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Relationship Of Self-Efficacy Beliefs Of Urban Public School Students To Performance On A High-Stakes Mathematics Test

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RELATIONSHIP OF SELF-EFFICACY BELIEFS OF URBAN PUBLIC SCHOOL STUDENTS TO PERFORMANCE ON A *HIGH-STAKES* MATHEMATICS TEST

A Dissertation Presented

by

KOLAJO A. AFOLABI

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DEDICATION

To my mother: the late Victoria Wuraola Afolabi, daughter of the late Angelina Aina Edun and the late Gabriel Ashiyanbi Idowu.

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ABSTRACT

RELATIONSHIP OF SELF-EFFICACY BELIEFS OF URBAN PUBLIC SCHOOL STUDENTS TO PERFORMANCE ON A *HIGH-STAKES* MATHEMATICS TEST

SEPTEMBER 2010

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The purpose of this study was to examine the relationship of *self-efficacy* for *Enlisting Social Resources*, *Self-Regulatory Efficacy*, *self-efficacy* for *Self-Regulated Learning*, and *self-efficacy* for *Academic Achievement* (Bandura's *Children's Self-Efficacy Scale*, 2006) of urban public school students to performance on the *high stakes* Massachusetts Comprehensive Assessment System (MCAS) math test. A survey questionnaire was administered to eighty three participants and the data, analyzed using linear regression, conformed to the assumptions of *Independence*, *Linearity*, *Normality*, *and Homoscedasticity*. *Self-Regulatory Efficacy*, *Academic Achievement*, and Socio-economic Status were statistically significant bivariate predictors of performance on MCAS math test. *Self-Regulatory Efficacy* was the only consistent statistically significant predictor of MCAS math performance. Gender interaction with *Self-Regulatory Efficacy* was statistically significant in isolation but was not when other variables were accounted for.

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CHAPTER 1

URBAN PUBLIC SCHOOLS, MATHEMATICS, AND OUR NATION

Introduction

> Much of the commentary on mathematics and science in the United States focuses on national economic competitiveness and the economic well-being of citizens and enterprises. There is reason enough for concern about these matters, but it is yet more fundamental to recognize that the safety of the nation and the quality of life—not just the prosperity of the nation—are at issue. (National Mathematics Advisory Panel, 2008, p. xi)

American public education system continues to lament the persistent underachievement of a significant number of urban public high school students in mathematics. This population faces a bleak future with dire social and economic consequences for our nation. In its *Final Report,* the National Mathematics Advisory Panel (2008) stated that high school students who excelled in mathematics at *Algebra II* level and above were more likely to succeed in college and make career choices in science, technology, engineering, and mathematics. The report also stated that these individuals were more likely to achieve financial success as well as strengthen our nation's position as a world leader in the future. According to the National Mathematics Advisory Panel (2008), "there are large, persistent disparities in mathematics achievement related to race and income—disparities that are not only devastating for individuals and families but also project poorly for the nation's future, given the youthfulness and high growth rates of the largest minority populations" (p. xii). Kozol (1992) concluded that students in our urban public high schools were more likely to be of low socio-economic status (SES). These urban public school students are more likely to be susceptible to risk factors such as "poverty, drug abuse, sexual activity, coming from a

single-parent home, having a sibling who has dropped out of school, or being home alone after school" (Waxman, Gray, & Padron, 2003, p. 2).

Urban public school students are more likely to underachieve academically, are less likely to graduate from high school in four years, and very likely to drop out of school. The ability of our nation to compete successfully in the 21st century global economy will depend on the academic competence, in general, and mathematics proficiency, in particular, of her citizens (National Mathematics Advisory Panel, 2008).

Nationwide, 2000-2001 Cumulative Promotion Index (CPI) graduation rate was 58% in urban districts but 73% in the *Suburb* (Swanson, 2003). In Massachusetts, the 2000-2001 CPI graduation rates were 55% urban and 78% suburban (Swanson, 2003). In 2003-2004, the nationwide rates increased by 2% each but the 15% urban-suburban *gap* persisted (Swanson, 2008). Boston, Massachusetts had 2003-2004 CPI graduation rates of 58% in *Urban District* and 83% in *Suburban District* and was ranked 13th among *50 Largest Cities* in the nation *by gap size* (Swanson, 2008).

Academic achievement is a robust function of *Identification with Academics* for the student of any race but, for African Americans, Latinos, and Native Americans, identification with academics often poses *Stereotype Threat* that leads to withdrawal from school (Osborne & Walker, 2006). According to Altschul, Oyserman, and Bybee (2006), the *Grade-Point-Average* (GPA) trajectory of the African American and Latino students was linear but negatively correlated with time and *Awareness of Racism* had main effect on GPA. Brody, Flor, and Gibson (1999), found that low SES but highly efficacious African American parents who advocated high academic achievement promoted children's *Academic Competence* and *Psychosocial Competence*. Skowron (2005) found

that the social adaptation, abstract thinking skills, and academic achievement of the low SES urban child correlated strongly positively with *The Mother's Level of Differentiation-of-Self*. Shumow and Lomax (2002) found that for adolescents, *Parental Involvement* enhanced *Academic Adjustment* for every group except for the *Latin American* but that *Parental Efficacy* had indirect effect on the *Academic Adjustment* for every group. These researchers also found that *Neighborhood Quality* affected *Parental Efficacy* except for the *African American*. According to Hill, Castellino, Lansford, Nowlin, Dodge, Bates, and Pettit (2004), parental involvement was a critical factor with respect to a student's academic achievement and, for parents with low education, academic involvement increased aspiration but did not affect school behavior or achievement.

According to Nelson and Debacker (2008), although *Adaptive Achievement Motivation* correlated significantly positively with school *Class Belongingness* and *Bestfriend's* academic values and goals, the correlation with *Bestfriend's* academic values and goals was more significant. In rural middle schools, the high academic achievement of African American students was significantly associated with high academic competence although students with high grades were more likely to be girls, less likely to be aggressive and more likely to be more popular and seen as leaders while the opposite was true for the boys (Farmer, Irvin, Thompson, Hutchins, & Leung, 2006). At the high school level, the low SES African American adolescent low achiever male was more likely to associate his teacher's feedback of being a *Good Student* more with his classroom behavior than his academic performance while his high achiever female counterpart was more likely to associate it with her academic performance (Honora,

2003). According to Gutman and Midgley (2000), the academic performance of low SES African American students decreased significantly between Grades 5 and 6 although those with higher self-efficacy beliefs were more likely to have better than the average Grade Point Average (GPA). Teachers who believed in their roles as the primary source of knowledge were more likely to develop students with high achievement in *Language Arts and Reading* and teachers who believed that every student could learn were more likely to develop students with high achievement in *Mathematics* (Love and Kruger, 2005). Several studies have explored the relationship between *mathematics self-efficacy beliefs* and performance on a specific *mathematics scale* or in a completed *mathematics course* (Pajares & Miller, 1994; Pajares & Miller, 1995; Randhawa, Beamer, and Lundberg, 1993; Stevens, Olivarez, Lan, and Tallent-Runnels, 2004). My search of the literature, however, did not reveal any study that examined the relationship of general *self-efficacy beliefs* as measured by subscales from the *Children's Self-Efficacy Scale* (CSES; Bandura, 2006) of urban public school students to performance on a *high-stakes* mathematics test, such as the Massachusetts Comprehensive Assessment System (MCAS) math test.

> It is clear that in the last two decades of the twentieth century, the urban family in the United States has undergone profound changes. Poverty, homelessness, drugs, and teen pregnancy are among the many social and economic problems that have been in the media to underscore the decline of urban America. (Kretovics & Nussel, 1994, p. 73)

The population of our nation's urban public schools faces a bleak future with dire economic and social consequences for them and our nation. There is a persistent 15% *gap* between suburban-urban school districts' *Cumulative Promotion Index* (CPI) graduation rates (Swanson, 2008). This gap puts *Goal No. 5* of *No Child Left Behind*

(NCLB) *Act* that all students will graduate from high school, in jeopardy. NCLB accountability measures require states to assess the academic progress of all students regularly. In Massachusetts, in order to fulfill this NCLB requirement, urban public high school students must pass the *high-stakes* Massachusetts Comprehensive Assessment System (MCAS) math test, and a couple of other tests, to earn the standard high school diploma.

In 2003-2004, Boston, Massachusetts, with *Metropolitan Area* CPI graduation rates of 58% in *Urban District* and 83% in *Suburban District* (a 25% *gap*) was ranked 13th *by gap size* among *50 Largest Cities* in the nation (Swanson, 2008). The academic success of those Massachusetts urban public high school students who constituted a portion of the 58% CPI graduation rate in 2003-2004 was probably not due to chance but caused by specific agents in their *Developmental Assets.* According to Leffert, Benson, Scales, Sharma, Drake, and Blyth (1998), *Developmental Assets* exist in the forms of *Internal Assets* (*Commitment to Learning, Positive Values, Social Competences,* and *Positive Identity)* and *External Assets* (*Support, Empowerment, Boundaries and Expectations,* and *Constructive Use of Time).* The urban high school student who attains proficient or better in MCAS math probably possesses value-added *Internal Assets* in the form of *Self-Efficacy Beliefs.* "These self-efficacy beliefs provide the foundation for motivation, well-being, and personal accomplishments in all areas of life" (Pajares, 2006, p. 339). Bandura's (1977) *Self-Efficacy Theory,* which posits that one's behavior is a function of the level of confidence in one's ability to gather necessary resources, organize these resources, and execute actions needed to achieve required outcomes, forms the basis for the Conceptual Framework of this study.

> The sharp falloff in mathematics achievement in the U.S. begins as students reach late middle school, where, for more and more students, algebra course work begins. Questions naturally arise about how students can be best prepared for entry into Algebra. These are questions with consequences, for Algebra is a demonstrable gateway to later achievement. Students need it for any form of higher mathematics later in high school; moreover, research shows that completion of Algebra II correlates significantly with success in college and earnings from employment. In fact, students who complete Algebra II are more than twice as likely to graduate from college compared to students with less mathematical preparation. Among African-American and Hispanic students with mathematics preparation at least through Algebra II, the differences in college graduation rates versus the student population in general are half as large as the differences for students who do not complete Algebra II. (National Mathematics Advisory Panel, 2008, p. xiii).

Purpose of the study

The purpose of this study was to examine the relationship of *self-efficacy belief* for *Enlisting Social Resources, self-efficacy belief* for *Self-Regulatory Efficacy, self-efficacy belief* for *Self-Regulated Learning,* and *self-efficacy belief* for *Academic Achievement* from the *Children's Self-Efficacy Scale* (CSES; Bandura, 2006) of urban public school students to performance on a *high stakes* mathematics test such as the Massachusetts Comprehensive Assessment System (MCAS) math test.

Significance of the study

The significance of this study is its potential to inform the relationship of *self-efficacy beliefs* of urban public school students to performance on a *high-stakes* mathematics test such as the Massachusetts Comprehensive Assessment System (MCAS) math test. The examination of *self-efficacy* is significant because it "represents relatively malleable and future-oriented conceptions of the self and its potential" (Bong and Skaalvik, 2003, p. 9).

CHAPTER 2

REVIEW OF THE LITERATURE

Bandura (1977) revolutionized learning theories and the world of social psychologists and behaviorists by asserting the central and critical nature of *Self-efficacy* construct in human functioning. In *Social Cognitive Theory, personal factors (cognitive, affective,* and *biological),* the *environment,* and the individual's *behavior* (driven by outcome expectations) reciprocally influence one another and shape human functioning (Bandura, 1986). *Self-Efficacy* is distinct from other self-percept constructs such as *self-concept, self-esteem, outcome expectations, and locus of control* because it focuses *on perceived capabilities,* is *domain-specific,* is *context-specific,* is *task-specific*, is *criterion-referenced,* and is usually assessed before the *task or activity* (Zimmerman & Cleary, 2008).

Bronfenbrenner (1979) advanced the role of the *environment* in human development and functioning through his *Ecological Systems Theory*: A theory that four concentric environmental spheres of bidirectional stimuli shape human development. At the heart is the *Microsystem* (the individual) which is directly influenced by the *Mesosystem* (e.g. *Family, Peers,* and *School*) followed by the *Exosystem* (e.g. *Extended Family, Family Friends,* and *Mass Media*). The outermost is the *Macrosystem* (the *Cultural* and *Ethical* forces). All of these systems are influenced by time in what is referred to as the *Chronosystem*.

This literature review focused on the domains in the *Microsystem* (The Student) and the *Mesosystem* (The Family, The Peers, and The School) from *Environmental Systems Theory* (Brofenbrenner, 1979): two members of the triad in the *reciprocal*

determinism relationship between an individual, his environment, and his behavior in human functioning (Bandura, 1986). The first three of its four sections reviewed studies involving The Student, The Family, and The School with respect to self-efficacy, *other determinants* of behavior, and their effects on the student's functioning. The fourth section reviewed studies of self-efficacy and mathematics performance or achievement. The Conclusion section discusses *outcome expectations* of the student and society, persistent urban high schools low graduation rate, and the potential role of *Self-Efficacy* in improving the performance of urban public school students on a *high-stakes* mathematics test.

According to Bandura (1977), the sources of one's *Self-Efficacy Beliefs* are, in decreasing order of effectiveness, personal *performance accomplishments* (*participant modeling, performance desensitization, performance exposure,* or *self-instructed performance), vicarious experience* of role models (*live modeling* or *symbolic modeling*), *verbal persuasion* from others (*suggestion, exhortation, self-instruction,* or *interpretive treatments*), and *emotional arousal* (*attribution, relaxation, biofeedback, symbolic desensitization,* or *symbolic exposure*).

> Efficacy in dealing with one's environment is not a fixed act or simply a matter of knowing what to do. Rather, it involves a generative capability in which component cognitive, social, and behavioral skills must be organized into integrated courses of action to serve innumerable purposes. A capability is only as good as its execution. Operative competence requires orchestration and continuous improvisation of multiple subskills to manage ever-changing circumstances. Initiation and regulation of transactions with the environment are therefore partly governed by judgments of operative capabilities. Perceived self-efficacy is concerned with judgments of how well one can execute courses of action required to deal with prospective situations. (Bandura, 1982, p. 122)

The Student

Educational Psychology has already affirmed the importance of "the cognitive approach [to learning] which adds internal conditions of learning such as learner characteristics, learning processes, and learning outcomes" (Mayer, 1999, p. 22). Analysis of *the structure and mechanism of self-regulation* indicated that self-regulatory systems govern the cause/effect of human behavior and since they regulate and determine the nature of human actions (Bandura, 1991). Most human actions are *purposive* because humans are capable of controlling *their thoughts, feelings, motivation, and action* (Bandura, 1991). Effective self-regulation is a function of accurate and precise diagnostic and motivational self-monitoring facilitated by self-efficacy beliefs (Bandura, 1991). In his article on *Human Agency in Social Cognitive Theory*, Bandura (1989) asserted that *self-generated influences* are critical to human functioning, must not be ignored, and that *self-efficacy* beliefs serve as the *proximal determinants* of our emotions, what we choose to do, why we are driven to do them.

According to Miller and Byrnes (2001), the adolescent's ability to make effective decision depended on his value judgment and the ability to make appropriate sequence of choices that would yield success. *Study 1 con*cluded that *valuing of academic goals* was a more powerful predictor of the adolescent male achievement behavior even though the effect of self-regulation was significant. *Study 1* also found that as adolescent males got older, their *valuing of achievement* declined**.** This study found that *Achievement Behavior* was a strong function of *Academic Goals* and *Self-regulatory Competencies* (Miller & Byrnes 2001). *Study 2* concluded that, unlike their adolescent male

counterparts, adolescent females tended to be more achievement oriented and tended to develop better decision-making competency with age (Miller & Byrnes, 2001).

Nota, Soresi, and Zimmerman (2004) used the self-regulated learning interview schedule (*SRLIS*) *(Zimmerman & Martinez-Pons, 1986)* to examine the relationships between self-regulatory strategies, *Education Aspirations*, and *Academic Attainments* of Italian high school students in the Veneto Region of Italy. This study found that the academic grades of the students in *Italian, mathematics, and technical subjects* were functions of the self-regulating strategy employed by the participants and that the aspirations of the participants regarding post secondary education was a strong function of *self-consequences strategy* (Nota et al., 2004). *Self-consequences strategy* of self-regulation was a major determinant of these Italian students' academic performance leading to educational aspiration beyond the secondary school.

Yen, Konold, and McDermott (2004), found that cognitive ability, of *non-institutionalized students* between 6 and 17 years old, was stronger than learning behavior as a predictor of academic achievement regardless of ethnicity or gender. These researchers also found that learning behavior interacted significantly with cognitive ability to provide a valuable insight for the prescription of the best intervention program for improving academic performance. Gutman and Midgley (2000) found that the academic performance of low SES African American students decreased significantly between Grades 5 and 6 but that those with higher self-efficacy were more likely to have better GPA than average. According to Altschul, Oyserman, and Bybee (2006), the academic achievements of *Low-income African American* and *Latino* 9th grade and 10th grade students from urban schools correlated positively with *Connectedness*, *Awareness*

of Racism, and *Embedded Achievement*. Farmer, Irvin, Thompson, Hutchins, and Leung, (2006) found that, for middle school African American students in rural settings, high academic achievement was significantly associated with high academic competence. They also found that students with high grades were more likely to be girls, less likely to be aggressive, and more likely to be more popular and seen as leaders. The study found the opposite to be true for the boys. Osborne and Walker (2006) found that *Academic achievement* was a strong function of *Identification with Academics* for the participant of any race but that, for African Americans, Latinos, and Native Americans, identification with academics often posed *Stereotype Threat* that led to withdrawal from school.

A meta-analysis study of the relationships between *self-efficacy beliefs*, *academic performance*, and *persistence* by Multon, Brown, and Lent (1991) found that 14% of academic performance variance and 12% of academic persistence variance were due to self-efficacy beliefs. They found that *self-efficacy enhancing manipulations* probably strengthen a student's academic performance as a function of self-efficacy. Jonson-Reid, Davis, Saunders, Williams, and Williams (2005) found that, although *Self-Esteem* was not significantly associated with *Academic Self-Efficacy*, the *Academic Self-Efficacy* of low SES African American 9th grade and 10th grade adolescents was significantly associated with *Intrinsic Rewards, Extrinsic Rewards, Encouragement, Role Models,* or having a relative who earned a high school diploma.

The Family

Brody, Flor, and Gibson (1999) found that *Self-Regulation* linked *Competence-Promoting Parenting Practices* indirectly to the children's academic achievement and this link seemed to be independent of SES. For this study, Brody et al. (1999) enlisted

African American single parents with children between 6 and 9 years old as participants. These researchers found that the parent's perceived financial wellbeing induced strong efficacy beliefs in these mothers but that there was no direct evidence of any association between these beliefs and *Competence-Promoting Parenting Practices* (Brody et al., 1999). The model hypothesized by Brody et al. (1999) and the *Fully Recursive Model* (*Bollen, 1989),* however, indirectly linked the parent's perceived financial status with the child's academic development via *Competence-Promoting Parenting Practices*.

Shumow and Lomax (2002), using *Social Cognitive Models,* found that for adolescents, *Parental Involvement* affected *Academic Adjustment* for every racial/ethnic group except for the *Latin American* but that *Parental Efficacy* had indirect effect on the *Academic Adjustment* for every group (Shumow & Lomax, 2002). Participants were European American, African American, and Latin American students between 10 and 17 years old and their parents. This study found that *Neighborhood Quality* affected *Parental Efficacy* except for the *African American* and that *Parental Efficacy* for combating negative peer influence decreased as the adolescent got older (Shumow & Lomax, 2002).

Cavanagh, Schiller, and Riegle-Crumb (2006) found that unstable family structure was more likely to result in failure to complete Algebra I in Grade 9 or Algebra II by the end of Grade 12. They also found that parental involvement could not guarantee that the student would complete high school. These researchers found that parental involvement was more likely to promote participation in school activities but with no significant effect on either the completion of high school or the probability of post secondary educational

prospects. According to Cavanagh et al. (2006), 39% of the participants lived in non-traditional family structure and about 30% lived in single-mother families.

Hill, Castellino, Lansford, Nowlin, Dodge, Bates, and Pettit (2004) found that highly educated parents who were academically involved not only increased aspiration but also improved behavior and increased achievement. They found that academic involvement by the parent was more likely to increase the academic achievement for the African American adolescent than for any other ethnic group. The participants were mostly European Americans (83%) with some African Americans (16%) and others. According to Hill et al. (2004), academic involvement by parents with little education increased aspiration but did not affect school behavior or achievement.

Skowron (2005) found that, for predominantly African American biological mothers each of whom was paired with her 6 to 13 years old child, social adaptation, abstract thinking skills, and academic achievement of the low SES urban child correlated significantly positively with *The Mother's Level of Differentiation-of-Self*. Bleeker and Jacobs (2004) found that the effect of White suburban mothers' perceptions of their children's *math-science* abilities on the adolescents' subsequent *math-science* self-efficacy and career choices was quite significant, especially for females. Bleeker and Jacobs (2004) also found that as students approach the 7th grade, the mother's perception of the child's *math-science* abilities was quite significant on the daughter's subsequent choice of life-science career but minimal for the son's choice. This study found that sons were more likely to choose engineering or computer science career.

For preadolescent English-Canadian Caucasian students, *Mothers' Self-Efficacy* beliefs correlated significantly positively with the girls' *Reader Self-Perceptions* but

Fathers' Self-Efficacy beliefs correlated significantly negatively with the boys' *Total Score of Self-Perceptions* (Lynch, 2002). Although there were no significant correlations between *Parent Self-Efficacy* and the students' *Reading Achievement*, mothers' *Mean Self-Efficacy Scores* were higher than the fathers' for both boys and girls (Lynch, 2002). Junttila, Vauras, and Laakkonen (2007), found that *Parent's Self-Efficacy (PSE)* correlated significantly negatively with *Parent's Loneliness*, positively with students' *Social Competence*, negatively with the students' *Loneliness*, and insignificantly with students' *Motivational Orientation*. The participants were 4th grade Finnish students, their parents, and their teachers. The same study found that Students' *Motivational Orientation* correlated significantly positively with *Reading and Mathematical Skills*.

In a longitudinal study of Italian adolescents, Bandura, Barbaranelli, Caprara, and Pastorelli (2001) found that high-perceived self-regulatory efficacy favored high academic achievement and that high parental efficacy was more likely to promote the *children's academic, social, and self-regulatory efficacy* resulting in higher career aspirations. Working with 12 to 15 years old students from a province in Spain with *Compulsory Secondary Education* system, Casanova, García-Linares, de laTorre, de la Villa Carpio (2005) found that, although socio-demographic factors were significant determinants of academic achievement, for low achievers, academic achievement was significantly influenced by family factors such as *democratic* or *authoritative* parenting style. According to Casanova et al. (2005), *Normal Achieving* students were more likely to have democratic parents than authoritarian parents.

The School

An individual's *Self-efficacy beliefs* could be *self-aiding or self-hindering* in *Cognitive Processes,* decide the amount of *effort* as well as the extent of *perseverance* in *Motivational Processes,* determine the tolerance levels of *stress and depression* in *Affective Processes,* and shape the life trajectory of the individual either as a function of or the determinant of his/her environments in *Selection Processes* (Bandura, 1989).

Honora (2003) found that the academic achievement of the low SES African American adolescent in an urban high school was a strong function of his perceived teacher feedback. This researcher found that the low SES African American adolescent low achiever male, however, was more likely to associate his teacher's feedback of being a *Good Student* more with his classroom behavior than his academic performance. The same study found that the low SES African American female was more likely to be higher achieving than the male and was more likely to associate her teacher's feedback of being a *Good Student* more with her academic performance (Honora, 2003).

According to Love and Kruger (2005), teachers who believed in their roles as the primary source of knowledge were more likely to develop students with high achievement in *Language Arts and Reading* and teachers who believed that every student could learn were more likely to develop students with high achievement in *Mathematics*. Although the participants were teachers in Kindergarten through Grade 5, the findings by Love and Kruger (2005) may be applicable to the teachers of urban public high schools students. It is also highly likely that the effects of the teachers' beliefs on a student's academic achievement in the elementary school could linger well beyond middle school.

Nelson and DeBacker (2008) used *Maehr's (1984) Theory of Personal Investment* to explore the relationships among peer-related influences, students' achievement goals, and self-efficacy beliefs. The participants were suburban male and female science students in the 6th, 7th, and 9th grades. These participants were composed of 51% Caucasians, 19% African Americans, 10% Multiethnic, 9% Hispanic, 5% Native Americans, 4% Asians, and 2% Arabs. Nelson and Debacker (2008) found that, although school *Class Belongingness* correlated significantly positively with *Adaptive Achievement Motivation*, *Bestfriend's* academic values and goals, correlations with *Adaptive Achievement Motivation* were not only positive but more significant.

According to Montague, Enders, and Castro (2005), in general, results of achievement tests in the elementary school were good predictors of achievement in the middle school. Theses researchers' finding support the belief that timely and appropriate intervention, in the elementary school, might ultimately improve a student's behavioral and academic achievement in the middle school as well as high school.

Peer influence could either hinder or promote academic achievement. In the Netherlands, Thijs and Verkuyten (2008) studied the mediating effect of academic self-efficacy on *Peer-Victimization* and *Academic Achievement Outcomes*. The participants consisted of 844 Dutch, 299 Turkish, 237 Moroccan, 69 Surinamese, and 446 *Mixed* 6th grade students. Thijs and Verkuyten (2008) found that *Peer Victimization* correlated negatively with *Academic Self-Efficacy, Relative Achievement, and Absolute Achievement*. These researchers found that the effect of *Perceived Academic Self-Efficacy* on these achievement measures was, nevertheless, positive.

Self-Efficacy and Mathematics

> Perceived efficacy plays a key role in human functioning because it affects behavior not only directly, but by its impact on other determinants such as goals and aspirations, outcome expectations, affective proclivities, and perception of impediments and opportunities in the social environment (Bandura, 1995, 1997). Efficacy beliefs influence whether people think erratically or strategically, optimistically or pessimistically. They also influence the courses of action people choose to pursue, the challenges and goals they set for themselves and their commitment to them, how much effort they put forth in given endeavors, the outcomes they expect their efforts to produce, how long they persevere in the face of obstacles, their resilience to adversity, the quality of their emotional life and how much stress and depression they experience in coping with taxing environmental demands, and the life choices they make and the accomplishments they realize. (Bandura, 2008, p. 309).

Meece, Wigfield, and Eccles (1990), in a longitudinal study, used *structural modeling* to examine *Math Anxiety* as a function of *past math grades, math ability perceptions, performance expectancies, and value perceptions* of suburban students in the 7^{th}, 8^{th}, and 9^{th} grades. The participants were mostly White and consisted of 119 males and 131 females. Meece et al. (1990) found that, student's perception of math ability had a lasting effect on self-efficacy and that math anxiety was a function of *current performance expectancies* as well as self-efficacy beliefs.

Lopez and Lent (1992) explored three areas of mathematics self-efficacy among high school students. The three areas were the sources of students' *math self-efficacy*, the effect of global self-concept on the students' *math self-efficacy*, and the predictive power of math self-efficacy on the students' career trajectories in life. Lopez and Lent (1992) found that, for highly motivated and mostly White (90%) Algebra II students consisting of 19 males and 31 females, self-efficacy theory (Bandura, 1986) supported the results of their study. They found that, as predicted by self-efficacy theory, performance experience was the primary source of math self-efficacy, exposure to math-competent

role models promoted choices of math-related careers, and students with low math-anxiety were more likely to feel more confident about their capabilities.

Randhawa, Beamer, and Lundberg (1993) used a *structural model* to examine the mediating effect of mathematics *self-efficacy* on mathematics *attitude* and mathematics *achievement*. The participants were male (n = 117) and female (n = 118) Grade 12 Canadian students of *Algebra 30* with ambitions for post-secondary education. Although Randhawa et al. found, based on hypothesized *two-group* model, that mathematics self-efficacy significantly mediated the effect of attitude to mathematics on mathematics achievement, the generalized model did not yield a good fit equally for both sexes. They found no significant difference between teachers' scores for boys and girls even though boys had higher perceived self-efficacy for mathematics.

Pajares and Miller (1994), using *Path Analysis*, found that *Math self-efficacy* had stronger, direct, and total effects on *Mathematical Problem Solving* performance than did *Mathematical Self-Concept* regardless of *perceived usefulness of mathematics, prior experience with mathematics, or gender*. Participants in this study were 229 female and 121 male university *undergraduates*. These researchers measured *Math self-efficacy* with *Mathematics Confidence Scale (MCS) (Dowling, 1978, Unpublished doctoral dissertation, Ohio State University, Columbus).* In spite of similar math *Prior Experience*, men were less anxious, more self-efficacious, and performed better than the women did but there was no finding of significant gender-based differences in *Math Self-Concept* or its *Perceived Usefulness* (Pajares and Miller, 1994).

Pajares and Miller (1995) explored the criticality of the task-specific nature of self-efficacy in its assessment. The participants were men (n = 144) and women (n =

247) university undergraduates consisting mostly of juniors and seniors. These researchers modified the *Mathematics Self-Efficacy Scale (Betz & Hackett, 1983)* and used it to measure *Mathematics Self-Efficacy*. Pajares and Miller (1995) found that for university undergraduates consisting mostly of juniors and seniors, problem-specific self-efficacy was a better predictor of performance on the problem than was mathematics self-efficacy. According to Pajares and Miller, assessment form did not affect perceived self-efficacy belief but students who took the *traditional multiple-choice* self-efficacy assessment performed much better on math test than those who took the *open-ended fill-in-the-blank* assessment. Pajares and Miller (1997) found that mathematics self-efficacy correlated more significantly with declared major than with problem-specific performance. They concluded that, for the *multiple-choice* self-efficacy assessed students, commonality of *multiple-choice* to both the assessment and the math test possibly induced *expectancy* that resulted in higher math test performance of these students. They also warned that perceived self-efficacy belief could be susceptible to how a study assessed it and could affect the validity and reliability of a self-efficacy instrument.

Career-interest in mathematics and science, mathematics self-efficacy, gender, ethnic-identity, and performance in mathematics are related. O'Brien, Kopala, and Martinez-Pons (1999) explored these relationships through three hypotheses. These hypotheses were: that career-interest in mathematics and science was a function of *gender* and *ethnic identity*; that math and science self-efficacy mediates the effects of gender and ethnicity on career-interest; and that math and science self-efficacy is a function of previous performance in math and science. These researchers measured

Mathematics self-efficacy with the *Mathematics Self-Efficacy Scale (Betz & Hackett, 1983).* The participants were *parochial* 11th grade urban boys (n = 221) and girls (n = 194) consisting of Whites (n = 165), Hispanics (n = 124), Blacks (n = 95), and Asians (n = 31). O'Brien et al. (1999) found that *Career-interest in science* was a function of only *science-mathematics self-efficacy, Self-efficacy* was a function of both *academic performance* and *ethnic identity*, and that *academic performance* was a function of socio-economic status.

Bong (2002) demonstrated the specificity of the effect of self-efficacy beliefs on academic performance with a study that explored English and mathematics achievements of 235 female Korean *high school freshmen*. This researcher depended primarily on *Confirmatory Factor Analysis* and *Structural Equation Modeling* for data analysis of the effects of *Subject-specific Self-Efficacy, Task-specific Self-Efficacy, Problem-specific Self-Efficacy* on *Immediate Performances* and *Delayed Performances*. Bong (2002) found that the association and the predictive nature of self-efficacy with academic achievement were subject-specific i.e. English self-efficacy correlated positively significantly with achievement in English more so than in mathematics and vice versa. Bong (2002) found that *Temporal Proximity* did not significantly affect self-efficacy predictions of academic performance although one should assess self-efficacy beliefs close to the time of and prior to engagement in a task, especially as the diagnostic instrument for improving academic performance.

Stevens, Olivarez, Lan, and Tallent-Runnels (2004) were interested in how mathematics self-efficacy study involving diverse ethnicity (predominantly Hispanic) would enlighten this construct that had traditionally been studied through the lens of

Caucasian participants. They, therefore, used path analysis to explore the relationships among *ability, mathematics self-efficacy, motivational orientation, prior mathematics achievement, mathematics performance,* and *intention to enroll in additional mathematics courses*. The participants were 9th Grade (n = 317) and 10th Grade (n = 100) students that consisted of African-Americans (4.6%), Caucasians (30%), Hispanics (53%), and Others (9.4%). Stevens et al. measured *Mathematics self-efficacy* with a *task-specific* scale by *Pajares and Graham (1999).* They found that achievement in mathematics was a significant function of self-efficacy beliefs and motivation regardless of ethnicity. They suggested that educators should take the requisite self-efficacy belief needs of all students, especially the Hispanics, into consideration with respect to academic interventions.

Self-Efficacy belief is the level of confidence one has in one's ability to achieve the expected outcome for a given task (Bandura, 1986). It is distinct from other self-percept constructs such as *self-concept, self-esteem, outcome expectations, and locus of control* because it focuses *on perceived capabilities,* is *domain-specific,* is *context-specific,* is *task-specific,* is *criterion-referenced,* and usually assessed before the *task or activity* (Zimmerman & Cleary, 2008).

Although self-efficacy is task-specific, self-efficacy instruments such as the problem-specific *Mathematics Self-Efficacy Scale (Betz & Hackett, 1983)* or the *task-specific Mathematics self-efficacy* scale by *Pajares and Graham (1999)* do not seem suitable for the *high-stakes* mathematics test such as the MCAS with its multiple mathematical skills test format. Attempt to develop and administer self-efficacy assessments for all the tasks involved in a *high-stakes* mathematics test such as in MCAS

may be possible but is more likely to yield little or no results amenable to application for practical academic intervention.

A self-efficacy scale such as the multidimensional *Children's Self-Efficacy Scale* (CSES; Bandura, 2006), although general in its construction, is concise, has clear domain specificity, and more likely to yield meaningful data amenable to practical application for improving the performance of urban public school students on multiple task assessment tool such as the MCAS math test.

Conceptual Framework

> Perceived self-efficacy is defined as people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses. (Bandura, 1986, p. 391).

On the third mission to land human beings on the moon, the Service module of Apollo 13 failed. The crew members summoned their creative spirits, salvaged the spacecraft, and returned back to earth safely. In doing so, they achieved what has been described as the *successful failure*. It is my belief that what enabled them to succeed in saving their lives in spite of the failure to accomplish the objective of their mission was, to a great extent, their *Self-Efficacy beliefs*. These crew members had unwavering confidence in their abilities to gather necessary resources, to organize those resources, to utilize those resources effectively, and to accomplish the task of returning safely back to earth because failure was not an option.

The Jedi Master Obi-Wan Kenobi, from *Star Wars* – the movies, would bid farewell to Luke Skywalker the young warrior by saying, "May the Force be with you." One possible interpretation is that the Jedi Master was not just saying good-bye to Luke but that he was making a wish for the *Force* (Luke's *Self-Efficacy beliefs*) to serve him well and ensure that he accomplished his mission.

Babies usually become ambulatory by first crawling and then taking those unsteady baby steps under the watchful eyes of their proud parents. Eventually, they master the skill of walking and some go on to become world record holders in the Olympics. They do not always accomplish each of these tasks on the first try and, in spite of several failures, never stop trying until they have mastered the skills required to succeed. I attribute the subsequent success of babies, in pedal mobility, to a driving force; innate *self-efficacy beliefs*.

Self-Efficacy beliefs are *self-thoughts* that exist within every individual, have significant variability, and are comparable to seeds of great expectations. A seed will germinate into a seedling, develop shoot and root, and grow to become a living tree, only if it is in the right environment and is provided with proper care and nourishment. It is my belief that, just like the tree, the general *self-efficacy beliefs* of the urban public school student can grow and enable him/her to reach a highly effective state of human functioning that would serve him/her well for a life time. It is my belief also that it was this enhanced state of general *self-efficacy beliefs* that enabled some of the urban public school students to achieve proficient or better level of performance on a *high-stakes* mathematics test. The persistent 15% *gap* between suburban-urban school districts' *Cumulative Promotion Index* (CPI) graduation rates (Swanson, 2008) is a reminder of the

failure of our urban public schools to develop the general *self-efficacy beliefs* of a significant number of students. For these students, their general *self-efficacy beliefs* never germinated let alone develop shoots and roots; they just withered and died for lack of proper care and nurturing.

The urban public school student who believes that success, after failure, is not only possible but highly probable is more likely to develop enhance *self-efficacy beliefs.* Such a student is likely to improve his/her performance on a *high-stakes* mathematics test. He/she is more likely to believe that failure usually presents the opportunity to learn how to improve and, that if one persists and perseveres, continued improvement will lead to success. General *self-efficacy beliefs* encompass core characteristic that, I believe, are essential precursors of domain-specific, skill-specific, and task-specific *self-efficacy beliefs.* This is why I believe that the performance of the urban public student on a *high-stakes* mathematics test is a probable function of his/her general *self-efficacy beliefs.* I also believe that the relationships between the performance of the urban public student on a *high-stakes* mathematics test and his/her general *self-efficacy beliefs* are positively linear.

One of the *courses of action* required for earning a high school diploma in Massachusetts is the passing of the *high-stakes* MCAS tests in English Language Arts and mathematics. In the United States of America, the mastery of English language is essential for academic success but research has shown, however, that proficiency in mathematics usually sets the *trajectory* for career aspirations in science, technology, engineering, and mathematics; the precursors to the future financial success of an adolescent (National Mathematics Advisory Panel, 2008). In *Self-efficacy: Toward a*

Unifying Theory of Behavioral Change, "the concept of *self-efficacy* is assigned a central role, for analyzing changes achieved in fearful and avoidant behavior" (Bandura, 1977, p. 193). One could make a reasonable argument that the study of mathematics elicits *fearful and avoidant behavior* in most students, especially the urban public school student. He/she is more likely to attribute performance in mathematics to a natural gift or innate talent rather than perseverance and effective use of effort and, therefore, more likely to perform poorly on the *high-stakes* MCAS math test.

The general *Self-Efficacy* construct as conceptualized in Bandura's (2006) *Children's Self-Efficacy Scale* (CSES) makes it the appropriate choice as probable predictor of the performance of the urban public school student on the *high-stakes* MCAS mathematics test. Bandura (1990) developed the *Multidimensional Scales of Perceived Self-Efficacy (MSPSE)* for the measure of this construct in educational research. The items and subscales of MEPSE were specifically crafted to explore *self-efficacy construct* in the *academic domains of functioning* (Miller, Coombs, Fuqua, 1999). The subscales of MSPSE consist of *Enlisting Social Resources, Academic Achievement, Self-Regulated Learning, Leisure-Time Skills and Extracurricular Activities, Self-Regulatory Efficacy to Resist Peer Pressure, Meet Others' Expectations, Social Self-Efficacy, Self-assertive Efficacy, and Enlisting Parental and Community Support.* Each item of MSPSE was rated on a seven-point scale; *not well at all* was rated as 1, *not too well* was rated as 3, *pretty well* was rated as 5, and *very well* was rated as 7 (Zimmerman, Bandura, and Martinez-Pons, 1992). Bandura (2006) reviewed MSPSE, renamed it *Children's Self-Efficacy Scale* (CSES), changed *Self-Regulatory Efficacy to Resist Peer Pressure* to just

Self-Regulatory Efficacy, and introduced *Confidence* level ratings of *0 – 100* for each item.

The dimensions of *self-efficacy* at the heart of this inquiry are those that I believe are most critical within the domains of functioning of the urban public school student with respect to his/her performance on the *high-stakes* MCAS math test. For the purpose of this inquiry, the domains that directly influence the learning behaviors, decision making skills, self-concept, self-esteem, and self-efficacy of these urban public school students are: the Student (male or female), the *Family*, and the *School*. Behavior depends, in part, on *outcome expectations* but mostly on the individual's *self-efficacy beliefs* (Zimmerman & Cleary, 2008). Although outcome expectations emanate, primarily, from the individual, the extent to which society's outcome expectation is concentric with the student's depends on the student, the family, the community, and the school (Bronfenbrenner, 1979). The urban public school student with value-added *internal asset* of *self-efficacy* is more likely to attain high level of performance in a *high-stakes* mathematics test. Society's outcome expectation for the urban public school student in the Commonwealth of Massachusetts is the passing of MCAS math test as a prerequisite for earning the high school diploma. In order to do this, the student must believe that he/she can successfully *execute courses of action* required to attain this goal. I believe that these courses of action include effective application of:

1. The *Self-efficacy for Enlisting Social Resources* of *teachers, another student, adults,* and *a friend* to help with *schoolwork* in mathematics or *social problems* for socio-emotional wellbeing.

2. The *Self-Regulatory Efficacy* to *resist peer pressure,* to attend school regularly, and to maintain optimum self-regulation necessary for the rigor of mathematics.
3. The *Self-efficacy for Self-Regulated Learning* in order to acquire the prerequisite skills to plan well, execute well, and persevere when solving mathematical problems.
4. The *Self-efficacy for Academic Achievement* to *learn* well in mathematics and science.

The ability of the urban public school student to successfully enlist his/her social resources of *Family, Peers, School, Extended Family, Family Friends,* and *Mass Media* would most likely determine how well he/she can improve his/her *internal assets* of *Perceived Self-Efficacy beliefs.* It would determine his//her capability to facilitate self-regulation in general and self-regulation for learning in particular. The urban public school student who is able to attain high self-efficacy for learning is more likely to attain enhanced self-efficacy for academic achievement. "These self-efficacy beliefs provide the foundation for motivation, well-being, and personal accomplishments in all areas of life"(Pajares, 2006, p. 339). The major *personal accomplishment* for the urban public school student in the Commonwealth of Massachusetts is the earning of a high school diploma. In order to attain this accomplishment, the urban public high school student in Massachusetts, however, first must pass the MCAS math test: a highly probable notion if the student possesses high *Self-efficacy Beliefs.* The study of mathematics is a study of, essentially, abstract concepts that are not, usually, easy to comprehend and master on the first try. In order for an urban public school student to succeed in mastering these

concepts for a *high-stakes* test, the student must possess value-added internal assets of *Self-Efficacy Beliefs*. I believe that the *Self-Efficacy Beliefs* of the urban public school student are probably the best measure of his/her *internal assets*. While the suburban student is likely to be the beneficiary of superior external resources, the urban student is most likely to compete for limited, and rapidly dwindling, external resources. It is reasonable to conclude that *Self-Efficacy* for enlisting *external assets* could be a critical determinant of the performance of the urban public school student on the *high-stakes* MCAS math test.

Conclusion

Efficacy judgment is more about what individuals believe about their capabilities and not necessarily their *skills* or *abilities* (Bong & Skaalvik, 2003).

> "Efficacy in dealing with one's environment is not a fixed act or simply a matter of knowing what to do. Rather, it involves a generative capability in which component, cognitive, social, and behavioral skills must be organized into integrated courses of action to serve innumerable purposes" (Bandura, 1982, p. 122).

Outcome expectation for the urban public school student is, in the short-term, academic achievement and, in the long-term, academic success; i.e. graduation from high school. One study of *school-related* performance of adolescents found that the effect of *Self-Efficacy* beliefs was more significant than that of outcome expectation (Zimmerman & Cleary, 2008).

I believe that the academically successful urban public school student in Massachusetts possesses value-added *internal assets* and that his/her *Self-Efficacy Beliefs* provide reasonable evaluation of these *internal assets*. I believe that *perceived Self-Efficacy for Enlisting Social Resources, perceived Self Regulatory Efficacy, perceived*

Self-Efficacy for Self-Regulated Learning, and perceived Self-Efficacy for Academic Achievement of the urban public school student have significant effects on his/her performance on the *high-stakes* MCAS math test.

Recently, Massachusetts became a partner in the *American Diploma Project (ADP)*; an attempt by states to use *Algebra II End-of-Course Exam* (MADOE, 2008) as an evaluation tool for the probability of a high school graduate to succeed in future endeavors. The *Self-Efficacy Beliefs* (independent variables) of the urban public school student should correlate positively with performance on the high-stakes MCAS math test (dependent variable). There could be some *unique effects* of *perceived Self-Efficacy* for *Enlisting Social Resources, perceived Self Regulatory Efficacy, perceived Self-Efficacy* for *Self-Regulated Learning,* and *perceived Self-Efficacy* for *Academic Achievement* due to moderations by Race/Ethnicity, Gender, and Socio-economic Status on the performance of the urban public school student on the *high-stakes* MCAS math test. I expect Socio-economic Status to have the most significant moderating effect followed by Gender. The moderating effect of Race/Ethnicity, though possible, should be insignificant.

Studies have found that socio-economic status (SES) played a significant role in the academic achievement of the urban public school student and I do not expect the results to be different in this study. The population of urban public school students across the nation is predominantly low socio-economic status. Other factors that deserve consideration are Race/Ethnicity and Gender, each of which could possibly have significant main effect on the performance of the urban public student on the MCAS math test. Although it is very unlikely that Race/Ethnicity would show significant

interaction effect, each of these moderators could yield significant interactive effects with each of the *perceived Self-efficacy Beliefs* on the performance of the urban public school student on the MCAS math test. A better understanding of the effects of general *perceived Self-efficacy Beliefs*, Race/Ethnicity, Gender, and Socio-economic Status on the performance of the urban public school student on the MCAS math test should enable parents, guardians, and educators to tap into the power of *Self-efficacy Beliefs* to improve academic achievement.

Research Questions

1. Does *perceived Self-efficacy for Enlisting Social Resources* have significant effect on the MCAS Math score of the urban public high school student?

This question is important to research because the urban public school adolescent encounters several different social and academic obstacles that, if not resolved immediately or managed properly could have detrimental impact on his/her academic achievement in general and performance on MCAS math test in particular.

2. Does *perceived Self-efficacy for Academic Achievement* have significant effect of on the MCAS Math score of the urban public high school student?

This question is important to research because the urban public school student is more likely to have difficulty in learning mathematics, science, reading, writing, and other subjects in order to do well enough on the MCAS math test, graduate from high school in four years, and not drop out.

3. Does *perceived Self-efficacy for Self-Regulated Learning* have significant effect on the MCAS Math score of the urban public school student?

This question is important to research because the urban public school student is more likely to have difficulty acquiring the skills necessary for *Self-Regulated Learning* and learn enough to do well on the MCAS math test, graduate from high school in four years, and not drop out.

4. Does *perceived Self Regulatory Efficacy* have significant effect on the MCAS Math score of the urban public school student?

This question is important to research because the urban public school student is more likely to have difficulty resisting peer pressure to make choices that would result in failure to stay in school and learn enough to do well on the MCAS math test, graduate from high school in four years, and not drop out.

5. Do all four *perceived self-efficacy beliefs* have significant collective effect on the MCAS Math score of the urban public school student?

This question is important to research because the urban public school student is more likely to be exposed concurrently to the potential risks of inability to elicit social resources, acquire self-regulatory skills, develop self-regulated learning, and appreciate the potential benefit of academic achievement. These risk factors that could deprive the urban public school student of the capability to learn enough to do well on the MCAS math test, graduate from high school in four years, and not drop out. *Self-efficacy Beliefs* are *self-thoughts* and do not exist in isolation. This question would shed light on the relative effect of each *perceived Self-Efficacy Belief* when the others are accounted for.

6. Are there significant *unique effects* of the four *Perceived Self-Efficacy Beliefs*, on the MCAS Math score of the urban public school student due to moderations by Race/Ethnicity, Gender, and Socio-economic Status?

This question is important to research because the urban public school student is more likely to be low socio-economic status with different developmental influences from the family, peers, and school depending on gender. We cannot discount the moderating effects of race/ethnicity, socio-economic status, and gender on the ability of the urban public student to elicit social resources, acquire self-regulatory skills, develop self-regulated learning, and appreciate the potential benefit of academic achievement. The urban public school student is more likely to be exposed to influences based on socio-economic status, gender, and his/her race/ethnicity. The racial diversity of the population, however, is insufficient to elucidate meaningful comparisons based on race/ethnicity. These influences are more likely to deprive him/her of the capability to learn well enough to attain proficient or better on the MCAS math test, to graduate from high school in four years, and not to drop out of school.

Definition of Terms

1. AA: *perceived Self-efficacy for Academic Achievement.*
2. *Academic Achievement*: For the purpose of this study, academic achievement is determined by performance on Grade 10 standard Massachusetts Comprehensive Assessment System (MCAS) test in mathematics.
3. *Academic Success*: For the purpose of this study, academic success is the completion of the requirements for a standard High School Diploma in Massachusetts.
4. Adolescent: An adolescent is a high school student who is under the age of 19 years old.

5. *Cumulative Promotion Index (CPI)*: An estimated "probability that a student entering the 9th grade will complete high school on time with a regular diploma" (Swanson, 2003, p. 7).
6. Covariates – Independent continuous interval variables.
7. CV – Control Variable
8. DV – Dependent Variable
9. ESR – *perceived Self-efficacy in Enlisting Social Resources.*
10. Factors – Independent nominal categorical variables.
11. *Internal Assets*: They are psychosocial constructs that measure, numerically, the student's perception about psychosocial phenomena within the student. For the purpose of this study, internal assets of *Perceived Self- Efficacy Beliefs* are the Independent Variables.
12. IV – Independent Variable: Massachusetts Comprehensive Assessment System (MCAS) Mathematics (Math) Test – measures a student's level of achievement in mathematics and is a requirement for earning a high school diploma in Massachusetts. For the purpose of this study, the MCAS Math score is the Dependent Variable.
13. MTH – scaled score on the *high-stakes* test of MCAS mathematics.
14. SES – Socio-economic Status
15. SRE – *perceived Self-Regulatory Efficacy.*
16. SRL – *perceived Self-efficacy for Self-Regulated Learning.*
17. Urban Public School – Springfield Public School District, Springfield, Massachusetts.

Assumptions

This study makes the following assumptions:

1. There is significant variability in the perceived *Self-efficacy Beliefs* of urban public high school students regardless of race/ethnicity, gender, or socio-economic status.
2. Perceived *Self-efficacy Beliefs* of urban public high school students are significant linear correlates of his/her MCAS Math score.
3. The size of the *Quota*-driven *Convenient Sample* would be adequate to yield meaningful results.
4. Participants would answer survey questions as honestly.

Delimitations

This study is not a research in the psychology of learning but rather the exploration of the relationship of psychological construct of *Self-efficacy Beliefs* of urban public school students to performance on a *high-stakes* math test.

CHAPTER 3

STUDY DESIGN

Introduction

The study of mathematics is a study of, essentially, abstract concepts that are not easy to comprehend and master on the first try. In order for an urban public high school student to succeed in mastering these concepts for a *high-stakes* test, the student must possess value-added internal assets of *Self-Efficacy beliefs*. These *Self-Efficacy beliefs*, complements of his *external assets* in the *Mesosystem* (e.g. *Family, Peers,* and *School*), his *Exosystem* (e.g. *Extended Family, Family Friends,* and *Mass Media*), and his *Macrosystem* (*Cultural* and *Ethical* forces) (Bronfenbrenner, 1979), are probably the best measure of his internal assets.

The primary source of *Self-efficacy* is the experience from *performance achievement* (Bandura, 1977). Reinforcement for *Self-regulatory efficacy as well as Self-regulated learning,* however, are more likely due to *vicarious* learning facilitated by the role models; *external assets* found in the *family, peers, school, and mass media.* While rich external resources are more readily available to the suburban student, the urban student must enlist meager external resources of the typical of urban public school districts. It is reasonable to conclude that *Self-efficacy for enlisting external resources* could be a critical determinant of the performance of the urban public school student on a *high-stakes* mathematics test.

This study measured *Self-Efficacy Beliefs* (as *Independent Variables)* with select subscales from the *Children's Self-Efficacy Scale* (CSES; Bandura, 2006) also known as the *Multidimensional Scales of Perceived Self-Efficacy* (MSPSE; Bandura, 1990).

Zimmerman, Bandura, and Martinez-Pons (1992) used MSPSE scale to study a model of *Self-Motivation* for *Academic Attainment* (Final Grades) based on the influence of *Perceived Self-Regulatory Efficacy* on *Perceived Self-Efficacy for Academic Achievement* (*Path 1*) and the influence of *Parent Grade Goals* on *Student Grade Goals (Path 2)* with respect to established academic achievement (*Prior Grades*). The participants were male (n=52) and female (n=50) students from Grades 9 and 10 from two urban high schools. They consisted of African Americans (34%), Hispanics (23%), Whites (24%), Asians (17%), and Others (2%).

Miller, Coombs, and Fuqua (1999) examined the construct validity and internal reliability of MSPSE. The 500 participants were mostly white middle-class students from diverse public high schools. They consisted of equal numbers of both sexes from Grades 11 and 12.

Choi, Fuqua, Griffin (2001) did an *empirical evaluation* study of MSPSE. Participants were 651 (87% singles, 51% females, and 49% freshmen) college undergraduates in the Midwest of USA. Their ethnic composition was 80% Caucasians, 10% Asians, 5% Native Americans, 3% African Americans, and 2% Hispanics.

This study measured *Mathematics Performance* (as *Dependent Variable)* with the student's performance on the Massachusetts Comprehensive Assessment System (MCAS) test in mathematics.

Participants

The 83 (33 males and 50 females) participants were urban public high school students from Springfield Public Schools District who took the grade 10 mathematics

MCAS test in May 2009. They consisted of Asian (n = 1), Black (n = 37), Hispanic (n = 39), Multi-Race (n = 5), and White (n = 1). Eighty-nine percent of them were Low SES.

Measures

Independent Variables

The independent variables were subscales from the *Children's Self-Efficacy Scale* (CSE; Bandura, 2006) also known as the *Multidimensional Scales of Perceived Self-Efficacy* (MSPSE; Bandura, 1990).

1. *Perceived Efficacy for Enlisting Social Resources*: Four-item subscale.

   Miller et al. (1999) reported Cronbach's Alpha of 0.60 for it.

   Choi et al. (2001) reported Cronbach's Alpha of 0.63 for it.

2. *Perceived Self-Regulatory Efficacy* (SRE): Eight-item subscale.

   Miller et al. (1999) reported Cronbach's Alpha of 0.79 for it.

   Choi et al. (2001) reported Cronbach's Alpha of 0.81 for it.

3. *Perceived Efficacy for Self-Regulated Learning (SRL)*: Ten-item subscale

   Zimmerman et al. (1992) reported Cronbach's Alpha of 0.87 for it.

   Miller et al. (1999) reported Cronbach's Alpha of 0.87 for it.

   Choi et al. (2001) reported Cronbach's Alpha of 0.86 for it.

4. *Perceived Efficacy for Academic Achievement* (AA): Nine-item subscale.

   Zimmerman et al. (1992 reported Cronbach's Alpha of 0.70 for it.

   Miller et al. (1999) reported Cronbach's Alpha of 0.74 for it.

   Choi et al. (2001) reported Cronbach's Alpha of 0.72 for it.

Control Variables

Race/Ethnicity, Gender, and Socio-economic Status are moderating factors that could have significant main effects and/or moderate the independent variables to induce significant *unique effects* on the performance of the urban public school student on a *high-stakes* mathematics test. I considered Race/Ethnicity (R), Gender (G), and Socio-economic Status as possible control variables and decided to examine their roles on the performance of the urban public school student on a *high-stakes* mathematics test.

1. Race/Ethnicity (R): Asian (A), Black (B), Hispanic (H), Mixed (M), White (W).
2. Gender (G): Female (F) or Male (M).
3. Socio-Economic Status (S): Low SES (L) or Not-Low SES (N).

Dependent Variable

I chose the performance of the participant on the *high-stakes* test of MCAS mathematics as the dependent variable.

1. Scaled score on grade 10 mathematics MCAS test (MTH).

Procedure

Sampling Considerations

The need to collect this data was the result of a literature search that did not reveal any existing data of this type and did not indicate previous use of this instrument for this purpose. I obtained permission for the study from of the Springfield Public Schools district through the Office of The Superintendent and pertinent student data from the Office of Research and Accountability.

Participation was open to all students who took the grade 10 MCAS mathematics test in May 2009. Sampling method, however, defaulted to the use of a hybrid of Convenience Sampling and Quota Sampling procedures: Convenience sampling because (1) the adolescent student participants were those who were within this researchers reach and willing to participate and (2) their parents or legal guardians were willing to provide informed consent for them to participate. The need for Quota sampling was due to my belief in the use of a-priori Power Analysis to determine the minimum sample size because it is very important that enough students participate such that this research would yield meaningful and statistically significant results.

"Statistical power analysis exploits the relationships among the four variables involved in statistical inference: sample size *(N)*, significance criterion *(ft)*, population effect size (ES), and statistical power. For any statistical model, these relationships are such that each is a function of the other three" (Cohen, 1992, p. 156).

According to Ferguson (2009), researchers are still debating "what magnitude of effect is necessary to establish practical significance" (p. 532). A study such as this one that is interested in the extent of the relation between variables would use the *Pearson r as* the yardstick for the effect size. Cohen (1992) recommended three effect size levels for the *significance of product-moment correlation r*: $r = 0.1$ for *small effect*; $r = 0.3$ for *moderate effect*, and $r = 0.5$ for *high effect.*

A high population effect size (0.5) for the independent and dependent variables would have required a sample size of only 28 (Cohen, 1992, p. 158) but, probably, too ambitious. Attempt to detect a small effect size (0.1), on the other hand, would have required a sample size of 783 (Cohen, 1992, p. 158); not impossible but would have been

difficult for this researcher. This study settled for the possibility of a moderate effect (*r=0.*3) and used statistical power analysis to determine the minimum sample size required for a minimum power of 0.8 and Type I error probability $\alpha = 0.05$ (i.e. the probability of rejecting a true H_o, Null Hypothesis).

According to Cohen (1992), the sample size required on this basis is 85 (p. 158). Sample size calculations using "G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences" (Faul et al., 2007, p.175-191), revealed that a sample size of 80 was adequate for actual power of 0.7933428 and 82 for actual power of 0.8033045 when $r = 0.3$ and $\alpha = 0.05$ were specified.

This study tried to measure the *perceived* beliefs of students; a construct whose validity and reliability are difficult to enumerate even under ideal conditions.

> Because people inherently interpret the results of their actions, their choices, behaviors, and competencies can typically be better predicted by the beliefs they hold about their accomplishments than by what they are actually capable of accomplishing. Of course, this does not mean that they can accomplish tasks beyond their capabilities simply by believing that they can. Competent functioning requires harmony between self-beliefs on the one hand and possessed skills and knowledge on the other. Rather, it means that self-efficacy beliefs help determine what people will do with the knowledge and skills they possess. (Pajares, 2006, p. 342)

Informed Consent and Confidentiality

I delivered two hundred and fifty *Informed Consent* forms to each of four high schools for distribution to only those students who took the grade 10 MCAS math in May of 2009. At my school, I invited students to participate in my study as they arrived in the cafeteria during my lunch duty. If the student showed interest, I discussed the purpose of my research and its methodology with him/her. If he/she was willing to participate, I gave him/her an informed consent form to take home to his/her parent or legal guardian.

I arranged for the questionnaire administration with those who returned the signed informed consent forms.

Request Letter - See Appendix A

Informed Consent Form - See Appendix B

The Survey Instrument - See Appendix C

Questionnaire Administration

The Springfield Public Schools stipulated that, as a condition for granting me permission to conduct my research in the district, I could not administer the questionnaire during school hours. I, therefore, arranged to meet with these participants after school at their convenience and compensated each one of them with five dollars for his/her trouble. I was able to administer the questionnaire to only eighty-four of the eligible students who returned informed consent forms signed by their parents or legal guardians.

According to Bowling (2005), the "mode of questionnaire administration has important implications for research methodology, the validity of the results of research, and for the soundness of public policy developed from evidence using questionnaire-based research" since it could introduce bias (p. 281). The mode for this data collection using survey questionnaire was via the *traditional paper and pencil self-administration* during which I handed the paper questionnaire to the participant for completion. Bowling (2005) found this mode to have the following levels concerning *potential biases:*

High – More complete population coverage for sampling bias

Great – Cognitive burden bias

Medium – Low Survey response bias

Low – Item response/completion of questionnaire bias

High – Question Order effects bias

High – Response-choice order effects bias

High – Recall bias

Low – Social desirability bias

Low – 'Yes-saying' bias

High – Willingness to disclose sensitive information bias

Low – Respondents' preferences for mode of administration bias

High willingness to disclose sensitive information is highly desirable in a study that intends to measure the *perceived Self-efficacy beliefs* of an individual. In order to minimize the *potential biases* of *Great cognitive burden* and *Low social desirability*, I administered the survey instrument at the school setting, used standardized procedures, and read the following statements to each participant prior to his/her completion of the survey questionnaire:

1. The purpose of this questionnaire is to determine the truth about your self-efficacy beliefs with respect to the tasks listed on the questionnaire.
2. There is no right answer or wrong answer: only the truth (I stressed the importance of the need for the truth and reiterated the assurance of anonymity).
3. Your self-efficacy belief is your level of confidence in assembling, organizing, and employing resources needed to accomplish these tasks successfully.

4. You must indicate your level of confidence by one of the following numbers: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90, and 100 (where 0 means you *Cannot* do it at all and 100 means you are *Highly certain* you can do it).
5. Please fell free to ask me for clarification about any of the items on the survey questionnaire.
6. Thanks for your participation.

Completing of the questionnaire by the participant verified the participants' implied informed consent. I made follow-up calls to the homes to thank the participants and their parents/legal guardians. One of the participants had a change of guardianship from the mother to the father during the summer and failed to respond to my follow-up calls. I excluded this student's data point from the study. This research data came from eighty-three willing and consenting participants. These participants came from three of the four regular high schools in this urban school district and constituted 70%, 24%, 6% of all participants respectively. I obtained the participants' corresponding MCAS results and pertinent demographic data directly from the district.

Data Analysis

The sampling method defaulted to the use of a hybrid of Convenience Sampling and Quota Sampling procedures. I used *Predictive Assistive Software (PASW) 17.0* (2009), former *Statistical Program for Social Sciences* (SPSS), for data analysis. I protected confidentiality by replacing the personally identifiable State Assigned Student Identification (SASID) numbers on the questionnaire data with study-specific codes.

Although the sampling procedure was not parametric, the statistical analysis method of choice was linear regression, a parametric analytical method. Linear

regression was chosen because the focal interest of this inquiry was the possibility of linear relationship between the independent and dependent variables. This study, therefore, cannot confer the usual *interpretation* on the reported levels of significance. In order for this study to inform credibly, however, the data must conform to the following assumptions of linear regression:

1. Each one of the *perceived Self-efficacy beliefs* must have a linear relationship with performance on MCAS math test – the *Linearity* requirement.
2. Residuals of performance on MCAS math test must not correlate with each other – the *Independence* requirement.
3. Residuals of performance on MCAS math test must have constant variance – *Homoscedasticity* requirement.
4. Residuals of performance on MCAS math test must have normal distribution – *Normality* requirement.

Lee and Philip (1994) "defined *self-efficacy strength* as the mean confidence rating, using a scale ranging from *completely unconfident* (0) to *completely confident* (10). [They] computed self-efficacy strength by summing all of the scores across items and then dividing by the total number of items" (p.365). I, therefore, calculated the mean *confidence ratings* for *perceived Self-efficacy* for *Enlisting Social Resources* (ESR), *perceived Self Regulatory Efficacy* (SRE), *perceived Self-efficacy* for *Self-Regulated Learning* (SRL), and *perceived Self-efficacy* for *Academic Achievement* (AA). I used these mean *confidence ratings* as the measure of the *perceived self-efficacy beliefs* for each of the 83 cases.

It was important to check the reliability of the subscales prior to conducting further analysis. According to Cronbach (1951), "α estimates, and is a lower bound to, the proportion of test variance attributable to common factors among the [scale] items. That is, it is an index of common factor concentration. This index serves purposes claimed for indices of homogeneity. α may be applied by a modified technique to determine the common-factor concentration among a battery of subtests" (p. 331). I checked the Cronbach's alpha (α) of each subscale before trying to answer the research questions.

Participants in the categories of Multi-Race (6%), Asian (1%), and White (1%) were not sufficiently represented in the study sample. I considered the analysis of the data on racial/ethnic basis as unlikely to inform this inquiry meaningfully and, therefore, revised Research Question Six to exclude Race/Ethnicity.

Checking The Assumptions of Linear Regression

Conformance of the data to the assumptions of linear as well as multiple regressions is critical to the use of regression analysis. I checked the conformance of the study data to these assumptions by obtaining the following:

- *Lack of Fit* test statistic for the Linearity Assumption: Obtained from the output of bivariate regressions of MCAS math scores on *perceived Self-efficacy beliefs* using the *Univariate* selection of the *General Linear Model (GLM)* of PASW 17.0.
- *Skewness* and the *Kurtosis* of the distribution of the *Standardized Residuals* for the Normality Assumption: Obtained by saving the *Standardized Residuals* from bivariate regressions of MCAS math scores

on *perceived Self-efficacy beliefs* and then using the following steps in PASW 17.0: Select *Analyze;* Select *Descriptive Statistics;* Select *Descriptives* and its *Options;* Check *Skewness* and *Kurtosis* in *Distribution*.

- *Variance Inflation Factor* (VIF) statistic for the Independence (No Collinearity) Assumption: Obtained from the output of multiple regression of MCAS math scores on the *perceived Self-efficacy beliefs* using *Regression* selection in PASW 17.0.
- *Levene's Test* statistic of the *Standardized Residuals* for the Homoscedasticity Assumption: Obtained *Levene's* statistic from PASW 17.0 for linear regression analyses (Method from SPSS Tutorials. Texas A&M University: Department of Statistics). First, I ran linear regression analysis and save *the Standardized Residuals.* Next, I ranked the cases and sort them into two groups. Finally, I performed *Independent-Samples t-test* on these two groups. The PASW 17.0 Output files contained the *Levene's* statistic for each linear regression model.

Answering Research Questions One thru Four

This study proposed research questions one thru four as follows:

1. Does *perceived Self-efficacy for Enlisting Social Resources* have significant effect on the MCAS Math score of the urban public school student?
2. Does *perceived Self-efficacy for Academic Achievement* have significant effect on the MCAS Math score of the urban public school student?

3. Does *perceived Self-efficacy for Self-Regulated Learning* have significant effect on the MCAS Math score of the urban public school student?
4. Does *perceived Self-Regulatory Efficacy* have significant effect on the MCAS Math score of the urban public school student?

In order to answer research questions one through four, I examined the statistical significance of the bivariate regressions of the MCAS math score (MTH) on *perceived Self-efficacy* for *Enlisting Social Resources* (ESR), *perceived Self Regulatory Efficacy* (SRE), *perceived Self-efficacy* for *Self-Regulated Learning* (SRL), and *perceived Self-efficacy* for *Academic Achievement* (AA).

Answering Research Question Five

This study proposed research question five as follows:

5. Do all four *perceived self-efficacy beliefs* have significant collective effect on the MCAS Math score of the urban public school student?

In order to answer research question five, I examined the collective statistical significance of the multiple regression of the MCAS math score (MTH) on *perceived Self-efficacy* for *Enlisting Social Resources* (ESR), *perceived Self Regulatory Efficacy* (SRE), *perceived Self-efficacy* for *Self-Regulated Learning* (SRL), and *perceived Self-efficacy* for *Academic Achievement* (AA).

Answering Research Question Six

This study proposed research question six as follows:

6. Are there significant *unique effects* of the four *perceived Self-efficacy belief*s on the MCAS Math score of the urban public school student due to moderations by Gender and Socio-economic Status?

Prior to answering research question six, I checked the significance of bivariate main effects of Gender (G) and Socio-economic status (S) on MCAS math score (MTH). I also coded the data such that *GLM Univariate* analysis would recognize Male [M=0] as the reference level for Gender and Not-Low Socio-economic Status [N=0] as the reference level for Socio-economic Status. In order to answer research question six, I examined the statistical significance of the *unique effects* of each of the *perceived Self-efficacy beliefs* on MCAS math score (MTH) due to moderations by Gender (G) and Socio-economic Status (S).

CHAPTER 4

RESULTS

This chapter begins with the presentation of the examination results of the reliabilities (Cronbach's alphas) of the *Self-Efficacy beliefs* scales. Next, it discusses the examination results of compliance of the data to linear regression assumptions. It concludes with the discussion of the answers to research questions one through six.

Reliability of the *Self-Efficacy Beliefs* Subscales

The reliability coefficient, Cronbach's alpha, for *perceived Self-efficacy* for *Enlisting Social Resources* (ESR) was 0.674, *Self Regulatory Efficacy* (SRE) was 0.848, *perceived Self-efficacy* for *Self-Regulated Learning* (SRL) was 0.892, *and perceived Self-efficacy* for *Academic Achievement* (AA) was 0.828. These coefficients were of the same order of magnitude as was reported in the literature.

Conformance to Linearity Assumption

The data conformed to the linearity assumption of linear regression. *Lack-of-Fit* test statistics (F Statistic) from bivariate regressions of MCAS math scores on *perceived Self-efficacy* for *Enlisting Social Resources* ($F = 1.288$, $p = 0.212$), *Self Regulatory Efficacy* ($F = 0.638$, $p = 0.897$), *perceived Self-efficacy* for *Self-Regulated Learning* ($F = 1.129$, $p = 0.355$), and *perceived Self-efficacy* for *Academic Achievement* ($F = 0.769$, $p = 0.789$) retained the *Null* hypothesis of linear relationship in each case.

Conformance to Normality Assumption

The data conformed to the normality assumption of linear regression. The *Skewness* (within ± 1) and *Kurtosis* (within ± 1) values for the distributions of the S*tandardized Residuals* from the bivariate as well as multiple regressions of MCAS math

scores on the *perceived Self-efficacy* for *Enlisting Social Resources, Self Regulatory Efficacy*, *perceived Self-efficacy* for *Self-Regulated Learning*, and *perceived Self-efficacy* for *Academic Achievement* supported conformance to normal distribution assumption in each case.

Conformance to Homoscedasticity Assumption

The data conformed to the homoscedasticity assumption of linear regression. *Levene's* statistic tests the *Null* hypothesis of the existence of homogeneity of variance in linear regression. *Levene's* test statistic from the regression of the MCAS math scores on the *perceived Self-efficacy* for *Enlisting Social Resources* ($F = 0.594$, $p = 0.443$), *Self Regulatory Efficacy* ($F = 0.007$, $p = 0.933$), *perceived Self-efficacy* for *Self-Regulated Learning* ($F = 0.030$, $p = 0.864$), and *perceived Self-efficacy* for *Academic Achievement* ($F = 2.122$, $p = 0.149$) supported the *Null* hypothesis of homoscedasticity in each case.

Conformance to Independence Assumption

The data conformed to the independence assumption of linear regression. The *Variance Inflation Factor* (VIF) statistic tests for the significance of the collinearity of the independent variables in multiple linear regressions. The VIF from the multiple linear regression of MCAS math scores on *perceived Self-efficacy* for *Enlisting Social Resources* (VIF = 1.110), *Self Regulatory Efficacy* (VIF = 1.150), *perceived Self-efficacy* for *Self-Regulated Learning* (VIF = 1.350), and *perceived Self-efficacy* for *Academic Achievement* (VIF = 1.499) was much less than 10 for each independent variable and, thus, supported their independence. Autocorrelation of the independent variables could become a problem at VIF values above 10.

Results for Research Questions One thru Four

The purpose of these research questions was to determine the significance of the individual effect, i.e. in the absence of other variables, of *perceived Self-efficacy Enlisting Social Resources*, *Self Regulatory Efficacy*, *perceived Self-efficacy* for *Self-Regulated Learning*, and *perceived Self-efficacy* for *Academic Achievement* on the MCAS Math score of the urban public school student.

Possible values of *perceived Self-Efficacy Belief* vary from 0 to 100 on the scale. The mean value of *perceived Self Regulatory Efficacy* was 84.6 and that of *perceived Self-efficacy* for *Academic Achievement* was 81.93. Both were much greater than those of *perceived Self-efficacy* for *Enlisting Social Resources* (67.75) and *perceived Self-efficacy* for *Self-Regulated Learning* (67.63). The mean MCAS math score was 236.48; slightly below the 240 needed to be classified as *Proficient* and required to pass the *high-stakes* MCAS math test.

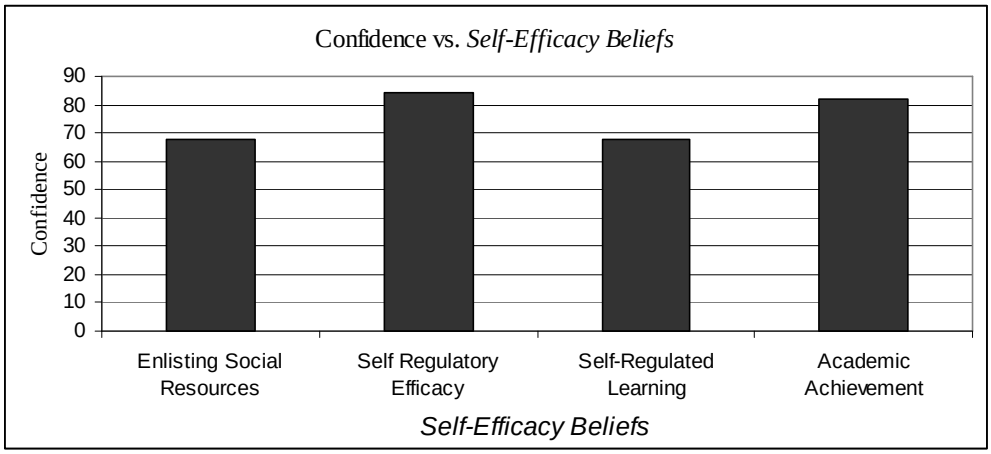

Figure 1: Mean Confidence Levels of *Self-Efficacy Beliefs*

The spread (Std. Dev.) of a set of data is an indication of the extent to which the participants perceive the same level of the *Self-Efficacy Belief*. The smaller the spread,

the more the participants agree collectively with respect to a perceived *Self-Efficacy Belief*. Although their confidence levels (the mean values) of *perceived Self Regulatory Efficacy* and *perceived Self-efficacy for Academic Achievement* were very high and about the same, the spreads were quite different. The spread of *perceived Self-efficacy for Academic Achievement* was14.808 and that of *perceived Self Regulatory Efficacy* was 18.911. This suggested that the average urban public school student from the study sample felt more certain about his/her *perceived Self-efficacy for Academic Achievement* in comparison with *perceived Self Regulatory Efficacy*. The mean MCAS math score of 236.48, however, was below proficient did not support this enthusiastic perception.

The small spread of *perceived Self-efficacy* for *Academic Achievement* and its statistical significance ($\beta = 0.346$, $p = 0.008$) as a predictor of MCAS math score affirmed its importance to MCAS math test performance. The spread of *perceived Self Regulatory Efficacy* was small and its statistical significance ($\beta = 0.302$, $p = 0.002$) as a predictor of MCAS math score also affirmed its importance to MCAS math test performance.

These results showed that, with every point gain in *perceived Self Regulatory Efficacy* confidence and *perceived Self-efficacy* for *Academic Achievement* confidence, the urban public high school student from this study sample was likely to gain 0.302 and 0.346 respectively on his/her MCAS math score. In this particular case, the student is more likely to get a bigger MCAS math score *Bang* for his/her *perceived Self-efficacy* for *Academic Achievement* than for *perceived Self Regulatory Efficacy*. This study also found that *perceived Self Regulatory Efficacy* ($R^2 = 0.115$, $p = 0.002$) and *perceived Self-efficacy* for *Academic Achievement* ($R^2 = 0.084$, $p = 0.008$) accounted for approximately

12% and 8% respectively of the variance in MCAS math score. In the absence of other variables, *perceived Self Regulatory Efficacy* accounted for more of the variance in MCAS math test performance than any of the *perceived Self-Efficacy beliefs* in this study.

It is reasonable to conclude that, in the absence of other variables, *perceived Self Regulatory Efficacy* and *perceived Self-efficacy* for *Academic Achievement* of the urban public high school student from this study sample were more likely to determine his/her success or failure on the *high-stakes* MCAS math test.

Results for Research Question Five

Research question five inquired about the significance of the collective effect of *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self Regulatory Efficacy, perceived Self-efficacy* for *Self-Regulated Learning,* and *perceived Self-efficacy* for *Academic Achievement* on the MCAS Math score of the urban public school student.

This study found that the collective effect of all the independent variables was statistically significant ($F = 3.482$, $p = 0.011$) as predictors of the performance of the urban public school student from this study sample on MCAS math test. Careful examination of the results found, however, that of the four independent variables, *perceived Self Regulatory Efficacy* ($\beta = 0.238$, $p = 0.019$) was the only one with statistically significant main effect on MCAS math test performance in this case. This did not imply that *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self-efficacy* for *Self-Regulated Learning,* and *perceived Self-efficacy* for *Academic Achievement* were not good predictors of the MCAS math test performance. It only meant that *perceived Self Regulatory Efficacy* contributed to the prediction of MCAS math score over and above what the other *perceived Self-efficacy beliefs* did.

Collectively ($R^2 = 0.152$, $p = 0.011$), all the independent variables accounted for approximately 15% of the variance in the predicted MCAS math score. According to Jaccard and Turrisi (2003), the square of the *Zero-Order Correlations Coefficient*, 0.339^2, or approximately 12% of MCAS math score variance was due to *perceived Self Regulatory Efficacy* when other *perceived Self-efficacy beliefs* varied (Table 9.) while the square of the *Part Correlations Coefficient*, 0.250^2, or only 6% of MCAS math score variance was due to *perceived Self Regulatory Efficacy* when other *perceived Self-efficacy beliefs* had fixed values (Table 9.). *Perceived Self Regulatory Efficacy* of the urban public school student accounted for approximately 6% more of his/her MCAS math scores variance than the other *perceived Self-efficacy beliefs* in this study.

The Fear of God is The Beginning of Wisdom (Psalm 111:10) is an expression that seems evocative of the relationship between *Self Regulatory Efficacy* (*The Fear of God*) and MCAS math performance (*The Beginning of Wisdom*) – Of the four independent variables in this study, *perceived Self Regulatory Efficacy* of the urban public school student was the only consistent statistically significant predictor of his/her MCAS mathematics test performance. An urban public school student from this study sample who was highly confident of his/her ability to *resist peer pressure* to make bad choices was more likely to perform well on the MCAS math test. Those urban public school students whose confidence levels to *resist peer pressure* were low were more likely to perform poorly on the MCAS math test. It is reasonable to expect a student who is able to *resist peer pressure* to make bad choices to do so because he/she is fearful of not meeting his/her own expectations as well as the expectations of significant adults (e.g. parents and guardians) and/or authority figures (e.g. teachers and preachers) in his/her

life. Such a student would, in all probability, be more inclined to focus his/her energy and time on those choices that would facilitate meeting expectations such as proficient or better performance on the MCAS math test. It is, therefore, reasonable to expect this fear of failure to serve as the impetus for academic excellence.

Results for Research Question Six

Research question number six inquired about the significance of the *unique effects* of *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self Regulatory Efficacy, perceived Self-efficacy* for *Self-Regulated Learning,* and *perceived Self-efficacy* for *Academic Achievement* on the MCAS Math score of the urban public school student due to moderations by Gender and Socio-economic Status.

I addressed this question in two stages. First I used bivariate linear regression to examine the significance of the main effect of each control variable on MCAS Math scores. Then I explored the *unique effects* of the *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self Regulatory Efficacy, perceived Self-efficacy* for *Self-Regulated Learning,* and *perceived Self-efficacy* for *Academic Achievement* on the MCAS Math score due to their moderations individually.

Main Effect of Gender on MCAS Math Scores

This study found that, in the absence of other variables, Gender was not a statistically significant predictor ($F = 0.182$, $p = 0.671$) of the performance of the urban public school student on the MCAS math test. The mean MCAS math score was about the same for both females (235.84) and males (237.45). The spread (Std. Dev. = 16.412) of the MCAS math scores of females was just slightly smaller than the spread (Std. Dev. = 17.602) of those of their male counterparts.

This result suggested that the MCAS math score of the urban public high student from this study sample was, probably, not a function of his/her gender when the relationship was examined in isolation. It is very unlikely that a set of twins, one male and one female, from this study sample would have MCAS math scores that are statistically significantly different. One can conclude that, when other variables were not accounted for, the female urban public school student and her male counterpart perform at the same level on MCAS math test.

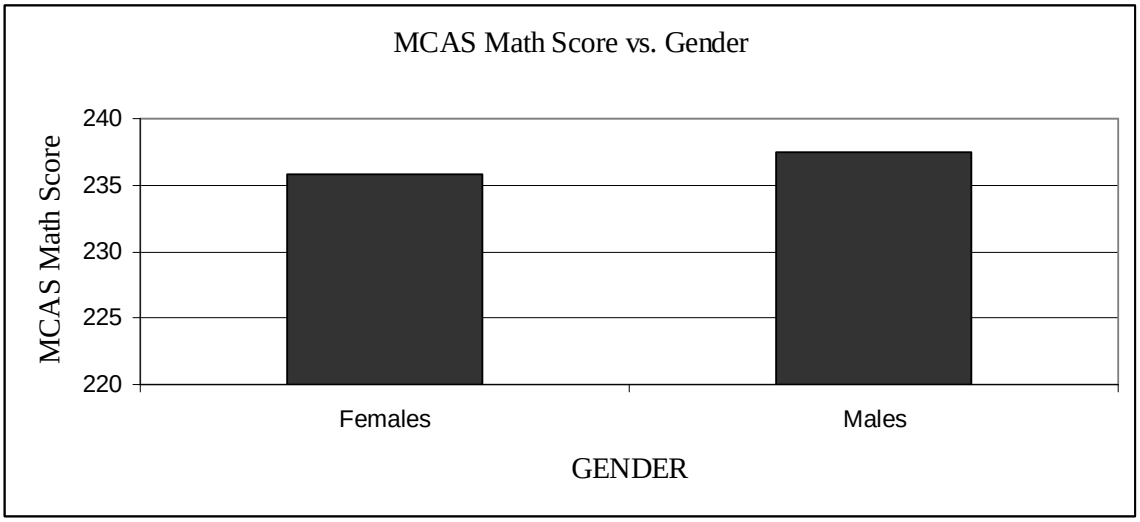

Figure 2: Mean MCAS Math Scores – Based on Gender

Gender Interactions with *Perceived Self-Efficacy Beliefs*

If Gender were a filter, both its male and female screens failed to retain the *unique effects* of three of the four *perceived Self-Efficacy beliefs* in this study. Gender did not moderate the effects of *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self-efficacy* for *Self-Regulated Learning,* and *perceived Self-efficacy* for *Academic Achievement* of the urban public school student, from the study sample, on the *high-stakes* MCAS math test performance.

The incredible influence of *perceived Self Regulatory* Efficacy: Gender failed to screen the *unique effects* of *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self-efficacy* for *Self-Regulated Learning, and perceived Self-efficacy* for *Academic Achievement* on MCAS math test performance but exhibited incredible influence in screening the *unique effect* of *perceived Self Regulatory Efficacy* on MCAS math performance. This interaction between Gender and *perceived Self Regulatory Efficacy*, in the absence of other variables, accounted for approximately 16% of the variance in MCAS math scores (R Squared = 0.165). Unlike the other *perceived self-efficacy beliefs* selected for this study, *perceived Self Regulatory Efficacy* was more consistent and exhibited a statistically significant interaction effect with Gender ($F = 5.205$, $p = 0.002$) on the MCAS math test performance. Female participants, it appeared, were more efficacious than males at the lower end of *perceived Self Regulatory Efficacy* scale and, therefore, were more likely to attain better performance on the MCAS math test than male participants in spite of this low level of *perceived Self Regulatory Efficacy*. As his confidence level increased, the performance of the male participant increased rapidly and caught up with the female at about 80 on *perceived Self Regulatory Efficacy*. Beyond 80 on *perceived Self Regulatory Efficacy*, the male participants were more likely to attain the same or better performance on the MCAS math test than the females. It appears that *The Fear of God* is more likely to establish the *Beginning of Wisdom* for the male student and spur him to attain improved MCAS math test performance at a higher rate than the female student. This finding has some implications regarding how the family, school, and society explicitly or implicitly influence the development of the urban public school female and male student. The results from this study have shown just one

probable consequence regarding the *unique effect* of *perceived Self Regulatory Efficacy* on MCAS math test performance due to moderation by Gender. The possibility of other Gender-moderated consequences such as the social emotional adjustments of the urban public school student should not be ruled out and every effort should be made to pay attention to the *perceived Self Regulatory Efficacy* of these students.

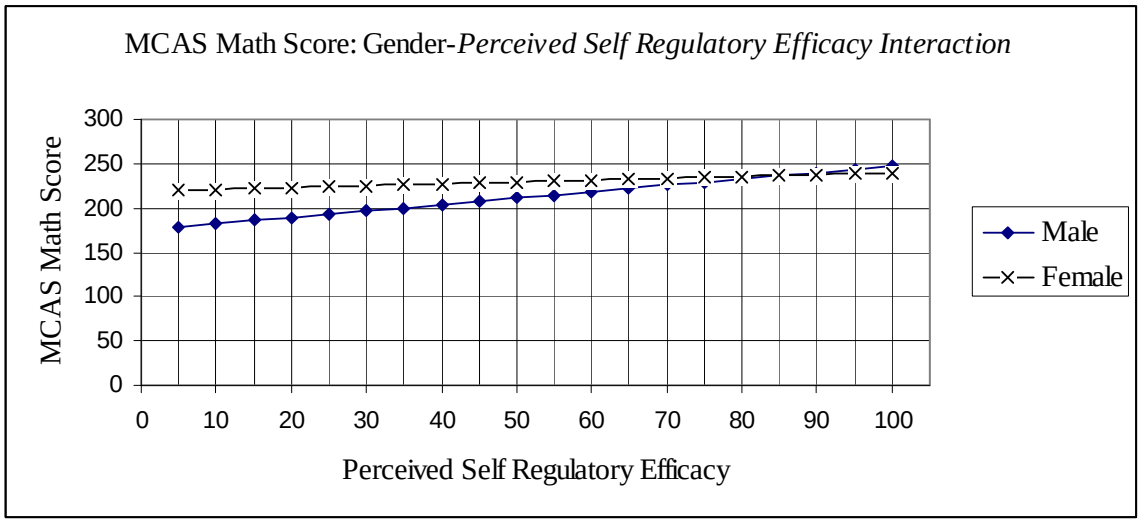

Figure 3: Gender Interaction with *Self Regulatory Efficacy Belief* – In Isolation

Gender Interaction with *Perceived Self Regulatory Efficacy – Accounting for Other Variables*

This study already found that when Gender was the moderator and *perceived Self-Regulatory efficacy* was the only independent variable, both showed statistically significant main as well as interaction effects on MCAS math score. These findings precipitated the following research question:

Would this Gender interaction with *perceived Self Regulatory Efficacy* on MCAS math score remain significant if the effects of *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self-efficacy* for *Self-Regulated Learning, perceived Self-efficacy* for *Academic Achievement*, and Socio-economic status were accounted for?

This study found that the statistically significant Gender interaction with *perceived Self-efficacy, that* was evident in isolation, did not materialize when other variables were accounted for. Although Gender interaction with *perceived Self Regulatory Efficacy* was not statistically significant in this case, the collective effect of accounting for *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self-efficacy* for *Self-Regulated Learning, perceived Self-efficacy* for *Academic Achievement,* and Socio-economic status in question six was impressively statistically significant ($F = 3.006$, $p = 0.008$) in predicting MCAS math score. Only *perceived Self Regulatory Efficacy* had statistically significant main effect ($\beta = 0.600$, $p = 0.011$) on MCAS math score. This time, neither Gender nor its interaction with *perceived Self Regulatory Efficacy* was statistically significant.

Once again, the study found that *perceived Self Regulatory Efficacy* was a highly probable determinant of the performance of the urban public school student on the *high-stakes* MCAS math test. This is not an affirmation of *perceived Self Regulatory Efficacy* as the panacea for student achievement but a recognition of the fact that, for the study sample, the urban public school student who was highly confident of his/her *perceived Self Regulatory Efficacy* was more likely to do well on the MCAS math test. The urban public school student who enters the comprehensive college-preparatory environment of urban public high school and, is highly confident of his/her *perceived Self Regulatory Efficacy,* possesses a very potent *Force* of nature that would serve him/her well in navigating the social and emotional labyrinth of adolescent world successfully. Such a student is more likely to perform well on a *high-stakes* mathematics test, graduate from high school in four years, and succeed in college.

Main Effect of Socio-economic Status on MCAS Math Scores

This study found that, in the absence of other variables, Socio-economic Status was a statistically significant predictor ($F = 4.769$, $p = 0.032$) of the performance of the urban public school student on the MCAS math test.

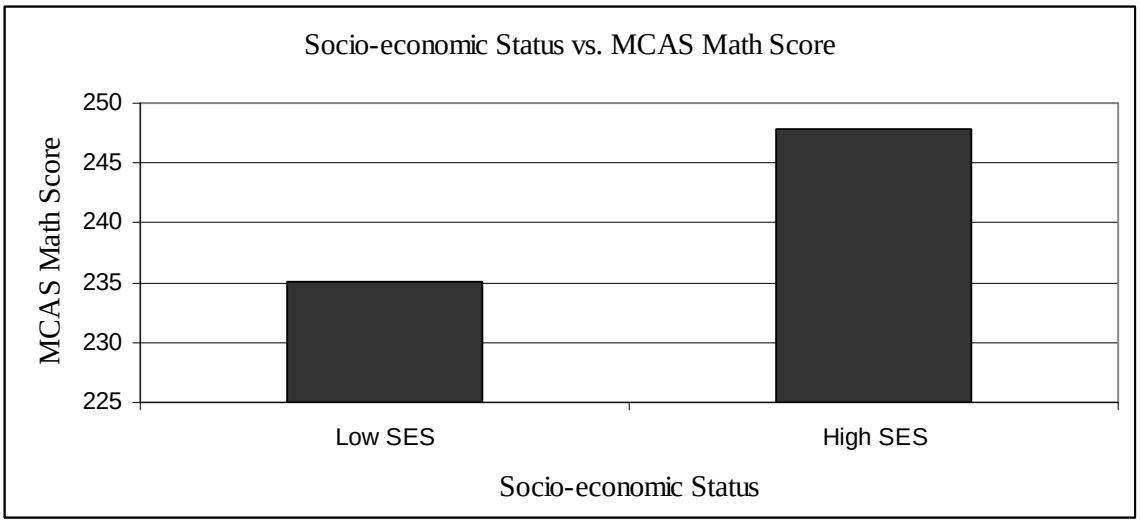

Figure 4: Mean MCAS Math Scores – Based on Socio-economic Status

The mean MCAS math score (235.11) of the Low SES urban public school student, from this study, was lower than that (247.78) of his/her Not-Low SES counterpart (Figure 3). The spread (Std. Dev. = 16.533) of MCAS math scores of the Low SES students was slightly greater than the spread (Std. Dev. = 15.506) of their Not-Low SES counterparts. The Low SES participant was more likely to have a mean score about 13 points lower than a participant who was not Not-Low SES. These findings suggested that Socio-economic Status, when examined in isolation, remains a powerful determinant of academic achievement and a highly probable predictor of the performance of the urban public school student on the *high-stakes* MCAS math test. Low Socio-economic Status continues to be a significant risk factor to an adolescent in an urban public school system.

Socio-economic Status Interactions with *Perceived Self-efficacy Beliefs*

Socio-economic status did not interact statistically significantly with *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self Regulatory Efficacy, perceived Self-efficacy* for *Self-Regulated Learning,* or *perceived Self-efficacy* for *Academic Achievement*. These findings suggested that, for the study sample, there were no *unique effects* of *perceived Self-efficacy* for *Enlisting Social Resources, Self Regulatory Efficacy, perceived Self-efficacy* for *Self-Regulated Learning,* or *perceived Self-efficacy* for *Academic Achievement* due to moderations by the Socio-economic Status of the urban public school student on his/her performance on the *high-stakes* MCAS math test.

CHAPTER 5

CONCLUSION, IMPLICATIONS, RECOMMENDATIONS

Conclusion

This study has shown that, for the study sample, the performance of the urban public student on the *high-stakes* grade 10 MCAS math test was a probable linear function of his/her *perceived Self-efficacy* for *Enlisting Social Resources, perceived Self Regulatory Efficacy, perceived Self-efficacy* for *Self-Regulated Learning*, or *perceived Self-efficacy* for *Academic Achievement*. It is reasonable to expect that general *perceived Self-Efficacy beliefs* are just as likely to inform the construct of *Self-Efficacy* as are task-specific *perceived Self-Efficacy beliefs.*

This study obtained reliability coefficients, Cronbach's Alpha, comparable to what was reported in the literature for the subscales of *perceived Self-efficacy* for *Enlisting Social Resources, Self Regulatory Efficacy, perceived Self-efficacy* for *Self-Regulated Learning*, and *perceived Self-efficacy* for *Academic Achievement*. The data conformed to all the assumptions of linear regression in spite of the fact that the sampling method was non parametric. It is suggested, however, that study results should be interpreted with caution. On the average, the study participants had high *perceived Self Regulatory Efficacy* (84.6) and *perceived Self-efficacy* for *Academic Achievement* (81.93). An urban public school student from this study sample was more likely to have less than proficient MCAS math-score; the mean was 236.48. The study revealed that *perceived Self-Regulatory Efficacy* and *Self-Efficacy for Academic Achievement* were statistically significant predictors, not accounting for other variables, of the performance of the urban public school student from this sample on the *high-stakes* MCAS math test.

When other independent variables were accounted for, *perceived Self Regulatory Efficacy* ($\beta = 0.238$, $p = 0.019$) was the only statistically significant predictor of MCAS math test performance.

The mean MCAS math score was about the same for both females (235.84) and males (237.45). MCAS math test performance of the participant could not be predicted on the basis of Gender alone. When the effect of Gender interaction with *perceived Self-efficacy beliefs* was examined, however, the study found that the *unique effect* of *perceived Self Regulatory Efficacy* on MCAS math score due to moderation by Gender was quite significant. The male participants lagged behind the females until their *perceived Self Regulatory Efficacy* confidence level reached approximately 80 then they surpass the females. This Gender- *perceived Self Regulatory Efficacy* interaction did not surface when all the other variables were accounted for. In this case, *perceived Self Regulatory Efficacy* was, again, the only independent variable that qualified as a statistically significant predictor of MCAS math score of the participant.

The study found that low Socio-economic Status continues to be a significant risk factor to the urban public school student. When examined in the absence of other variables, the Low SES student from this study was more likely to score about 13 points less than the Not-Low SES student on the MCAS math test. With regards to interactions, Socio-economic Status of the participant was inconsequential regarding his/her performance on MCAS math test because it did not statistically significantly moderate the effect of any of the *perceived self-efficacy beliefs.*

Limitations

This study was limited to urban high school students in the Springfield Public School System in Massachusetts. *Convenience Sampling* method possesses the inherent inability to provide a sample that is representative of the population of interest. The sampling method defaulted to a convenience-quota-driven hybrid type because of the very narrow window of opportunity to contact and enlist participants. The population of interest consisted of adolescents. These adolescents had to be available, they had to be willing to participate, and their parents or legal guardians had to be willing to give permission for their children to participate. Administration of the survey instrument was limited to after school hours when many students could not participate owning to difficulties with transportation and/or conflict with other activities.

This study does not make implicit or explicit claim of the validity of its findings for urban high school students in general and the Springfield Public Schools high school students in particular. The participants came from three of the four regular high schools in the district and, even then, the majority of them came from just one of the high schools.

Implications

> "The pessimist sees difficulty in every opportunity; an optimist sees the opportunity in every difficulty."
>
> - Sir Winston Churchill

Just as *The Little Red Caboose* (Potter, 2009) believed in its capabilities, prevented the train from rolling backward, and assisted it in climbing to the top of mountain, the *self-efficacy beliefs* of the urban public school student, if enhanced, could enable the student to attain proficient or higher level of performance on the *high-stakes*

MCAS mathematics test. The urban public school student who possesses a high level of general *self-efficacy beliefs* is more likely to be an optimist rather than a pessimist. He/she is more likely to recognize the positive possibilities of making progress in spite of social and academic problems. Such a student is more likely to adapt quickly in difficult situations and initiate the process of continuous self improvement. This process of continuous self-improvement is more likely to enhance his/her general *self-efficacy* and increase his/her chance of attaining proficient or better performance on a *high-stakes* mathematics test. I believe that we must provide the resources needed to improve the confidence level of the *self-efficacy beliefs* of the urban public school student to enable him/her to attain proficient or higher level of performance on the *high-stakes* MCAS math test. Indeed, possession of the requisite skills may not necessarily guaranty success if the confidence level of the student's *self-efficacy beliefs* is low and he/she could fail to attain proficient level of performance on the *high-stakes* mathematics test. I believe that the performance of the urban public school student on a *high-stakes* mathematics test can be improved by a continuous improvement process. This academic intervention process would enable the student's general *self-efficacy beliefs* to advance like rungs as he/she ascends the ladder of academic achievement.

Literature review of studies of *Academic Self-Concept versus Academic Self-Efficacy* revealed that *Experience* and *Significant Others* shape the nature of ones *Self-Concept* through *Frames of Reference, Causal Attributions, Reflected Appraisals from Significant Others, Mastery Experiences,* and *Psychological Centrality* (Bong and Skaalvik, 2003). Of course, Bandura (1977), already attributed the sources of one's *Self-Efficacy Beliefs* to personal *performance accomplishments* (*participant modeling,*

performance desensitization, performance exposure, or *self-instructed performance), vicarious experience* of role models (*live modeling* or *symbolic modeling*), *verbal persuasion* from others (*suggestion, exhortation, self-instruction,* or *interpretive treatments*), and *emotional arousal* (*attribution, relaxation, biofeedback, symbolic desensitization,* or *symbolic exposure*). Bong and Skaalvik (2003) concluded that, "self-concept embodies fairly stable perceptions of the self that are past-oriented, whereas self-efficacy represents relatively malleable and future-oriented conceptions of the self and its potential" (p. 9).

Since *self-efficacy* is *malleable* and *future-oriented*, there is hope that appropriate intervention can improve the performance of the urban public school student on the *high-stakes* MCAS math test through acquisition of enhanced *self-efficacy beliefs.* A significant number of urban public school adolescents enter the comprehensive college preparatory environment of high school every year without the prerequisite skills needed for social, emotional, and academic success. At Lagos, Nigeria, on the west coast of Africa, the elders would occasionally refer to an incorrigible child as a *Dried Fish.* The *Dried fish* metaphor may seem applicable to the adolescent who has failed to meet expectations after being "availed" of every possible intervention because once dried, it is too late and almost impossible to change the shape of the fish to the customer's desire. Unlike dried fishes whose shapes are permanently set without the possibility of modification, these adolescents possess the innate human characteristic of *malleable* and *future-oriented self-efficacy* beliefs. Although developing a highly efficacious urban public school student is easier when done very early in the development of the individual, I believe very strongly that it is never too late to improve the *self-efficacy* beliefs of these

adolescents. It is easier and better to mould the form of the tree to one's desires when a seedling than to wait until full grown when changing its shape becomes almost impossible. Timely application of effective means to promote the continuous cycle of self-improvement of the urban public school student under the mentorship of a caring and competent role model would strengthen his/her *self-efficacy beliefs*. This should spur significant improvement in the performance of the urban public school student on the *high-stakes* MCAS math test.

According to Pajares (2005),

> *self-efficacy beliefs* provide the foundation for motivation, well-being, and personal accomplishments in all areas of life. This is because unless young people believe that their actions can produce the results they desire, they have little incentive to act or to persevere in the face of difficulties that inevitably ensue. They can, of course, be cajoled or coerced to complete tasks or participate in activities not of their choosing, but, as soon as they are provided with the option to select their own life paths, they will surely select tasks and activities they believe are within their capabilities and avoid those that they believe are beyond their perceived competence. (p. 339)

This study found that, of the four *perceived Self-Efficacy beliefs* investigated as independent variables in this study, *perceived Self Regulatory Efficacy* emerged as the most consistent and the most powerful determinant of the performance of the urban public school student on the *high-stakes* MCAS math test. Parents, guardians, advocates, and educators must pay attention to the *perceived Self-Efficacy beliefs* of the urban public school student. Occasionally, someone would refer to a student who refuses to cooperate in the classroom *a bad student*. I believe that there is no such thing as *a bad student*. Every student is a good student and, sometimes, even the best ones make some bad choices. We must strive to understand the student's reasons for making those choices,

when they deviate negatively from our expectations. I believe that a parent, a guardian, or a teacher who is able to evaluate the level of the urban public school student's *perceived Self-Efficacy beliefs*, would gain a better understanding of what motivates him/her to make certain behavioral choices. This knowledge would promote better communication and facilitate more effective intervention for improving the performance of the urban public school student on *high-stakes* test such as the MCAS math test.

Nota et al., 2004, found that *Self-consequences strategy* of self-regulation was a major determinant of Italian students' academic performance leading to educational aspiration beyond the secondary school. Brody, Flor, and Gibson (1999) found that *Self-Regulation* linked *Competence-Promoting Parenting Practices* indirectly to the children's academic achievement but this link seemed to be independent of SES. According to Bleeker and Jacobs, 2004, the effect of White suburban mothers' perceptions of their children's *math-science* abilities on subsequent adolescents' *math-science* self-efficacy and career choices was quite significant, especially for females. The results of this study suggested that *perceived Self-Efficacy beliefs* in general and *perceived Self Regulatory efficacy* in particular are *internal assets* that we must nurture in our youths.

It is reasonable to expect that any urban or suburban student, who possesses high *perceived Self Regulatory efficacy*, is more likely to make a more effective use of his resources. Such a student is more likely to focus on school-related tasks that would safeguard his welfare and contribute to his academic success. A student is who is able to resist the risk factors related to peer pressure is more likely to acquire those critical thinking skills required for proficient performances in mathematics and science.

Research has shown that success in mathematics, Algebra in particular, is more likely to establish successful economic trajectory for the adolescent in life. It is, therefore, imperative that our teacher preparation institutions, urban school districts, and social support organizations recognize the importance of helping adolescents develop their *perceived Self-Efficacy beliefs* in general and *perceived Self Regulatory efficacy* in particular. These agencies should facilitate the acquisition of the pedagogical skills necessary to reach the urban public school student. The educator must be able to reach his/her disciple before he/she can teach.

This study found that *perceived Self-Efficacy* for *Academic Achievement*, in isolation, was a statistically significant predictor of MCAS math score. One should expect this because the items contained in *perceived Self-Efficacy* for *Academic Achievement* subscale addressed the *perceived Self-efficacy belief* for learning in the academic domain of functioning. These items inquire about the student's level of confidence in learning to read, write, and do mathematical computations. They question the student's self-efficacy beliefs with respect to learning academic subjects such as *mathematics, science, biology, foreign language, social studies,* and *English.* The finding that *perceived Self-Efficacy* for *Academic Achievement*, in isolation, was a statistically significant predictor of MCAS math score is an affirmation of its power to shape the trajectory of academic success and, probably, the economic future of the urban public school student. According to Bandura (1977), the sources of *Self-Efficacy Beliefs* are *performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal.* The most influential of these are the *performance accomplishments* of the student. The educator can induce a positive effect on the student's *Self-Efficacy* for

Academic Achievement by ensuring that lesson plans are prepared with clear objective(s), that the objectives are clearly communicated to the student, that the classroom environment is conducive to teaching and learning, that instruction is devoid of confusion and delivered with clarity, and that each student is given equitable consideration. The educator must remain cognizant of the potent effects of these four sources of the student's *Self-Efficacy Beliefs* at all times. Educators must acquire the tactical skills needed to impress upon urban public school adolescents that education is the critical path to successful participation in our democracy and the source of knowledge and skills needed to advocate ones interest as well as the interests of society.

The urban public school teacher who is able to reach his/her students successfully would be able to optimize their *perceived Self Regulatory Efficacy* such that more of them would get education: The acquisition of knowledge, critical thinking skills, and empathy. Although socio-economic status plays a significant role is student achievement, any intervention that could possibly enhance a student's *perceived Self Regulatory Efficacy* should be embraced and diligently employed in the process of educating children in general and adolescents in urban public schools in particular.

According to Bong and Skaalvik (2003), enhancing the student's self-efficacy belief should take less *time and effort* than trying to alter his/her *self-concept.* "Therefore, teachers might be better off investing in (1) fortifying students' efficacy perceptions, especially when the primary goal is to improve their immediate future performance, (2) creating environments that reduce students' preoccupation with ability comparisons, and (3) reducing the impact of academic self-concept on students' self-worth" (Bong and Skaalvik, 2003, p. 34).

The education system must reform its policies such that the tactics employed in engaging the young learners of the 21st century urban public schools could foster and not hinder the attainment of enhanced *perceived Self-Efficacy beliefs* by these learners as early as possible in the developmental process.

"These self-efficacy beliefs provide the foundation for motivation, well-being, and personal accomplishments in all areas of life" (Pajares, 2006, p. 339). The educator who succeeds in enlisting the *Force* of S*elf-Efficacy Beliefs* of the urban public school student for proficient or better performance on a *high-stakes* mathematics test such as the MCAS math test is destined to become a Guardian of Dreams.

Recommendations

A new study should replicate this one. Parametric sampling procedure is highly desirable and should be used, if feasible. This sampling procedure would ensure that the significance levels obtained from data analysis would retain the usual social scientific *interpretation*. The sample size should be robust enough for the detection of small effect size, $r = 0.1$, at $\alpha = 0.05$.

Other studies could use the same subscales but examine the relationship to other *high stakes* tests such as MCAS English Language Arts test and MCAS Science, Technology, and Engineering test. A more ambitious endeavor would involve all the sub-scales of CSES for all the *high stakes* tests in all urban public school districts across the Commonwealth.

APPENDIX A

INFORMED CONSENT REQUEST LETTER

Mr. Kolajo A. Afolabi
66 Woolworth Street
Longmeadow, Massachusetts 01106

May 4, 2009

Dear Parent/Guardian:

I am an Assistant Principal at the High School of Commerce and doctoral student at the University of Massachusetts Amherst. I am conducting a dissertation research study in the Springfield Public Schools system. The title of this study is *Relationship of Self-Efficacy Beliefs of Urban Public School Students to Performance on A High-Stakes Mathematics Test.*

The purpose of this study is to examine the significance of *Self-Efficacy Beliefs* of the urban public high school student as correlates of the performance on the *high-stakes* MCAS mathematics test. The significance of this study is the potential to inform the design and practice of academic intervention for urban public high school students.

Your child is eligible to participate in this study. The student's participation is voluntary and the student can terminate it at any time. The study will use survey questionnaire and will require approximately 30 minutes of the participant's time.

Participation by all eligible students would be essential to the success of the study and the usefulness of the results. I need your permission to administer the study questionnaire to your child in the school setting after school hours. I also need your permission to obtain demographic information and MCAS results from the Springfield Public Schools. Your personal information and that of your child will not be used for identification on the test results and reports.

The Institutional Review Board (IRB) at the University of Massachusetts Amherst has approved this study. If you have any concerns about your rights as a participant in this study you may contact the Human Research Protection Office via email (humansubjects@ora.umass.edu) or by telephone (413-545-3428). Results will be available when the study is completed. Please feel free to call me at work (413-787-7220) or at home (413-567-4780), if you have questions.

Sincerely,

Kolajo A. Afolabi

APPENDIX B

PARENTAL/LEGAL GUARDIAN INFORMED CONSENT FORM

Mr. Kolajo A. Afolabi

University of Massachusetts Amherst

Please return this portion to your child's principal

Student SASID #: _____

_____ YES, You may administer the survey questionnaire for this study to my child and you may obtain my child's demographic information and MCAS results from the Springfield Public Schools.

My name is: _____

My child's name is: _____

My address is: _____

My phone number is: @ Home: _____ @ Work: _____

My signature: _____ Date: _____

APPENDIX C

SURVEY INSTRUMENT: SELF-EFFICACY SCALES

"Please rate how certain you are that you can do each of the things described below by writing the appropriate number. Your answers will be kept strictly confidential and will not be identified by name" (Bandura, 2006). There is no right or wrong answer.

Student ID _____

Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:

0	10	20	30	40	50	60	70	80	90	100
Cannot do at all					Moderately can do					Highly certain can do

Item	**Self-Efficacy for Enlisting Social Resources** (Bandura, 2006)	Confidence
1	Get teachers to help me when I get stuck on schoolwork	
2	Get another student to help me when I get stuck on schoolwork	
3	Get adults to help me when I have social problems	
4	Get a friend to help me when I have social problems	
Item	**Self-Efficacy for Academic Achievement** (Bandura, 2006)	Confidence
1	Learn general mathematics	
2	Learn algebra	
3	Learn science	
4	Learn biology	
5	Learn reading, writing, and language skills	
6	Learn to use computers	
7	Learn a foreign language	
8	Learn social studies	
9	Learn English grammar	
Item	**Self-Efficacy for Self-Regulated Learning** (Bandura, 2006)	Confidence
1	Finish my homework assignments by deadlines	
2	Get myself to study when there are other interesting things to do	
3	Always concentrate on school subjects during class	
4	Take good notes during class instruction	
5	Use the library to get information for class assignments	
6	Plan my schoolwork for the day	
7	Organize my schoolwork	
8	Remember well information presented in class and textbooks	
9	Arrange a place to study without distractions	
10	Get myself to do school work	
Item	**Self-Regulatory Efficacy** (Bandura, 2006)	Confidence
1	Resist peer pressure to do things in school that can get me into trouble	
2	Stop myself from skipping school when I feel bored or upset	
3	Resist peer pressure to smoke cigarettes	
4	Resist peer pressure to drink beer, wine, or liquor	
5	Resist peer pressure to smoke marijuana	
6	Resist peer pressure to use pills (uppers, downers)	
7	Resist peer pressure to have sexual intercourse	
8	Control my temper	

APPENDIX D

TABLES

Table 1: Participants by Race/Ethnicity, Gender, and SES

Participants (N = 83)	**% of Study**	**% of District (2008-2009)[1]**	**% of State (2008-2009)[1]**
African American	45	23.2	8.2
Asian	1	2.2	5.1
Hispanic	47	54.8	14.3
White	1	15.7	69.9
Multi-Race, Non-Hispanic	6	4.0	2.0
Male	39.8	51.7	51.4
Female	60.2	48.2	48.6
Free/Reduced Lunch-Eligible	89.1	77.8	27.7

1. Massachusetts Department of Elementary and Secondary Education (2009)

Table 2: Reliabilities of *Self-Efficacy Beliefs* Subscales (Cronbach's Alphas)

Subscale	**N of Items**	**This Study**	**Choi et al. (2001)**	**Miller et al. (1999)**	**Zimmerman et al. (1992)**
ESR	4	0.674	0.63	0.60	N/A
SRE	8	0.848	0.81	0.79	N/A
SRL	10	0.892	0.86	0.87	0.87
AA	9	0.828	0.72	0.74	0.70

N/A = Not Available

Table 3: *Lack-of-Fit* Statistics for Linearity Assumption

Regression of MCAS Math Scores on	***Lack-of-Fit* Test**	
	F Statistic	**Sig.**
Enlisting Social Resources	1.288	0.212
Self Regulatory Efficacy	0.638	0.897
Self-Regulated Learning	1.129	0.355
Academic Achievement	0.769	0.789

Table 4: *Skewness* and *Kurtosis* Statistics for Normality Assumption

Regression of MCAS Math Scores on	**Standardized Residuals**			***Skewness* Statistic**	***Kurtosis* Statistic**
	N	**Min**	**Max**		
Enlisting Social Resources (ESR)	83	-1.453	2.557	0.426	-0.854
Self Regulatory Efficacy (SRE)	83	-1.776	2.448	0.295	-0.833
Self-Regulated Learning (SRL)	83	-1.532	2.426	0.410	-0.890
Academic Achievement (AA)	83	-1.867	2.596	0.282	-0.748
ESR, SRE, SRL, and AA	83	-1.968	2.442	0.272	-0.647

Table 5: *Levene's* Statistics for Homoscedasticity Assumption

Regression of MCAS Math Scores on		***Levene's* Statistic**	
		F	**Sig.**
Enlisting Social Resources	Equal variances assumed	0.594	0.443
Self Regulatory Efficacy	Equal variances assumed	0.007	0.933
Self-Regulated Learning	Equal variances assumed	0.030	0.864
Academic Achievement	Equal variances assumed	2.122	0.149

Table 6: *Variance Inflation Factor* Statistics for Independence Assumption

Multiple Regression of MCAS Math Scores on	***Variance Inflation Factor* (VIF)**
Enlisting Social Resources	1.110
Self Regulatory Efficacy	1.150
Self-Regulated Learning	1.350
Academic Achievement	1.499

Table 7: Descriptive Statistics: MCAS Math Scores and *Perceived Self-efficacy Beliefs*

Variables	**N**	**Mean**	**Std. Dev.**
MCAS Math Score	83	236.48	16.808
Perceived Self-Efficacy for Enlisting Social Resources	83	67.75	19.342
Perceived Self Regulatory Efficacy	83	84.06	18.911
Perceived Self-Efficacy for Self-Regulated Learning	83	67.63	18.911
Perceived Self-Efficacy for Academic Achievement	83	81.93	14.808

Table 8: Coefficients: Main Effects of *Perceived Self-Efficacy Beliefs* – In Isolation [a]

Model	**Predictor**	**Constant**	**B**	**R^2**	**Sig.**
1	*Enlisting Social Resources*	228.293	0.121	0.019	0.210
2	*Self Regulatory Efficacy*	211.126	0.302	0.115	0.002
3	*Self-Regulated Learning*	225.733	0.159	0.032	0.106
4	*Academic Achievement*	208.165	0.346	0.084	0.008

a. Dependent Variable: MTH

Table 9: Coefficients: Collective Effect of *Perceived Self-Efficacy Beliefs* [a]

Multiple Regression Model		**Unstandardized Coefficients**		**t**	**Sig.**	**Correlations**	
		B	**Std. Error**			**Zero-Order**	**Part**
1	(Constant)	195.452	11.764	16.614	0.000		
	Enlisting Social Resources	0.045	0.095	0.469	0.641	0.139	0.049
	Self Regulatory Efficacy	0.238	0.099	2.399	0.019	0.339	0.250
	Self-Regulated Learning	0.033	0.108	0.308	0.759	0.179	0.032
	Academic Achievement	0.192	0.152	1.259	0.212	0.290	0.131

a. Dependent Variable: MTH

Table 10: Descriptive Statistics: MCAS Math Scores – Based on SES

Socio-economic Status (SES)	Mean	Std. Deviation	N
Not-Low [S=N]	247.78	15.506	9
Low [S=L]	235.11	16.533	74
Total	236.48	16.808	83

Table 11: Parameter Estimates: Main Effect of SES – In Isolation [a]

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	247.778	5.478	45.231	0.000	236.878	258.677
[S=L]	-12.670	5.802	-2.184	0.032	-24.213	-1.126

a. Dependent Variable: MTH

Table 12: Descriptive Statistics: MCAS Math Scores – Based on Gender

Gender	Mean	Std. Deviation	N
Female [G=F]	235.84	16.412	50
Male [G=M]	237.45	17.602	33
Total	236.48	16.808	83

Table 13: Parameter Estimates: Gender Interaction with *Self Regulatory Efficacy Belief* – In Isolation [a]

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	175.133	18.727	9.352	0.000	137.859	212.407
[G=F]	43.750	20.638	2.120	0.037	2.671	84.829
SRE	0.720	0.214	3.364	0.001	0.294	1.146
[G=F] * SRE	-0.514	0.237	-2.169	0.033	-0.986	-0.042

a. Dependent Variable: MTH

Table 14: Parameter Estimates: Gender Interaction with *Self Regulatory Efficacy Belief*– Accounting for Other Variables [a]

Parameter	B	Std. Error	t	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Intercept	182.381	20.706	8.808	0.000	141.132	223.631
[G=F]	35.773	21.461	1.667	0.100	-6.980	78.527
[S=L]	-10.137	5.834	-1.738	0.086	-21.759	1.484
ESR	0.032	0.094	0.345	0.731	-0.155	0.219
SRE	0.600	0.230	2.609	0.011	0.142	1.059
SRL	0.058	0.110	0.525	0.601	-0.161	0.277
AA	0.082	0.160	0.513	0.609	-0.237	0.402
[G=F] * SRE	-0.438	0.243	-1.799	0.076	-0.922	0.047

a. Dependent Variable: MTH

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