform)

NCLB amended the preexisting Title I program under the Elementary and Secondary Education Act of 1965. It paid particular attention to closing the "achievement gap" for students identified as disadvantaged. Though it does not explicitly define disadvantaged it clearly suggested that the achievement gap affects English language learners, minorities "...migratory children, children with disabilities, Indian children, neglected or delinquent children, and young children in need of reading assistance...." (U.S. Department of Education, *No Child Left Behind*, 2002). Under NCLB all students should have access to a fair and equal opportunity for a high-quality education and at the very least meet state academic standards.

Though NCLB is far-reaching and inclusive in its rhetoric it also has serious implications for schools that serve disadvantaged students. If as NCLB suggests, all students regardless of race or class were held to high expectations, the schools that these children attend must receive adequate funding resources in order to provide high-quality education. Under NCLB schools are held accountable for the failure of their students on yearly achievement tests. The term used in the professional community is Adequate Yearly Progress (AYP). AYP is established by states and measured by student performance. If schools are unable to make AYP, the law under NCLB outlines specific ramifications. After two years of not meeting AYP, the school is identified by the district as needing improvement and must offer students the opportunity to attend any public school within the district.

After three years of failing to meet AYP, low-income students can receive supplementary academic services along with public school choice. After four years corrective action is taken which may mean replacing certain staff and implementing new curriculum. After five years the school is restructured which could mean all new staff. NCLB's assertion of holding all students to high expectations while putting special attention on disadvantaged students and holding schools accountable for their inability to meet standards a mixed message has made the topic of poverty and higher order thinking especially important today.

Rationale

The issues of poverty, education and high academic standards piqued my interest during the 2003-2004 school year when I worked as an AmeriCorps volunteer with the Washington Reading Corps. The school was located in a diverse part of Seattle where

80% of the students were enrolled in the free and reduced lunch program. (Seattle Public Schools, n.d., <http://www.seattleschools.org/area/main/ShowSchool?sid=212>) Free and reduced lunch percentage is a common indicator of the poverty level at any given school across the United States. My year of service made apparent the pervasiveness of poverty.

One responsibility of my position was to recruit; train and coordinate volunteer literacy tutors for students from varying ethnic and economic backgrounds. The students referred for literacy tutoring were generally one to two grade levels behind in literacy acquisition. In addition to volunteer coordination, fundraising and special event coordination, I tutored six students in grades 2-5. Because of my limited experience, tutoring six students below grade level in reading and writing seemed an insurmountable task, I became more aware of the possibility embedded in holding all students to high standards.

Cultivating higher-level thinking was strengthened by high expectations and every student deserved the opportunity to build a rich academic self. As the year progressed, my tutees had no lack of success. One second grader who had come to me reading below grade level ended the year confidently reading chapter books. The more I settled into my role the more compelled I was to push students in their thinking irregardless of their financial or ethnic background. The students' successes pushed me to reevaluate the supposed link between academic failure and socioeconomic status. I learned the importance of diligence and commitment to academic success, in whatever big or small forms it came.

As my master's program commenced I began to wonder what the professional literature suggests about the importance of higher-level thinking for students living in poverty.

Definitions

Poverty

Currently, the federal poverty level is \$20,000 for a family of four. (U.S. Department of Health and Human Services, 2006) In Washington State, school districts and the Office of the Superintendent of Public Instruction use the number of students who receive free or reduced lunch (FRL) as indicator of the degree of poverty in a school. The eligibility criteria is a family income of “. . . 130% or less of the federal income poverty guidelines for free and 185% for reduced-price meals” (National School Lunch and School Breakfast Programs, n.d., para. 2, <http://www.k12.wa.us/ChildNutrition/NSLSBP.aspx>).

Both the federal government and the state of Washington measure poverty purely on an individual's financial situation but Payne (2005) explained that poverty is a complex and multi-layered issue. Payne suggested that poverty is defined by the “extent to which an individual does without resources” (Payne, 2005, p. 7). She believed that poverty is a combination of factors other than financial woes. In her book, Payne names seven additional resources that a person can lack to experience poverty. The seven resources she named are financial, mental, emotional, spiritual, physical, support systems, relationships/role models and having a knowledge of hidden rules.

Higher-Level Thinking

In this paper, higher-level thinking refers to the higher levels of Bloom's taxonomy which are those levels of thinking that engage students in complex levels of thinking. For example, students engaged in higher-level thinking are problem solving, making inferences beyond what is explicitly presented, building adequate representations, analyzing and constructing relationships..." (Lewis & Smith, 1993, p. 133). Thus, higher-level thinking, as the term will be used in this paper, indicates that students are fully engaged in the learning process on many cognitive levels and infer beyond the correct solution, recognizing that multiple solutions, if well thought out and reasoned, are possible. Please note that the term "higher level thinking" is often referred to higher-order thinking in the professional literature. Both terms will be used interchangeably in this paper.

Limitations

Studies before 1968 were not utilized, as they were considered too outdated for the current discussion on higher-level thinking and poverty. Studies from outside the United States were considered and used if they were applicable to the discussion. Most literature does not address the use of higher-level thinking with elementary age students. Therefore, studies addressing middle and high school age students were accepted.

CHAPTER TWO: HISTORICAL BACKGROUND

Introduction

In the previous chapter, poverty's effects on student ability to engage in higher-level thinking were introduced. The historical context for the question of how teachers can help students living in poverty develop higher-level thinking skills will be addressed next. This chapter is divided into two parts, an historical exploration of for whom schooling has been created, and a look at the modern roots of our understanding of cognitive demand.

Schooling: For Whom?

This section addresses the development of schools in the United States of America from colonial times to the 20th century with an emphasis on who had access to schooling; this is done as a means to articulate the historical plight of those students identified as disadvantaged under the No Child Left Behind Act of 2002.

In the year 1642 the first known law was made about schooling in the American colonies. (Spring, 2005) This specific law planted the seed for subsequent laws requiring compulsory schooling. The Massachusetts Law of 1642 required that parents and business people provide town officials with honest and accurate information about their children's education from masters. Masters referred to masters of a specific vocation instead of an academic subject. The law's main purpose was to ensure that apprentices (usually children) in service to a master were being taught a valuable skill. If their master failed, apprentices were reassigned to a master that would abide by the new law. (Webb, Metha & Jordan, 2007) During this time in history, many children were apprentices to a master for seven years and it was the master's responsibility that the apprentice learn to

read and write. Schooling clearly neither put an emphasis on higher-level thinking at this time, nor was it accessible or considered a necessity by many families.

The 1642 law was a precursor to the Education Law of 1647. The Education Law of 1647 required that townships with 50 or more people provide a teacher for reading and writing. Every township with more than 100 individuals was ordered to establish a grammar school modeled after those of ancient Rome. Another name for the Education Law of 1647 was the “Old Deluder Satan Law” which demonstrates how religion and schooling were closely aligned from the inception of schooling in the “new” world. The main idea behind the Education Law of 1647 was to ensure that children could read and write to avoid falling under the spell of Satan and neglect learning the Scriptures.

(Spring, 2005)

However, most poor children were apprenticed because their families needed the extra set of helping hands. Economics often predicted whether or not children could attend school. The majority of people lived in townships during this period in history and though pious behavior was emphasized, being able to provide for one’s family was key.

(Spring, 2005) Children who were not apprenticed were able to attend reading-and-writing or grammar schools. The establishment of different types of schools meant to perpetuate the existing social order, which implied that those in power remained in power, and religious conformity was encouraged. (Spring, 2005)

Reading-and-writing and grammar schools reflected the prominent Christian ideals of Protestantism, which suggested that it was an individual’s responsibility to be versed in the word of God. (Spring, 2005) Reading-and-writing and grammar schools were meant to perpetuate the ability for an individual to be pious. The reading-and-

writing content was mostly religious in nature and *The New England Primer* was the primary text used for instruction. (Webb, Metha & Jordan, 2007) The *Primer* included the alphabet but focused mainly on teaching specific moral values empathetic with the Church. White male children from the upper classes attended secondary grammar schools that taught much more than the *Primer* had to offer. (Webb, Metha & Jordan, 2007) Students who had the privilege to attend these secondary schools often went on to a university education that required proficiency in Latin and Greek for admission. The establishment of secondary schools seems to suggest an educational divide between rote memorization and opportunities to engage in higher-level thinking.

The European Age of Reason, increasing numbers of immigrants and a changing economy, influenced the colonies of the 18th century. The emergence of a middle class changed schooling's emphasis from piety to a more localized focus, more on mathematics and vocational types of training. (Webb, Metha & Jordan, 2007) Although the curriculum was becoming more secular, the emphasis on vocational training, seen with early school laws around apprenticeship, also continued.

In the 18th century differing views about schooling became more evident in the colonies. (Webb, Metha & Jordan, 2007) The Southern colonies, that included Georgia, the Carolinas, Maryland and Virginia, did not have the religious emphasis of the Mid-Atlantic colonies. Whereas, the Mid-Atlantic colonies schools were steeped in Puritanical values (as evident in the *New England Primer*), the Southern colonies were less concerned with religious education in the schools and replaced with an emphasis on economics in the south. (Webb, Metha & Jordan, 2007)

The emphasis on economics in the Southern colonies helped create a school culture in which class differences were more readily pronounced than in the north. Though class in the Mid-Atlantic colonies had influenced schooling, most children could attend the grammar schools. In the Southern colonies educational opportunities were solely based on class. (Webb, Metha & Jordan, 2007) Very few in the southern lower social class attended school, even though it was available to them. The majority of the school-going children were offspring of plantation and business owners. These children received private tutoring and attended private Latin grammar schools.

As colonial leaders were preparing to declare independence from England, new ideals advocated a more secular interpretation of education regulated by the new government. (Spring, 2005) The biggest shift that most significantly shaped the modern day school system was the idea of public schools. The prevailing attitude after the revolution was that schooling should be available to all peoples. One proponent of public schools was Thomas Jefferson.

Jefferson believed that schooling should educate the masses so that they may form their own opinions about politics. He strongly believed that education should be for the average citizen, not just the elite. (Spring, 2005) Jefferson believed that once the average citizen was educated she would be able to form her own political beliefs based on reason. Jefferson's viewpoint stirred a debate about what kind of knowledge citizens needed in the new republic. Some Post-Revolutionary leaders believed that schooling should be used to teach the citizens about the new form of government. Though Jefferson espoused public schools for the average citizen, there were limitations. According to Jefferson the average citizen fit the profile of male and female free white

citizens. (Webb, Metha & Jordan, 2007). The proposal was significant because it advocated education be available across class lines. However, it did not suggest educational access across race and/or ethnic lines. This seemingly negated a growing faction of the republic's population.

Prior to the American Revolution, the colonies managed an influx of immigrants from around the world, which influenced how school was conducted. Native Americans, Asian Americans and African American language or traditions were frowned upon. These groups were not allowed to attend public schools but were "educated" in many other ways, which often involved an enculturation process that emphasized the Anglo-Saxon culture as superior. (Spring, 2005)

Immigration between 1830 and 1860 effected the population of the new republic dramatically. As a consequence a system of nationwide schools open to all students the common schools, were developed to accommodate the influx of new students and educate them for the purpose of preserving the existing culture. (Spring, 2005)

Class played a large role in how, what and whom common schools were believed to be for. (Webb, Metha & Jordan, 2007) The working classes were happy to support common schools with their taxes because it meant that their children might have a chance at upward mobility. The upper classes "...viewed the common schools as agencies of social control over the lower socioeconomic classes" (Webb, Metha & Jordan, 2007, p.137). Over time and the relentless push for common school by proponents like Horace Mann, common schools evolved into the system we are familiar with today. Mann worked hard to reform schools and he believed that every child should be allowed to attend school and that each state should ensure this for each child.

Mann's Tenth Annual Report influenced the first compulsory attendance law to be passed in Massachusetts. (Webb, Metha & Jordan, 2007) Since Mann's time, the formation of specific structure of a school system has created a large nationwide offering of public schools to all children. Even though Mann's influence was significant in creating what was to become our modern day educational system, the education of children who were not white took a different turn before ending up at the same crossroads.

The education of African American children did not coalesce as easily as Mann's ideas for white children. The push for an Anglo-Protestant culture in schools left little room for African Americans participation. The North and South had differing views about the treatment of African Americans and many more abolitionists lived in the North. Prior to the Civil War and up until 1954, education for African Americans was offered but segregated. Even though the common schools of the North allowed anyone to attend it became apparent to African Americans that the vast majority of people were not ready to accept integrated educational facilities. (Spring, 2005) Much of the struggle for equal education opportunity took place in Boston, Massachusetts. Boston was one of the first cities to offer schooling to all citizens.

Even though schooling was offered to all citizens, most African American children did not attend school due to poor economic situations. (Spring, 2005) In 1806 the Boston school board allowed a group of citizens to open a school specifically for African Americans. A mix of private and public monies funded it. The segregated school ran smoothly until the 1820s when "...the African American community realized that a segregated education was resulting in an inferior education for their children"

(Spring, 2005, p. 112). The Boston school board created a subcommittee to look into the matter and concluded that segregated schools did not benefit either race.

As the need for greater intervention arose a series of important court cases guaranteed greater equality in public schooling. The subcommittee reports withstanding, segregated schooling was strengthened by a separate-but-equal ruling by the Massachusetts Supreme Court. The case, *Roberts v. City of Boston*, ruled that offering separate-but-equal facilities did not violate the rights of African American children. The struggle for integration continued for decades and the United States Supreme Court struck down the separate-but-equal ruling in 1954. The *Brown vs. Board Education of Topeka* case overturned a previous ruling, *Plessy v. Ferguson* that was similar to the Roberts case. The court ruled in the *Brown* case that “Whatever may have been the extent of psychological knowledge at the time of *Plessy v. Ferguson*, this finding is amply supported by modern authority” (Spring, 2005, p.408). As this section has demonstrated, there are many facets of education for whom schooling existed; yet consequently, in the various facets, many had no access.

Evolution of Developmental Psychology in Relation to Cognitive Demand

This section briefly discusses and traces popular theory in developmental psychology that has significantly shaped the educational community with respect to higher-order thinking.

Cognitive development in children has been of growing interest to researchers and psychologists since Piaget developed his theories of cognitive development during the late 1920s and early 1930s (Anderson, 1990). To develop his theory Piaget conducted

numerous experiments with children and formulated four stages of cognitive development. His research suggested an inability to engage in higher-order thinking because they have yet to reach the stage of formal operations. The formal-operations stage does not occur until age 15 or beyond.

Prior to the formal operation stage, children experience the concrete operational stage in which they apply mental operations to events and objects. (Miller, 2002) In the formal operational stage, they take concrete operations one step further and make hypotheses. (Miller, 2002) Miller (2002) likened Piaget's ideas about the formal operations stage to scientific thinking. First the subject observes, conjectures, makes a plan, follows through and then reflects on said hypothesis. In the concrete operational stage, the child is more haphazard about his/her explorations; thus without a plan. Hence, the possibility that higher-level thinking is relegated to those of a certain age.

Contrary to Piaget's ideas of development, Vygotsky espoused a theory built on an idea he termed the zone of proximal development. (Miller, 2002) The zone of proximal development is the expansion of a child's current understanding heightened by collaboration with peers (or an adult) who have more knowledge. (Miller, 2002) Unlike Piaget's theory of development, Vygotsky's theory suggested no specific limitations due to age.

The development of stages mainly espoused by Piaget suggests an inability to engage in higher-level thinking until the teen years. The work of Vygotsky is also explored as an alternative to Piaget's stages and suggests a greater possibility of higher-level thinking at all ages, with the assistance of more capable peers. (Miller, 2002)

Key to Vygotskian theory was “scaffolding.” Scaffolding was the process of a more competent peer or adult supporting the less knowledgeable person to a more knowledgeable end. (Miller, 2002) Vygotsky’s theory also applied to more social situations than did Piaget’s. Vygotsky suggested that the zone of proximal development was applicable in situations outside of school, whether it be at play or by leading an activity. (Miller, 2002) Though both theories delineate the acquisition of knowledge in their own ways, both support the ability of students of all ages to engage in higher-level thinking.

Summary

The first section of this chapter provided some information about the availability of schooling to different groups in America from the colonial period until the 1950s. The impact of race, gender, class and religion on exclusion from schooling was discussed. Concerns about access to schooling continue to the present day. This chapter also discussed how our growing understanding of cognitive development, specifically the work of Piaget and Vygotsky, has shown that the capacity to do higher-level thinking is present but may be dependent on age and experience. In the next chapter, literature related to higher order thinking and poverty will be reviewed.

CHAPTER 3: CRITICAL REVIEW OF THE LITERATURE

Introduction

This chapter has been divided into three sections to address the question, how can teachers help students living in poverty develop higher-order thinking skills? The first section features studies that make connections between socioeconomic status and student academic performance. The second section addresses differing opinions in the research about higher-order thinking and the third section explores possible links between teacher expectations and student achievement.

Section I: Socioeconomic Status and Student Academic Performance

The research literature reviewed in this section focuses on links between socioeconomic status and student academic performance. The majority of this research explores whether socioeconomic status has an effect on student academic performance and whether teacher perception of student socioeconomic status may bear weight on the academic performance of students.

Marks (2006) sought to determine the extent to which student achievement is affected by the socioeconomic background of student families. Although Marks' study does not specifically focus on higher-level thinking, it provides insight into how socioeconomic status (SES) may affect students' school performance.

The sample included 2500 (USA) and 30,000 (Canada) 15-year-old students. Performance was measured using test scores in reading, science, and mathematics gathered from 30 countries. Data was also gathered on grade level, school program and academic location. School programs were broken into three categories: academic,

vocational and work preparation programs; the programs were also classified at two levels---upper or middle secondary school.

The student's SES was determined by collecting information from the students about their mother's and father's occupation and educational levels. Socioeconomic status, material, culture and educational resources were combined to create a global measure of poverty (SESALL) so data could be compared across countries. Material resources had two components: wealth and educational resources. A determination about material resources was based on whether specific things like the following were in the home or not in their homes: a room of their own, an Internet connection, TVs, availability of indoor plumbing, dishwashers, cars and computers. In addition to material resources the researchers accounted for cultural resources. Cultural resources were judged by the possession of books in the home and the presence or lack of, works of art, books of poetry and classic literature. Educational resources were determined by the availability of a quiet place to study, a desk for study, a dictionary, textbooks and the number of calculators in the home.

Given the information about material, cultural and education resources in relation to SES, researchers concluded that SES could only account for limited difference in performance between students from different countries. The researcher did note that students from higher socioeconomic backgrounds are in "...pedagogically richer and academically challenging environments"(Marks, 2006, p.38) than their counterparts in lower socioeconomic situations. Another conclusion worth noting suggested that when education systems differentiate instruction for SES, a correlation can be found between student performance and SES. Countries that offer more choices in their educational

systems (for instance, vocational training) have wider variation in how well students perform, whereas countries in which students have less choice may perform lower.

It is unclear how the sample size was reduced from 172,000 to 30,000 subjects and how the number of countries was reduced from 32 to 30. Though the sample size is quite large, the author did not indicate how the students were selected to be in the study.

The author did not provide information about the content of the reading, mathematics and science tests, which calls into question whether higher-order thinking would need to be employed to successfully complete the tests. However, the limited connection found in this study between SES and student performance may also point to a link between SES and students' ability to engage in higher-order thinking.

It is unclear how, if at all, single parent households were accounted for. Though Marks (2006) was thorough in his explanation of how the data was codified, the sample size seems significant enough that some single parent households may have been present. More information would make the case for solely using both parent's occupation and educational level even stronger.

Mulvenon's (2001) study investigates how poverty effects student achievement. The author's focus was on whether socioeconomic status, defined by the percentage of students receiving free and reduced lunch assistance (FRL), effected and/or was a predictor of student performance on the Fourth Grade Benchmark Exam in Arkansas. Using the FRL percentage Mulvenon's (2001) purpose was to determine whether there were academic differences among Arkansas schools that may positively or negatively bias scores, and if bias was found, to remove the effect of SES on the scoring system.

In order to determine the impact of FRL on student performance all students taking the Fourth Grade Benchmark Exam were used as the sample. All students that completed the test in 1999 were used equaling roughly 32,000 students. The data collected for FRL percentage and information about the test were obtained from the Arkansas Department of Education. The Arkansas Department of Education used codes to identify different types of students. These codes indicate students who are regularly enrolled, students considered Gifted and Talented (GT) and students learning English as a Second Language (ESL), etc. The 32,000 students were narrowed to 30,447. Those that made up the new sample students were regularly enrolled status or GT status.

Researchers tested a predication that SES would affect test scores, by breaking up the distribution of free or reduced lunch percentages into deciles. The deciles ranged from 10-99, indicating the percentage of students enrolled in the FRL program. Researchers were hoping to find anomalies within the data. Two deciles (10-19th and 30-39th) showed that in fact, FRL percentage is not a predictor of performance.

Nonetheless, researchers still strongly advised that FRL percentage does have a significant effect on performance and should be considered when evaluating individual schools. Students were deemed proficient if they received a score of 200 or above on the exams for literacy and mathematics. The authors reported that of the 30,447 students 44% of them were proficient in literacy and 34% in mathematics.

Therefore, clear conclusions about higher-order thinking are sparse at best. The data does help us better understand the impact that FRL percentage has on student performance. Though the researchers did find that FRL percentage was not always a predictor of performance, the deciles in which these anomalies occurred all boast lower

percentages of FRL. This is not to suggest that the students were not at a socioeconomic disadvantage, but the authors use of gifted and talented student in the deciles may have had an effect in said deciles.

This study provides encouraging information for the question at hand because it supports the general idea that students living in poverty are capable of higher-order thinking. Though the study clearly lacks any indication of use of higher-order thinking in the tests, it does suggest that students can be successful when supported by effective teaching.

Another study that studied any correlation between socioeconomic status and student achievement was conducted by Peck and Trusty (1994). Specifically they investigated socioeconomic status, achievement and ideas of self-concept in fourth graders. It is insightful for the question at hand, because it shows the possibility for teachers to effect students' self concepts that may in turn better help them engage in higher-order thinking. The data used in the study came from Mississippi State University's Program of Research and Evaluation for Public Schools (PREPS). The sample consisted of 392 fourth graders randomly selected from 14 elementary schools across the state of Mississippi. Approximately 65% of the students in the sample were eligible for the free school lunch program

Achievement and socioeconomic status data were determined through questionnaires that were completed by teachers and counselors. Parental educational levels were broken into five hierarchical categories and the parent with the highest education rating was used to determine socioeconomic level. School lunch data was broken into three categories to better determine socioeconomic status: fully paid, reduced

or free. Self-concept was measured by the Self Observational Scales and broken into seven dimensions making up self-concepts. The information about parental educational levels and school lunch were rescaled to give equal weight to each answer, so as to not skew the SES variable.

The results of the study determined that in order for students from differing SES backgrounds to be successful in higher-order thinking and/or achievement they must have specific positive self-concepts in place. Results varied but the most significant shows that students from low SES backgrounds are most vulnerable to negative self-concepts, whereas their higher SES counterparts are least vulnerable. Thus concluding that if students' self-concepts can be reinforced that they are capable of successful academic achievement.

Though the sample may have been random the authors do not indicate whether there were more than a total of 14 elementary schools in the state of Mississippi. Assuming that there are more than 14 schools and there is no indication of why or how the 14 schools were selected calling into question the randomness of the sample.

A large part of the study focused on the measurement of self-concept in students and how it could affect their academic performance. The results suggest that if students from low SES backgrounds do not feel supported in their school environment it will affect their academic performance. According to the results of this study, teachers can best foster higher-order thinking by helping low SES students develop positive self-concepts.

Schultz (1993) investigated the relationship between socioeconomic status, academic performance and achievement motivation of 130 minority elementary students. The sample used for the study had students in grades fourth through sixth that were “...randomly drawn from a child population attending three neighborhood elementary schools in a large urban metropolitan community in the upper Midwest” (Schultz, 1993, p.223).

Two sub samples were identified out of this group to make up the total 130 students. The sub samples used the student’s school records to determine eligibility for the free or reduced lunch program and then grouped them as more or less advantaged given the data. In order to determine eligibility parental income level was a factor. Students deemed with less socioeconomic status were eligible whereas students deemed having more socioeconomic status did not qualify. Academic achievement was measured by the Basic Achievement Skills Individual Screener (BASIS) and given to each student by the classroom teacher.

The additional information about the reason that standardized test scores were not used is a strength and gives cause to question other studies that use standardized tests to measure achievement. In addition, the authors give information about the specific content of the BASIS tests that were used. The mathematics and reading comprehension subtests were used. The content on both tests ranged in level of difficulty from current grade level to and eighth-grade level of competency. The mathematics subtest included the need for “...rote computational skills and conceptual application and analysis” (Schultz, 199, p.224). This is extremely helpful in being able to better determine whether higher-order thinking skills were needed to complete the subtest. It is uncertain whether

higher-order thinking skills were needed to complete the tests without specific examples of the questions but, it seems that the mathematics subtest may have called for use of higher-order thinking. Therefore, some conclusion can be made about how poverty affects student's ability to engage in higher-order thinking.

The research showed that socioeconomic advantage had a significant correlation to performance on the mathematics subtest ($r = .44$) and reading subtest ($r = .42$). In addition, the students considered to have more socioeconomic advantage were more likely to score higher on the mathematics and reading subtests, than their counterparts with less socioeconomic advantage. Both p values were significant at .05.

The insight into the content on the tests suggests that students from lower socioeconomic backgrounds are capable of engaging in higher-order thinking. This conclusion is strictly made on the inference of the rigor of the tests and the given results. Irregardless of more or less socioeconomic status, the students were still able to complete the tests. Even though some scored better than others the content may have called for higher-order thinking.

Schultz (1993) made a strong observation that the relationships reported in his study may differ with younger or older children and/or in different classroom contexts. He suggests that given different academic tasks, rather than standardized tests, we may be able to gain further insight into any correlations between socioeconomic status and academic performance. More research about daily classroom assignments, or analysis of work other than on achievement tests, may yield more conclusive results about any correlations between students' socioeconomic status and their ability to engage in higher-order thinking.

Some of the research reviewed in this section suggests that students from lower socioeconomic backgrounds are capable of engaging in higher-order thinking.

(Mulvenon, 2001; Peck & Trusty, 1994) The research findings point out that a key to low-income student success at higher-order thinking is the need to support and develop positive self-concepts.

Some of the research reviewed clearly suggests that the higher the socioeconomic background of a student the better they will perform academically. (Marks, 2006; Peck & Trusty, 1994) A telling idea was presented in Marks (2006) where he stated that most students, who do well academically, are exposed to school environments that in essence have better curriculum. This suggests that students who have lower socioeconomic status do not have access to the same services as their affluent counterparts.

Section II: Higher-Order Thinking

The studies reviewed in this section investigated higher-order thinking in the classroom. The majority of the studies were conducted in middle or high school classrooms spanning Portugal to the United States. Few studies addressed both higher-order thinking in conjunction with students living in poverty.

A study conducted by Salema (2001) in Portugal with 46 6th grade students at risk of failure. The aforementioned students took part in a program in Portuguese Language. The program emphasized a systematic and explicit teaching intervention that included higher-order thinking. The inclusion of higher-order thinking infused in the curriculum is particularly applicable.

The research was conducted over two school years, 1991-1993. Forty-six students identified as at-risk, from two schools, were studied. They received two extra hours of

Portuguese Language instruction and intervention in higher-order thinking skills. The higher-order thinking skills that were targeted included metacognition, textual comprehension and composition and positive thinking dispositions. The teachers involved in the program received 80 hours of training over the school year.

The authors' assumptions about higher-level thinking and at-risk students included the following 1) Intelligence can be taught, 2) Thinking skills in one context area can be transferred to other subjects and/or life situations, 3) Students considered at-risk may have inadequate relations between what they are being taught and their social context and 4) The effectiveness of a thinking skills program depends on how the teachers implement it.

A feature of the program required that teachers are trained to be explicit and intentional in teaching higher-order thinking skills. Teachers demonstrated higher-order thinking by verbalizing his/her own thinking processes, modeling his/her thinking process in textual comprehension and composition and then encouraged student's to do the same.

Quantitative and qualitative instruments were used to collect data. The quantitative instruments were two pre and two post tests that measured reading comprehension and written composition. Qualitative measures included individual interviews of the 46 students. The at-risk students reading and written composition marks were compared to 69 regular students marks. At-risk students were referred to as the experimental group, and the regular students were the control group.

End-of-term test data showed a significant improvement by the experimental group on the reading comprehension and writing composition tests. The writing

composition pre and posttest data also show that the control group gained. After the implementation of higher-order thinking expectations into the curriculum, term marks of at-risk and the control group yielded no significant difference.

One year later the experimental group's school marks were examined and individual interviews conducted. "Of the students interviewed 81% expressed that the extra classes they had attended during the previous year had helped them in the current year" (Salema, 2001, p.77). These findings are especially encouraging for low-achieving students because it indicates that they can engage in higher-order thinking when explicitly taught how to apply higher-order thinking skills in content area. The only concern with this study, which may effect transferability, is that it was not conducted in the United States. School systems and or options may be significantly different.

Haller, Monk and Tien's (1993) research study investigated the hypothesis that students who attend rural schools have less opportunity to engage in higher-order thinking in mathematics and science, than their urban school counterparts. Haller et al. (1993) suggested that the curricula in smaller schools may not provide as much depth or diversity as larger urban schools.

The data was collected over four years were collected for the National Science Foundation as part of a project known as the Longitudinal Study of American Youth (LSAY). The sample included middle and high school students taking mathematics and science courses. The first year's sample included 2, 829 10th grade students from 51 public schools across the nation. Sixty students were randomly selected to participate from each school; if the school's 10th grade population was less than 60, all students were

included in the study. Students were tested on their math and science abilities and higher-order thinking skills over two years.

A test for higher-order thinking skills was administered in 1987 when the LSAY students were in the 10th grade. The higher-order thinking pretests were used to control for the pre-existing factor of SES that may have effected 12th grade achievement. The researchers also accounted for courses offered at different schools that could be classified as advanced given that they may effect student ability to engage in higher-order thinking.

Results show that higher-order thinking in mathematics and science were not effected by school size. Offering advanced courses had no effect on the students' ability to engage in higher-order thinking but enrollment in them had an effect on student's achievement levels on tests of higher-order thinking.

The authors conceded that SES may effect student's ability to engage in higher-order thinking. Though SES was not an explicit factor in the study, an informed decision suggests that a percentage of the students involved in the study likely came from lower socioeconomic backgrounds than some.

Taylor, Pearson, Peterson and Rodriguez (2003) conducted a study in the United States in nine high-poverty schools that engaged in literacy instruction reform. The study sought to better understand effects that specific teaching strategies for higher-order thinking had on reading achievement.

The study was conducted over one school year with students in grades one through five. The nine schools that were part of the study were engaged in the CIERA (Center for the Improvement of Early Reading Achievement) School Change Project. Poverty was determined by the percentage of students enrolled in a free or reduced lunch

program. In the nine schools between 70-95% of the students qualified for the free or reduced lunch program. The schools were located in both urban and rural settings. In order to be part of the study 75% of the teachers in each school had to agree to be participants in the study (Taylor et al., 2003). The total sample size was 88 teachers and 792 students in grades one through five.

In each of the 88 classrooms, nine students were randomly selected. In order to randomly select nine students in each classroom, the teachers were asked to classify their learners into three achievement levels: high, average and low. Once students were divided into said groups, three were randomly selected from each category.

Student proficiency in literacy was assessed in the fall and again in the spring. The literacy assessments were different for students at differing grade levels. Teachers who participated in the study were interviewed in the fall, winter and spring for approximately 30 minutes. Each teacher was also observed for one hour in the fall, winter and spring. The variables considered were comprehension as measured by a standardized test, reading fluency, writing and comprehension as measured by a basal reader.

In fluency, the analysis found that for grade one there was a 35% variance between teacher's student scores after comparing them to the fall scores. The 35% variance between teachers was influenced by use of higher-level questioning. In grades two through five, the variance between teachers for spring and fall fluency scores was 46%. Reading comprehension measured by a standardized test in all grades was similar to the percentages for fluency. The same or similar percentages are found in the other

two categories. In general, higher-level questioning contributed to all grade levels growth in reading and writing.

The authors point out that they made limited use of interview data to better shed light on the practices of 25 teachers who used higher-order questioning. No interview quotes or questions are given. Given the aforementioned information, it is unclear if the sample size of the teachers was then narrowed from 88 to 25. There is no explicit information that points to this and it is unclear what was done with the interview data from all 88 teachers.

The researcher did not explain the criteria teachers used to classify high, average and low students. There is no indication that specific and consistent criteria were established across schools. It may be possible that a student classified as high at one school may be classified as average at another. Without more information about criterion used, the validity of sampling is suspect. Though the research yields some inconsistency it is especially encouraging because it suggests that students in poverty are capable of engaging in higher-order thinking if teaching strategies explicitly push students.

Bruno and Allen (1992) focused on how aware minority students from economically disadvantaged backgrounds were of their usage of higher-order thinking. The findings from this study aids in better understanding of how poverty might influence student's ability to engage in higher-order thinking. The research sought to find out how minority students used higher-order thinking processes in academic problem-solving situations (Bruno & Allen, 1992).

The sample was selected from an urban high school in Connecticut. It consisted of 107 high school students 77 of which was African American and 30 which were

Latino students. The school from which the sample was drawn received Title I funds and was located in a low-income neighborhood. The students were randomly selected from 9th and 10th grade classes.

Quality Point Average (QPA) determined current academic performance of the sample. A letter grade is assigned a certain score, which is based on the difficulty of a course. For instance, an “A” grade in a higher-level class has more weight than an “A” in a lower level class. “Examination of the schools records indicated that 12 (13%) of the total sample were classified as low achieving, 60 (56%) as average, and 33 (31%) as high achieving” (Bruno & Allen, 1992, 275).

The researchers used a 37 item self-report questionnaire (Student Thinking About Problem-Solving Scale, or STAPSS) to aid in reflection about problem-solving experiences. Each of the 37 items was responded to using a 6-point Likert scale.

The answers from the questionnaire were grouped into two categories: planning and monitoring. These two categories refer to what cognitive processes the students made use of when engaging in higher-order thinking. The results of the study indicate that students who engage in higher-order thinking make use of planning prior to actually solving a problem. In addition, students made use of monitoring strategies when engaged in problem solving. Monitoring is defined as a function of “...self-regulated cognition...” (Bruno and Allen, 1992, p. 278).

The majority of students when engaged in problem solving used planning and monitoring. The use of planning and monitoring included both positive and negative aspects depending on the student’s ability to self-monitor. The success for planning was twofold because it was found that planning prior to problem solving was advantageous,

but monitoring and knowing one's weaknesses was considered to have a negative impact on performance.

The methods and sample used are not very generalizable but they negate ideas that low-income minority students are unable to engage in higher-order thinking. The question of poverty's effect on higher-order thinking is dispelled in this study but again, this claim is preliminary given the little information from the study. It is unclear which category of achievers they were referring to or how the categorization of the sample into high, average and low achievers may have effected the outcome.

Eisenman (1997) sought to measure the effectiveness of the HOTS (Higher-order Thinking Skills) program versus the traditional program for Chapter One students' self-concept, reading achievement and higher-order thinking skills. Chapter One refers to programs that offer low-achieving students in low-income neighborhoods extra instruction in an attempt to fill the achievement gap.

Individual eligibility for the program is based on a students' standardized achievement scores. Remedial instruction is offered in basic skills for mathematics and reading. Schools receive Chapter One funds from the United States government and eligibility for such funds is determined by the poverty level of the district, which is typically based on the percentage of students who receive free or reduced lunches.

The HOTS program incorporates computers into the classroom to enhance higher-order thinking skills. Students are usually given a series of questions to answer about a reading and/or lesson that fall on the higher levels of Bloom's taxonomy. Pogrow (1987) from the University of Arizona designed the program.

Eisenman (1997) conducted a longitudinal study over one school year with fourth and fifth graders in a school district in Georgia in seven elementary schools that were eligible to receive Chapter One funds. Three schools used the traditional Chapter One approach and four of the schools used the experimental HOTS program with their fourth and fifth graders. All participants of the study were Chapter One eligible for a total of 175 students. The control group (traditional Chapter One group) consisted of 37 fifth graders and 35 fourth graders. The HOTS group had 49 second-year HOTS students in fifth grade and 54 first-year HOTS students in fourth grade.

Three instruments were used to determine student's self-concept, reading achievement and higher-order thinking skills. Higher-order thinking skills were measured using the Ross Test of Higher-Order Cognitive Processes. The Ross test is made up of multiple-choice questions with 105 items. Three Ross subtests that related to Bloom's taxonomy were used to measure higher-order thinking skills because they best related to the skills emphasized in the HOTS program.

Observations were made of each program a minimum of six times during the school year; twice in the fall, winter and spring. Interviews were also conducted with teachers and students to get a better idea of the program content. The students also took the Iowa Test of Basic Skills (ITBS).

The study employed a pretest-posttest data analysis using the three aforementioned tests. The ITBS scores from the previous spring were utilized as the pretests and again administered the next spring. The three dependent variables were self-concept, reading achievement and higher-order thinking skills. Because the fifth graders

in the HOTS program had completed two years rather than one year like the fourth graders, each dependent variable was analyzed separately by grade.

No statistically significant correlation was found between self-concept and grade four students in both programs. However, the fifth grade students' data indicated a statistically significant difference between the students in the HOTS program versus the students in the Chapter One program ($p < .05$). The students in the traditional program yielded lower self-concept than HOTS students, which given possible correlations between self-concept and achievement, may suggest an effect on achievement. In addition, this leaves question about student's socioeconomic backgrounds possible effect on self-concept and how the HOTS program accounted for possible changes in student behavior or ability to engage in higher-order thinking.

In regard to higher-order thinking skills and the three concepts identified as relevant to the programs, various statistical significance was found in the different categories. Fifth graders in the HOTS program had higher scores than the students in the traditional program. These data indicate that the students involved in the HOTS program are capable of engaging in higher-order thinking despite their socioeconomic backgrounds.

The significance of the study is that all students who participated were Chapter One students which indicates that on a socioeconomic level they were considered "disadvantaged" therefore it may be possible that they would be considered by some as unable to engage in higher-order thinking. The insight we gain from this study is that students who are low-income can engage in higher-order thinking when it is taught.

Eisenman (1997) shows strength in the meticulous detailed description of each program content and details. We are better able to see the similarities and differences across control and experimental groups. Similarities between the programs include the same amount of pullout time (45 minutes) with the same amount of students per class (5 to 10 students). The details of the two programs helps to better assess the curriculum for engagement in higher-order thinking skills. The HOTS program offers Socratic dialogue whereas the majority of time spent in the traditional Chapter One program focuses on drill and practice. The findings indicate that the HOTS program is most effective after two years of participation and that student's ability to engage in higher-order thinking skills are heightened.

Raudenbush, Rowan & Cheong (1993) investigated the teaching of higher-order thinking skills in United States secondary school classrooms. The authors investigated three hypotheses: a) higher-order thinking skills are primarily for high-track students taking advanced courses, b) teachers do not have adequate training to teach higher-order thinking and c) some norms discourage higher-order thinking skills.

The researchers surveyed teachers in 16 schools about their instructional goals in mathematics, social studies, English and science. Survey scales were constructed to try to capture higher order emphasis in the subjects. Data were collected in 16 high schools in California and Michigan, chosen for the diversity they would offer in terms of state policies, school organization, school composition and district resources. Questionnaires were administered to teachers of math, science, social studies and English. The sample consisted of 303 teachers.

Class size was used as a control variable to help code different academic tracks of classes. The average class size was 25.69 students and grades levels ranged from 9th to 12th grade. For each class, teachers were asked to identify the academic track of the class using the coding scheme of college-bound, nonhonors, honors, mixed, vocational or general.

To measure teaching for higher-order thinking, Raudenbush et al., (1993) decided to develop separate measures for teaching higher-order thinking in English, social studies, math and science. The researchers explained that because many of the disciplines share common features with respect to higher-order thinking they felt it best to be specific rather than generic. Each teacher of said subjects received a questionnaire that asked teachers to rate the cognitive demand of particular learning objectives. A four-point Likert scale was used on a set of discipline specific items the included an ability to indicate higher-order or lower-order objectives. There was little consistency and no higher-order or lower-order items formed a single scale so separate scales were created for each. In each subject analysis, patterns emerged that suggested that higher-order tasks included things like problem-solving and inference whereas lower-order tasks involved more rote memorizations or were skills based.

The results suggest that infusing higher-order thinking depends on the subject and differentiation of instructional objectives is highly influenced by academic tracks. Results showed a strong relation between grade and the effect of academic tracks, most notably in mathematics and science. The emphases on higher-order objectives were 10.50 points higher for academic classes than nonacademic classes. Similar effects were echoed with social studies and English. The researchers concluded that “Field research

cited earlier suggests that teaching for higher-order thinking, when it does occur, is far more likely to occur in high-ability classes than in low ability classes...” (Raudenbush et al., 1993, p.545). The findings here suggest that various factors are involved in whether lower-achieving students have access to classes or activities that call for higher-order thinking skills.

Because the study focused on secondary schools it is unclear how these results translate to elementary schools in which tracking may not be as prevalent. But elementary schools do commonly employ ability groupings for reading activities that would suggest that those in the lower tracks are challenged less to engage in higher-order thinking.

Salema (2001) suggests most strongly that all students are capable of higher-order thinking when it is systematically and explicitly introduced to them. Other researchers suggest that higher-order thinking does not belong in the general education classroom (Raudenbush et al., 1993) or that prior achievement is indicative of a student’s ability to engage in higher-order thinking (Taylor et al., 2003).

Section III: Teacher Expectations and Student Performance

The research reviewed in this section explores teacher beliefs towards academically at-risk students. The research spans 30 years and though beliefs have changed over time, there are distinct consistencies.

Marlow and Inman (1992) sought information about teacher perceptions and attitudes about the nature of higher-order thinking. Subjects of the study attended a workshop that emphasized use of activities to actively involve students in higher-order thinking.

The sample included 100 K-12 teachers from urban and rural elementary, middle and high schools. All teachers were involved in a four-hour seminar on higher-order thinking skills. The percentage of teachers from elementary, middle and high schools were evenly distributed among the group, 36% = elementary, 28% = middle and 35% = high school teachers. All participants voluntarily attended the seminar.

All were asked to respond to a ten-item survey before and after the workshop. The survey used a five-point Likert scale designed into three categories. The Likert scale ranged from strongly agree at number five to strongly disagree at number one. The categories addressed prior training in teaching higher-order thinking skills, teacher perceptions and attitudes about higher-order thinking and self-perceptions in ability to teach higher-order thinking.

The researchers found that after a workshop about higher-order thinking skills and ways to infuse them into the curriculum, most teachers were willing to encourage them in the classroom. The results indicate that teacher perceptions changed from pre to post workshop.

Scores went from 2.03 to 2.27 and 2.25 respectively, indicating that perceptions changed in a positive direction. General perceptions about higher-order thinking also saw changes. Three items addressed statements about lack of opportunity for higher-order thinking skills in the present classroom structure, the importance of higher-order thinking in daily lessons and the necessity of computers to teach higher-order thinking skills. The first statement's pretest had a score of 2.03 whereas the posttest had a 1.90. Integrating higher-order thinking skills into the classroom lessons saw a change from 3.89 to 4.32. The last category concerned with teachers' perceptions of their ability to

teach higher-order thinking also showed significant changes. The researchers suggested that involvement in the workshop helped increase confidence to teach higher-order thinking skills.

Although this study is quite simple it gives insight into the thoughts of teachers considering higher-order thinking skills in their classrooms. It would be interesting to see a follow-up study of the same teachers over a school year to determine the effectiveness of the workshop and implications it may have had for teaching higher-order thinking. Nonetheless, it shows that with minimal training teachers' confidence and ability to assist learners in higher-order thinking is a reasonable goal.

Zohar, Degani and Vaakin (2001) studied the relationship between teacher beliefs about low-achieving student abilities to engage in higher-order thinking and student achievement was examined by using semi-structured interviews with 40 Israeli teachers. The interviewees were 40 junior high school teachers who taught in two different schools in Israel. Twenty teachers were chosen from each school. All interviewees represented a range of academic subjects. The number of years spent teaching ranged from three to twenty-nine. The student population of the two schools represented students from low, medium and high socioeconomic backgrounds with mixed academic abilities.

The interviews lasted 30 minutes and conducted by the third and fourth authors of the study. All authors read the transcribed interviews and established categories for recurrent ideas. Interrater reliability between two independent readers was at 80%. Particular attention was paid to determining the difference between low achieving and high achieving students because the authors found that the student populations of each

school were heterogeneous in terms of students' socioeconomic backgrounds and academic levels. Low-achieving (LA) students were described as low achieving in academic achievements and high achieving (HA) were described as the opposite. Thus, the longitudinal analysis of each individual interview sought internal consistency in terms of whether or not teachers distinguished between LA and HA students with respect to higher-order thinking instruction. The interviews were divided into three categories; distinguishing consistently (DC), not-distinguishing consistently (NDC) and inconsistency (INC).

The DC classification found that teachers were consistent when drawing distinctions between HA and LA students and their ability to engage in higher-order thinking. Teachers classified as DC believed that higher-order thinking was best for HA students. By classifying the first section of the interviews into the three categories Zohar et al. (2001) determined the following percentages: DC = 20% (or 8 teachers), NDC = 45% (or 18 teachers) and INC = 35% (or 14 teachers).

The second section of the interview revealed teachers' views about which teaching methods were best for LA students. Responses were only calculated if more than two teachers brought up the idea/category. The authors found that 45% of teachers expressed the view that "thinking-based" learning confused LA students. The authors conclude that this belief dissuades many teachers from using this method in their classrooms.

The anomaly of this study is that the students who were classified as LA students were not necessarily associated with low-socioeconomic status. Therefore, distinct conclusions about higher-order thinking and low SES are harder to argue

from the results of this study. In addition, Israeli schools may be uniformly different from schools in the United States. But the results clearly suggest that LA students who may or may not be from low SES backgrounds are tremendously influenced by teacher beliefs in their ability.

O'Connell, Dusek and Wheeler (1974) conducted a follow-up study to a previous study done by Dusek & O'Connell (1973) that investigated teacher bias and teacher expectancy effects on elementary school students. The previous study attempted to bias teacher expectancy by suggesting that eight specific students were targeted to make significant gains in language and arithmetic. The previous study found that telling the teachers that students would perform well did not effect student test scores.

The same students that were the sample in the original study became the sample in this study. Of the original 64 participants 38 were still available for testing. Twenty-two were now in the third grade and 16 in the fifth. The subjects were given two subtests from the Stanford Achievement Test (SAT) in September and January of the 1972-1973 school year. The procedure was much the same as the previous study.

Teachers were told that the tests administered would help predict which students had high academic potential in language and arithmetic skills. The only difference was that the teachers were not asked to rank the children as they had in the first study. The researchers suggested that they did not ask the teachers to rank the studies because the goal was to determine any long-term effects of teacher expectancy.

Three factors were present in the analysis design: grade level, teacher ranking from the 1971-1972 school year and experimental condition. Twenty-six of the original 64 subjects were not available. The 38 subjects first SAT test scores were used in

conjunction with the fourth and fifth SAT scores. In all three cases, the students that were ranked higher by the teacher had higher SAT total scores than those ranked lower. This information is consistent with the original findings but somewhat confusing given that teachers did not rank the students in the second study. This suggests that over time teacher expectancy stayed somewhat stable and were good predictors of students' academic performance.

This study is somewhat contradictory to the majority of other studies in this section because it found that teacher expectancy cannot be biased, which in turn did not effect student performance. It is an encouraging study, but leaves some unanswered questions. Though the results are clear it is unclear why teachers were not prone to bias when presented with specific information about their students. In addition, there is no mention of teaching methods or philosophy that would point to a more in-depth approach to non-bias. Given that there is no mention of socioeconomic status predictions about teacher bias, imposed or otherwise, conclusions could use expansion.

The studies findings are encouraging because it suggests that over time teachers may not influence student outcomes as heavily thought, and that as long as teachers do not impose bias onto their students, those living in poverty may be more apt to engage in higher-order thinking when they do not feel bias from their teachers.

A Brattesani, Weinstein and Marshall (1984) article describes two studies that make use of a hypothesis suggesting that students revise their own achievement expectations from observations about teacher treatment towards high and low achievers. Each study will be addressed because of its applicability to the question. The first study

had subjects from third, fourth and fifth grade that numbered 101 altogether from seven classrooms in the same school district.

During February teachers of the sample were asked to rank each of the students for their expected year-end achievement in reading. About the same time, students completed a Teacher Treatment Inventory (TTI) on which they indicated the frequency of 44 different items that indicated teacher behaviors towards a hypothetical low and high achiever. The inventory consisted of a four-point Likert-like scale for students to indicate never, sometimes, often or always. Four scales were then created based on the analysis of the TTI. Scale One was labeled Supportive Help; Scale Two was Negative Feedback and Teacher Direction; Scale Three Work and Rule Orientation and Scale Four addressed High Expectations, Opportunity and Choice. The researchers used Scales Two, Three and Four because they felt these were congruent with previous analysis of high and low achievers. In addition, reading scores from the prior-year end and the current year-end were collected and based from the Comprehensive Tests of Basic Skills Reading Achievement Test.

Results indicate that student perceptions, whether negative or positive, matched their achievement levels only in classrooms in which teachers differentiated treatment toward high and low achieving students. The second study had a sample size of 234 fourth, fifth and sixth graders from 16 classrooms in the same district. The procedure was relatively the same in this study as the previous 1 and students indicated their expectation for year-end schoolwork and reading performance. Again, scores from the Comprehensive Test of Basic Skills Reading Achievement Tests were used. Similar

results were found, and the hypothesis that teacher expectations predict student outcomes beyond predictions based on prior achievement was analyzed.

Again, researchers found that prior achievement was a better predictor of year-end achievement in the lower-differential classrooms versus the high. Teacher expectations tended to be more of a predictor in the high rather than lower-differential treatment classrooms. (14% vs. 3% of the variance)

The results from the first study indicated that students who received higher achievement scores or high teacher expectations perceived a more positive classroom than low-achievers. The students who received low achievement scores or low teacher expectations perceived more negative interaction with the teacher. These results are congruent with classrooms identified as high-differential treatment classrooms. In low-differential classrooms perceptions were more positive all around. This study helps to better explain that teacher expectations and student outcomes differ according to the type of perceived treatment students receive. Therefore, it is important that when putting these results in the context of teaching higher-order thinking skills, perceived ability by the students could effect actual outcomes.

Smith, Jussim and Eccles (1999) investigated change over time of students' self-prophecies about their academic abilities. This is especially illuminating given the question of higher-order thinking. Smith, Jussim & Eccles (1999) factored in the possibility of self-fulfilling prophecies in relation to the number of perceivers. First, Smith et al., considered multiple perceivers expectations because each year the students encountered different teachers' expectations. Secondly, Smith et al., examined the effect over time with the same perceiver. Multiple perceiver's data was collected every year

between 6th and 12th grade whereas the same perceiver data was collected over two semesters of the same school year.

The three hypothesis about self-fulfilling prophecies developed by the researchers warrant more explanation. The accumulation hypothesis refers to effects that have at one time been triggered by one perceiver's expectations and the particular target performance conforms more and more to the perceiver's expectations over time. The dissipation hypothesis suggests that the original impact of one perceiver's false expectations diminishes over time. The stability hypothesis means that the self-fulfilling prophecies created by a perceiver maintain over time.

The first section of the study examined self-fulfilling prophecies with multiple perceivers from grades 6 through 12. The sample varied between 545 and 1,728 students and included approximately 98 teachers. The second section of the study examined the effects of self-fulfilling over time with one perceiver. The second study had a sample size of 1,023 students and 65 teachers for 6th grade and 1,888 students and 50 teachers for 7th grade.

For determining self-fulfilling prophecies for multiple receivers from 6th to 12th grade, the researchers created eight samples. Five of the samples focused on the relationship between teacher perceptions and achievement in 6th grade and three examined the same relationship for 7th grade. The five samples were not independent because three of the five examined final mathematics marks and two examined mathematics standardized test scores. The 7th grade samples were broken up similarly with two samples related to final math marks and one related to standardized mathematics test scores.

The teachers received questionnaires in October of the 6th grade year and again in October of the 7th grade year. The questionnaires focused on teacher perceptions of effort, talent and performance and were combined to form a single variable called Teacher-Perception-Scale. Students also received questionnaires in which they self-reported their perceptions of their effort in math, self-concept of ability in math and time spent on homework.

Measures for student achievement were based on the previous year's final mathematics marks and math percentile scores on one of the four standardized achievement tests taken at the end of 5th or 6th grade. These scores were in relation to teacher perceptions. For the analyses done with multiple perceivers over time, final mathematics scores from 6th to 12th grade were used to measure future achievement. Achievement variables were determined by combining the math percentile scores from standardized achievement tests taken in 9th and 10th grade to form one variable and a second variable combined 11th and 12th grade.

The researchers found that teacher predictions of mathematics marks were less strong in 7th grade than in 6th

Dusek and O'Connell (1993) investigated teacher expectancy effects on children's academic performance. Teacher expectancy effects are especially relevant to engaging students in higher-order thinking. If teachers do not expect students to succeed it may affect student performance. The researchers attempted to induce bias by revealing the test results of children who scored high on the Stanford Achievement Tests (SAT). The researchers disguised the test results as a measure for potential gains in language and arithmetic skills during the academic year.

The sample included students in 2nd and 4th grade. No information about the student's socioeconomic backgrounds was revealed and therefore it is uncertain how many of the students in the sample could be classified as living in poverty. The SAT tests were administered to 32 second graders and 32 fourth graders. Of the 32 subjects in each classroom 16 were selected for the study.

The 16 subjects were selected based on the classroom teacher being prompted by researchers to rank students based on their expectations regarding their year-end performance level in language and arithmetic. Prior to testing the teachers were told that the researchers wished to pilot a test that would predict future academic performance. The teachers were informed that after the first round of tests, teachers would be supplied with the names of the students who scored highest and would show high academic gains throughout the year. The tests were administered at the beginning, middle and end of the school year; October, February and June.

The children that were ranked 1-16 by the teacher were divided into groups of four and two students from each group were randomly assigned to the experimental group and the remaining two were part of the control group. One week after testing, eight from the experimental group were given to the teachers and explained that these eight subjects were suppose to show large gains in language and arithmetic skills over the school year. Results indicated that in October both grade levels had equivalent scores on the SAT. The researchers conclude that a child's achievement may be raised by imposed bias.

On the whole, the study seems to lack essential information that would make it more valid. Not very much information is provided about the students in the experimental

and control groups. If the two groups included learning-disabled students the results may have been skewed but that information is not provided. The procedure for random selection was not outlined affecting the generalizability of the study. This study demonstrates that teacher expectancy can substantially effect student outcomes, even if said bias is fabricated.

Kinney (1995) investigated one teacher's classroom that was successful in engaging students who come from economically disadvantaged neighborhoods. The study included 40 students and the teacher, Mr. Picard, who taught an audio/visual communications technology shop class for four hours per day. The high school was located in Philadelphia, had a predominant Hispanic population (78%). This ethnographic study spanned two years. Several visits were made to Mr. Picard's classroom at the end of the 1993-94 school year to make preliminary observations and interview Mr. Picard. In 1994-95 the researchers visited his class once a week.

Researchers interviewed Mr. Picard in between two classes and after school. The students were interviewed during class time after they had completed assignments or at lunch. "During these weekly visits we spent the entire day in the classroom observing instructional activities, teacher-student interaction, and peer relations" (Kinney, 1995, p. 9). At first, the researcher mainly focuses on interviewing Mr. Picard to get his opinion about successful and unsuccessful teaching strategies. After an unspecified amount of time, the researchers began to interview students about their perceptions of the class. The researchers were then able to identify recurrent themes that help increase or maintain motivation to learn in urban adolescents.

The researchers identified three recurrent themes that made Mr. Picard's teaching strategies effective. They were:

Caring-Classroom Context

- They defined a caring classroom community as a place in which all members contributed to a feeling of mutual concern for a positive environment.
- “We also frequently observed Mr. Picard creating a comfortable learning environment by working one-on-one with students, listening attentively to their questions and concerns, and exhibiting sensitivity to the adversities students from economically disadvantaged backgrounds face in the urban environment” (Kinney, 1995, p. 10-11).
- Mr. Picard employs the use of more capable peers to create a feeling of teamwork and caring in his classroom

Learner-Focused Instruction

- Students have freedom and choice within the parameters of the given assignments
- Mr. Picard frequently bends the curriculum to relate to the context of his students' lives
- Mr. Picard realizes that by allowing students to choose their own topics that it fosters their natural motivation.

Building a Sense of Future

- Mr. Picard makes a point to relate in class learning to “real” life situations
- Mr. Picard lets his students know that the learning they are doing in his class can help them with job opportunities once they are out of high school

The researchers conclude that the most effective educators pay special attention to their students' backgrounds and culture so that students' strengths are utilized to engage them in the learning.

Although the authors draw conclusions that are congruent with Mr. Picard's goal the credibility of the study is called into question. Though they identified effective teaching strategies, it could be argued that Mr. Picard was successful because he possessed personality traits that appealed to his students. The interview excerpts

presented were insightful but it was unclear how the recurrent themes were related to teaching methods or strategies. This brings into question the transferability of the study.

The strength may lie in that Mr. Picard's classroom was a class that would, at most high schools, be considered an optional class. If students were already motivated enough to sign up for the optional class, that would have effect on their levels of motivation. The conclusions are clear but did not offer up concessions about what strategies or methods did not work. It would be helpful to know more about the methods or strategies that Mr. Picard used that were ineffective.

Mr. Picard's teaching style and philosophy does lend itself to developing higher-order thinking as a normal part of learning for all students. Generalizing his ability to all teachers is difficult, but does give an example and hope for a teacher to assimilate some of his strategies for developing higher-order thinking in diverse classrooms.

Fuchs, Fuchs and Phillips (1994) investigated teacher expectations for their students and its effect on student academic performance. The specific purpose of the study was to determine if a correlation between teacher belief of student work habits and the responsiveness of it in teachers' planning.

The sample included 121 elementary and middle school teachers in 32 schools with over half located in the southeast region of the United States and the other in the upper Midwest region. Each was identified as a general educator with at least one student identified as possessing a learning disability (LD). Most teachers had one or more LD students in their classrooms. All 121 teachers completed a Classroom Standards Scale that measured, using a Likert-scale, teachers' beliefs about students' work habits and classroom behavior. Nine items outlined statements about student work

and behavior. A subgroup of 24 teachers was identified that believed all nine items were essential and a subgroup of 18 was identified as believing the items were between essential and unnecessary. These 42 teachers became the new sample.

Information and data were recorded about the LD and average-achieving (AA) students and found that in October of the school year their achievement levels for reading and mathematics were comparable. To measure achievement the LD and AA students in each class were pretested and posttested in reading or mathematics in October and April respectively. To compare achievement growth the various elements of the tests were computed for each measure and standardized which produced z-scores, which were then averaged across the two mathematics measure and two reading measures. Finally, all the z-scores were averaged into one variable called Standardized LD Academic Growth and Standardized AA Academic Growth.

The results of student performance and the surveys given to teachers indicated that the teachers with higher classroom standards reported they paid more attention to student performance when planning, than did teachers with lower standards. The same result shows up for having effected greater achievement across AA and LD pupils. Thus, the teachers whom demonstrated better instructional practices positively effected student achievement in both AA and LD pupils. This was backed by strong beliefs in the importance of classroom behavior and work habits.

There was no information about the socioeconomic backgrounds of the students observed which effects any strong conclusion about engaging said students in higher-order thinking. Nonetheless, the findings about work habits and classroom behavior may relate to students at differing achievement levels.

Although Fuchs et al. (1994) offered an informative look at the content on each test, it is not apparent whether the content called for use of higher-order thinking skills. Some parts of the reading test point to using higher-order thinking but no concrete conclusion can be made without more specific information.

Thompson, Warren and Carter (2004) investigated teacher beliefs about who was to blame with low student performance in an underperforming school. Data were collected from 121 teachers at an urban high school in southern California over the 2002 school year. A questionnaire consisted of 80 questions and statements that were designed to identify teacher practice, attitudes and beliefs that could contribute to student underachievement. A four-part Likert scale was used to assess the aforementioned statements. Student underachievement was defined by the low scores of standardized tests scores in language arts and mathematics that contributed to the state labeling the school as underperforming. The 121 teachers who completed the questionnaire made up 89% of the teacher population at the participating high school.

Fifty-seven percent of the surveyed teachers agreed with a statement that suggests when students fail they are largely to blame. This statement was used as the criterion variable and other questionnaire items were then identified as predictors. Eight different predictors were identified to contribute to the overall attitude of the criterion variable. Most all the predictors had to do with blaming the students for their apparent failure or having a mistrust in their abilities. Sixty-four percent of the teachers agreed with a statement that suggested parents were the primary people to blame for student underachievement. The strongest predictor of whether teachers blamed parents was based on whether the teacher also blamed the student.

Thompson et al. (2004) concluded that the teachers most likely to engage in the “blame game” were characterized as having negative or contradictory attributes. The most shocking admission that surfaced about the teachers who blamed students for their own underachievement was the that they “...did not treat their students in the manner in which they would want their own children to be treated by teachers” (Thompson et al., 2004, p.9). This admission may have especially harsh ramifications for low-income students’ ability to engage in higher-order thinking. When teachers play the “blame game” low-income students may be subjected to unequal educational opportunities.

The authors point out that teachers have higher levels of accountability since the No Child Left Behind Act was passed. Thompson, Warren & Carter (2004) suggested that since NCLB more emphasis has been put on closing the achievement gap and that teachers’ beliefs about their students’ ability to succeed may have special ramifications for all parties involved. By better understanding teacher beliefs that have a negative effect on student achievement, the better able the professional educational community can address unmet professional development needs

Solomon and Battistich (1996) used teacher questionnaires and classroom observations to measure the effects of teacher beliefs on students who came from economically disadvantaged backgrounds. The effects of poverty on teacher beliefs are paramount when addressing engagement in higher-order thinking. If students perceive negativity because they are from economically disadvantaged backgrounds their ability to engage in higher-order thinking could be hindered.

Twenty-four schools were used in the study. The schools were divided evenly into two groups, with 1 group of schools serving as the control. The schools involved

were located across the United States with the majority located on the West Coast. All were either urban or suburban schools and 90% of the teachers were female with 1 to 44 years teaching experience. The participants were 476 mainstream elementary school classroom teachers (K-6). Poverty was determined by the percentage of students receiving free or reduced lunches. To maximize comparability the researchers also grouped the schools into high, medium or low poverty groups.

Teacher attitudes and beliefs were measured by a teacher questionnaire that was completed by 89% of the teachers. Different sets and scales were then created using factor analysis. The first set reflected teachers' educational attitudes and beliefs which included factors like a) skepticism about students' learning potential, b) belief regarding teacher authority and student compliance, c) belief in student autonomy and d) trust in students and e) how much control teachers assert in their classrooms. The second set addressed teachers' feelings about self-efficacy as a teacher and feelings about being a teacher. The third set reflected teacher perceptions of school climate.

Classroom observations accompanied the questionnaires. Four observers spent 90 minutes in each classroom at various times throughout the school year. Although the observers had a high interrater reliability percentage of 84.6% we know nothing about them or their possible biases. Based on classroom observations the Solomon and Battistich (1996) created scales for better classifying classroom activities, student's behavior and teacher practices. Items represented observations of teacher warmth and student autonomy, etc.

Results suggested teachers in the high-poverty schools were more skeptical and less trusting of student potential even if actual achievement scores contradicted their

beliefs. The school climate scale revealed a similar belief. Teachers generally viewed high-poverty schools as a less than desirable place of employment. Teaching practices in high-poverty schools also fell low on the aforementioned scales. In general, results showed that teachers in high-poverty schools put more emphasis on extrinsic control, were less warm and supportive, and put less stress on intrinsic motivation.

Researchers came to numerous conclusions that are applicable. First, the research suggested that teachers in higher-poverty schools exert more control and afford students less autonomy, which may have effect on the practice of higher-order thinking. Second, even when higher-poverty student achievement levels were equivalent to their peers in different socioeconomic levels, teachers believed students were less capable. This strongly attests that teacher beliefs and attitudes have weight in the classroom and shape the availability of learning activities to encourage higher-order thinking.

Love and Cale-Kruger (2005) conducted two studies examining teacher beliefs and student achievement in urban schools. The studies are similar to an element of Zohar's (2001) research that examined different pedagogical strategies teachers believed produced the best learning for their students.

Six schools participated in the first of Love and Cale-Kruger's (2005) studies. The schools served free and reduced lunches to 95% of the students. This indicated a strong link to low socioeconomic status among the student bodies. All schools primarily served African American children and five were located in the same metropolitan area in the southeastern United States and the sixth school was located in a different city. The 244 participants included teachers, principals, media specialists, paraprofessionals,

counselors and instructional assistants. A survey was used that measured culturally relevant beliefs and practices of teachers' classrooms.

The second study included two of the six participating schools from the first study. Both of the schools were placed in the lower 20% of schools in the state based on scores on the Iowa Test of Basic Skills (ITBS). The ITBS tested third and fifth graders in reading, language arts and mathematics. Fifty of the previous 244 participants in Study One were the sample. In this study, the researchers correlated the survey items from Study One with the standardized achievement scores of all students who were in the 50 participants classes ($N = 1,432$). The advanced skills components of the ITBS were included in the achievement scores. Each test was then separately correlated with teachers' beliefs.

The results of Study One found differing views about teachers' role in disseminating or ascertaining knowledge to or from students, the importance of students' culture, race or ethnicity in teaching and social relations in and outside the classroom. The majority of respondents favorably rated four culturally relevant statements that related the teaching profession to giving back to community.

The authors concluded that the findings from Study One indicated an overwhelming agreement of the importance of teachers to learn from their students and that it is vitally important to teach critical thinking skills. Study Two found that four of the nine statements about social relations in and outside the classroom related to achievement. Therefore, teacher belief and achievement are correlated to some degree.

Both studies are encouraging because they indicate that teacher beliefs can positively effect achievement levels of students from low-income backgrounds.

Although there is no specific information about higher-order thinking, the tests may have called for some level of it. The critical implications of these two studies support the idea that when teachers believe in their students, achievement levels reflect that belief.

Anderson, Greene and Loewen (1988) investigated teacher and student self-efficacy, student achievement and thinking skills. The research was done in three school districts with teachers in grade levels three through six. A 16-item scale to assess teachers' sense of efficacy was used as a measure. Students' sense of self-efficacy was assessed using a four-item measure created by the researchers.

Thinking skills for both teachers and students were measured using the New Jersey Tests of Reasoning Skills (NJTRS). Student achievement was based on scores received on Canadian Achievement Tests. Finally, students' perceptions of their teachers' beliefs were assessed using a test called *Our Class and Its Work*. Interviews were conducted with teachers and lasted from 20-60 minutes at the beginning and end of the study. The interviews were meant to solicit any other information that would better address teachers' sense of efficacy, how self-efficacy is formed, teaching style and perceived role and any more information that may effect the results.

The chosen sample came from three school districts in southern Alberta, Canada that taught grades three and six. Seventy-seven surveys were mailed out with a return of 65 (84%). From the 65, 24 were selected for further participations in the study. The teachers were selected based on their personal efficacy score and classified into either a "high efficacy" or "low efficacy" group. All the aforementioned tests were administered in the fall and then in the spring of the same school year. The sample number of students was 584.

The analysis of teacher data showed that generally teachers' put stronger faith in their personal efficacy than in their general efficacy as teachers. The comparison from fall to spring resulted in slightly higher personal efficacy scores than teaching efficacy scores (fall $t = 6.55$, $p < .01$; spring $t = 4.21$, $p < .01$).

Analysis of student data revealed that using achievement tests to measure achievement was not as efficient as the researchers had hoped. Instead of all three districts administering the same tests, different tests were utilized in different districts. The researchers decided that they could not measure gain scores but did use posttest scores as the measure of student achievement. Significant correlations between achievement scores and students' sense of efficacy suggested that students who believed in their ability were successful. No significant correlation was found between teachers' scores on the NJTRS and students outcomes at any grade level. This is surprising given that 16 of the 24 teachers believed that teachers have a major impact on student learning.

Winfield's (1986) main focus was to determine the effect of teacher beliefs on academically at-risk students in several inner-urban schools. Five inner urban schools serving primarily low-income and minority students in grades K-12 participated in the study. Forty elementary school teachers were interviewed. The case study methodology was used and a narrative was constructed for each school in the sample. Teacher beliefs were determined by teachers' self-reports and observational field notes. The interviews helped determine teacher beliefs about student learning, other staff members in the school, goals of instruction and teacher effort in classroom instruction.

The data analysis showed that teachers categorized academically at-risk students into one of two categories, either students that needed additional instructional assistance or students whose low performance could be ignored. Teacher behaviors for dealing with academically at-risk students were classified into four different categories. They were: tutors, general contractors, custodians or referral agents. Teachers who were labeled tutors generally found it valuable to provide necessary instruction to improve student achievement. Being labeled a general contractor suggested agreement that students needed extra instruction but responsibility for improving students' skills fell into other staff members responsible for achievement gains.

Custodians indicated that they felt there was nothing or little they could do to improve student performance and referral agents pushed responsibility to others but differed from general contractors in that they believed the academically at-risk students were incapable of learning. Several well documented excerpts of teachers labeled in each category expanded and added validity to the study.

Winfield (1986) concluded that the beliefs identified in this study have implications for student learning outcomes of academically at-risk students. She suggested that caution should be exercised on these conclusions and that these case studies "...do not provide strict causal tests of hypotheses but are generative in nature" (Winfield, 1986, p. 264). Her strongest suggestion is that the categories may be a continuum of teacher's responses to academically at-risk students. More research may be warranted and brings into question causal relationships between teacher beliefs and low-income student achievement.

The categories in which teachers dealing with academically at-risk students were classified are insightful. Three of the four categories allow the teacher to transfer responsibility of instruction onto a second party or simply do little to improve student performance. The ability to develop higher-order thinking is also transferred and possibly never attempted.

The research in this section found varying degrees of agreement regarding the influence of teacher beliefs on students. Some studies suggested that higher-order thinking was not an option for low-achieving students thus teachers found no reason to introduce it. (Thompson, Warren & Carter, 2004; Solomon & Battistich, 1996; Winfield, 1986) One study found students who received higher achievement scores generally perceived the school environment to be more positive than did their low-achieving counterparts. (Brattesani, Weinstein & Marshall, 1984)

In contrast, other studies (Kinney, 1995; O'Connell, Dusek & Wheeler, 1974; Brattesani, Weinstein & Marshall, 1984; Love & Cale-Kruger, 2005) found that effective educators who paid particular attention to student backgrounds and cultures created an atmosphere that engaged all students in higher-order thinking.

CHAPTER FOUR: CONCLUSION

Introduction

In this chapter a summary and the major implications for practice of the research findings described in chapter three are presented. The summary and implications are organized based on the three sections of Chapter 3 : socioeconomic status/academic performance, higher-order thinking skills and teacher expectations in relation to student performance.

Summary of Findings

The first section of chapter three reviewed research about correlations between socioeconomic status and academic performance. Across all studies (Mulvenon, 2001; Peck, Trusty & Matthews, 1994; Schultz, 1993; Marks, 2006), socioeconomic status had a significant impact on student performance. This echoes sentiments introduced in Chapter 1 about justifications for the passage of the No Child Left Behind Act of 2002.

Although the majority of the findings in section one indicate a link between socioeconomic status and student achievement, not all were discouraging in relation to higher-order thinking. Peck, Trusty and Matthews (1994) study shed light on the complexities about students from differing socioeconomic backgrounds. The study extensively investigated the effect of socioeconomic status' effect on self-concept for high and low achieving students from high and low socioeconomic backgrounds.

The categories that Peck et. al (1994) developed to define the myriad of social factors that contribute to self-concept illuminated the embedded complexity of socioeconomics effects on student achievement. Even high-achieving students who

came from low socioeconomic backgrounds, had lower self-esteem than their high achieving counterparts from high socioeconomic backgrounds. On the surface this study seemingly negates students from low socioeconomic backgrounds ability the to engage in higher-order thinking. Upon closer investigation it also clearly suggests that if teachers can work to heighten positive self-concepts in all students, all students will achieve at higher levels irregardless of their socioeconomic status.

A frustrating lack of information about the content of the achievement tests used to measure student achievement, made for any specific conclusions about the use of higher-order thinking on tests, nil. Given the clear link between socioeconomic status and student achievement one can only conjecture that tests that employ higher-order thinking may impede student performance. Marks (2006), Mulvenon (2001) and Schultz (1993) used various standardized tests to measure student achievement but no information was provided about the actual content of the tests other than what subjects were tested.

The second section of chapter three, reviewed varied research about student ability to engage in higher order thinking. The literature was somewhat disjointed but presented a clearer picture about the varied opinions present in the education community. Some of the studies (Salema, 2001; Haller 1993; Raudenbush; 1993) failed to include information about student's socioeconomic status, thus only addressing a small facet of the question at hand. Nonetheless, the information is illuminating about the use of higher-order thinking in varied classrooms.

One major finding was that student's classified as at-risk (or of low socioeconomic status) were capable of higher order thinking if it were explicitly

taught. (Salema, 2001) This study's findings were especially exciting but the generalizability of it may be hampered because it was conducted in Portugal. A higher-order thinking skills emphasis was infused into a curriculum for students who had been identified as at-risk for academic failure. Teachers explicitly modeled elements of higher-order thinking and had their students follow suit. End of term marks found that there was no longer any difference between at-risk and regular students. A study done in the United States (Einseman, 1997) about a higher order thinking skills program yielded similar results.

Lastly, in section three research was reviewed from over 30 years of inquiry into teacher expectations/beliefs and its relationship to student performance. Though the literature spanned over 30 years the results are fairly consistent over time. A most significant finding is that teacher belief about students affects student performance. This finding was supported in studies (Sherman, Brophy, Evertson, & Crawford, 1976; Veldman & Brophy, 1974; O'Connell, Dusek, & Wheeler, 1974; Dusek & O'Connell, 1973) conducted in the 1970s and supported by studies (Love & Cale-Kruger, 2005; Thompson, Warren, & Carter, 2004) conducted in the 2000s. The difference between the latter studies and newer studies was in their specificity about the population targeted for research. The newest studies (Love & Cale-Kruger, 2005; Thompson, Warren, & Carter, 2004) tended to specify links between students from low socioeconomic backgrounds and teacher expectation and suggested attitudes detrimental to the performance of students in poverty. The older studies (Sherman, Brophy, Evertson, & Crawford, 1976; Veldman & Brophy, 1974; O'Connell, Dusek, & Wheeler, 1974; Dusek & O'Connell, 1973)

appeared to be broader in their sample specifics and focused on the influence teacher's perceptions had on performance.

Two strikingly different studies illustrated the varying degrees of how teacher expectations can positively and negatively effect students. The first study was conducted by Kinney (1995) and focused on a particular teacher's methods for engaging all students in the learning process. Kinney observed Mr. Picard making an effort to engage all students by paying particular attention to what their cultures and backgrounds could contribute to the classroom community.

The second study is less encouraging. Thompson's (2004) research focused on teacher perceptions of low achieving student's responsibility in their academic failings. Teachers engage in a "blame game" in relation to low achieving students. Even if test scores proved otherwise, teachers were convinced that students from lower socioeconomic backgrounds were less capable.

Classroom Implications

The research yielded varying degrees of insight into the question: How can teachers help students living in poverty develop higher-level thinking skills? The first section of research addressed socioeconomic status and academic performance. The most relevant to classroom implications came from the Peck (1994) study.

Peck's (1994) study focused on specific implications self-concept had on student achievement. It suggested that in order for students of differing socioeconomic backgrounds to be successful, they must have certain self-concepts in place. One of the self-concepts was linked to school environment. The low achieving low income students felt more negative at the school environment than did their high and low achieving

affluent peers. Classroom implications from this facet of the research suggests that teachers must develop a classroom community where students from low socioeconomic backgrounds will feel confident about their ability to engage in higher order thinking. Teachers can help by recognizing the importance of students to master higher levels of thinking by balancing instruction so that students are mastering the basics. (Campbell & Chastain-Bogy, 1996) A classroom community that places value in reasoning and conjecturing has the potential to inspire students to stretch their thinking. If a classroom community emphasized and pushed each student to not only get the right answer and move on, students may not have been compelled to engage in higher order thinking. A classroom community that values deep inquiry for understanding creates a safe space in which to learn.

In any given classroom the development of community rests on the type of instruction used to scaffold students to work at their highest potential. (Chancellor, 1991) The second section of chapter three addressed higher-order thinking skills and some studies addressed specific instruction that will assist students. Salema (2001), Taylor et. al (2003) and Einseman (1997) outlined instructional strategies to best support all learners in higher-order thinking. Salema discovered that when teachers modeled various aspects of higher-order thinking students were more successful at engaging in it. Taylor et.al, discovered that when teacher use higher-level questioning their students are more likely to make academic gains. Einseman discovered that students from low-income backgrounds were capable of higher-order thinking by being involved in a program that explicitly taught higher-order thinking skills.

Teachers must have confidence that they are capable of leading their learners in discoveries using higher-order thinking. Teachers must be systematic and explicit about what higher-order thinking looks like, sounds like and feels like. Simply telling students what higher-order thinking is will not suffice; it must be explicitly modeled. In order to be able to model higher-order thinking teachers must engage in it themselves. A large part of higher-order thinking is the use of metacognition. Metacognition is essentially thinking about your own thinking. It is a complex notion that involves an emphasis on process as well as the product.

The last section of chapter three is likely the most relevant and revealing section about classroom implications for higher-order thinking. Section three addressed the interchange between teacher expectations and students outcomes. Essential to developing higher-order thinking skills for students living in poverty or those identified as low-achievers, is the belief that they are capable. If, as in the Solomon (1996) study, teachers are more skeptical and less trusting of low-achieving students even when test scores contradict teacher judgment, then students are not given the opportunity to develop higher-level thinking skills due to teacher bias or misconceptions. In order to develop higher-order thinking skills teachers must suspend judgment so that higher-order thinking is accessible to all students. Useful feedback about teaching practices can be accessed by periodically video taping one's teaching, having colleagues or administrators do formal observations in the classroom and making a concerted effort to use Bloom's taxonomy to formulate questions that will draw out higher-order thinking. If students are used to a certain form of instruction and seldom asked questions from the highest

levels of Bloom's taxonomy they will perform at the level they are expected or instructed at. (Campbell & Chastin-Bogy, 1996)

Mr. Picard, a teacher profiled in Kinney's (1995) study, exemplified many effective teaching strategies to engage all students in the learning process. Mr. Picard was most effective because he engaged student's backgrounds and cultures and utilized them as strengths rather than roadblocks to learning. Specific models of teaching that encourage the opportunity for higher order thinking include problem-based inquiry and cooperative learning. Teachers must be intentional in using these teaching models and infusing higher-order thinking into the classroom, so as to not cognitively burn out. (Chen & McGrath, 2004) Other models of teaching like direct instruction are not lost to being able to engage students in deep thinking, and it is possible to employ many different models at once to engage students. (Chen & McGrath, 2004)

Implications for Further Research

Little research that applied to elementary school students was presented in this discussion because it was unavailable. The majority focused on middle or high school students and included students who resided in countries outside the United States. Research about the effectiveness of explicitly teaching higher order thinking skills to elementary school students in the United States is needed. Poverty is multifaceted and complex in the effects it has on individual students and/or schools. Researchers generally defined poverty based on numerical values but the complexity of poverty goes far beyond numerical values. (Payne, 2001) In order to deepen the understanding of the psychological effects of poverty additional research should be done in this area.

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